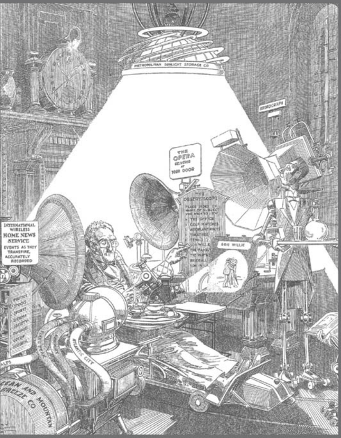
MEDIA ARCHAEOLOGY

Approaches, Applications, and Implications



Edited by Erkki Huhtamo and Jussi Parikka

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Introduction

An Archaeology of Media Archaeology

Erkki Huhtamo and Jussi Parikka

The advent of "new media" (in common parlance, a loose conglomeration of phenomena such as the Internet, digital television, interactive multimedia, virtual reality, mobile communication, and video games), has challenged many scholars to investigate the media culture of late modernity. Research agendas vary from network analysis to software studies; from mappings of the new empire of network economies to analyses of new media as "ways of seeing" (or hearing, reading, and touching). Efforts have been made to pinpoint where the "newness" of social networking, interactive gaming, or data mining lies and to lay the foundations for "philosophies" and "languages" of new media. For some researchers, the main concerns are social or psychological, while for others they are economical and ideological, or motivated by search for technological determinants behind the myriad manifestations of media.

As different as these approaches may be, studies of new media often share a disregard for the past. The challenges posed by contemporary media culture are complex, but the past has been considered to have little to contribute toward their untangling. The new media have been treated as an all-encompassing and "timeless" realm that can be explained from within. However, signs of change have begun to appear with increasing frequency. Numerous studies and collections addressing the media's past(s) in relation to their present have appeared in recent years.[1] This influx of historically oriented media studies must be greeted with a cheer. Still, one cannot avoid noticing how little attention has often been devoted to defining and discussing methods and approaches. The past has been visited for facts that can be exciting in themselves, or revealing for media culture at large, but the nature of these "facts" has often been taken as a given, and their relationship to the observer and the temporal and ideological platform he or she occupies left unproblematized.

This book aims at amending the situation by introducing an approach—or a bundle of closely related approaches—that has come to be known as "media archaeology." Although this term does not designate an academic discipline (there are no public institutions, journals, or conferences dedicated to it), it has appeared in an increasing number of studies, and university courses and lectures have also been given under this heading.[2] As their highly divergent syllabi and reading lists testify, there is no general agreement about either the principles or the terminology of media archaeology. Yet the term has inspired historically tuned research and is beginning to encourage scholars to define their principles and to reflect on their theoretical and philosophical implications. The purpose of this volume—the first collection of writings on media archaeology published in the United States—is to facilitate this process of self-identification and -definition.

No effort will be made to nail down "correct" principles or methodological guidelines or to mark fixed boundaries for a new discipline. Rather than positing an "orthodoxy," the book presents itself as an open forum for very different voices, hoping to trigger "polylogues" about the problems and prospects of this emerging field. It could be claimed that a compilation of texts that have already been published would have served this purpose.[3] The editors have chosen a different path by soliciting *new* contributions from both seasoned and emerging scholars, asking them to look forward rather than backward and to reflect on their particular take on media archaeology. To set the stage, work that has already been done will be reviewed in this introduction, a tentative mapping of an "archaeology of media archaeology." Concentrating solely on cases where the words *media archaeology* have been explicitly enounced would have been too limiting.[4] It is also important to acknowledge work that has not defined itself as "media archaeology" but nevertheless has shared similar interests and goals.

Michel Foucault's writings have been an important formative experience for many media archaeologists. However, there are other theoretical and critical contributions that have contained seeds of media archaeology. Theorists and historians such as Walter Benjamin, Siegfried Giedion, Ernst Robert Curtius, Dolf Sternberger, Aby Warburg, and Marshall McLuhan were all in some ways "media archaeologists" *avant la lettre*. More recently, the debate on new historicism has brought up themes and motifs that occupy media archaeologists as well. It could be claimed that media archaeology is new historicist in its essence, but this would be too gross a generalization.[5] A wide array of ideas have provided inspiration for media archaeology. Theories of cultural materialism, discourse analysis, notions of nonlinear temporalities, theories of gender, postcolonial studies, visual and media anthropology, and philosophies of neo-nomadism all belong to the mix.

What is it that holds the approaches and interests of the media archaeologists together, justifying the term? Discontent with "canonized" narratives of media culture and history may be the clearest common driving force. Media archaeologists have concluded that widely endorsed accounts of contemporary media culture and media histories alike often tell only selected parts of the story, and not necessarily correct and relevant parts. Much has been left by the roadside out of negligence or ideological bias. For the media critic Geert Lovink, media archaeology is by nature a "discipline" of reading against the grain, "a hermeneutic reading of the 'new' against the grain of the past, rather than telling of the histories of technologies from past to present."[6] Media archaeologists have challenged the rejection of history by modern media culture and theory alike by pointing out hitherto unnoticed continuities and ruptures. As a consequence, the area for media studies has been pushed back by centuries and extended beyond the Western world.[7] On the basis of their discoveries, media archaeologists have begun to construct alternate histories of suppressed, neglected, and forgotten media that do not point teleologically to the present media-cultural condition as their "perfection." Dead ends, losers, and inventions that never made it into a material product have important stories to tell.

Media archaeology should not be confused with archaeology as a discipline.[8] When media archaeologists claim that they are "excavating" media-cultural phenomena, the word should be understood in a specific way. Industrial archaeology, for example, digs through the foundations of demolished factories, boardinghouses, and dumps, revealing clues about habits, lifestyles, economic and social stratifications, and possibly deadly diseases. Media archaeology rummages textual, visual, and auditory archives as well as collections of artifacts, emphasizing both the discursive and the material manifestations of culture. Its explorations move fluidly between disciplines, although it does not have a permanent home within any of them. Such "nomadicism," rather than being a hindrance, may in fact match its goals and working methods, allowing it to roam across the landscape of the humanities and social sciences and occasionally to leap into the arts. Media archaeology may—and perhaps it should—develop into a "traveling discipline," to refer to an idea proposed by Mieke Bal.[9]

THE DISCOVERY OF THE "ARCHAEOLOGICAL" DIMENSION OF MEDIA

Probably the first scholar to develop a media-archaeological approach and give it that name was Jacques Perriault in his *Mémoires de l'ombre et du son: Une archéologie de l'audio-visuel* (1981). As the title of the book reveals, his "archaeology of audiovisuality" was occupied with both visual and auditory media of the past. Perriault analyzed the relationship between what he called "use function" and "social representation."[10] He also discussed the relationships between the technologies of the past and contemporary forms, emphasizing that he did not want his work to be seen as an "escape into history," motivated by fear of contemporary media practice.[11] That Perriault did not consider himself a professional historian may have contributed to the unprejudiced flexibility of his approach.

Years before Perriault, the word *archaeology* had been used in the title of C. W. Ceram's *Archaeology of the Cinema* (1965). Ceram, whose real name was Kurt Wilhelm Marek (1915–72), was a well-known popularizer of archaeology. Yet applied to the prehistory of cinema his idea of "archaeology" hardly differed from the goals of traditional positivistic historical scholarship. Ceram presented a strictly linear and teleological account about the developments that led to the cinema, breaking off his narrative in 1897, the year that, according to him, "saw the birth of the cinema *industry*."[12] Ceram focused on inventors and the technical steps that led to cinematography. Everything that did not fit neatly into this narrative was left out, no matter how interesting it might otherwise have been. The illustrations, selected by the British scholar Olive Cook (mostly from the great collection of John and William Barnes), told an entirely different story, pointing out phenomena and potential connections omitted by Ceram.[13] This was an interesting rupture, embodying a tension between two very different notions about the history of the moving image.

The word *archaeology* later appeared in the title of Laurent Mannoni's *Le grand art de la lumière et de l'ombre: Archéologie du cinéma* (1994).[14] A change of emphasis is clear. Based on an extensive consultation of archival material (which justified the use of the word *archaeology*), Mannoni's book no longer tried to present a closed historical narrative arranged as a set of interconnected causal chains inevitably leading toward cinema. Rather, the five-hundred-page volume consists of a succession of carefully researched case studies of different facets of the moving image culture, covering several centuries. Although there is a strong emphasis on technology, Mannoni also discusses its applications and discursive manifestations. Piece by piece, a narrative develops, but one that does not pretend to be complete or to hide its gaps. Although Mannoni's discourse stays close to the sources, avoiding theoretical speculation, the book invites new insights, opening paths for further interpretations.[15]

However, these pioneering works represent only one of the possible roads toward media archaeology. The emergence of modern media technology from the nineteenth century onward and its growing prominence over minds in the mass society led to a need to analyze its nature and impact. The sense of urgency often led early scholars to concentrate on contemporary issues with political and social implications, leaving less room for "media-archaeological" concerns. The critiques of mass media developed by Theodor W. Adorno and Max Horkheimer in their *Dialectic of Enlightenment* (1944) and by Richard Hoggart in his *Uses of Literacy* (1957) are good examples of this.[16] When these authors turned to the early histories of media, they were often occupied with reconstructing their technological and industrial development, and—as in the case of photography and cinema—arguing for their potential as new art forms. Inventors and industrialists played prominent roles. The structure was usually linear, and different media forms were normally discussed in isolation from each other.

Marshall McLuhan introduced a new approach, new combinations, and new themes to the study of media. His early work *The Mechanical Bride* (1951) developed a critique of contemporary mass media, drawing occasional parallels with mythology and history, and shifting between high culture and popular culture with apparent ease and (and some took it) recklessness. In *The Gutenberg Galaxy* (1962) McLuhan's vision came to embrace the history of media in a more rigorous sense as he traced the dynamics between orality, the Gutenbergian printing revolution, and the new orality represented by televisual media.[17] Instead of providing a neutral and linear narrative, McLuhan's idiosyncratic discourse surfaced as an essential element. The materiality and the processual nature of his discourse was further emphasized in the collagelike books (*The Medium Is the Massage, War and Peace in the Global Village,* and *Counterblast*) that he produced with the graphic designer Quentin Fiore following the international success of *Understanding Media: The Extensions of Man* (1964).

McLuhan's influence on media archaeologists has been manifold. Of utmost importance is his emphasis on temporal connections, translations, and mergers between media, something that inspired Jay David Bolter and Richard Grusin to develop their notion of "remediation" and to use it to investigate how features of earlier media forms are subsumed into digital media.[18] Bolter's and Grusin's endeavor was not defined as "media archaeology," but it has affinities with the ways media archaeologists draw parallels between seemingly incompatible phenomena. McLuhan's understanding of "media" and "medium" was broad and challenged existing dichotomies, like those between material things and notions of the mind. His ideas of new media as "extensions" and as driving forces for changes in society have influenced the German "media materialist school" of media archaeology through the work of Friedrich Kittler. Last but not least, McLuhan's unwillingness to stick with formal "methods" and fixed sets of concepts, as well as his self-reflective play with his own discourse, seems to appeal to "anarchistically minded" media archaeologists, determined to keep their approaches free from institutional-theoretical dogmas and infections.[19]

ANONYMOUS HISTORY, ARCADES, AND THE MUSEUM WITHOUT WALLS

Early media scholarship was associated with research on the impact of technology on human civilizations, typified by Lewis Mumford's classic *Technics and*

Civilization (1934).[20] Siegfried Giedion's *Mechanization Takes Command* (1948) presented a detailed account about the forms and impact of mechanization. Ranging from techniques for capturing human movements as graphic representations to the features of everyday household objects like the bathtub, Giedion's history had less to do with isolated apparatuses than with their interconnections.[21] Mechanization was presented as a depersonalized force that infiltrated Western societies down to the minutest details of everyday life. Giedion was mainly concerned with material culture, "the tools that have molded our present-day living."[22] The "anonymous history" he proposed looked for a synthesis between *Geistesgeschichte* and positivism, where every detail was "directly connected with the general, guiding ideas of an epoch. But at the same time it must be traced back to the particulars from which it rises."[23]

Even earlier, the German cultural critic Walter Benjamin had already projected a kind of anonymous history, but one that involved discursive layers of culture to a much greater extent than Giedion's largely materialist vision. Benjamin is arguably the most prominent forerunner—beside Foucault—of media-archaeological modes of cultural analysis and is a major influence for cultural studies.[24] In particular, his unfinished *Arcades Project* (*Passagen-Werk*) became a case study about the kinds of issues media archaeologists deal with.[25] Benjamin's reconstruction of nineteenth-century culture, with Paris as its capital, relied on a multitude of sources, including texts, illustrations, urban environments, architecture, public spectacles like the panorama and the diorama, and objects deemed to be emblematic of the era. The approach was remarkably open, shifting, and layered and took political and economic but also collective psychological factors into consideration. Beside material forms, Benjamin's work illuminated the "dream worlds" of consumerism and early modernity.

Working against the tidal wave of *Geistesgeschichte,* Benjamin refused to group the massive evidence he had gathered under any single symbol deemed characteristic of the era. Such persistence is one of the reasons why the work remained unfinished. The readers were left with a huge collection of notes, images, and ideas that constitute a database rather than a preorganized narrative. Benjamin offered meditations on time, spatiality, nature, and emergent modernity as a new realm of sensations. The concept and method of allegory that he had already developed in his earlier work referred to alternative ways of seeing temporality not as an organic succession but through the figures of ruins and decay. The interest in change and the "ruins" of the body and mind were evident in his other works as well, which famously touched on historical changes in the modes of perception.

Dolf Sternberger's *Panorama of the Nineteenth Century,* originally published in German in 1938, also anticipated issues that became important to media archaeology. At first glance it bears similarities with the *Arcades Project* because of the way it draws from a multitude of sources to paint a portrait of an era.[26]

Both Benjamin and Sternberger were interested in the panorama as a visual manifestation of the nineteenth-century culture. However, their approaches differ in important respects. For Benjamin the panorama was just one of the manifestations of the larger topic he was trying to get hold of, while for Sternberger it became nothing less than the organizing metaphor for his portrait of an era, the key to unlock the secrets of, in the words of his book's subtitle, "how nineteenth century man saw himself and his world and how he experienced history." In his book Sternberger deals less with concrete panoramas than with their manifestations in cultural phenomena as diverse as steam power, railway travel, the Western idea of the Orient, the theory of evolution, and domestic lighting. While this totalizing idea clearly derived from the ideology of the *Geistesgeschichte,* it may also bear certain similarities with the ways Foucault dealt with his "epistemes."

In the early decades of the twentieth century, art history also began proposing ways of recontextualizing art within textual traditions and expanding its own reach to visual material that had traditionally been left outside its confines. A reevaluation of "neglected traditions" has been proposed by Horst Bredekamp, who has related the theories of *Bildwissenschaft* that emerged in Germany to pioneering approaches toward technology and media in the early twentieth century. Around 1900–1933, according to Bredekamp, a new "science of the image" emerged in the German-speaking world with radical ideas about the continuities between different genres of images from advertisements and photography to film and political iconography.[27] The art historian Aby Warburg and scholars he influenced, like Ervin Panofsky and E. H. Gombrich, stood out as "picture-historians," interested more in recurring visual motifs and their contextualization than in weeding the popular out of art history. Warburg's unfinished "Mnemosyne Atlas" (which in some ways resembles Benjamin's *Arcades Project*) suggested a nonlinear way of understanding the temporal recurrence of images and their relations, raising also the issue of "intermediality" by pointing out motifs that shifted and transformed across what we would now call media platforms.[28] Furthermore, the project suggested a new idea about dynamics of the image, pointing out how images and motifs in themselves could function as "time-machines" in an isomorphic fashion to the task of media archaeology.[29]

Another unconventional work that anticipated some of the concerns of media archaeology was André Malraux's *Musée imaginaire* (trans. *Museum without Walls*), published in 1947.[30] Malraux discussed the ways in which mechanical reproduction, in particular photography, was changing our understanding of images and visual culture in general (without referring to Benjamin's "Work of Art in the Age of Mechanical Reproduction," 1936). He demonstrated how the unprecedented availability of reproductions was turning the past into an archive, and he challenged observers to draw connections between visual traditions and motifs that had until then been considered unrelated.

INFLUENCES: THE ARCHAEOLOGY OF KNOWLEDGE AND NEW HISTORICISM

The work of Michel Foucault has had a strong impact on media archaeology. An archaeology of his "archaeology of knowledge" would be useful but cannot be developed here.[31] When classifications of media archaeology have been attempted, a binary division has usually been drawn between the socially and culturally oriented Anglo-American studies and the techno-hardware approach of German scholars, who have taken their cue from Friedrich Kittler's synthesis of Foucault, information theory, media history, and McLuhan's emphasis on the medium as the message.[32] The German tradition has been claimed to emphasize the role of technology as a *primum mobile,* which has led to accusations about technological determinism, whereas Anglo-American scholars often assume that technology gets its meanings from preexisting discursive contexts within which it is introduced.

One way of explaining this division is to see it as a consequence of different readings of Foucault. The Anglo-American tradition has valorized Foucault as a thinker who emphasized the role of discourses as the loci where knowledge is tied with cultural and social power. Material bodies, events, and institutions are all conditioned by discursive formations. The effects of "hard" technology are considered secondary to immaterial forces that differentiate and mediate their uses. We find quite different readings of Foucault in the German variant of media archaeology, which was strongly influenced by Kittler's *Aufschreibesysteme 1800/1900* (1985), his pathbreaking habilitation thesis that dealt with the impact of technical media on nineteenth-century literature and writing practices.[33] It was followed by *Grammophon Film Typewriter* (1986), which shared the same basic premises but focused more directly on technical media.[34]

Kittler argued for the need to adjust Foucault's emphasis on the predominance of words and libraries to more media-specific ways of understanding culture. According to him, the problem was that "discourse analysis ignores the fact that the factual condition is no simple methodological example but is in each case a techno-historical event."[35] To be able to understand media technologies from the typewriter to the cinema and on to digital networks and coding paradigms, one must take their particular material nature into consideration—an idea Kittler's followers like Wolfgang Ernst have adopted for their own work.[36] It was probably in this sense that Michael Wetzel purported to combine Foucault and Kittler in his "preliminary considerations for an archaeology of the media," published in 1989 in a collection of writings that already bore the words "archaeology of the media" in its title.[37]

However, Kittler never claimed he was focusing solely on technology or technical apparatuses. From early on he emphasized the role of institutions as nodes in the networks of technical media. Although he has often been seen as part of a generation of German humanities scholars determined to steer media theory away from meaning and interpretation, Kittler did not neglect the power-related implications of technology. There is a "brand" of German media theory that emphasizes the "epistemic effects of media in the production and processing of knowledge" and "the medial dimensions of the mechanisms of power," as the editor of a recent issue of *Grey Room* explained.[38] To prevent the application of simple binary models to his work and his intellectual position, Kittler has denied any affiliation with the notion of media archaeology.[39] His more recent work has returned to a more Heideggerian-inspired excavation of the history of Western culture through music and mathematics.[40]

Anglo-American media archaeologists—whether identifying themselves as such or not—have received impulses from the new historicism that emerged in the 1980s. Although it appeared first within literary scholarship, it soon spread to other areas, including history, where it inspired a movement known as the new cultural history.[41] Among other sources, the new historicism was also influenced by Foucault, although his ideas were by no means approved without debate.[42] H. Aram Veeser aptly summarized its "key assumptions" by stating "1) that every expressive act is embedded in a network of material practices; 2) that every act of unmasking, critique, and opposition uses the tools it condemns and risks falling prey to the practices it exposes; 3) that literary and non-literary 'texts' circulate inseparably; 4) that no discourse, imaginative or archival, gives access to unchanging truths or expresses inalterable human nature; 5) finally . . . that a critical method and a language adequate to describe culture under capitalism participate in the economy they describe."[43]

Applied to historical scholarship, the new historicism promoted a self-reflexive and discourse-oriented approach that frequently drew on neighboring disciplines, including the symbolic anthropology of Clifford Geertz, and the rather amorphous field of cultural studies.[44] A kind of double focus developed: on the one hand, historians were supposed to immerse themselves in the past, observing it as if by the eyes of the contemporaries; on the other hand, they were supposed to be constantly aware of their observation post in the present, with all the ideological implications it entailed.[45] The research process shifted constantly between the facts of the past, in the process of forming themselves into meaningful constellations, and the subjectivity of the observer. The historical explanation was formulated on/as a dynamic field with multiple determinants that were dynamic rather than static.

Media-archaeological works that are developed under the influence of such modes of thinking assess the material and the technological through their discursive manifestations. Giuliana Bruno's *Atlas of Emotion: Journeys in Art, Architecture, and Film* (2002) created a network of "journeys" across history (treated as a place or a map) in a non-linear fashion, triggered by the author's "e-motions" (and illness).[46] The observing and sensing subject became the organizing entity for highly heterogeneous material, giving the book at times a fiction or diary-like quality, although it was defined as a "cultural history."[47] Another, although less subject-centered, example is Jeffrey Sconce's *Haunted Media: Electronic Presence from Telegraphy to Television* (2000), which explored discourses of the supernatural in the context of telecommunications and broadcasting media.[48] Although Sconce defined his work as "a cultural history of electronic presence," his concern with the electronic presence as a changing social construct, as well as his analysis of the continuities and ruptures manifested by the "familiar stories that appear in new incarnations with the advent of each new medium," was clearly media-archaeological.[49]

AGAINST THE GRAIN OF (ALMOST) EVERYTHING

Siegfried Zielinski's version of media archaeology is a practice of resistance, not only against what he perceives as the increasing uniformity of mainstream media culture, but also against media archaeology itself, or rather its assimilation and hardening into the normalcy of contemporary media studies.[50] Considering media archaeology a "method" pinned down into an academic textbook would no doubt be a horror for Zielinski, who also calls his "activity" *(Tätigkeit)* by other names, such as "anarchaeology" and "variantology," expressing an uneasiness toward permanent categories and doctrines. For him, media archaeology "in a pragmatic perspective means to dig out secret paths in history, which might help us to find our way into a future."[51] This formulation reveals the utopian and Romantic underpinnings of Zielinski's thought, which is not without—productive?—contradictions.

Zielinski's early work was not yet identified as "media-archaeological." *Zur Geschichte des Videorecorders* (*On the History of the Video Recorder,* 1986) was a dense and detailed exploration of the topic, covering technological, institutional, and economical as well as sociocultural issues.[52] It also contained a special section, "Aspects of the Video Recorder in Pictures," a kind of visual essay that already pointed toward media-archaeological interests. His next major book, originally published in 1989 and translated as *Audiovisions: Cinema and Television as Entr'actes in History,* defined itself as an "outline of a history of audiovision" *(Entwurf zu Geschichte der Audiovision),* or a contribution toward to "an integrated history of the media" *(integrierte Mediengeschichte).*[53] Drawing on an enormous mass of highly heterogeneous source material, the book demonstrated how distinctions between different audiovisual media were gradually erased during the twentieth century.[54]

Inspired by the work of Kittler, a discussion on the archaeology of the media was emerging in Germany in the late 1980s, but Zielinski was obviously not yet part of it; his influences were quite different.[55] Although the theoretical construct behind *Audiovisions* was more implicit than explicit (as Zielinski himself admitted), he singled out the triad "technology-culture-subject," identifying each of its elements with a recent intellectual tradition that had influenced him: the British cultural studies represented by Raymond Williams; the German historiography of technology that used a specific systems approach (Günter Ropohl); and the metapsychological cinema theories of Jean-Louis Baudry, Jean-Louis Comolli, and Christian Metz, which emphasized the notion of the cinematic apparatus.[56] Zielinski stated that he did not want to "compete with other models that emphasise more strongly the techno-structure of media processes (like, for example, those of Friedrich Kittler and his pupils)," seeing his own as "supplementary."[57]

Zielinski's road from *Audiovisions* to media archaeology seems logical.[58] His project had taken him to "the end of the history of cinema and television," where he saw only uniformity and unlimited industrial exploitation, surprisingly much in line with Adorno's and Horkheimer's position. "New media" did not provide relief, as their possibilities were mostly used to remediate and perpetuate hegemonic forms. Zielinski began turning toward two seemingly opposite directions that in the end pointed to the same goal, offering to break the *psychopathia medialis* of modern media culture. On the one hand were radical contemporary artists, who had potential to break the vicious goals of the culture industry; on the other were the hidden treasures of the past that might provide keys for a cultural renewal. Zielinski's position was influenced by his role as the founding director and later rector of the Academy of Arts and the Media in Cologne, which gave him an opportunity to build connections between media studies and experimental media practices.[59]

Zielinski's next book, translated as *Deep Time of the Media: Toward an Archaeology of Hearing and Seeing by Technical Means* (originally published in 2002), plunged into the "deep time" of media, offering a series of studies that were dedicated to the work of personalities who had rarely been associated with media culture before and were written in "a spirit of praise and commendation, not of critique."[60] Empedocles, Athanasius Kircher, Cesare Lombroso, and others provided examples of genial individuals who worked out of love and inspiration against the odds of the real world.[61] In Zielinski's mind at least, they shared a kinship with another set of cultural heroes, contemporary artists working with media, such as Valie Export, David Larcher, Nam June Paik, Steina and Woody Vasulka, and Peter Weibel.[62] Ideologically Zielinski almost seems to nod toward Thomas Carlyle's Romantic classic *On Heroes and Hero Worship and the Heroic in History* (1841). He plunges headlong, and with *pathos*, into the world of his heroes, eschewing critical, skeptical, and theoretically oriented perspectives.[63]

Zielinski's understanding of media is unconventional in its openness (perhaps unintentionally recalling McLuhan's amoebic definitions), and his intellectual appetite bottomless.[64] His recent ongoing project named *Variantology,* a series of anthologies based on international workshops, seems to have been calculated to take his plea for a radical heterogeneity to a new level. Its keywords are well expressed by translations of the Latin verb *variare:* "to be different, to deviate, to change, to alternate, to modify."[65] Variantology, like his brand of media archaeology, favors "local" explorations, refusing to develop them into overarching explanations such as the ones coined by historically leaning visual theorists like Jonathan Crary.[66] Zielinski's pleas for openness, curiosity, and "traffic" between disciplines are commendable, but his apparent resistance to systematization and theorization runs the risk of atomism.

THE NEW FILM HISTORY, MEDIA ARCHAEOLOGY, AND THE CHALLENGE OF THE DIGITAL

The "new film history" can arguably be seen as a parallel enterprise to media archaeology; both have their origins in the 1980s and are continuing to evolve.[67] Although the profile of the former is far from clear, many of its practitioners sought new insights into the specific nature of cinema by introducing extended cultural, social, and economic contextualization, based on the consultation of varied firsthand source material, and by emphasizing cinema's intermedial relationships. In a way Zielinski's *Audiovisions* also pointed in this direction, but it went beyond the horizon of most film historians by focusing on the interplay between technology, cultural forms, and viewing subjects and by paying little attention to the content of films or television programs; the context and the technological apparatus were given center stage.

The need for contextualization and intermediality was expressed well by Thomas Elsaesser in an article entitled "The New Film History as Media Archaeology":

> Sound, for instance, since the silent cinema was rarely if ever silent, in which case: why is the history of the phonograph not listed as another tributary? And as we now understand the cinema as part of a multimedia environment, how about the telephone as an indispensable technology? Radio-waves? Electro-magnetic fields? The history of aviation? Do we not need Babbage's difference engine ranged parallel to his friend Henry Fox-Talbot's Calotypes or Louis Daguerre's sensitised copper plates? These questions in themselves show how much our idea—and maybe even our definition—of cinema has changed even without appealing to digitization as a technology, which is nonetheless implicit as a powerful "perspective correction" and thus counts as an impulse in this retrospective re-writing of the past.[68]

According to Elsaesser, one of the goals of the new film history has been to explore the peculiar nature of the cinematic experience up until around 1917.[69]

Tom Gunning's writings on the cinema of attractions, Charles Musser's work on the history of screen practice, and André Gaudreault's explorations of early optical media are representative examples.[70] Gunning has also published many studies linking early cinema to other media, technological phenomena like ghost photography and X-rays, and institutions of emerging modernity, such as the World's Fairs. Similarly, in *Window Shopping* (1993) Anne Friedberg traced the origins of cinema to forms and institutions of the emergent popular and consumer culture of the nineteenth century, creating an approach that clearly raised media-archaeological concerns.[71] In *The Virtual Window* (2006) she pushed her analysis back by hundreds of years, further estranging it from the cinema studies paradigm.

For Elsaesser, one of the challenges is the reevaluation of the connections and gaps between media technologies. The onslaught of digitalization is forcing cinema to rethink both its cultural position and its history. Considering digitality as a rupture provides a conceptual way of seeing media history as a discontinuous enterprise subject to constant reevaluation. Lev Manovich's *The Language of New Media* (2001) was a historically tuned version of new media theory that built on cinema studies and film theory. It purported to place the new media "within the history of modern visual and media cultures."[72] Manovich pointed out continuities between early avant-garde and animation film practices and the emerging digital culture, based on numerical representation, modularity, automation, variability, and transcoding. Beside film history and theory, he drew on the traditions of the *Bildwissenschaft,* including the work of Ervin Panofsky. The focus on new media changes the historical meaning and context of cinema from narrative cinema to one flexible enough to lend itself to interactivity, navigability, and digital representation and transmission. Media-historical and theoretical works with a background in film studies pose a challenge for the continued renewal of media archaeology. How does one avoid reducing all other media to a footnote to the history of the moving image? One alternative is the recent influx of archaeologically oriented works concentrating on the audible dimension of culture and history.[73]

MEDIA ARCHAEOLOGY, ART, AND EVERYDAY LIFE

Media archaeology may not have organized itself as a discipline; it may be loitering at the periphery of institutions and drawing the attention of career academics previously devoted to established disciplines; occasionally it may forget to define its own identity, or even ignore it, being still in the process of self-discovery. Yet media archaeology is already much more than a footnote to Foucault's or Kittler's work. One should not forget Bernhard Siegert's studies on the postal system, Wolfgang Ernst's research on the archaeology of technical media and of archives, Claus Pias's studies on the historic constellations of computer games, or Jussi Parikka's archaeologies of computer viruses and "insect media," let alone scholarly works that can be identified as "media-archaeological" even though they never identify themselves as such.[74] Emphasizing such heterogeneity is an attempt not so much to deliberately diversify the existing body of media-archaeological theory and praxis as to encourage "traveling" between discourses and disciplines.

Still, amid all the variety, there is a need to define approaches and perhaps even to crystallize them into "methods," at least in a local and tactical sense. Erkki Huhtamo's variant of media archaeology is one such attempt, stemming from an effort to apply the idea of topos, as developed by the German literary scholar Ernst Robert Curtius in his classic *Europäische Literatur und lateinisches Mittelalter* (1948), to the field of media culture.[75] The topos approach eschews "the new," which is so often the focus of media-cultural discourses, both critical and popular; instead, it emphasizes the clichéd, the commonplace, and "the tired" (to appropriate jargon from *WIRED* magazine). Identifying ways in which media culture relies on the already known is just as essential as determining how it embodies and promotes the never before seen. In fact, these two aspects are connected with each other; the new is "dressed up" in formulas that may be hundreds of years old, while the old may provide "molds" for cultural innovations and reorientations.

Huhtamo's approach does not only identify topoi, trace their trajectories, and explore the circumstances of their reappearances. It also purports to demonstrate how topoi are constantly evoked by cultural agents, from spokespeople, sales agents, and politicians to writers, journalists, exhibition curators, and, last but not least, media artists, who use them for various kinds of purposes, from sales pitches and ideological persuasion to aesthetic reflections on media culture and history. This emphasis gives Huhtamo's approach a culture-critical character.[76] Although the cultural agents themselves may not always acknowledge it, the media-archaeological dimension is an essential element of the contemporary mind-set, constantly bombarded by media and communications. By demonstrating how the media's past(s) lives on in the present, guiding and informing people's attitudes in their daily lives, the topos approach helps to detect novelties, innovations, and media-cultural ruptures as well.

As Huhtamo had already pointed out in 1996 in his essay "Time Machines in the Gallery: An Archeological Approach in Media Art," a growing number of artists who are aware of media archaeology get inspiration from its findings and are contributing their own creations and discoveries.[77] This has led to intriguing parallels and connections between research and artistic creativity.[78] Artists like Paul DeMarinis and Toshio Iwai have used their media-archaeological explorations to construct alternate and hypothetical media histories, while others, such as Zoe Beloff, Heidi Kumao, Rebecca Cummins, and Ellen Zweig, have imagined the psychological and/or gender-specific implications of technologies of the past, visualizing them with their re-creations. Still others have reproduced idiosyncratic versions of "obsolete" media, unleashing their unexplored potential; Ken Jacobs, Bernie Lubell, and Gebhard Sengmüller are representative examples.

Iwai, DeMarinis, and Julien Maire have also used media archaeology as an inspiration for astonishing high-tech creations, such as Iwai's *Electroplankton* (for Nintendo DS) and *TENORI-ON* (developed with Yamaha), DeMarinis's *Rain Dance* and *Firebirds,* and Maire's *Demi-Pas,* a twenty-first-century version of the magic lantern show. These works do not necessarily even reveal their media-archaeological inspiration at first look, yet they create a cyclical motion in a way many media archaeologists no doubt endorse. There is no separation; instead, there is constant interchange, a cruise in time. The past is brought to the present, and the present to the past; both inform and explain each other, raising questions and pointing to futures that may or may not be.

NOTES

1. See the Selected Bibliography at the end of this volume.

2. For example, by Trebor Scholz, Department of Media Study, SUNY at Buffalo; Alex Galloway and Ben Kafka, Department of Media, Culture, and Communication, New York University; Dr. Darren Wershler-Henry, Department of Communication Studies, Wilfrid Laurier University; Wendy Chun, Committee on Science and Technology Studies, Brown University; Erkki Huhtamo, Department of Design | Media Arts, University of California, Los Angeles.

3. One should acknowledge the impact of the Web site "Early Visual Media Archeology," maintained by the collector and early media enthusiast Thomas Weynants (www.visual-media.be, accessed March 15, 2009).

4. Jeffrey T. Schnapp uses the word *anthropology* in his explorations of the cultural manifestations of speed, although his nonlinear and nondeterministic approach has parallels with those of the media archaeologists (true, transportation is a more important concern for him than the virtual motions in media). See his "Crash (Speed as Engine of Individuation)," *Modernism/Modernity* 6, no. 1 (1999): 1–49. Schnapp's long-term book project bears the working title "Quickening: On the Cultural History and Anthropology of Speed." Other prominent works that don't use the concept of media archaeology but have similarities with it (associated with women's studies) are Terry Castle, *The Female Thermometer: 18th Century Culture and the Invention of the Uncanny* (New York: Oxford University Press, 1995), Rachel P. Maines, *The Technology of Orgasm: "Hysteria," the Vibrator, and Women's Sexual Satisfaction* (Baltimore: Johns Hopkins University Press, 1999), and Lynn Spigel, *Make Room for TV* (Chicago and London: The University of Chicago Press, 1992).

5. In *Window Shopping,* which has affinities with media-archaeological approaches although it is situated within the paradigm of cinema studies, Anne Friedberg claims: "Because this book crosses disciplinary boundaries (architecture, literature, film, consumer culture) and because I insist that the film text be read in the architectural context of its reception rather than as an autonomous aesthetic product, my method may be labeled new historicist." Anne Friedberg, *Window Shopping: Cinema and the Postmodern* (Berkeley: University of California Press, 1993), 6.

6. Geert Lovink, *My First Recession: Critical Internet Cultures in Transition* (Rotterdam: Nai Publishers, 2004), 11.

7. Timon Screech's remarkable *The Lens within the Heart: The Western Scientific Gaze and Popular Imagery in Later Edo Japan* (1996; repr., Honolulu: University of Hawai'i Press, 2002) can be considered a media-archaeological work, although Screech does not use the word. The Japanese media scholar Machiko Kusahara has contributed to media archaeology with several articles.

8. See Jaroslav Malina and Zdeněk Vašíček, *Archaeology Yesterday and Today: The Development of Archaeology in the Sciences and Humanities,* ed. and trans. Marek Zvelebil (Cambridge: Cambridge University Press,1990). About the relationship between archaeology and the new cultural history, see Ian Morris, *Archaeology as Cultural History: Words and Things in Iron Age Greece* (Malden, MA: Blackwell, 2000), ch. 1.

9. Mieke Bal, *Travelling Concepts in the Humanities* (Toronto: University of Toronto Press, 2002).

10. Jacques Perriault, *Mémoires de l'ombre et du son: Une archéologie de l'audio-visuel* (Paris: Flammarion, 1981), 13. Perriault's book cannot be recommended any longer, except for its historiographical interest, because it is dotted with mistakes, and many of his interpretations have been proven wrong.

11. Ibid., 18.

12. C.W. Ceram, *Archaeology of the Cinema,* trans. Richard Winston (New York: Harcourt, Brace and World, [1965]), 9. The contradiction between the text and the visuals was pointed out by Erkki Huhtamo, "From Kaleidoscomaniac to Cybernerd: Notes toward an Archaeology of the Media," in *Electronic Culture: Technology and Visual Representation,* ed. Timothy Druckrey (New York: Aperture, 1996), 296–303, 425–27, and later discussed by Stephen Herbert in his introduction to *A History of Pre-cinema,* ed. Stephen Herbert (London: Routledge, 2000), 1:xxv-xxvi.

13. Olive Cook herself had already published a book on much the same developments, *Movement in Two Dimensions* (London: Hutchinson, 1963). It presented a much broader vision, deviating from the linear cause-and-effect chains proposed by Ceram to consider discursive factors as well.

14. Laurent Mannoni, *Le grand art de la lumière et de l'ombre: Archéologie du cinéma* (Paris: Nathan, 1994), translated into English as *The Great Art of Light and Shadow: Archaeology of the Cinema,* ed. and trans. Richard Crangle (Exeter: University of Exeter Press, 2000).

15. In the catalogue of an exhibition he curated about "archaeology of cinema," Mannoni emphasized that "the long history is complex, full of surprises, mysteries, and extraordinary findings." *Trois siècles de cinéma de la lanterne magique au Cinématographe* (Paris: Éditions de la Réunion des musées nationaux, 1995), 13. The title was provocative because the exhibition was supposed to celebrate the one-hundredth anniversary of the cinema. In the preface, Dominique Paini used the term *anthropological perspective,* emphasizing that the exhibition dealt not only with technology but also with beliefs associated with it (11).

16. Theodor W. Adorno and Max Horkheimer, *Dialectic of Enlightenment,* trans. John Cumming (1944; repr., London: Verso, 1979), 120–67 ("The Culture Industry: Enlightenment as Mass Deception"); Richard Hoggart, *Uses of Literacy* (London: Chatto and Windus, 1957). While Adorno and Horkheimer saw the "cultural industry" as monolithic, anonymous, and alienating, Hoggart emphasized that working-class culture was also able to read products of the industrial popular media culture against the grain.

17. Marshall McLuhan, *The Gutenberg Galaxy: The Making of Typographic Man* (Toronto: University of Toronto Press, 1962), and *Counterblast* (New York: Harcourt, Brace and World, 1969); Marshall McLuhan and Quentin Fiore, *The Medium Is the Massage: An Inventory of Effects* (New York: Bantam Books, 1967).

18. Jay David Bolter and Richard Grusin, *Remediation: Understanding New Media* (Cambridge,

MA: MIT Press, 1999). The title refers to McLuhan's *Understanding Media: The Extensions of Man* (1964; repr., Cambridge, MA: MIT Press, 1994).

19. In *The Virtual McLuhan* (Montreal: McGill-Queen's University Press, 2001), Donald F. Theall defined McLuhan as a "Menippean satirist" rather than as a media theorist.

20. Lewis Mumford, *Technics and Civilization* (New York: Harcourt Brace, 1934).

21. Such an approach was not entirely unique. New ideas about the "evolution of technology" were emerging on a broad front, from Samuel Butler's fiction writings to Lieutenant-General A. Lane Fox Pitt-Rivers's collections of tools, and on to arguments about the systemic relations between technological artifacts. After the Second World War, the French philosopher Gilbert Simondon continued the individuation of technological objects and ideas of material history from a depersonalized (or "preindividual") point of view. Gilbert Simondon, *Du mode d'existence des objets techniques* (Paris: Aubier-Flammarion, 1992).

22. Siegfried Giedion, *Mechanization Takes Command: A Contribution to Anonymous History* (1948; repr., New York: W. W. Norton, 1969), 2.

23. Ibid., 4.

24. The influence of both can be clearly seen in Jonathan Crary's *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: MIT Press, 1990), another book that has affinities with media-archaeological interests.

25. Walter Benjamin, *The Arcades Project,* trans. Howard Eiland and Kevin McLaughlin (Cambridge, MA: Belknap Press, 2002). See also Susan Buck-Morss's creative reconstruction, *The Dialectics of Seeing: Walter Benjamin and the Arcades Project* (Cambridge, MA: MIT Press, 1991). An excellent introduction to Benjamin's complex thinking is Norbert Bolz and Willem van Reijen, *Walter Benjamin,* trans. Laimdota Mazzarins (Atlantic Highlands, NJ: Humanities Press, 1996).

26. Dolf Sternberger, *Panorama of the Nineteenth Century: How Nineteenth Century Man Saw Himself and His World and How He Experienced History,* trans. Joachim Neugroschel (New York: Urizen Books, 1977), originally published as *Panorama oder Ansichten vom 19 Jahrhundert* (1938). The work was a strong influence on the cultural historian Wolfgang Schivelbusch, whose work also has affinities with media-archaeological approaches.

27. Horst Bredekamp, "A Neglected Tradition? Art History as Bildwissenschaft," *Critical Inquiry* 29 (Spring 2003): 418–28.

28. About this project, see Philippe-Alain Michaud, *Aby Warburg and the Image in Motion,* trans. Sophie Hawkes (New York: Zone Books, 2004), 244, 251–53.

29. Pasi Väliaho, *The Moving Image: Gesture and Logos circa 1900* (Turku: University of Turku Publications, 2007), 215–17.

30. "Museum without Walls" now forms the first section of Malraux's *The Voices of Silence,* trans. Stuart Gilbert (1953; repr., Princeton: Princeton University Press, 1978).

31. For both a good introduction and a penetrating critique, see Hubert L. Dreyfus and Paul Rabinow, *Michel Foucault: Beyond Structuralism and Hermeneutics,* 2nd ed. (Chicago: University of Chicago Press, 1983), chs. 2 and 4. Foucault presented the principles of his archaeological approach in two books, *The Order of Things: An Archaeology of the Human Sciences,* trans. A. M. Sheridan Smith (New York: Pantheon Books, 1970), originally published as *Les mots et les choses: Une archéologie des sciences humaines* (1966), and *The Archaeology of Knowledge,* trans. A. M. Sheridan Smith (London: Routledge, 2002), originally published as *L'archéologie du savoir* (1969).

32. Kittler's debt to McLuhan is clear. See Wendy Hui Kyong Chun, "Introduction: Did Somebody Say New Media?" in *New Media, Old Media: A History and Theory Reader,* ed. Wendy Hui Kyong Chun and Thomas Keenan (New York: Routledge, 2006), 4.

33. Friedrich Kittler, *Aufschreibesysteme 1800/1900* (Munich: Wilhelm Fink, 1985), translated by Michael Metteer as *Discourse Networks 1800/1900* (Palo Alto: Stanford University Press, 1990).

34. Friedrich Kittler, *Grammophon Film Typewriter* (Berlin: Brinkmann and Bose, 1986), translated by Geoffrey Winthrop-Young and Michael Wutz as *Gramophone, Film, Typewriter* (Stanford: Stanford University Press, 1999).

35. Kittler, *Gramophone, Film, Typewriter,* 229.

36. Drawing on Foucault and Kittler, Wolfgang Ernst has suggested that media should be primarily researched as nonsignifying channels. The fact of mediation should be considered before any idea of hermeneutic meaning. The phenomenological content of communication is too often mistaken for the essence of media. For Ernst, media archaeology focuses on the agency of the machine, the ways in which technical media themselves contract time and space. See Wolfgang Ernst, "Let There Be Irony: Cultural History and Media Archaeology in Parallel Lines," *Art History* 28 (November 2005): 582–603.

37. Michael Wetzel, "Von der Einbildungskraft zur Nachrichtentechnik: Vorueberlegungen zu einer Archäologie der Medien," in *Mediendämmerung: Zur Archäologie der Medien,* ed. Peter Klier and Jean-Luc Evard (Berlin: Edition Tiamat, 1989), 16–17.

38. Eva Horn, "Editor's Introduction: There Are No Media," *Grey Room* 29 (Fall 2007): 10.

39. John Armitage, "From Discourse Networks to Cultural Mathematics: An Interview with Friedrich A. Kittler," *Theory, Culture and Society* 23, nos. 7–8 (2006): 32–33.

40. Friedrich Kittler, *Musik und Mathematik,* 2 vols. (Munich: Wilhelm Fink, 2006).

41. See Lynn Hunt, ed., *The New Cultural History* (Berkeley: University of California Press, 1989).

42. See Patricia O'Brien, "Michel Foucault's History of Culture," in Hunt, *New Cultural History,* 25–46; Keith Windschuttle, "The Discourses of Michel Foucault: Poststructuralism and Antihumanism," in *The Killing of History: How Literary Critics and Social Theorists Are Murdering Our Past* (San Francisco: Encounter Books, 2000), 131–71.

43. H. Aram Veeser, introduction to *The New Historicism,* ed. H. Aram Veeser (New York: Routledge, 1989), xi.

44. See Brook Thomas, *The New Historicism and Other Old-Fashioned Topics* (Princeton: Princeton University Press, 1991). See also the traditionalist criticism by Windschuttle, *Killing of History.*

45. Already in the 1970s Hayden White had pointed out that there are various ways of writing history and that the historical discourse itself can be analyzed as an epistemological mode of knowledge production. See his *Metahistory: The Historical Imagination in Nineteenth-Century Europe* (Baltimore: Johns Hopkins University Press, 1973).

46. Giuliana Bruno, *Atlas of Emotion: Journeys in Art, Architecture, and Film* (New York: Verso, 2002). Avital Ronell's *The Telephone Book: Technology, Schizophrenia, Electric Speech* (Lincoln: University of Nebraska Press, 1989) let the subjectivity of the implied author and the resulting highly idiosyncratic discourse dominate to such an extent that it was at times difficult to assess the actual historical subject matter through this "screen."

47. Bruno, *Atlas of Emotion,* 2.

48. Jeffrey Sconce, *Haunted Media: Electronic Presence from Telegraphy to Television* (Durham: Duke University Press, 2000).

49. Ibid., 8.

50. Zielinski was invited to contribute to the present volume, but he refused to write before a publishing contract would have been signed. The need to prepare the manuscript to earn a contract led to a chicken-and-egg problem and made Zielinski's participation impossible.

51. Siegfried Zielinski, "Media Archaeology," *CTheory,* no. ga111 (July 11, 1996), www.ctheory.net/articles.apsx?id=42.

52. *Zur Geschichte des Videorecorders* (Berlin: Wissenschaftsverlag Volker Spiess, 1985) was Zielinski's PhD dissertation.

53. Siegfried Zielinski, *Audiovisions: Cinema and Television as Entr'actes in History,* trans. Gloria Custance (Amsterdam: Amsterdam University Press, 1999), originally published as *Audiovisionen: Kino und Fernsehen als Zwischenspiele in der Gechichte* (1989). *Zwichenspiel* also translates as "interlude." Does Zielinski mean that both cinema and television are just interludes in a much larger history? If so, this would be a very media-archaeological attitude. The choice of *entr'acte* may have been meant to resonate with Clair's and Picabia's Dadaistic film *Entr'Acte* (1924).

54. In retrospect *Audiovisions* is structurally a relatively conventional work of linear media history. However, its illustrations point toward more open possibilities (somewhat in the manner of Ceram's *Archaeology of the Cinema*).

55. The term *media archaeology* seems to have entered Zielinski's own discourse around 1993–94. In 1994 he defined the "archaeology (of the media, or of audiovisions)" as "a method of disassembling largely linear and chronologically constructed histories by researching resistive local discursivities and expressive practices as well as technically-based world pictures and picture worlds" (trans. Erkki Huhtamo). The densely formulated original says, "Archäologie (der Medien, der Audiovision) wäre in diesem Sinne die Methode, in der weitgehend linear und chrono-logisch konstruierten Geschichte die widerständigen lokalen Diskursivitäten und Ausdruckspraxen des Wissens und des Konzeptionierens technisch basierter Weltbilder und Bilderwelten herauszuarbeiten." Siegfried Zielinski, "Medienarchäologie: In der Suchbewegung nach der unterschiedlichen Ordnungen des Visionierens," *EIKON: Internationale Zeitschrift für Photographie und Medienkunst* 9 (1994): 32.

56. Zielinski, *Audiovisions,* 21.

57. Ibid., 21.

58. The term *media archaeology* was mentioned in *Audiovisions,* when Zielinski called for "future research" on auditory media (35).

59. His more recent affiliation with the University of Arts, Berlin, is at the Institute for Time Based Media, where his chair has a focus on archaeology and variantology of media.

60. Siegfried Zielinski, *Deep Time of the Media: Toward an Archaeology of Hearing and Seeing by Technical Means,* trans. Gloria Custance (Cambridge, MA: MIT Press, 2006), 34. The original used the words *archaeology of the media* in its title: *Archäologie der Medien: Zur Tiefenzeit des technischen Hörens und Sehens* (Reinbek bei Hamburg: Rowohlt, 2002).

61. The focus on personalities was even clearer in the German original, where the chapters had such names as "Empedocles Chapter," "Kircher Chapter," and "Lombroso Chapter."

62. *Audiovisions,* 22. Compared with the German edition, published a decade earlier, the list has changed. Bill Viola has fallen out of favor (perhaps having become too much part of the art establishment?), and Export, Larcher, and the Vasulkas have been added.

63. Zielinski shows relatively little interest in engaging in explicit dialogues with other contemporary media scholars, relying mostly on his own encounters with the primary source material. For example, Thomas L. Hankins and Robert J. Silverman's *Instruments and the Imagination* (Princeton: Princeton University Press, 1995) has not been referred to, although it contains an important chapter on Kircher (ch. 2). Pressed at the discussion following his presentation at the Imaginary Media conference in Amsterdam (2004) to define his method, Zielinski characterized it as "Kircherian," referring to the seventeenth-century Jesuit polymath he deals with in *Deep Time.*

64. Zielinski, *Deep Time,* 33.

65. Siegfried Zielinski and Silvia M. Wagnermaier, "Depth of Subject and Diversity of Method: An Introduction to Variantology," in *Variantology 1: On Deep Time Relations of Arts, Sciences and Technologies,* ed. Siegfried Zielinski and Silvia Wagnermaier (Cologne: König, 2007), 9. Four volumes have been published so far, the others being *Variantology 2* (2007), *Variantology 3* (2008) and *Variantology 4* (2010). Five workshops have been organized so far.

66. Crary, *Techniques of the Observer;* Jonathan Crary, *Suspensions of Perception: Attention,*

Spectacle, and Modern Culture (Cambridge, MA: MIT Press, 1999). Crary's interests come close to those of media archaeologists; see in particular his "Géricault, the Panorama, and Sites of Reality in the Early Nineteenth Century," *Grey Room* 9 (Fall 2002): 5–25.

67. The first recorded use of the term *the new film history* is said to be Thomas Elsaesser, "The New Film History," *Sight and Sound* 55 (Autumn 1986): 246–51. See James Chapman, Mark Glancy, and Sue Harper, introduction to *The New Film History: Sources, Methods, Approaches,* ed. James Chapman, Mark Glancy, and Sue Harper (Houndsmills, Basingstoke: Palgrave Macmillan, 2007), 5.

68. Thomas Elsaesser, "The New Film History as Media Archaeology," *Cinémas* 14, nos. 2–3 (2004): 86. The theoretical impulse behind Elsaesser's version of media archaeology stems from Foucault's genealogical writings, especially from his essay "Nietzsche, Genealogy, History." Michel Foucault, "Nietzsche, Genealogy, History," in *Language, Counter-memory, Practice: Selected Essays and Interviews,* ed. D. F. Bouchard (Ithaca: Cornell University Press, 1977), 146–47. A genealogical perspective considers the perceiving and sensing body as a surface of inscription, opened up to cultural forces like media technologies. Even though Foucault did not directly refer to technology as such as a cultural force, his emphasis on the body as a historical, discontinuous force field can be related to the idea that our ways of perceiving the world are historically determined: "History becomes 'effective' to the degree that it introduces discontinuity into our very being—as it divides our emotions, dramatizes our instincts, multiplies our body and sets it against itself" (154).

69. Elsaesser, "New Film History" [2004].

70. See Tom Gunning, "An Aesthetic of Astonishment: Early Cinema and the (in)Credulous Spectator," *Art and Text* 34 (1989): 31–45. See also, e.g., Wanda Strauven, ed., *The Cinema of Attractions Reloaded* (Amsterdam: Amsterdam University Press, 2006) and Thomas Elsaesser and Adam Barker, eds., *Early Cinema: Space, Frame, Narrative* (London: British Film Institute, 1990).

71. Anne Friedberg, *Window Shopping: Cinema and the Postmodern* (Berkeley: University of California Press, 1993), and *The Virtual Window: From Alberti to Microsoft* (Cambridge, MA: MIT Press, 2006).

72. Lev Manovich, *The Language of New Media* (Cambridge, MA: MIT Press, 2001), 8. Despite the popularity of Manovich's book, other kinds of archaeologies of computing and software have been presented. On another kind of a media archaeology of software that takes theoretical elements from Deleuze and Guattari, see Jussi Parikka, *Digital Contagions: A Media Archaeology of Computer Viruses* (New York: Peter Lang, 2007). Of interest as a media archaeology of computing is Werner Künzel and Peter Bexte, *Allwissen und Absturz: Der Ursprung des Computers* (Frankfurt: Insel, 1993).

73. See, for example, Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham: Duke University Press, 2003); Emily Thompson, *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900–1933* (Cambridge, MA: MIT Press, 2004).

74. Bernhard Siegert, *Relays: Literature as an Epoch of the Postal System,* trans. Kevin Repp (Stanford: Stanford University Press, 1999); Wolfgang Ernst, *Das Gesetz des Gedächtnisses: Medien und Archive am Ende (des 20. Jahrhunderts)* (Berlin: Kulturverlag Kadmos, 2007); Christoph Holtorf and Claus Pias, eds., *Escape! Computerspiele als Kulturtechnik* (Cologne: Böhlau, 2007); Parikka, *Digital Contagions,* and *Insect Media: An Archaeology of Animals and Technology* (University of Minnesota Press, 2010). Prominent examples of media-archaeologically leaning works that don't call themselves such are Ellen Lupton, *Mechanical Brides: Women and Machines from Home to Office* (New York: Cooper-Hewitt National Museum of Design; Washington, DC: Smithsonian Institution; Princeton: Princeton Architectural Press, 1993); Lisa Cartwright, *Screening the Body: Tracing Medicine's Visual Culture* (Minneapolis: University of Minnesota Press, 1995); Lisa Gitelman, *Scripts, Grooves, and Writing Machines: Representing Technology in the Edison Era* (Stanford:

Stanford University Press, 1999), and *Always Already New: Media, History, and the Data of Culture* (Cambridge, MA: MIT Press, 2006).

75. See Huhtamo's chapter in this book.

76. Although the words *media archaeology* were not explicitly mentioned, the *Spectres: When Fashion Turns Back* exhibition organized by the Victoria and Albert Museum in 2005 promised to show "the hidden, yet haunting, connections between recent fashion and its past," setting out "to reveal the shadows and experiences that form a 'fashion memory' in contemporary dress." The entire exhibition design had been inspired by "obsolete" media like peep shows, kaleidoscopes, and the phantasmagoria. Some actual traces of the past such as magic lantern slides were also exhibited as props. "Guide to Exhibition, 24 February–8 May 2005," booklet, Victoria and Albert Museum. See also the exhibition catalogue, Judith Clark, *Spectres: When Fashion Turns Back* (London: V&A Publications, 2004). For another example of a media-archaeological approach to exhibition design, see the works of the Dutch artist and designer Tjebbe van Tijen at http://imaginarymuseum.org .

77. Erkki Huhtamo, "Time Machines in the Gallery: An Archeological Approach in Media Art," in *Immersed in Technology: Art and Virtual Environments,* ed. Mary Anne Moser (Cambridge, MA: MIT Press, 1996), 232–68. See also his "Twin-Touch-Test-Redux: Media Archaeological Approach to Art, Interactivity, and Tactility," in *MediaArtHistories,* ed. Oliver Grau (Cambridge, MA: MIT Press, 2007), 71–101.

78. It is perhaps appropriate that media archaeologists themselves have sought alternative ways of demonstrating their findings. Huhtamo, for example, created *Ride of Your Life,* a "meta-ride" through the history of the ride film using a hydraulic flight-simulator platform (ZKM, 1998), and a stage performance titled *Musings on Hands* with media artists Golan Levin and Zachary Lieberman (Ars Electronica, 2006). The latter dealt with the topos of "the hand of God."

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PART I

Engines of/in the Imaginary

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"MEDIA" ARE NOT ONLY RELATED to the established institutions of modernity. They are also manifested in the narratives of madmen, religious visions, theories about the psyche and the body, and other recurring issues associated with technological modernity. But the term *imaginary media* does not refer only to the human imagination as a site for fantastic modes of communication. It can also mean extensions of the notion of "media" in theories of the mind and the brain. Media are in this sense a reservoir for tactics and techniques for manipulating humans and their culture. The chapters in this section demonstrate that media archaeology not only is grounded in Foucault's methodology but can also find inspiration from psychoanalysis and other early twentieth-century cultural theories, including the German *Bildwissenschaften* and the topos theory of literature.

Erkki Huhtamo's chapter offers a theoretical-historical contextualization of the topos, a notion he has adopted from the literary scholar Ernst Robert Curtius and has turned into a "tool" for explaining the recurrence of clichés and commonplaces in media culture. Huhtamo has applied the idea to various media forms ranging from "peep media" and the moving panorama to mobile media. In this chapter he delineates his approach theoretically, discussing its predecessors and demonstrating how it can be applied to various facets of media culture. For Huhtamo, the task is "identifying topoi, analyzing their trajectories and transformations, and explaining the cultural 'logics' that condition their 'wanderings' across time and space." Topoi are discursive "engines" that mediate themes, forms, and fantasies across cultural traditions. Predictably, they have become a tool in the hands of the culture industry.

Eric Kluitenberg discusses ways of conceptualizing the notion of "imaginary media." Setting out from a Foucauldean position, he mobilizes Siegfried Zielinski's notions of "variantology," and "anarchaeology of media." Through a series of examples, Kluitenberg demonstrates how the notion of imaginary media can be conceived and used to contextualize and enhance contemporary media production. Relying on Zielinski, he claims that excavating the media cultures of the past is important not only in itself but also for the creation of innovative and critical futures. This is one of the key features of many media-archaeological writings: archival findings and reconstructions of the narratives of the past are tied with emerging media practices.

Both Jeffrey Sconce's and Thomas Elsaesser's chapters submit psychoanalytic themes to a media-archaeological elaboration. Theories of the psyche and the mind become excavation sites that both Sconce and Elsaesser explore to uncover new ways of understanding modern media culture. Sconce focuses on "the influencing machine" as it was conceptualized by the psychoanalyst Victor Tausk in the 1930s. Rather than considering it as a schizophrenic delusion, Sconce sees it as a projection of broadcast media, implicitly associated with mind control. The "delusions" he discusses are not related to any specific technology; rather, they testify to "a vernacular theory of power forged at the end of the nineteenth century."

In his chapter Elsaesser analyzes Sigmund Freud's writings, providing insights to the media archaeological conceptualization of memory. He shows that Freud's analyses of the psyche can be taken as media theories in their own right—as ways of understanding not only perception, but issues like storage and processing as well. The psyche itself is a kind of a media machine. Elsaesser's media archaeological reading of Freud's classic text "Notes on the Mystic Writing Pad" opens an alternative path to understanding early psychoanalytic theories in the context of the emerging media culture. It shows that Freud can also be applied to a media archaeology of images in the era of digital data. Elsaesser argues that "considering Freud as theorist of auxiliary memory and the technical media, and thus as a media theorist, shifts this perspective away from film to a more general consideration of the technical media" (101).

2

Dismantling the Fairy Engine

Media Archaeology as Topos Study

Erkki Huhtamo

THE LITTLE MEDIA PEOPLE: WHERE DID THEY COME FROM?

Some time ago, while I was leafing through an airline magazine, an ad caught my attention. It was associated with a current event—the Winter Olympics in Turin—and promoted Samsung mobile phones.[1] The setting was a deserted, dimly lit office after hours. Unusual mini-Olympics were taking place on a desk in the foreground. Between a frozen laptop computer and a frost-covered coffee cup, Lilliputian sportspeople—a figure skater, skiers, ice hockey and curling players—were in full action. The center of everything was a snow-covered mountain capped by a Samsung phone. The mountain continued into the virtual realm of its screen, where a takeoff ramp built on its slope could be seen; a jumper was midair, shooting down from the ramp—and out from the screen.

It immediately occurred to me that I had encountered such tiny people before. Examples abound: in a cartoon published in the *New Yorker* in 1959 a cleaning lady is seen mopping the floor after hours next to a huge mainframe computer.[2] She turns her head and sees a tiny man leaving through a doorway on the side of the enormous computer, clutching his suitcase and raising his hat in a mechanical greeting. I also came to think about *Little Computer People*, a computer game for the Commodore 64 (1987). In its promotional campaign, Activision pretended they had found little people living inside computers. The idea of the product was to persuade one of them to live in a "House-on-a-Cassette," a software application where the person's routines could be observed and interacted with. The project must have been influenced by the well-recorded popular beliefs in tiny people living inside radios and TV sets.[3] Going back even further, we discover that little people had already appeared in the context of phonograph and gramophone advertising.[4] Elsewhere, we discover them in early trick films and in the delightfully impish video installations by the French media artist Pierrick Sorin.[5] We could also fly back through the tunnel of time to the realms of fairies, gnomes, and Lilliputians.[6]

"The little people" is a topos—a stereotypical formula evoked over and over again in different guises and for varying purposes. Such topoi accompany and influence the development of media culture. Cultural desires are expressed by being embedded them within topoi. Functioning as shells or vessels derived from the memory banks of tradition, topoi mold the meaning(s) of cultural objects. High technology can be represented as something else through application of the "fairy engines" of topos traditions. They can disguise culture as nature, and something unheard-of as something familiar. As Peter Burke has written, "The facade of tradition may mask innovation."[7] As discursive meaning processors, topoi not only express beliefs but can serve rhetorical and persuasive goals, as evidenced in the field of advertising. New products are promoted by being packaged into formulas that are meant to strike the observer as novel, although they have been put together from ingredients retrieved from cultural archives. Burke's dictum can therefore also be reversed: the facade of innovation may mask tradition, and apparent ruptures disguise hidden continuities.

Identifying topoi, analyzing their trajectories and transformations, and explaining the cultural logics that condition their "wanderings" across time and space is one possible goal for media archaeology.[8] In this chapter I will lay a theoretical and historiographical foundation for this type of approach. I have already applied it in a more strategic sense in a number of studies.[9] Media archaeology means for me a critical practice that excavates media-cultural evidence for clues about neglected, misrepresented, and/or suppressed aspects of both media's past(s) and their present and tries to bring these into a conversation with each other.[10] It purports to unearth traces of lost media-cultural phenomena and agendas and to illuminate ideological mechanisms behind them. It also emphasizes the multiplicity of historical narratives and highlights their constructed and ideologically determined nature.

I will begin by discussing the origins of *Toposforschung* in the work of Ernst Robert Curtius and assessing some of its influences, including C. G. Jung's theory of archetypes and Aby Warburg's iconological approach to the study of visual culture.[11] I will then discuss the relevance of Curtius's ideas for the study of media culture and will propose modifications in the light of more recent applications of the notion of the topos. I will proceed to exemplify roles the topoi serve within media culture and, finally, will discuss the potential advantages and problems of the approach delineated in this chapter.

CURTIUS AND THE STUDY OF TOPOI

Continuity of the literary tradition—a simplified expression for a very complicated state of things.

ERNST ROBERT CURTIUS

Topos study was pioneered by the German literary scholar Ernst Robert Curtius (1886–1956) in the 1930s.[12] It became widely known after the publication of his magnum opus, *Europäische Literatur und lateinisches Mittelalter* (1948), translated into English in 1953 as *European Literature and the Latin Middle Ages.* In the foreword to the English edition Curtius admitted that his book was "not the product of purely scholarly interests, that it grew out of a concern for the preservation of Western culture."[13] Curtius, a traditionally educated humanist and specialist of modern French literature and culture, had come to the conclusion that the catastrophic emergence of totalitarianism and nationalism in Europe in the 1930s forced scholars to take a stand. Having had his academic working possibilities severely limited by the Nazi regime, his solution was to immerse himself in the study of literary traditions of the Middle Ages. By demonstrating how elements of the cultural heritage of classical antiquity had been preserved and transmitted through the Middle Ages into the early modern age, Curtius defended the continuity and universality of the Western tradition threatened by the new Dark Ages.

To give shape to the enormous amount of material he had amassed during years of archival study, Curtius developed a new approach informed by linguistics, giving the topos (pl. topoi) a central role. His inspiration came from the theory of rhetoric of classical antiquity, but he used the concept in an idiosyncratic way. One of the earliest and foremost authorities, Quintilian, explained in his *Institutio oratoria* (ca. 95 CE) that in rhetoric topoi were "storehouses of trains of thought" (*Argumentorum sedes* 5.10.20), systematically classified formulas used in the composition of orations. Curtius characterized them as intellectual themes, suitable for development and modification at the orator's pleasure. As oligarchy replaced more democratic forms of government during antiquity, rhetoric, which had been so important in the city-states of Greece and in the Roman Republic, lost its significance in public affairs, though it continued to be used in educational curricula, and penetrated literary genres. The topoi became "clichés, which [could] be used in any form of literature, they spread to all spheres of life with which literature deals and to which it gives form."[14]

In antiquity a distinction was made between topoi that were specific to certain types of discourse *(topoi idioi),* and ones that that could appear in any type *(topoi koinoi,* Lat. *loci communi).*[15] It was the latter Curtius was interested in, but he did not limit his attention to classical rhetoric and its afterlife. He suggested that new topoi had been created since late antiquity and that these did not necessarily have their origins in rhetoric. They might quite as well begin their life as poetic metaphors and be adopted into rhetorical systems only afterwards. Curtius called them "historical topoi." He concentrated in his massive volume on their reception, transfer, and renewal. The vast array of topoi whose "travels" within literary traditions he traced included "the world as a book," "*theatrum mundi,*" "the ideal landscape," "the Muses," "the world upside-down," "the eye of the soul," and "We must stop because night is coming on."[16]

Topoi can be mistaken for factual statements. There are medieval sources talking about olive trees growing in the medieval North, or about lions living in Europe. For Curtius, "All these exotic trees and animals were . . . imported from the South—not, however, from gardens and menageries, but from antique poetry and rhetoric."[17] A seemingly innocuous formula like "I saw it with my own eyes" can also turn out to be a topos. It was used over and over again in the travel accounts written by foreigners who visited Italy in the sixteenth century.[18] Although they no doubt visited the places they described, their "firsthand descriptions" resorted to models culled from guidebooks, travel accounts, and maybe also oral folklore. Instead of relying on their own perceptions, travelers appropriated opinions and judgments from authorities. The ideology of the Grand Tour solidified this practice into a rigid rhetorical system between the seventeenth and the nineteenth centuries. Nearly identical letters were sent home by thousands of young noblemen touring Europe along strictly codified routes for the purpose of perfecting their education. What they actually saw and felt is much more difficult to tell than to pinpoint the topos tradition within which they operated.[19]

CRITICISMS OF CURTIUS'S WORK

While it has been highly influential, the work of Curtius has also been criticized on several grounds.[20] His idea of the topos has been considered too vague and overarching because it covers both stylistic and content-related formulas.[21] According to Berthold Emrich, in antiquity the topos always referred to form, never to content.[22] Curtius of course knew that his way of applying the concept was unorthodox, even suggesting that his book constituted a *Nova Rhetorica.*[23] But writing a history of rhetoric was never his goal.[24] He was interested in "a new perception of the inner connections of European literature" and the "psychological history of the West."[25] These goals had been influenced by Henri Bergson's interpretation of evolution as a cosmic process leading toward consciousness and permeated by *élan vital,* as well as by Bergson's notion of a *fonction fabulatrice,* which emphasized fiction making by the human imagination as a basic ingredient of life.[26] Curtius pointed out that "Bergson repeatedly insists that our thinking has a tendency to reduce the creatively new to something already existing, something finished," which provided him a philosophical justification for focusing on the "already existing."[27]

Curtius also frequently referred to Carl Gustav Jung and his archetypes.[28] By *archetype* Jung understood an "explanatory paraphrase of the Platonic *eidos*," a kind of shared primordial image existing in the collective unconscious and manifesting itself in dreams and visions, as well as in mythology, fiction, and poetry.[29] As a "structural condition of the psyche," archetypes don't change but become "clothed" as they "partake of the concrete outside world." As Jung's disciple Jolande Jacobi formulated it, the archetype's "'fundamental pattern' is immutable, but its mode of manifestation is ever changing."[30] Archetypes could be metaphorically characterized as "channels, predispositions, river-beds into which the water of life has dug deep."[31] At times Curtius seems unable to decide whether the topoi he encounters are controlled by historical forces or should be interpreted as eternal archetypes. Discovering *puer senex* from cultures geographically and temporally wide apart makes him conclude that it must be an "image of the collective unconscious in the sense of C. G. Jung."[32]

The same goes for the "rejuvenated supernatural old woman." Curtius finds it in antique authors like Claudian and Boethius, but also—a millennium and a half later—in Balzac. Its reappearance is "only comprehensible by the fact that it is rooted in the deeper strata of the soul."[33] Curtius is on ontologically treacherous ground here. At the time he was working on his magnum opus, Jungian deep psychology was a new and attractive theory that had a powerful influence on studies of folklore and mythology. It has largely fallen out of favor since then, particularly within cultural studies. Although the rise of cognitive science has renewed interest in unconscious and shared patterns of cognition, they have little to offer for historically oriented research. The continued usefulness of the notion of the topos for media archaeology must rely on the assumption that its origins and manifestations are both created and conditioned by cultural forces.

Another issue that has been criticized is Curtius's determination to limit topos study to literary traditions and therefore to literary scholarship. Although he briefly admitted that musical topoi could exist, he made a notorious attack against the visual arts, claiming that literature is "the medium of ideas, art not" and that "knowing pictures is easy compared with knowing books."[34] His outburst is puzzling, the more so because *European Literature and the Latin Middle Ages* was dedicated to the memory of Aby Warburg (1866–1929), the great scholar of visual culture, whom he had known personally. In 1938 he compared his own work with textual traditions to an "art history without names," reiterating, surprisingly without attribution, the famous formula associated with the art historian Heinrich Wölfflin.[35] Curtius wrote: "A topos is something anonymous. It flows into the author's pen as a literary reminiscence. It has a temporal and spatial omnipresence like a sculptural motif. [Topos study] resembles an 'art history without names' in contrast to the history of individual masters. It can advance to the impersonal stylistic forms. In these impersonal stylistic elements we touch on a layer of historical life which is more deeply imbedded than that of individual invention."[36] Wölfflin's aim was to develop a scientific and formalistic history of styles. This differs from Curtius's interest in the *content* of the topoi. Both scholars shared the conviction that artworks, whether visual or literary, owed more to models culled from earlier works than to direct observation of reality. However, because of his "restraint," as E. H. Gombrich put it, Wölfflin "never entered into speculations about the ultimate causes of historical change."[37] This applies to Curtius as well. Warburg, on the contrary, refuted the idea of art history as an independent realm segregated from social, economic, and other contextual factors. He was determined to turn it into a "cultural science" *(Kulturwissenschaft)* and called for an interdisciplinary approach that "can range freely, with no fear of border guards."[38] As Richard Woodfield has observed, for Warburg "the study of the image was simply a means to an end: an understanding of the tensions . . . in concrete historical situations."[39] To reach this goal it was necessary to consult many fields of knowledge, including philosophy, religion, science, mythology, poetry, and literature.[40]

After Warburg's death in 1929, Erwin Panofsky, Fritz Saxl, and others developed his ideas into a pair of methods known as "iconography" and "iconology."[41] The basic idea was to tie the visual arts to textual traditions within which they emerged and without which they could not be fully comprehended. This led to tracing the migration of iconographical schemas and formulas from one context to another.[42] Warburg himself coined the notion of the *Pathosformel,* which can be considered a predecessor to Curtius's historical topos.[43] He originally used it to demonstrate how "*quattrocento* artists, who had previously been regarded as the champions of pure observation . . . frequently took recourse to a borrowed formula."[44] Pathos formulas opened up channels of expression for visual elements and themes from pagan antiquity, suppressed by Christian doctrine. Warburg understood that numerous topoi had manifested themselves *both* in literary texts *and* in visual artworks. Tracing their coexistence and interrelationships was a logical way of breaking boundaries between academic disciplines.

THE BROADENING FIELD OF TOPOS STUDY

Francis Haskell has suggested that Curtius's harsh reaction to the visual arts may have been caused by scholars' increasing use of visual evidence. Curtius may have felt that the authority of the text was under attack and had to be defended.[45] In a sense Warburg's final project, *Mnemosyne Atlas,* was the ultimate expression of this visual trend. It was an attempt to write "an art history without a text" solely by means of carefully selected and combined pictorial reproductions.[46] This issue was also raised by André Malraux's *Musée imaginaire* (trans. *Museum without Walls*), which was published in 1947 almost simultaneously with the magnum opus of Curtius.[47] Malraux discussed ways in which mechanical reproduction was changing our understanding of visual culture. The unprecedented availability of photographic reproductions challenged us to draw connections between visual traditions that had until then been considered unrelated or nonexistent. Malraux's exhortation to detect, "by way of modulations hitherto unobserved, the persisting life of certain forms, emerging ever and again like spectres of the past" evokes Curtius.[48] Almost as much as *European Literature and the Latin Middle Ages, Musée imaginaire* could be considered a foundational text for media archaeology.

Although he claimed he was practicing "philological microscopy," Curtius's approach was expansive. He compared it to aerial photography, which had helped archaeology to discover massive land structures invisible from the ground level; after the discovery, the photograph had to be enlarged and the details investigated. Curtius condensed his approach into a maxim: "Specialization without universalism is blind. Universalism without specialization is inane."[49] Universalism as he understood it applied only to literary traditions, which he treated as an independent realm.[50] Although he described in meticulous detail how specific topoi had been handed down from writer to writer, he did not perceive essential changes in their meanings—only changes in their style.[51] In spite of making occasional context-driven statements such as "In messianically and apocalyptically excited periods, faded symbolic figures can be filled with new life, like shades which have drunk blood," Curtius did not really explain topoi by relating them to factors that could be considered external to the literary tradition.[52]

Had he attempted to analyze topoi as symptomatic of the times and places in which they were evoked, Curtius might have come to the conclusion that their appearances marked not only continuities but cultural ruptures and discontinuities as well. This has been emphasized by later topos scholars. For Ernst Ulrich Grosse, differences in the ways a certain topos has been used are more interesting than similarities because they have potential to reveal changes and historical turning points. For him, the appearance of a topos is potentially conditioned by several factors: the immediate environment as well as the will of the author; the evolution of literary genres as well as the history of mentalities.[53] When a topos emerges, it should be treated as a node in a complex network of references and determinants. Topos study is steeped in the issue of cultural contextualization, no matter how difficult and elusive it may be.

In his review of *European Literature and the Latin Middle Ages,* the linguist Leo Spitzer sarcastically concluded that "Curtius has found an escape by immersing himself in the necropolis of a past that was alive as late as the eighteenth century."[54] Had this really been the case, there would be no reason to waste time with his massive funeral monument. But not only are many ancient topoi very much alive today; new ones are created at a rapid pace. German scholars have discovered the relevance of topoi, although they don't seem to have a common methodology or even to agree about the definition of the word.[55] Theodor Viehweg's dissertation "Topik und Jurisprudenz" (1953) led to a lively discussion about the topoi of law and became the cornerstone of German rhetorical legal theory.[56] Social topoi have been discussed by German sociologists and political scientists, referring to formulas used within working-class culture, by teachers, or by salespeople.[57] The topoi of media culture, however, have hitherto been largely neglected.

In spite of the reservations by linguists, medievalists, and other "border guards," topos study is a useful tool for making sense of media culture. Still, lapsing into a blind reverence for Curtius would be counterproductive. The following discussion of topoi in media culture is based on six assumptions that *deviate* from his ideas:

1. Topoi are created, transmitted, and modified by cultural agents operating in historically specific circumstances; they are not unchanging archetypes or proto-images existing *beyond* culture.
2. Topoi are not limited to literary traditions: there are many kinds of topoi, including visual ones, and topoi can also manifest themselves as designs, such as machinery or a user interface.
3. Topoi undergo transformations that affect both their form and their idea; a topos can shift from one medium (carrier) to another.
4. Topoi should be analyzed not only *internally* within a topos tradition but also *externally* through relation to the cultural contexts within which they appear.
5. Not all topoi date from antiquity; some have emerged recently and may have short time spans.
6. Topoi should be researched as symptoms of both cultural continuities and ruptures.

THE ROLES OF TOPOI IN MEDIA CULTURE

Some of the roles topoi play in media culture can now be identified. At least three cases can be separated analytically, although in practice they are often interconnected and overlapping: (1) topoi as connectors to other cultural traditions; (2) topoi as commentaries and elaborations of media-cultural forms, themes, and fantasies; and (3) topoi as vehicles of the culture of attractions and as discursive formulas used by the culture industry. Each of these cases will be discussed separately and illustrated by a few examples.

Connecting to Other Cultural Traditions

No matter how dominant "media culture" may have become in the contemporary world, it arguably does not constitute an all-encompassing realm. In spite of the claims by media theorists with totalistic agendas, media culture does not form a total way of life or cover everything there is; it coexists with and may even be embedded in other cultural formations (the borderline between media culture and "everything else" is hard, perhaps impossible, to define). One may therefore expect topoi from other realms, including ancient ones, to reappear within media-cultural contexts. Indeed, this is often the case, as the following examples will demonstrate.

We will first revisit the "little people" we already encountered in the beginning of the chapter. In one of the manifestations of this topos it has been associated with another one. An early twentieth-century advertisement for the Victor Talking Machine Company shows an entire parade of Lilliputian performers emerging from the horn of a gramophone, while a slogan asks: "How did they all get in there?"[58] The answer—from the terrain of mythology, because the horn of the gramophone has become a manifestation of the ancient topos of *cornucopia,* or the horn of plenty. Although the choice of the horn to amplify the sound was originally dictated by acoustic reasons, in his imagination the advertising copywriter obviously pondered its shape and associated it with an age-old myth. Another layer of meaning was therefore added to the endeavors of the engineer, one that associated contemporary technology with a much longer temporal perspective.

Another example is the topos of the mysterious "hand of God" interfering in the lives of humans (often reaching out from the clouds or from behind a veil). It appears in both literary and iconographic traditions—punishing or protecting, bringing destruction, justifying "sacred monarchies" on earth, or writing prophetic messages on the wall *(Mene, mene, tekel, upharsin!).*[59] In the twentieth century this disembodied hand "from beyond" has been appropriated for secular purposes to give consumer products from the T-Model Ford to Karim Rashid's KONE vacuum cleaner for Dirt Devil *(sic)* a kind of otherworldly aura. It also appears in the graphic designs for *X-Devian: The New Technologies to the People System* (2006), an alternative, partly fictitious operating system-cum-artwork by the Spanish software artist Daniel García Andujar. Significantly, the hand holding the DVD in the fake campaign poster appears from below rather than from above.

Andujar's ironic reenactment of the topos in the context of the open-source movement points to a change of emphasis: the mysterious hand now belongs to a human posing as a (techno) god. This shift reflects, among other things, the evolution of interactive media.[60] The "disembodied" drawing hand (cut away from the rest of the body by the close-up framing) in operation in early animated cartoons by Émile Cohl and other pioneers bears witness to this, as well as—although in a more ambiguous way—the hand from above that sets the stage in the opening sequence of Roberto Rossellini's classic film *La macchina ammazzacattivi* (*The Machine That Kills Bad People,* 1948).[61] One is tempted to see the same topos manifested in popular "God's Eye" video games like *The Sims.* The notion, according to Matt Wolf, "refers to player's position as God, General, or Wizard floating above the world with total control over cities, armies and minions."[62] This may not correspond with earlier manifestations in a literal sense (the metaphysical hand has now materialized as the player's own interacting hand, coordinated with his own will), but a case can still be made about the simultaneous existence of a continuity and rupture with a deeply rooted topos tradition.

It could be suggested that the flow of topoi from ancient traditions to contemporary media culture is likely to become even more intense, rather than to dry out, in the era of the Internet. This has to do with the unprecedented access to cultural traditions the world over, thanks to rapidly growing digital online databases and ever more powerful search engines. The postmodern predilection for rummaging the archives is also a contributing factor.[63] The Internet could be characterized as an enormous topos transmitter (and perhaps as a topos generator as well). Malraux and Warburg may already have intuited something about this, but the possibility of such an enormous expansion of multimedial topos traditions escaped Curtius's more limited and academically oriented vision.

Commenting on Media-Cultural Forms, Themes, and Fantasies

Beside reenacting topoi from other traditions, media culture gives rise to its own (although they may sometimes prove to be just ancient topoi in disguise). To begin immediately with an example, one can evoke an iconographical motif that was often encountered in nineteenth-century cartoons: the photographer as a one-eyed monster. The hood under which the photographer had to be "hiding" to snap his pictures was the monster's body and the lens its single "cyclopic" eye. This topos can be identified as an early manifestation of the discourse on the cyborg, the hybridization of the biological and the technological. In one case the new monster roaming around was identified as a new species called "Elephans Photographicus" and thus was associated with the contemporary discussion on evolution that had been triggered by the publication of Charles Darwin's *Origin of Species* (1859).[64] It may well be argued that only in the late twentieth century did the cyborg become both a significant material-industrial force and a dominant cultural image, but media archaeology can demonstrate that its entry was anything but a sudden rupture.

The nineteenth century also witnessed the appearance of illustrations and photographs depicting women impersonating technology: for example, wearing camera hats and dresses coated with photographs, or outfits covered by illuminated lightbulbs. Such "dressing up in technology" is another topos that manifested itself both as imaginary projections and in the new realities of working life. Women working as telephone switchboard operators were "dressed up" in their headphones all day long and, indeed, could be argued to have became cyborgs of sorts as well.[65] An intriguing manifestation of such developments is the famous artwork *Electric Dress* created by the radical Japanese Gutai artist Atsuko Tanaka for her performances in the 1950s. Whether Tanaka was aware of the topos tradition anticipating her work is uncertain but unlikely.[66] One could also refer to public demonstrations of smart fabrics and cyberfashion in recent years.

Yet another nineteenth-century example is a topos that could be labeled "What is happening behind your back?"[67] In its most typical manifestation a man (often an officer) is represented kissing a girl left unguarded when her mother is peeping into a peep-show box. This topos jumped from device to device (peep show, magic lantern, telescope, kaleidoscope, Daguerreotype camera, etc.), justifying Peter Burke's call to "focus on the displacement or migration of a given schema or stereotype from one object to another."[68] By midcentury the man stealing the kiss had been transformed from a reckless officer seeking amorous encounters into a door-to-door salesman marketing stereoscopic photographs, acting when the unsuspecting husband is peering at his sample cards.[69]

In another variant of the same topos, already known around 1800, the man peeping into a peep-show box falls prey to a pickpocket, who is actually represented as a tax official stealing money from the people to fund the government's war efforts; media like broadcast television are still used much the same way, not only by governments but also by groups like televangelists. The same topos reappeared in the context of another peeping device, the mutoscope, a hundred years later, but here the political has been replaced by the homoerotic. In a French cartoon (1910) a male peeping into the mutoscope experiences the pickpocket's touches as erotic; the positions of the male bodies suggest anal intercourse.[70] Exactly the same variant reappeared in a series of video installations by Pierrick Sorin. The similarities make one wonder whether Sorin actually knew the topos or whether he grasped the idea spontaneously.[71]

Topoi that have been inspired by media spectacles may remain just stereotypical metaphors, but their recurrence may also point to wider concerns and cultural patterns. Although the topos "What is happening behind your back?" usually appears in comic episodes and may be dismissed just as a joke, it could also be read as a repeated warning about the risks of excessive media use. Too much immersion may upset one's social relations and disturb one's relationship to one's immediate physical surroundings, it seems to say. It functions, then, as a kind of discursive buffer softening the shocks caused by encounters with new media and the mediated environment. The theme is familiar from later debates, including those about television viewing and video gaming, although it may have been expressed by other metaphors as well.

The phantasmagoria, the kaleidoscope, dissolving views, the diorama, the moving panorama, and many other media-cultural phenomena have given rise to topoi.[72] Indeed, Curtius himself resorted to them when he wrote, "Not until late Antiquity is color in demand again—and then it is the color of a kaleidoscope."[73] And again: "New and ever new figures rise kaleidoscopically—rhetorical bravura pieces whose exuberance pours out like a cascade."[74] Many "media-cultural" topoi keep on appearing long after the thing they originally designated has materially disappeared. *Moving panorama* originally referred to a popular nineteenth-century spectacle.[75] As a topos, it came to manifest perceptual experiences, inner visions ("life passing before the mind's eye like a moving panorama at the moment of death"), religious revelations (God revealing his plans as a moving panorama in the sky), celestial mechanics, and many other purposes. In *Elvis' Search for God* (1998), Jess Stearns still described how Elvis "felt a surge of emotion, as the moving panorama of the gilded years floated by for a moment."[76] Although, as Curtius said, "the topos can be employed in any context," its manifestations are affected by the specific nature of that context.[77]

Media-related ideas may also traverse culture as "imaginary media" long before they materialize as artifacts. "Seeing at a distance" is such a topos. We encounter it already in discourses about magic mirrors, and in an intensified form in technocultural fantasies about the telectroscope, an imaginary anticipation of the television.[78] One the other hand, as Geoffrey Batchen has demonstrated, the desire to photograph seems to have emerged rather suddenly in the late eighteenth century, preceded by very few immediate fantasies.[79] However, once photography made its breakthrough, the discursive floodgates opened and the desire to photograph was translated into an intense topos activity.[80]

Promoting New Products

Aided by easier and easier access to cultural archives (in its simplest form, just by surfing the Internet), topoi are constantly reactivated by promoters of high technology; creators and publicists of films, video games, and music videos; and media artists.[81] This rarely happens systematically, in full awareness of the workings of the topoi. In fact, it often seems that topoi just happen to pop up in contemporary advertisements and other forms of popular representations and need to be pointed out and reconnected with the past by media archaeologists. It would be tempting to propose that topoi in some way think *through* cultural agents without being fully acknowledged, recalling Claude Lévi-Strauss's famous formulation about the way myths function in culture.[82] Such a conclusion is tempting but should be resisted because it would easily lead to unnecessary and totalistic hypotheses about collective unconsciouses, intelligences, or epistemes.

The use of topoi in promotional strategies exploits their attraction value but also their "nonattraction" value. Topoi are used to arrest the eye in accordance with the long traditions of the culture of attractions.[83] They provide a striking sight or textual formula that intrigues the observer. In commercial media culture their character is instrumental: they have been recruited to provide a product or spectacle with a certain historical or cultural surplus value acknowledged by the observer. Obviously the topos can have an effect by its invisibility, by its unremarkable and commonplace character. In such cases it is used to provide a mold for content that pretends to be something unprecedented, cut off from the past.

In either case topoi provide advertisers with tried-and-tested formulas that are used to introduce new consumer products by embedding them within molds the customers already know (whether they are aware of it or not). There seems to be a paradox here: the newest of the new is packaged in the oldest of the old. The most obvious example that comes to mind is from the marketing strategies of screen technology. No matter how "revolutionary" the product may be, advertisements show us, over and over again, humans or objects breaking through the screen, in either direction. The manifest features of such ads are of course constantly updated in accordance with fashions and stylistic trends, but underneath we detect an ancient topos associated with the history of illusionistic representation. Figures have been stepping in and out of paintings for millennia; they are still performing stunts on today's flat-panel plasma screens.

The recurrence of the "traversing the screen" topos may be motivated by the need to fight consumer resistance toward the new, although in a postmodern culture that readily embraces high technology it may have more to do with appealing to consumers' love of pastiche, nostalgia, and cultural sound bites. Such issues also occupy industrial design, preoccupied with finding the right ratio between futuristic and retro styles (retro-futuristic is one option). Early TV sets were often enclosed in wooden cabinets that made them look like a traditional piece of furniture, while Jonathan Ive's original iMac (1999) displayed its "inner organs" through its acrylic plastic case. Apple's advertisements tried to make most out of it, displaying the computer from the side rather than from the front, as had nearly always been the case. The campaign broke with the "breaking through the screen" tradition, but it may well have reactivated the topos of the little people, at least in some consumers' minds: the inside of the iMac was made to look like a miniature world that could well have been inhabited by little computer people.

The case of the little people demonstrates that cultural subjects do not consume representations provided by the industry as such. Users developed and disseminated their own beliefs and even tested them in action, pushing food through holes inside TV sets, stalking behind their sets to see the little people leave their workplace, or even attempting to break the screen physically to free them.[84] Today's beliefs associated with media still circulate by oral communication (not the least via mobile phones), but they are also increasingly being spread by homepages, blogs, and social networking sites such as Facebook, Myspace, and YouTube. The spreading of topos traditions is becoming viral, deliberately exploited by industrial players but also created and modified by the users themselves. Understanding how age-old topos traditions are co-opted and exploited by the media industry and at the same time discussed and transformed within online communities has become an increasingly important task for media archaeology.[85]

PLAYING *CACHE-CACHE* WITH THE LITTLE PEOPLE

Why pursue media archaeology? Why spend time tracing the elusive paths of the topoi? The answer is no longer the same—or at least not *quite* the same—as the one that motivated Curtius to accomplish his Herculean task. Although it could be argued that much general knowledge about the world and the history of the humankind has degenerated into sound bites useful in a television quiz show but hopelessly estranged from contexts in which they would really make sense, there are developments countering this trend. The digitization of archives is progressing fast, and more and more of them can be accessed online, in some cases for free. To name just one effort, Google Books is making millions of books, magazines, and other documents available on the Internet. Content-based searches allow researchers to look for specific information from *inside* these documents, many of which have been utterly forgotten. Such information is practically never listed in book indexes or library catalogs. This is an unprecedented opportunity for media archaeologists.

The Internet also provides a platform for collective efforts from which media archaeology can profit. *The Dead Media Project,* initiated by Bruce Sterling in 1995, produced during the years of its existence a large number of working notes on early media forms written by the members of the list.[86] The extensive Web site "Early Visual Media," which characterizes itself as "a historical window to early vintage visual media archeology," is the work of a single individual, Thomas Weynants.[87] A blog named "The History of the Button" focused on a mundane and banal interface that its daily use had made invisible, proving that it had a complex and intriguing history.[88] By inviting Web users to contribute their findings, the blog was able to uncover many forgotten uses and sources. It would have been difficult for a single scholar to gather all this information. Of course, such Web sites only provide raw material; it is the task of the media archaeologist to draw the conclusions.

In spite of the postmodern mania for storing and archiving, there are trends that still aim at effacing the past, or at least selectively rewriting it. High-tech industries and their marketing machineries, as well as the entertainment business, are constantly engaged in this dubious activity. Corporate histories are interested only in telling their side of the story, which is not only partial but meant to present the corporation and its interests in the best possible light. Every new form of high technology is meant to make its predecessors feel obsolete overnight, good only for the dump or an obsessive collector's basement—even if they remain perfectly functional. Advertisements abound with slogans like "unique breakthrough," "unprecedented achievement," "never before seen." Such formulas themselves could be treated as topoi. Unfortunately, there are customers who take their messages at face value without being able to detect the topos traditions beneath their glossy surfaces.

Excavating the topoi operating in media culture is therefore a more important task than providing an intellectual pastime for career academics. If we accept the idea that media culture is not just about hard facts but also about discourses that envelop their manifestations, expressing, extending, and questioning their underlying assumptions, topos study can develop into a tool for cultural critique. Far from aiming at reducing "the creatively new to something already existing, something finished" (to recall Curtius's comment about Bergson), media archaeology can help us understand the reverse: the things that are genuinely new and progressive. To achieve this, sifting cultural material through media archaeological "topos filters" can be useful and can provide unexpected results.

As attractive as its prospects for explaining "almost anything" may seem, we should avoid turning topos study into a quest for phantoms. It may be possible to read everything semiotically as a sign, but we should resists the temptation to interpret everything as a topos. We should also avoid seeing the topos as a kind of monolithic entity. The little people are not really "little people," even in the sense of a clearly delineated discursive object. They are playing *cache-cache* with the researcher in an environment that has countless places to hide behind other cultural entities; sometimes these entities seem to merge with the object of the investigation. It is best to conceive the topos as a temporary manifestation of a persisting cultural tradition, linked by numerous threads with other cultural phenomena both from the past and from the cultural context within which the topos has made its appearance. Making sense of this intriguing network of interconnections is the real challenge for the topos approach within the wider framework of media archaeology.

NOTES

The section epigraph within the chapter is from Ernst Robert Curtius, *European Literature and the Latin Middle Ages,* trans. Willard R. Trask (1953; repr., London: Routledge and Kegan Paul, 1979), viii.

1. The ad "Samsung Torino," 2005, created by Fido Film, Sweden.

2. By Chas. Addams, reprinted in Les Brown and Sema Marks, *Electric Media* (New York: Harcourt Brace Jovanovich, 1974), 100.

3. The Web site "I Used to Believe: The Childhood Beliefs Site" contains numerous testimonies from private people; see www.iusedtobelieve.com/, accessed January 24, 2009. Compare this with reminiscences about radio listening from the 1930s in Ray Barfield's *Listening to Radio, 1920–1950* (Westport, CT: Praeger, 1996), 16–17.

4. "Will you open your door to all the music of all the world?" brochure advertising the Victrola XVI, 1907–21, and "How did they all get in there?" ad for the Victor VI, both reprinted in Arnold Schwartzman, *Phono-Graphics: The Visual Paraphernalia of the Talking Machine* (San Francisco: Chronicle Books, 1993), 48, 38.

5. For example, in his three "optical theatres," titled *Quelques inventions remarquables* (2003). See *Vom Funken zum Pixel: Kunst + Neue Medien* (Berlin: Berliner Festspiele / Nicolai, 2007), 168–71; for other works, see Pierre Giquel, *Pierrick Sorin* (Paris: Hazan, 2000).

6. Arthur Conan Doyle believed in fairies and was an ardent supporter of the authenticity of the so-called Cottingley fairies, photographs taken by two Yorkshire schoolgirls supposedly showing them communicating with fairies in the family garden. The fairies were later revealed as cutout figures on paper derived from the Victorian girls' culture of collecting and creating scraps. See Susan Schmit, "Conan Doyle: A Study in Black and White," in *The Perfect Medium: Photography and the Occult,* ed. Jean-Loup Champion (New Haven: Yale University Press, 2005), 93–94. Photography, a product of advances in chemistry and optics, was often associated with esoteric beliefs. Modern-day folklore was created around it.

7. Peter Burke, *Varieties of Cultural History* (Ithaca: Cornell University Press, 1997), 189.

8. I am aware of the existence of other concepts such as the meme, postulated as the culturally transmitted counterpart of the gene by Richard Dawkins in his *The Selfish Gene* (Oxford: Oxford University Press, 1976). I find the notion of the meme rather limited and problematic and too reliant on the discussion and theory formation around natural selection; I prefer the topos concept, which emerged from the context of both cultural praxis and analysis.

9. See Erkki Huhtamo, "Elements of Screenology: Toward an Archaeology of the Screen," *Iconics: International Studies of the Modern Image* 7 (2004): 31–82, "The Pleasures of the Peephole: An Archaeological Exploration of Peep Media," in *Book of Imaginary Media: Excavating the Dream of the Ultimate Communication Medium,* ed. Eric Kluitenberg (Rotterdam: NAi Publishers, 2006), 74–155, and "Cyborg Is a Topos," in *Synthetic Times: Media Art China 2008,* ed. Fan Di'An and Zhang Ga (Beijing: National Art Museum of China; Cambridge, MA: MIT Press, 2008), 52–71.

10. An early formulation was Erkki Huhtamo, "From Kaleidoscomaniac to Cybernerd: Toward an Archeology of the Media," in *Electronic Culture: Technology and Visual Representation,* ed. Timothy Druckrey (New York: Aperture, 1996), 296–303, 425–27.

11. Some early commentators suggested translating *Toposforschung* as *topology,* but I have chosen to use *topos study* to avoid confusion with the many other uses of the word *topology.*

12. Curtius's most important work from that period is "Zur literarästhetik des Mittelalters II," *Zeitschrift für romanische Philologie* 58 (1938): 129–232.

13. Curtius, *European Literature,* viii.

14. Ibid., 70.

15. See "Topos," in the *1911 Encyclopedia Brittanica,* http://encyclopedia.jrank.org/articles/pages/5856/Topos.html.

16. They also fall victim to deliberate parodies, as when Don Quixote explains the similarity between a play and the life of man for Sancho Panza, who replies: "A splendid comparison, though not so new that I have not heard it many a time before" (Curtius, *European Literature,* 141).

17. Ibid., 184.

18. I encountered it when I was researching French sixteenth-century travels to Italy in Rome in 1983–84. It could be compared to one Curtius discusses, "I bring things never said before" (Cur-

tius, *European Literature,* 85–86). Writing about travelers to Italy, Peter Burke emphasizes "the rhetorical aspect of their descriptions [in their travel journals and diaries], notably the importance of commonplaces and schemata." See his "The Discreet Charm of Milan: English Travellers in the Seventeenth Century," in *Varieties of Cultural History,* 94.

19. There is much literature on the Grand Tour, but its topoi have not been analyzed. A standard work is Christopher Hibbert, *The Grand Tour* (New York: G.P. Putnam's Sons, 1969). Hibbert writes briefly about the role of guidebooks (16) and the rules that governed travel (19–21).

20. One devastating critique is Peter Jehn's "Ernst Robert Curtius: Toposforschung also Restauration," in *Toposforschung: Eine Dokumentation,* ed. Peter Jehn (Frankfurt: Athenäum, 1972), vii–lxiv. Jehn considers Curtius's notion of topos subjective, ahistorical, and misleading, "the false result of a-historical equations of various terms of historical topoi" (x, my translation).

21. Arthus R. Evans Jr., "Ernst Robert Curtius," in *On Four Modern Humanists: Hoffmansthal Gundolf Curtius Kantorowicz,* ed. Arthus R. Evans Jr. (Princeton: Princeton University Press, 1970), 117–18 n. 59. The medievalist F.P. Pickering found Curtius's use of the topos concept "a dangerous simplification," accusing him of packing under the same label "not only statements, but any recurrent pattern of argument, and traditional metaphors and similes." F.P. Pickering, "On Coming to Terms with Curtius," *German Life and Letters,* n.s., 11 (July 1958): 335.

22. Berthold Emrich, "Topik und Topoi," in *Toposforschung,* ed. Max L. Baeumer (Darmstadt: Wissenschafliche Buchgesellschaft, 1973), 214.

23. Curtius, *European Literature,* 128.

24. Alexander Gelley, "Ernst Robert Curtius: Topology and Critical Method," *MLN* 81 (December 1966): 579–94.

25. Curtius, *European Literature,* 381, 82.

26. Ibid., 8–9. Both were from Bergson's *L'évolution créatrice* (1907).

27. Ibid., 391.

28. Another influence was Arnold Toynbee's enormous *A Study of History* (1934–61), a comparative world history based on the author's identification of twenty-one civilizations. Curtius's own comparisons concern only Western traditions and are largely limited to textual traditions.

29. Jung presented his idea in condensed form in "Archetypes of the Collective Unconscious [1934]," in *The Basic Writings of C.G. Jung,* ed. Violet Staub de Laszlo (New York: Modern Library, 1959), 286–326, quotation on 288. Maud Bodkin applied Jungian archetypes to the study of literature already in 1934 in her classic *Archetypal Patterns in Poetry: Psychological Studies of Imagination* (1934; repr., London: Oxford University Press, 1971).

30. Jolande Jacobi, *Complex/Archetype/Symbol in the Psychology of C.G. Jung,* trans. Ralph Manheim (Princeton: Princeton University Press, 1974), 53. Originally published as *Komplex, Archetypus, Symbol in der Psychologie C.G. Jungs* (1957).

31. Ibid., 52.

32. Curtius, *European Literature,* 101.

33. Ibid., 105.

34. Musical education had been closely linked with the development of rhetoric. On musical topoi, see ibid., 78; on the attack on visual arts, see 14–15.

35. The formula is often quoted without reference. According to Victor Erlich, it comes from Wölfflin's *Kunstgeschichtliche Grundbegriffe* (Berlin, 1917). See Erlich, *Russian Formalism: History-Doctrine* (1955; repr., The Hague: Mouton, 1980), 59. Discussing the influence of this concept on the Russian formalists, the art historian Marga van Mechelen has characterized it as a "topoi" *[sic]* in "M.M. Bakhtin and German 'Kunstwissenschaft,'" abstract, 2002, http://home.hum.uva.nl/oz/mechelenm/abstracts.htm.

36. Ernst Robert Curtius, "Zum Begriff einer historischen Topik," extract from "Zur Liter-

arästhetik des Mittelalters II" (1938), in Jehn, *Toposforschung,* 9. Quotation translated by Gelley in "Ernst Robert Curtius," 592. This brings to mind the "anonymous history" propounded by Siegfried Giedion in *Mechanization Takes Command: A Contribution to Anonymous History* (1948; repr., New York: W.W. Norton, 1969). Giedion mainly analyzed material culture—"the tools that have molded our present-day living" (2). Anonymous history looked for a new synthesis between *Geistesgeschichte* and positivism. It was "directly connected with the general, guiding ideas of an epoch. But at the same time it must be traced back to the particulars from which it rises" (4).

37. E.H. Gombrich, *Art and Illusion: A Study in the Psychology of Pictorial Representation* (1960; repr., London: Phaidon Press, 1977), 14.

38. Aby Warburg, "Italian Art and International Astrology in the Palazzo Schifanoia in Ferrara," paper delivered at the Tenth Art-Historical Congress, Rome, October 1912, trans. David Britt and quoted in E.H. Gombrich, "Aby Warburg: His Aims and Methods: An Anniversary Lecture," *Journal of the Warburg and Courtauld Institutes* 62 (1999): 270.

39. Richard Woodfield, "Warburg's 'Method,'" in *Art History as Cultural History: Warburg's Projects,* ed. Richard Woodfield (Amsterdam: G+B Arts International, 2001), 260. Warburg's texts have been collected as *The Renewal of Pagan Antiquity: Contributions to the Cultural History of the European Renaissance,* trans. David Britt (Los Angeles: Getty Research Institute, 1999).

40. This was reflected in the contents of Warburg's Die Kulturwissenschaftliche Bibliothek Warburg, his private "cultural scientific library." After Warburg's death and the rise of the Nazi regime, it was moved to London and became the famous Warburg Institute of the University of London.

41. Panofsky, "Iconography and Iconology: An Introduction to the Study of Renaissance Art" [1939], in his *The Meaning in the Visual Arts: Papers in and on Art History* (Garden City, NY: Doubleday Anchor Books, 1955), 26–54. There are three levels: preiconographical description, iconographical analysis, and iconological interpretation. The first is the description of "objects and events whose representation by lines, colors and volumes constitutes the world of motifs" (33). Iconographical analysis is concerned with "the subject matter or meaning of works of art, as opposed to their form" (26). It connects "artistic motifs and combinations of artistic motifs (compositions) with themes or concepts" (29) but remains limited in its scope, a tool or ancillary. Iconology treats "the work of art as a symptom of something else which expresses itself in a countless variety of other symptoms" (31), which can be theological, philosophical, political, and so on. Iconology is iconography taken out of isolation and turned interpretative.

42. Panofsky wrote about iconographical "types" and iconological "cultural symptoms" or "symbols" and Gombrich about "schemata." See Panofsky, *Meaning in the Visual Arts,* 41, and Gombrich, *Art and Illusion,* passim. Influenced by the psychology of perception, Gombrich analyzed visual style, not in terms of direct observation of nature, but in terms of the use of inherited schemata.

43. See Petri Vuojala, *Pathosformel: Aby Warburg ja avain tunteiden taidehistoriaan* [Pathosformel: Aby Warburg and the Art History of Emotions] (Jyväskylä: University of Jyväskylä, 1997).

44. Gombrich, *Art and Illusion,* 20. *Pathosformel* originally referred to the way in which early Renaissance artists borrowed features with strong psychic expressions from the artworks of the antiquity. Over the years Warburg began using it in more loose and metamorphic ways that brought the term closer to Curtius's *topos.*

45. Haskell thinks Curtius's reaction may have been caused by the way Johan Huizinga used visual evidence in his *The Autumn of the Middle Ages.* Francis Haskell, "Art and History: The Legacy of Johan Huizinga," in *History and Images: Towards a New Iconology,* ed. Axel Bolving and Philip Lindley (Turnhout, Belgium: Brepols, 2003), 14–15. For a broader discussion about the role of visual evidence in historical scholarship, see Haskell's *History and its Images: Art and the Interpretation of the Past* (New Haven: Yale University Press, 1993). The last chapter deals with Huizinga, but Curtius is not mentioned.

46. Warburg characterized *Mnemosyne,* started in 1923, as an "iconology of the intervals," involving tensions, analogies, contrasts, and contradictions between the chosen pictures. See Philippe-Alain Michaud, *Aby Warburg and the Image in Motion,* trans. Sophie Hawkes (New York: Zone Books, 2004), 244, 251–53. *Mnemosyne*'s approach toward tradition was more complex and radical than Curtius's emphasis on the continuity of topos traditions.

47. "Museum without Walls" now forms the first section of Malraux's *The Voices of Silence,* trans. Stuart Gilbert (1953; repr., Princeton: Princeton University Press, 1978). The analogy between Curtius and Malraux has been pointed out by Evans, "Ernst Robert Curtius," 120–21.

48. Malraux, *Voices of Silence,* 24.

49. Curtius, *European Literature,* ix.

50. In this sense it has some parallels with New Criticism, a form of literary scholarship that was emerging at the same time in America. It emphasized the importance of close reading of literary texts and rejected explanations referring to extratextual sources. However, it emphasized textual autonomy, while Curtius emphasized connections between texts.

51. Ernst Ulrich Grosse, "Curtius et les *topoi,*" in *Ernst Robert Curtius et l'idée d'Europe: Actes du Colloque de Mulhouse et Thann des 29, 30 et 31 janvier 1992, organisé par Jeanne Bem et André Guyaux* (Paris: Honoré Champion Éditeur, 1995), 94. For Peter Burke "the great weakness" of Curtius's study was his treatment of the commonplace as a constant, something he felt Warburg and his followers had avoided. See his *What Is Cultural History?* (Cambridge: Polity Press, 2004), 27. Gelley had made a similar observation: "In spite of his preoccupation with historical method, his conception of a text is remarkably ahistorical. Fundamentally, he viewed literary texts as coextensive and timeless." Alexander Gelley, "Ernst Robert Curtius: Topology and Critical Method," *MLN* 81 (December 1966): 590.

52. Curtius, *European Literature,* 104.

53. Grosse, "Curtius et les *topoi,*" 104–6.

54. Leo Spitzer, review of Curtius's *European Literature, American Journal of Philology* 70, no. 4 (1949): 428.

55. See the interdisciplinary collection of interventions *Topik: Beiträge zur interdisziplinären Diskussion,* ed. Dieter Breuer and Helmut Schanze (Munich: Wilhelm Fink, 1981).

56. Agnes Launhardt, "Topik und Rhetorische Rechtstheorie: Eine Untersuchung zu Rezeption und Relevanz der Rechtstheorie Theodor Viehwegs" (PhD diss., Heinrich-Heine-Universität Düsseldorf, 2005), deposit.ddb.de/cgi-bin/dokserv?idn=977181979&dok_var=d1&dok_ext=pdf&filename=977181979.pdf. See also Norbert Horn, "Topik in der rechtstheoretischen Diskussion," and Theodor Viehweg, "Zur Topik, insbesondere auf juristischem Gebiete," in Breuer and Schanze, *Topik,* 57–64 and 65–69, respectively.

57. See Oskar Negt, "Die Funktion der sozialen Topik" (1971), and Wolfgang Fritz Haug, "Der Topos der 'Blindheit' in der Faschismus-Diskussion westdeutscher Hochschullehrer" (1967), in Jehn, *Toposforschung,* 181–87 and 209–12, respectively; Siegwart Berthold, "Der Topos von der falschen Freundlichkeit der Verkäufer," in Breuer and Schanze, *Topik,* 213–29.

58. "How did they all get in there?" ad, in Schwartzman, *Phono-Graphics,* 38. James N. Weber caught the cornucopia reference in his *The Talking Machine: The Advertising History of the Berliner Gramophone and Victor Talking Machine,* ed. Eric Skelton (Midland, Ontario: Adio, 1997), 23.

59. Michelangelo's fresco of God giving life to Adam by a touch between their fingers (on the ceiling of the Sistine Chapel in the Vatican) has turned into a topos that could be considered a variant of the "God's hand" topos. It has been used many times in media culture from Nokia's "Connecting People" logo to a spoof in the poster for the Jack Black film *Tenacious D in the Pick of Destiny* (2006). In the latter, God's hand reaching out from a cloud has a competitor, an awkward-looking

hand appearing from a circle of fire below. The Black character is also reaching out his hand, in a pose reminiscent of Michelangelo's Adam.

60. This was anticipated by an extraordinary mechanical automaton by Friedrich von Knauss (1764). Instead of writing prophesies of doom, the mechanical hand appearing from a cloud now appeals to God for a pleasurable future, reflecting Enlightenment optimism with its message: "In this house may God never put limits on prosperity or time." The automaton shows that topoi can be embedded in the designs of technological devices. See Barbara Maria Stafford and Frances Terpak, *Devices of Wonder: From the World in a Box to Images on a Screen* (Los Angeles: Getty Research Institute, 2001), 279–80.

61. In the film the creative hand of the human using technology (photography) is also related to both God and the devil. (Rossellini was a devout Catholic). The opening sequence also evokes the topos of *theatrum mundi.* See my "'Shaken Hands with Statues . . .': On Art, Interactivity and Tactility," in *Second Natures,* ed. Christiane Paul (Los Angeles: Regents of the University of California, 2006), 17–21.

62. Matt Wolf, "God's Eye Views," *Heeb Magazine,* July 2004, www.eddostern.com/texts/HEEB.htm.

63. For an archaeology of archives, see Wolfgang Ernst, *Das Gesetz des Gedächtnisses: Medien und Archive am Ende (des 20. Jahrhunderts)* (Berlin: Kulturverlag Kadmos, 2007). Ernst defines his method as media-archaeological, drawing mostly on Foucault, although Kittler's thinking can be sensed in the background (31–41). Ernst situates his method in the intersection of Foucault's archaeology of knowledge, media science, and archaeology (31).

64. Huhtamo, "Cyborg Is a Topos."

65. Ellen Lupton, *Mechanical Brides: Women and Machines from Home to Office* (New York: Cooper-Hewitt National Museum of Design; Washington, DC: Smithsonian Institution; Princeton: Princeton Architectural Press, 1993), 29–41.

66. Huhtamo, "Cyborg Is a Topos," 64–66.

67. See Huhtamo, "Elements of Screenology" and "Pleasures of the Peephole."

68. Burke, *Varieties of Cultural History,* 178.

69. On the traveling salesmen for stereoscopic photographs and their tactics, see John Plunkett, "Selling Stereoscopy, 1890–1915: Penny Arcades, Automatic Machines and American Salesmen," *Early Popular Visual Culture* 6 (November 2008): 239–55. Plunkett does not refer to this topos.

70. Reprinted in Stephen Bottomore, *I Want to See This Annie Mattygraph: A Cartoon History of the Coming of the Movies* (Pordenone: Le giornate del cinema muto, 1995), 42. The peeper says: "When I see a naked woman, I can almost feel her caresses." On the same page there is a much tamer British variation of the same motif (published two months later). The caption says: "Jones (looking into animated-picture machine): Oh, I say, that's funny—ha, ha! A chap having his pocket picked—ha, ha!"

71. Giquel, *Pierrick Sorin,* 31–33.

72. About the discursive meaning of *kaleidoscope,* see Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: MIT Press, 1990), 113–16. Similar discursive meanings can be attached to different media. In his *Private Lives of William II and His Consort, and Secret History of the Court of Berlin* (New York: Fischer's Foreign Letters, 1898), 148, Henry William Fischer wrote, "It is said that one's whole life kaleidoscopically passes before the mind at the moment of death." Instead of "kaleidoscopically," references to other media, such as "like a moving panorama" and later "like a strip of film," are also encountered.

73. Curtius, *European Literature,* 192.

74. Ibid., 94.

75. See Erkki Huhtamo, *Illusions in Motion: A Media Archaeology of the Moving Panorama and Related Spectacles* (forthcoming).

76. Jess Stearns, *Elvis' Search for God* (Murfreesboro, TN: Greenleaf Publications, 1998), 19.

77. Curtius, *European Literature,* 94.

78. Jurgis Baltrusaitis, *Le miroir: Révélations, science-fiction et fallacies. Essai sur une légende scientifique* (Paris: Aline Elmayan and du Seuil, 1978), 204–9. Discussing views seen in magic mirrors, Baltrusaitis uses the anachronistic expression *téléviseur catoptrique* (catoptric television) (208).

79. Geoffrey Batchen, *Burning with Desire: The Conception of Photography* (Cambridge, MA: MIT Press, 1997), 31–36. An exception was Tiphaigne de La Roche's allegorical novel *Giphantie* (1760), which contained a description of a hall with camera obscura–like windows that faithfully reproduced static views of the agitated seascape outside.

80. See Huhtamo, "Cyborg Is a Topos," and "Pockets of Plenty: An Archaeology of Mobile Media," in *The Mobile Audience,* ed. Martin Rieser (Amsterdam: Rodopi, forthcoming). Works by unconventional photography historians like Bill Jay and Rolf H. Krauss have uncovered material that is of interest for media archaeology. See Jay's Web site, www.billjayonphotography.com/ (accessed March 8, 2009).

81. See Erkki Huhtamo, "Time Machines in the Gallery: An Archeological Approach in Media Art," in *Immersed in Technology: Art and Virtual Environments,* ed. Mary Anne Moser (Cambridge, MA: MIT Press, 1996), 232–68.

82. Claude Lévi-Strauss, *Le cru et le cuit* (Paris: Plon, 1964), 20. The life-size cutout cardboard figures of policemen used in supermarkets to psychologically discourage shoplifting are a reenactment of a tradition already known in the Baroque era (to frighten thieves or to surprise guests at the palaces of the nobility). It is possible that neither the advertisers nor the consumers are aware of this hidden lineage. The painted life-size figures seen at amusement parks (and earlier at photographers' studios) that allow a person to insert his or her head to be photographed are a variant of the same tradition.

83. The discussion on the culture of attractions began in the context of early cinema research in the early 1980s. See Tom Gunning's "The Cinema of Attraction: Early Film, Its Spectator and the Avant-Garde," *Wide Angle* 8 (Fall 1986): 63–70.

84. Posts on the theme "People on TV shows live inside the television" for I Used to Believe: The Childhood Beliefs Site, n.d., www.iusedtobelieve.com/media/tv/people_on_tv_live_in_it/ (accessed August 14, 2009).

85. Media archaeology can profit from folkloristics. See Linda Dégh, *American Folklore and the Mass Media* (Bloomington: Indiana University Press, 1994). An issue on which these could cooperate is the vogue for medievalism in contemporary culture, manifested in video games, popular literature, and other aspects of media culture. See Eddo Stern, "A Touch of Medieval: Narrative, Magic and Computer Technology in Massively Multiplayer Computer Role-Playing Games," in *Computer Games and Digital Culture Conference, Proceedings,* ed. Frans Mäyrä (Tampere: Tampere University Press, 2002), www.eddostern.com/texts/Stern_TOME.html.

86. The list is "dead" at the time of writing; the existing database of working notes at www.deadmedia.org/, accessed March 9, 2009, and now offline, is promised, as of June 23, 2010, to go back online "in the future."

87. www.visual-media.be/ (accessed August 14, 2009).

88. The site evolved into the Web site Push Click Touch (www.pushclicktouch.com/blog).

3

On the Archaeology of Imaginary Media

Eric Kluitenberg

Imaginary media mediate impossible desires. As such they can be considered impossible machines. Because of their impossibility they appear to belong to the domain of pataphysics, the realm of imaginary solutions, or the study of *un*logic. They would seem to be entirely fictional creations, objects that exist only as literary or folkloristic imaginaries. If this were so, then it would be most straightforward to deal with imaginary media as purely narrative devices. They would then in simplest terms be regarded as stories that convey what technological media are seen to be capable of. More often than not, the expectations contained in such imaginaries far exceed that what actual media machines are actually capable of doing. However, impossible desires are also ascribed to or projected onto actual media machines both by their designers and by the public. The transition between imaginary and actual media machines, in terms of their signification, can be almost seamless. Thus the imaginaries of imaginary media tend to weave in and out of the purely imagined and the actually realized media machineries. Because impossible desires can never be fully realized or satisfied, imaginary media exceed the domain of apparatuses (realized media machines) and their "histories." They articulate a highly complex field of signification and determination that tends to blur the boundaries between technological imaginaries and actual technological development.

The archaeology of imaginary media is an attempt to shift attention somewhat away from a history of the apparatus and to focus on the imaginaries around technological media—communication media in particular—of both realized and unrealized media machines.[1] The archaeology of imaginary media also suggests a shift away from the utilitarian and toward the phantasmatic in "excavating" these imaginaries from the histories of technology and the media and from the (media) practices of everyday life. The aim of this "archaeology" is not to establish a history or a set of lineages of media and technological imaginaries. Rather, it is to study these imaginaries in action across different historical and discursive settings and contexts.

An approach that foregrounds the phantasmatic and the imaginary is certainly not entirely new. Erkki Huhtamo, for instance, pointed to the need for a more discursive understanding of media early on, citing the cultural historian Carolyn Marvin: "The history of media is never more or less than the history of their uses, which always leads us away from them to the social practices and conflicts they illuminate."[2] Seen from such a point of view, Huhtamo contends, "unrealized 'dream machines,' or discursive inventions (inventions that exist only as discourses), can be just as revealing as realized artefacts."[3] If media archaeology offers possibilities to venture into the realms of both the realized and the imaginary, with the obvious intention of showing how these two domains influence each other, then the archaeology of imaginary media is a suggestion to shift attention to the domain of the imaginary and the unrealizable for both realized and unrealized media machines.

This investigation has proven to be highly productive. In February 2004 De Balie, a center for culture and politics in Amsterdam, invited theorists, writers, and filmmakers to take part in a three-day lecture program and minifestival to explore the speculative concept of imaginary media.[4] This led to the publication of a book titled *Book of Imaginary Media* in 2006.[5] The project revealed, first, how permeable the boundaries between the domains of imaginary and realized media can be, and second, how both domains continuously help constitute each other. The archaeology of imaginary media should, however, not be understood as a "theory" of imaginary media. It does not provide a singular formula to designate what imaginary media "are," what their essence or nature is or what it might be. The aim of this undertaking is much more to show how indistinct the boundaries and demarcations of media and technological imaginaries are.

An issue that has concerned me for a long time is the recurrence of similar patterns in technological imaginaries across different historical settings. At first sight these often seem strikingly similar, but on closer scrutiny their significations turn out to be fundamentally heterogeneous, at times even deeply contradictory or mutually exclusive. For example, a closer examination of the historical significations of the mechanical clockwork as a symbolical or allegorical device reveals that at least three completely contradictory significations of this "master medium" can be found in different historical settings. In scholastic teachings the clockwork was seen as God's intervention bringing divine regularity to the erratic flow of earthly existence. In Cartesian terms the clockwork was reconfigured into a conceptual model of the heavens and of animal and human bodies.

There it became a testimony to the strength of human invention and discovery and the power of the human mind to assert control over nature. As such it was seen primarily as an extension of human agency. Under the conditions of large-scale industrialization the same mechanical clockwork became a symbol of inhuman oppression, something Andreas Huyssen has called a "blindly functioning world-machine."[6] How can we accommodate such completely contradictory significations of a machinery so central to human development for almost six centuries?

If we are to follow such a "discursive" approach, then the area of media archaeology is clearly not concerned with an excavation of apparatuses or with the construction of lineages of these apparatuses, let alone with unidirectional histories. Instead, the archaeology of imaginary media tries to uncover the heterogeneity and multiplicity of its object. In doing so, it raises a whole series of methodological complications that in a larger sense can also be raised with regard to the idea and practice of media archaeology.

CRITICISMS OF THE "ARCHAEOLOGICAL APPROACH"

Before developing the concept of imaginary media further, I would like to attend to some more general criticism that has been raised about the validity of the "archaeological" approach to writing media "history." Such criticism was voiced by Timothy Druckrey at the end of his concluding lecture to the "Archaeology of Imaginary Media" event in Amsterdam in 2004.[7] In this discussion, as well as in many other instances, the notion of archaeology denoted simultaneously the uncovering of physical objects from the dustbin of the past and the "archaeology of knowledge" proposed by Michel Foucault. I will briefly examine to what extent the archaeology of imaginary media actually meets the requirements of Foucault's methodology (if it can be labeled as such) and to what extent it falls short of it.

The most general concern Druckrey raised was whether the explorations presented under the label "imaginary media," and to some extent more generally under the rubric of "media archaeology," could be legitimately called an archaeology, in the sense of Michel Foucault's understanding of archaeology as discourse analysis, or whether it should more properly be understood as cultural history. Although Foucault himself suggested that "other archaeologies"—beside the ones presented in his *Archaeology of Knowledge*—were also possible, his specific reduction of this "archaeological approach" to the systematic description of discourse objects appears to run counter to the "materialist" orientation of a history or histories of the (media) apparatus.[8]

The danger, according to Druckrey, lies in subsuming too much of what in essence might be considered a more traditional approach to history under the rubric of "archaeology." As a result, the term is used in an almost prismatic fashion. As a result it risks losing its real meaning, namely, the description of discourses as practices obeying certain rules that are irreducible to any other, thus defining their specificity across different domains. Media archaeology can refer to this more narrow understanding of the "archaeological approach" and can be inspired by it, but it is hardly ever truly coextensive with it.

Furthermore, there seem to exist pertinently different genres within archaeological efforts to (un)write media history. Friedrich Kittler's rather more materialist approach (almost a "hardware analysis," one could say) should be clearly distinguished from the much more poetic approach of Siegfried Zielinski's "*an*archaeology of the media." It is clear that media archaeology is not (yet) a clearly demarcated discipline. A further issue—raised by Erkki Huhtamo—is whether it should be understood as a "field" (of study) or—as it is treated here—as an "approach" toward the (un)writing of media history.

Druckrey specifies his criticism when he writes: "The mere rediscovery of the 'forgotten,' the establishment of oddball paleontologies, of impractical genealogies, uncertain lineages, the 'excavation' of antique technologies or images, the account of erratic technical developments, are, in themselves, insufficient to the building of a coherent discursive methodology." He concludes: "What is most necessary for the field of 'media archaeology' is to both distinguish it as a nascent discipline and to set some boundaries in order to avoid its subjectivation."[9]

Media archaeology can most productively be read as an alternative to the dominant writing of media history, whose implicit construction of a unitary narrative of progress—the idea that the course of technological development over time in and of itself equals progress, the predominant orientation regarding the realized and successful media forms and apparatuses—tends to marginalize the significance of failed projects, the shards of media history, and to exclude the role of the phantasmatic in media culture. Media archaeology should be seen primarily as a critique of progress, yet it is also *Zeitkritik:* it speaks to the present and critiques the present in examining its historical" objects. It does this primarily by imposing limits on the viability of linear extrapolation of perceived (and imagined) conditions into the future.

In his recent book *Deep Time of the Media* (2006), Zielinski has proposed a series of important reconsiderations of his approach to media archaeology. He adopts a "paleontological" view of media development, loosely modeled after insights derived from the work of the paleontologist Stephen J. Gould. Gould emphasized earlier stages in the development of life on our planet that exhibited a far greater biological diversity than our own time. On the basis of his findings he discarded any suggestion of progress in biological development or of a linear progression in the development of the species on this planet.

Zielinski states in the introduction to his book:

> I use certain conceptual premises from paleontology, which are illuminating for my own specific field of inquiry—the archaeology of the media—as orientations: the history of civilization does not follow a divine plan, nor do I accept that, under a layer of granite, there are no further strata of intriguing discoveries to be made. The history of the media is not the product of a predictable and necessary advance from primitive to complex apparatus. The current state of the art does not necessarily represent the best possible state, (. . . in the sense of Gould's excellence . . .). Media are spaces of action for constructed attempts to connect what is separated.[10]

It is worth remembering, however, that Michel Foucault, who laid the methodological groundwork for an archaeological approach to historical description, emphatically rejected the idea of equating his archaeological method (by analogy) with any form of geological examination: "Archaeology, as I understand it, is not akin either to geology (as the analysis of substrata) or to genealogy (as the description of beginnings and successions); it is the analysis of discourse in its archival form."[11]

Whereas Zielinski attempts to construct a nonlinear description of media development using particular case studies as "attractive foci," points in the labyrinth of media development where definitions are in flux and conditions remained temporarily undefined, Foucault's proposition is much more static. In Zielinski's work the tracing of lineages of media machines remains a concern or at least a possibility. Foucault's understanding of the archaeological method instead attempts to locate the object of study in an irreducible discursive setting, where change and transformation from one discursive setting to another are explained exclusively in terms of rupture and discontinuity. So, while Foucault's archaeological methodology shows how different historical settings are discursively differentiated, he does not say anything about if and how they derive from each other or how changes from one setting to another can be accounted for. The tracing of lineages (whether explained as ruptures or as continuities) between different discursive settings is in Foucault's case the object of another methodological framework, that of "genealogy," which he developed later and within which the archaeological method still figures as a form of historical description. Foucault's genealogy explicitly exceeds the frame of archaeological description in order to account for changes and relationships between different discursive settings ("formations" in Foucault's terminology). If the tracing of lineages of media apparatuses would be an aim, then such a methodology would have to be renamed as "media genealogy" to remain true to Foucault's original project.

Foucault's archaeology has been criticized for its tendency to freeze the object of its analysis by locating it in an irreducible discursive setting. More importantly, Foucault's insistent effort to transcend the particular, to always locate a work, a text, an utterance in a system of rules and "material practices" in which it is embedded, tends to dissolve the individual object of analysis. This orientation runs entirely counter to Zielinski's insistence on a "project of diverse praxis" with advanced media that has underwritten his media-archaeological project from the beginning. It seems that Zielinski has recognized this problem by proposing an "*an*archeology of the media" as a further extension of his media-archaeological project. In *Deep Time of the Media* and a series of edited publications that have followed, Zielinski explains that he has increasingly come to understand his project as constructing a "variantology" of the media.[12] It emphasizes temporary linkages between heterogeneous positions with regard to the development of "hearing, seeing and combining using technical means."[13]

IS AN "ARCHAEOLOGY OF IMAGINARY MEDIA" POSSIBLE?

Now the question is whether the methodological problems thus ascribed to media archaeology by the adoption of the term *archaeology* (an obvious appropriation of Michel Foucault's much more narrow understanding of it) apply equally to the description and analysis of imaginary media. To answer this question it may be helpful to briefly revisit some of the basic principles on which Foucault laid out his "archaeology."

Foucault positions his archaeology as an abandoning of the history of ideas and characterizes it as the systematic description of discourses as practices. He provides four basic principles for it: [14]

1. "Archaeology tries to define . . . [the] discourses themselves as practices obeying certain rules."[15]
2. "Its problem is to define discourses in their specificity; to show in what way the set of rules they put into operation is irreducible to any other."[16]
3. "[Archaeology] defines types of rules for discursive practices that run through individual oeuvres."[17]
4. "[Archaeology] is not a return to the innermost secret of the origin; it is the systematic description of a discourse object."[18]

In summary, Foucault's understanding of an archaeological analysis could be delineated as the systematic description of a discourse object as a practice obeying a specific set of rules, irreducible to any other, thus defining its specificity across different oeuvres and domains. From this it becomes obvious that the apparatus history that is so central to media archaeology as a "nascent discipline" is most problematic for a Foucauldian discourse analysis, since his aim is not to reveal an object, a physical substrate, underneath a particular writing of media history. Instead, for him writing in itself is to be seen as a practice obeying certain rules and performing certain functions.

In their pure form (as unrealized or impossible media machines), imaginary media are strictly discursive objects. They obey certain specific rules; they appear and reappear across different times, oeuvres, and domains. However, between one discursive and historical setting and another, their signification can be radically different or simply incommensurable. In many ways they seem much more readily available to the archaeological approach than the "realized" media of dominant media history. However, it is still highly problematic to capture imaginary media as products of particular discursive formations. Part of the problem is that more often than not the imaginary status of an imaginary medium is not consciously addressed in the analysis of how that medium is put in operation in a particular context. In some cases the imaginary medium under scrutiny is not even recognized as a medium by its protagonists. At other times, imaginary media are not recognized as imaginary by their inventors, producers, or users, who perceive the imaginary constructs as "realized" and "actual" even if no evidence exists to support the functional characteristics ascribed to them. Here the objects present themselves as myth rather than as a discursive formation.[19]

The final and most decisive problem is that Foucault time and again stresses that "archaeology" in his understanding refers to "the systematic description of a discourse object." The description of imaginary media is at this point rather the opposite—impressionistic, approximative. Its boundaries have not been precisely defined; its rules have not been set clearly enough to make them irreducible to any other discourse; its appearances across time and manifold domains are radically polymorphous. The boundary with dominant media histories is as yet still highly permeable; the two sides might even prove essentially inseparable.

Rather than attempting to construct a "theory" of imaginary media at this point, it is more helpful to differentiate this concept further: to "unearth" in the preliminary archaeology of imaginary media the multiplicity of this concept or idea and to show that within the histories of the media the interplay of the imaginary and the actual, the realized and the desired, is constantly at work. Rather than suggesting a unifying perspective on this interplay of the imagined and the realized, it is more helpful to elucidate the historical setting in which certain illuminating case examples emerged, to trace the "network of material practices in which they are embedded," as the new historicist would say.[20] Such an examination will show that beyond the most general similarity in pattern of what we could designate as an imaginary medium—the mediation of impossible desires by means of a machine in which the imaginary and the realized are in constant interplay, with the ultimate resolution belonging emphatically to the domain of pataphysics, the realm of imaginary solutions—there is indeed a radical multiplicity of signification at work that makes the concept of imaginary media deeply polysemic.

If one would like to extract from a critical scrutiny of imaginary media some potential for improving future prospects for media and technological development, or at least avoiding disastrous avenues of false progress, then the concept would have to be explored for the heterotic potential of the crossbreeding of imaginary with realized media to produce qualities in their "offspring" that would be "superior" to those found in both parents. If one would like to keep a certain utopian moment alive for the media—this is the stated aim of, for instance, Siegfried Zielinski, and I would be prone to follow him in that aim—then this question is quite unavoidable. This, as yet, leaves unanswered the question as to which qualities would then count as "superior" for a future development of the media. The issue remains a slippery one: as contemporary observers we are, after all, as unable as our historical predecessors to "uncover the network of material practices" in which our own actions, biases, and preferences are embedded. Yet I feel that this question (how to retain a certain utopian potential for the media) is quite crucial for the archaeology of imaginary media and is frankly unavoidable.

DIFFERENTIATING IMAGINARY MEDIA

Before discussing a series of case studies that have emerged so far out of the Archaeology of Imaginary Media project, it seems useful to introduce two sets of general distinctions that create a slightly more diversified context for understanding imaginary media. My first aim here is to move away for a moment from the simple dichotomy of the imaginary and the realized in media, into a more interesting conceptual field. Peter Blegvad, who was invited to develop a stage play for the original Archaeology of Imaginary Media project, presents in his study of numinous objects a triangular classification that also served as the starting point for his play *On Imaginary Media*.[21] Blegvad distinguishes three general types of media: media remembered; media observed; and media imagined. This classification distinguishes imaginary media from existent media by their having no fixed location in time (unlike media remembered or forgotten), and by their not needing to be "physically present to the senses" (unlike media observed), but by their nonetheless having distinctive properties. What the archaeology of imaginary media should attempt to do is to identify these properties ascribed to media existent and nonexistent and to situate them in a specific historical and discursive setting, to uncover the network of material practices in which these imaginaries are embedded.

Blegvad's tripartite classification of mental objects derives from his early practice as a cartoonist, which prompted him, in a desire to get his drawings "right," to produce comparative drawings of subjects imagined, observed, and remembered. He writes about this curious procedure:

> Would a picture of the idiosyncratic eidolon or phantom in my imagination be legible to the public as a sign for the thing intended? I doubted it. Often I destroyed the unity of my illustrations by populating, for instance, a stylized cartoon with

> items (the "props" of the scene) which I'd copied in an academic manner from life or from photographs in my compulsion to "get them right." Primarily as therapy, therefore, I began drawing sundry items thrice—first as I imagined them to be, then as I actually observed them to be, and lastly, after a suitable interval, as I remembered them to have been. I accorded no less a degree of "reality" to the item as it appeared to my imagination or memory than to the item as it appeared to what Blake called the "vegetative organs" of sight.[22]

A THREEFOLD PHENOMENOLOGY OF IMAGINARY MEDIA

Siegfried Zielinski, in his contribution to the *Book of Imaginary Media,* distinguishes three groups of phenomena in what he calls the "category" of imaginary media. First are "untimely media/apparatus/machines": that is, "media devised and designed either much too late or much too early, realised in technical and media practice either centuries before or centuries after being invented." Second are "conceptual media/apparatus/machines," "artefacts that were only ever sketched as models or drafted as concrete ideas on paper, but never actually built." Third are "impossible media/apparatus/machines," or "imaginary media in the true sense, by which I mean hermetic and hermeneutic machines, that is machines that signify something, but where the initial design or sketch makes clear that they cannot actually be built, and whose implied meanings nonetheless have an impact on the factual world of media."[23] There is for Zielinski no original point of departure for a genealogy of realized and imaginary media: "The paleontological view of media development—a view I share with Bruce Sterling—can accept no layer of bedrock beyond which no further downwards exploration is possible when searching for the new in the old."[24] In the *Deep Time of the Media* the idea of (historical / technological) "progress" is unequivocally rejected: "The notion of continuous progress from lower to higher, from simple to complex, must be abandoned, together with all the images, metaphors, and iconography that have been—and still are—used to describe progress. Tree structures, steps and stairs, ladders, or cones with the point facing downwards . . . are from a paleontological point of view misleading and should therefore be discarded."[25] Referencing the work of the paleontologist Stephen J. Gould, Zielinski emphasizes how even the limited knowledge we have of geological deep time today reveals that there have been periods in Earth's history and the evolution of nature on earth that exhibited far greater biological diversity than our current time. On the grand scale of geological time "humankind" should be regarded as no more than "a tiny accident that occurred in one of evolution's side branches."[26]

As noted earlier, Foucault emphatically rejects the idea of equating his archaeological method to any form (by means of analogy) of geological examination (e.g., the analysis of substrata) or to genealogy as the description of beginnings and successions. The apparatus history that is a central concern of media archaeology is most problematic for a Foucauldian discourse analysis, since Foucault's aim is to reveal, not an object, a physical substrate, underneath a particular writing of media history, but instead that writing in itself as practice obeying certain rules and performing certain functions. Zielinski and other media archaeologists, on the other hand, want to illuminate the histories of the media software and hardware at the same time, giving equal importance to both the ideas, the discursive formations, and the material apparatuses, the machines and the imaginaries, understanding the boundaries between them as highly permeable and porous.

While the apparatus history, so central to a more "materialistic" approach to media archaeology, might well signal a fundamental point of divergence between Foucault's understanding of archaeology as method of historical description and the more material and less discursive conception of media "archaeology," the archaeology of imaginary media, in its emphasis on technological imaginaries and discursive practices, would seem to remain closer to Foucault's original archaeological project. This is merely to indicate that the discussion of these methodological terms is neither arbitrary nor self-evident.

A "VARIANTOLOGY" OF IMAGINARY MEDIA

On the basis of some of the outcomes and findings in the research conducted thus far in the project, I want to present a preliminary and entirely open-ended selection of case histories in the archaeology of imaginary media that serve to illuminate the surprising multiplicity and polysemic character of this deceitfully simple concept. This selection of heterogeneous objects we might call a "variantology" of imaginary media.

Imaginary Media for Communication with the Divine

Heinrich Suso's *Horologium Sapientiae (Wisdom's Watch upon the Hour),* commonly dated to 1339, is certainly one of the most elaborate imaginary media identified. Suso, a Catholic mystic, describes a system of prayer and communication with the divine that is regulated by a clock (Wisdom's Watch). The process is structured into a series of twenty-four dialogues with "Eternal Wisdom," a virtue who communicates divine regularity to erratic earthly life by keeping her hands on the wheel of the clock and regulating its motions into even intervals.

Indeed, Lewis Mumford famously showed how the mechanical clock had originated in the thirteenth century in Benedictine monasteries, at first in England, then spreading later via the Benedictine order to monasteries throughout Europe.[27] Its function was to call to prayer at regular intervals on the canonical hours. By the time Suso's manuscript appeared, the mechanical clock had started to spread to mayor cities all over Europe. The appearance of this new quasi-autonomous mechanism regulating the pulse of human life must have felt like divine intervention at the time. The imaginary medium here is the understanding of the earthly mechanical clockwork as a reflection of the divine clockwork of the heavens and its eternal (untimely) order, whose divine wisdom was communicated to lesser earthlings as a supernatural regularity imposing itself on the erratic flow of natural life.

Prayer itself is commonly facilitated by the most modest of media: position of the hands. Peter Blegvad recognized this elementary form of an imaginary medium in the folding of the hands that accompanies most Christian faithful when establishing communication with the divine. The hands act as transmitters of devout aspiration. In one of his beautiful *Book of Leviathan* cartoons, Blegvad draws a comparison between the Christian hand position in prayer, the Greek cheironome, and the concept of mudra (Sanskrit for "seal") in Hindu and Buddhist ritual. Mudra consisted of "a highly elaborate code of stylised gestures, several hundred in number, but all variations on four basic hand positions, namely the open palm, the hollowed palm, the hand with finger-tips together and the closed fist," expressing and communicating a divine network of relations in ritual dance, mime-drama, and religious ceremony.[28]

Quite another form of communication with the divine is described by the seventeenth-century Jesuit scholar Athanasius Kircher in his *Itinerarium extaticum s. opificium coeleste* (1656). Kircher describes a fantastic voyage through the solar system that allows him to reject the Copernican cosmology and align himself with the geocentric astronomical conception of Tycho Brahe. Accompanied by the music of the heavens, Kircher, represented in the story as its protagonist Theodidactus, travels with the spirit Cosmiel. Moved by divine intervention they explore the heavens and communicate with other creatures in the new worlds they encounter. We can recognize in this narrative the essential elements of the immensely popular *Star Trek* TV series, the archetypical science-fiction rendition of space travel and exploration. The spaceship is replaced here by divine intervention ("the hand of God"). The narrative of a fantastic journey through space as communication with the otherworldly (divine) serves a markedly different function, however. Its aim is to support Jesuit orthodoxy against an emerging scientific cosmology promoted by Copernicus and his followers.

Imaginary Media for Communication with the Spirit World

A recurring pattern of media activity is the use of electronic or technological media to bridge the divide between the living and the dead. The current embodiment of this strategy, using electronic media to record voices of paranormal origin, is called EVP—electronic voice phenomena. The aim of the people involved in EVP is to record these paranormal voices with the aid of electronic devices, specially tuned radio receivers, and other media machines in order to capture and decipher the messages that are believed to be circulating around us. The source of these paranormal voices is mostly identified with attempts of deceased people to establish communication with the living. Needless to say, this activity is accompanied by intense controversy, and the actual recordings made are most commonly dismissed either as fabricated or as resonances of merely natural phenomena.

EVP was a concern that also gripped the famous inventor and industrialist Thomas Edison in the latter half of his life. Around October 1920 Edison gave a series of public interviews with, among others, B. C. Forbes, founder of *Forbes Magazine,* in which he claimed to be working on an electrical device to communicate with the departed. In an article in *Scientific American*, entitled "Edison's Views on Life after Death," Edison explains: "I am inclined to believe that our personality hereafter will be able to affect matter. If this reasoning be correct, then, if we can evolve an instrument so delicate as to be affected, or moved, or manipulated . . . by our personality as it survives in the next life, such an instrument, when made available, ought to record something." And Edison is adamant in claiming that his methods for studying these phenomena are strictly scientific and rational. He concludes in the same article: "Certain of the methods now in use are so crude, so childish, so unscientific, that it is amazing how so many rational human beings can take any stock in them. If we ever do succeed in establishing communication with personalities which have left this present life, it certainly won't be through any of the childish contraptions which seem so silly to the scientist."[29]

In her contribution to the *Book of Imaginary Media,* the artist and filmmaker Zoe Beloff discusses at length the inspiration she took in her work from the histories of female "mediums" at the turn of the nineteenth and twentieth centuries, and their curious intermingling with the birth of modern cinema.[30] Interestingly, these mediums were studied by investigators of the paranormal as well as more regular scientists and engineers. These researchers used the technological media of their era—time exposure photography and proto-cinematographic machines such as chronophotographic cameras, extended and double-exposure techniques—to record and thereby fix spirits' emanations and apparitions of the dead.

Beloff refers to a variety of photographic sources from that period, among others the autobiography, published in 1897, of the medium Elizabeth d'Esperance, who took spirit photographs during her sessions and had them reproduced for her autobiography; Dr. Charles Richet, winner of a Nobel Prize for physiology, who extensively documented the séances of the medium Eva C. with multiple stereoscopic cameras; the psychiatrist Albert Londe, who used a chronophotographic camera to record the contorted movements of his patients, including a medium and hysteric referred to as Augustine; and Baron von Schrenk-Notzing, who took controlled (nude) studio photographs for his book *Phenomena of Materialization: A Contribution to the Investigation of Mediumistic Teleplastics* (1914). In all these cases the orthodoxy that photographic evidence constituted truth served to provide irrefutable evidence of these spirit manifestations.

The Belgian cinema critic Edwin Carels similarly identifies in early, pre- and proto-cinema a recurring iconography of death and a phantasmagoric fascination with bringing the deceased back to life. For instance, one Etienne-Gaspard Robert, also known as Robertson, conducted pseudoscientific magic lantern shows using what he called a fantascope, a magic lantern whose design he had extended and improved. The magic lantern was mounted on wheels, allowing it to be moved during live performances to create stunning zoom in animation effects, while the image remained in focus through a patented mechanism developed by Robertson as its prime innovation.

Carels calls his spectacles, accompanied by music, smoke, and sound effects, a kind of "expanded cinema" *avant la lettre,* in which the spectacular animated images could suggest a resurrection from the dead in a fantastically dramatic form. Death was the key theme in Robertson's shows, which not only employed figures of dancing skeletons as representations of death but also integrated the audience's requests for the resurrection of recently deceased people.

Carels writes:

> In the afternoons before each séance, the public could visit him and order the apparition of a particular person for later that evening. An eyewitness described it as follows: "Then Robertson poured two glasses of blood, a bottle of vitriol, twelve drops of aqua fortis and two copies of the journal Hommes-Libres on a lighted brazier. Immediately a small, hideous phantom in a red bonnet gradually arose, armed with a dagger. A man recognized the apparition as Marat, and went to embrace him, but the phantom made a frightful grimace and disappeared." Robertson apparently made people believe that the faces he projected (which he copied from medallions) where actually those of their dead loved ones.[31]

Imaginary Media for Communication with "the Other"

One of the great promises of the early public phase of the Internet as an egalitarian (low-bandwidth) communication space was the idea that communicative relations were nominalized by the limitations of the technology in a way that would more easily establish equal relations within that communication space and would more easily allow for bridging differences in race, gender, age, social class, and culture. In short, communication with the "other" would be greatly facilitated in this nominalized communication environment. The rapid differentiation of types of connectivity, not least in terms of differing bandwidth, the reinstatement of cultural and social patterns, the investment of commercial interests, and local forms of regulation have all shifted this image back in the direction of the existing social formation we can witness offline. Although a certain democratizing (cultural) effect of Internet-based communications is undeniable, the persistence of social and cultural divides and the intricate difficulties of communication with the other have turned out to be far more tenacious than originally conceived in the early stages of the development of Internet as a public medium.

The desire for technological means to bridge the gap with the other and to alleviate linguistic confusion are a popular theme in technological fictions. Popular culture is densely populated by such devices, and especially in science fiction narratives they appear as self-evident and unquestioned, a natural extension of technological progress. *Star Trek*'s universal translator is certainly one of the most prominent representatives of this type of imaginary medium. It allows the protagonists of the stories to communicate seamlessly with thousands and thousands of species across the universe, and even entire language systems of species never encountered before can be effortlessly assimilated by its remarkable underlying technology.

Literary fiction has, however, produced a different category of devices for communicating with the other that have a distinctively more shady character—those famously identified by the French literary critic Michel Carrouges in the 1950s as *machines célibataires*.[32] Carrouges describes bachelor machines as "mechanisms that transform the act of love-making from a principle of life into a mechanism of estrangement and death." The bachelor machine is a distinctly heterosexual assemblage, in which the sexual element is doubly represented by two distinct types of mechanisms acting as the male and the female principle. Thus the technological element places itself between the male and female principles and acts as a harbinger of disunity leading to estrangement that in turn leads to insanity and ultimately death. Bachelor machines can be found all over modernist literature (as in Franz Kafka's "In the Penal Colony," and the fictions of Raymond Roussel), the machine or mechanomorphic paintings of Francis Picabia and Marcel Duchamp, and in films like Fritz Lang's *Metropolis* (the woman robot), but also in a more popular form in the *Barbarella* comics of Jean-Claude Forest and the cult classic movie *Barbarella* (starring Jane Fonda) by Roger Vadim. In the latter film the principle of the bachelor machine is embodied in the orgasmic organ of the corrupted scientist Duran Duran.

Marcel Duchamp's *The Bride Stripped Bare by Her Bachelors (The Large Glass)* can be considered the archetypical and most elaborate model of a bachelor machine, decipherable only through Duchamp's extensive accompanying notes. The work depicts a frustrated nonunity between an upper four-dimensional "bride" domain and a lower three-dimensional "bachelor" domain. According to Duchamp's notes, the bride machine is a "love machine running on love-gasoline"; she is eternally dependent on the love gasoline produced by the desiring bachelors, with whom she cannot reach unity because of the dimensional shift between them. She constantly teases the bachelors with her tentacle to encourage them to produce the love gasoline, which is filtered from the three-dimensional world to the four-dimensional bride domain through a system of alchemical sieves. The bachelors are driven beyond themselves by desire to reach an impossible unity with the bride, while the bride needs to fuel their desire to ensure her supply of love gasoline. The whole apparatus is a machine of frustration that can be read as Duchamp's allegorical commentary on the restricted potentialities of cross-gender communication.

Imaginary Media for Transcending Space and Absence

The desire to transcend distance, especially between loved ones, by means of a technological prosthesis is an almost universally recognizable aspiration. Not surprisingly, an enormous amount of technological research and development has been invested in the creation of apparatuses that attempt to perform exactly this function. Telegraph, telephone, video conferencing systems, e-mail, chat, SMS text messaging, GSM mobile phones, walkie-talkies, and more—all these are examples of existing media that can be observed or at least remembered (though some may have already been forgotten). In countless variations cultural imaginaries have been created around these devices, suggesting that they can actually achieve the aim of creating (tele-)presence over great distances. Yet it is obvious that none of these technological devices actually creates presence across distance in the strict sense. Though Samsung claims, "Imagine being in two places at once!" in a recent TV ad, it is obvious that we will never be in that position using the device promoted. What is transferred is an incredibly reduced signal that has some origin in a living person and his or her limited agency within the technological system in question—the status of which is the subject of furious debates. In such cases the existent and the imaginary medium seem to coexist in the same locus, in the interaction between the device and our understanding of this device (imagination).

Again *Star Trek* produces the ultimate imaginary medium to address the challenge of physically insurmountable distance in the form of its teleportation transporter technology. This device is in itself not a communication device, one of the conditions initially set out for imaginary media, but it does address the same desire and imaginary.

Mediatic travels across great distance can also be recognized in pre-electronic settings. Erkki Huhtamo has over the years produced numerous studies on stereoscopy and the principles of armchair traveling. An especially startling example is included in his study on stereoscopy as a peeping medium in the *Book of Imaginary Media:* a postcard of the Keystone View Company, USA, stamped on July 2, 1921, titled, "She Sees Her Son in France—You can talk across the miles with your TELEPHONE—The WHOLE FAMILY Can See the WAR ZONE."[33] The postcard in question was used to inform customers of the company that their order for a stereoscopic viewer had been taken into processing and to announce the date of delivery. Stereoscopy, Huhtamo shows, has always been intimately tied to the notion that it is possible to "travel" to distant places without leaving the house and to experience them in 3D through their stereoscopic recording—an obvious precursor to later virtual reality technologies.

Imaginary Media for Transcending Time

The desire for transcendence of space and distance is easily extended into that other great vector of human activity: the dimension of time. Time machines are quite obviously imaginary machines—even more than tele-transportation and universal communication devices they have populated popular fictions since the stories on chronotravel of H. G. Wells, where traveling through time was achieved no longer by divine intervention but instead by manmade machines. But can time machines also be considered communication devices? Most time machines "merely" transport persons and objects through time while not being specially focused on establishing communication across these temporal divides. Even more so, many narratives imply that communication should be avoided altogether so as not to corrupt time lines and inadvertently alter "historical development." Even in Wells's classical story on the time machine the protagonist is finally carried through time only unidirectionally, for his time-traveling device is ultimately destroyed and no communicative link between different time zones is established.

A slightly more interesting proposal for temporal displacement is introduced in the short story "Minority Report," by Philip K. Dick (1956), transformed into a feature-length movie by director Steven Spielberg in 2002. The story describes a rather complex biological and technological assemblage in which genetically modified youngsters have acquired special psychic capabilities to see infallibly into the near future and identify crimes that are about to happen. A scanning device of brain activity simultaneously allows for their "precognition" to be visualized on holographic screens used by a special precrime unit to detect crimes before they happen and arrest perpetrators before the act. The imaginary medium is the assemblage of the precognitives' hive mind (there are three of them) and the interface that connects them to each other and the holographic visualization apparatus.

The computer scientist Danny Hillis has offered a radically different approach to the idea of transcending time. Hillis is the principal architect of the Connection Machine, a parallel computer architecture that made possible the construction of highly compact, versatile, and efficient supercomputers and that is widely in use in technology labs across the globe today. Hillis has become increasingly concerned about the shrinking time horizon and temporal consciousness in a society, economy, and culture driven toward immediacy. He set up a nonprofit foundation to design, build, and install a clock that would operate autonomously on natural energy to extend our current time horizon to ten thousand years. The Long Now Clock is designed to tick once a year, bong every century, and produce a small mechanical show every thousand years. The clock should count off ten thousand years and become a mythological object for present and future generations, establishing a continuity across a time span exceeding the current Christianic recording of time by a factor of ten; hence by Hillis's time system I am writing in the year 02007. Several designs for the clock have been produced, the funds for its construction and placement have been secured, and the patch of land for its installation has been purchased (in Nevada).

Imaginary Media as Potential Media: Unrealized or Abandoned Media Lineages

"Dead media" as commemorated in Bruce Sterling's Dead Media Project do not in themselves constitute another type of imaginary media. Rather, they are an example of remembered or sometimes (almost) forgotten media, and they have been documented in this project as a testimony to the mortal character of media apparatuses. Unrealized dead media, especially prematurely deceased media, are, however, prime examples of imaginary media, and they are always plentiful. Phillips, the consumer electronic manufacturer, has produced several famous examples of prematurely deceased media, such as the CD-i player, an interactive CD-ROM player that displayed interactively navigable contents on a regular TV screen. The CD-i, which was heralded as a platform for interactive home entertainment as well as a scientific and educational instrument, proved not to be a profitable business proposal. The Video 2000 system of Phillips is another famous case in point—technologically superior to the VHS system, it seemed predestined to become an international standard for recorded home entertainment but failed for lack of cross-producer support and consumer interest.

Gebhard Sengmüller, an Austrian media artist, famously reversed the status of the potential medium as an imaginary extrapolation of a dead medium by extending the "history" of vinyl recording from sound into video. He managed to construct a system that allowed the recording of low-grain video onto vinyl records to be played back with an old-style record player and produced a catalogue of several titles for his Vinyl Video system. Thus he retroactively filled in a gap in the (un-)realized media history of an almost dead medium (vinyl recording and playback).

Imaginary Media as Media of Abundance

Why people generally like imaginaries of media or machines that provide an inexhaustible supply of material benefits requires hardly any explanation. Again, in folk mythology such "horns of plenty" are usually reserved for the domain of the sacred and (benevolent) divine intervention. The DotCom movement and the imaginary construct of the New Economy in the second half of the 1990s, however, tied this mythological assemblage to the advance of digital electronic information and networking technologies in virtually all sectors of society. Central to this claim was the idea that downward trade cycles could finally be eliminated altogether: the application of information and networking technology to all sectors of production and the economy would produce continuous productivity gains in production that could absorb any constraining factors elsewhere in the economy that had traditionally been responsible for a declining trade cycle (such as rising labor costs). Thus an endlessly growing economy could be achieved.

What the idea of the New Economy quite obviously did not take into account were the ecological constraints that such a system of hyperproduction would inevitably encounter. In the midst of the DotCom crisis and the unraveling of the tech giant WorldCom and the energy Moloch Enron, power shortages and outages allegorically dismantled the Californian dream. Nobody in the late 1990s seemed particularly interested to check the productivity figures in the United States and other highly industrialized economies for the *non*-computing sectors. These showed no significant productivity gains as compared to figures from the 1950s onwards. Instead, emphasis was placed either on the productivity miracle of the network economy or, conversely, on the unstoppable destructive force of informational capitalism. In both the positivistic as well as the dystopian variant of essentially the same myth, linear extrapolation based on uncritically assumed pseudoeconomic data served to underscore a soon-to-be-exposed fraudulent vision of the "future."

Imaginary Media as Media of Deliverance

Afro-futurism provides one of the most fascinating narratives of imaginary media, that of a machine of deliverance. This narrative, embodied in the figure of the Mothership or Motherwheel, a spaceship that will deliver especially the black population on Earth to a prosperous future in space, free from oppression and displacement, is repeated time and again in black science-fiction stories and novels, popular music (George Clinton's *Mothership Connection* in funk, for instance), jazz (as in Sun Ra's famous space narratives), and cinema. The Mothership narrative derives in part from the obscure and radical teachings of the Black Nation of Islam, which encompass a rather obscure mixture of teachings from Islam, black colonial history, Egyptology, and science fiction motifs. Its founder, Mohammed Fard, taught, at first exclusively orally within the circle of the Black Nation of Islam and in utmost secrecy, that a spaceship was still hovering in orbit around Earth, cloaked by stealth technology and thus imperceptible from Earth. This Motherwheel was waiting for the moment when a new world elsewhere in the galaxy would be chosen for blacks and Asians, both of whom were supposed not to originate from Earth; it would rescue and deliver them to a new existence in this promised new world, while leaving whites to perish in a final Armageddon on Earth.

Fard's virulent and overtly racist mysticism reflects the impossible position of the black descendants of slavery in the United States and elsewhere in the Western world. A return to the African homeland is absurd and impracticable and is not a desired option for many generations who have never known or even visited the African continent. Equally, life in the frame of Western society has been defined by the persistence of displacement and racist discrimination at virtually all levels of society. As the historian Michael Adas has pointed out, Westerners' conception of their own technological superiority played a crucial role in legitimizing the colonial practices of large-scale slavery and genocide that produced the displacement of black populations.[34] Yet in Afro-futurist narratives this very technological lineage is embraced as a means of deliverance of oppression. The assertion that blacks do not originate from Earth, that, paradigmatically, Egyptian civilization had an extraterrestrial origin, serves to pave the way for an ultimate exodus of black populations into space and so into freedom. In a similar narrative, the jazz musician Sun Ra stressed time and again in public statements and interviews that he was not of this earth, that Earth was but a temporary and transitory station for him, and that ultimately his destiny was to return to space. In these technologically saturated narratives of black science fiction, the machines of oppression (Western technological dominance) paradoxically become, or rather are transformed into, machines of redemption.

Imaginary media, when understood as machines that mediate impossible desires, should be regarded as impossible machines. They can never attain what they are proclaimed to achieve. Imaginary media can therefore be read as an ironic allegorical comment on the impossible desires that the imagining subject projects onto its surroundings, desires that estrange it further from its own illusory selfhood. The moment of recognition of the impossibility of these desires and the inability of the machines to achieve their resolution is the moment of absolute disintegration of the subject: such a realization constitutes a negation of the self by false desires and spurious technological imaginaries. Duchamp's *Large Glass* and in a larger sense many of the ironic machines of the historical avant-garde have clearly articulated this modern sentiment, a subliminal anxiety that accompanies imaginary media.

Imaginary media are, however, not simply fictional objects. As I have argued and shown in the case studies presented earlier, the imaginary and the realized in the histories of the media continually weave in and out of each other and, more importantly, also constitute each other. Actual media machines give rise to intense speculation of what such machines might be able to achieve or what they signify. Conversely, imaginations of possible media continually give rise to actual media machines, and even though these may not achieve what was imagined for them, their creators quite often derive their inspiration in considerable measure from such imaginations and the (impossible) desires that fuel them.

The archaeology of imaginary media as outlined here shifts attention away from a mere "apparatus history." However, it does not aim to deny the material histories and lineages of media machines. Instead, this discursive approach to studying imaginary media intends to show how particular discursive genres are at work and shape the development of these lineages of media apparatuses. Imaginary media may prefigure realized media machines, and they certainly play an important role in shaping significations of these machines. Still, imagination and realization rarely coincide. While realized machines most often fall short of their imagined qualities, the actually realized formations of media machines and their transformative capacity, for instance in communicative and economic activities, can quite often exceed the boundaries of the imagined. The discursive framing of the lineages of media discussed here can help reveal the continuities and ruptures across this field. This can help us intensify our sensitivity toward the reciprocal operation of the imagined and the realized on each other in the development of technological media.

The boundary between the imaginary and the realized in the domain of technological development is porous, and their respective membranes are highly permeable. As a result, the future course of technological and media development, based on such a heady mixture of the imagined, the desired, and the realized, becomes contentious and largely unpredictable. From a contemporary point of view it is impossible to assert how the "network of material practices" in which a contemporary observer is immersed influences his or her imaginations of media and technology. It is equally contentious, then, to draw a clear distinction between the actual functionality of realized media machines and the purely imaginary qualities ascribed to them. Extrapolations into the future based on such a unstable and ambiguous footing tend to be deeply unreliable. Especially linear extrapolations into the future should be viewed as extremely dubious. Yet, being bound up with some of our deepest and most unattainable desires, they remain extremely attractive.

The archaeology of imaginary media should not be regarded as a nihilistic enterprise, attempting merely to reveal the futility of any aspiration to improve human conditions by means of media and technology. Quite the contrary, the intended cautionary effect of revealing imaginary media to be impossible machines mediating impossible desires serves quite deliberately to retain the utopian moment that unveils itself when aberrant trajectories in the development of technology and the media are recognized. The temporary void that results from abandoning one trajectory opens up the possibility of choosing a more benign one and embracing aspirations that can help us transcend the unacceptable realities before us. In that sense the archaeology of imaginary media attempts to do exactly what Siegfried Zielinski set forth as an initial goal for his project of an (an)archaeology of the media: "to dig out secret paths in history, which might help us find our way into the future."[35] The clear aim of this undertaking is to find less hazardous roads into the future than the ones we have traveled so far.

NOTES

1. Imaginary media carry more than a passing semblance to the "imagined communities" that Benedict Anderson has so famously identified. Interestingly, the imagined properties of media are often somehow obscured by the fact that so much of what is studied in the histories and theories of the media is embodied in physical media machines. This appears to give such objects of study a reality of their own. The imagined properties of media need to be "uncovered" from these material histories, which is exactly what an archaeology of imaginary media could set out to do.

2. Carolyn Marvin, *When Old Technologies Were New: Thinking about Electric Communication in the Late Nineteenth Century* (Oxford: Oxford University Press, 1988), 8, quoted in Erkki Huhtamo, "From Kaleidoscomaniac to Cybernerd: Notes toward an Archaeology of the Media," in *Electronic Culture: Technology and Visual Representation,* ed. Timothy Druckrey (New York: Aperture, 1996), 302–3.

3. Huhtamo, "From Kaleidoscomaniac to Cybernerd," 303.

4. The lecture program is archived online along with a selection of key texts on the area. See De Balie's Web dossier "Media Archaeology," 2004, www.debalie.nl/archaeology.

5. Eric Kluitenberg, ed., *Book of Imaginary Media: Excavating the Dream of the Ultimate Communication Medium* (Rotterdam: NAi Publishers, 2006). The book was published with a DVD containing a collection of cartoons produced for the event and a *son et lumière* version of Peter Blegvad's stage play *On Imaginary Media*—produced for this project.

6. Andreas Huyssen, "The Vamp and the Machine: Fritz Lang's Metropolis," in *After the Great Divide* (London: Macmillan, 1986).

7. This riveting discussion was captured on video and can be viewed at the end of the video documentation of Druckrey's lecture; see De Balie's Web dossier "Media Archaeology" 2004, www.debalie.nl/archaeology.

8. Michel Foucault, *The Archaeology of Knowledge,* trans. A. M. Sheridan Smith (London: Routledge, 2002), 212–15.

9. Timothy Druckrey, "Imaginary Futures . . . ," in Kluitenberg, *Book of Imaginary Media,* 246–47.

10. Siegfried Zielinski, *Deep Time of the Media: Toward an Archaeology of Hearing and Seeing by Technical Means* (Cambridge, MA: MIT Press, 2006), 5. Originally published as *Archäologie der Medien: Zur Tiefensicht des technischen Hörens und Sehen* (2002).

11. Michel Foucault, "On the Ways of Writing History," interview by Robert Bellour, originally published in *Les lettres françaises,* June 15–22, 1967, 6–9, and taken here from Michel Foucault, *Aesthetics, Method, and Epistemology,* vol. 2 of *Essential Works of Michel Foucault, 1954–1984,* ed. James Faubion (1998; repr., London: Penguin Books, 2000), 289–90.

12. In the first volume of the *Variantology* book series, Siegfried Zielinski and Sylvia M. Wagnermaier explain their methodological approach somewhat more specifically as follows: "In contrast to the heterogeneous, with its ponderous oscillations in ontology and biology, we are interested in

the variant both methodologically and epistemologically as a mode characterized by lightness and ease. As such the variant is equally at home in experimental science and various artistic and media praxes. . . . The semantic field to which the concept of variantology belongs possesses for us positive connotations in principle: To be different, to deviate, to change, to alternate, to modify. . . . They only slide into the negative when the speaking or writing human subject uses them as means of discrimination. To vary something that is established is an alternative to destroying it." Siegfried Zielinski and Sylvia M. Wagnermaier, "Depth of Subject and Diversity of Method: An Introduction to Variantology," in *Variantology 1: On Deep Time Relations of Arts, Sciences and Technologies,* ed. Siegfried Zielinski and Sylvia M. Wagnermaier (Cologne: König, 2007), 8–9.

13. Siegfried Zielinski and David Link, eds., *Variantology 2: On Deep Time Relations of Arts, Sciences and Technologies,* (Cologne: König, 2006).

14. Foucault, *Archaeology of Knowledge,* 154.

15. Ibid., 155.

16. Ibid., 155–56.

17. Ibid., 156.

18. Ibid.

19. *Myth* is understood here as a second-order semiological system, following its definition by Roland Barthes, *Mythologies* (London: Vintage UK, 1972).

20. See H. Aram Veeser's introduction to *The New Historicism,* ed. Aram Veeser (London: Routledge, 1989), xi.

21. "A numinous object is one in which matter, form and situation combine to 'haunt' or otherwise fascinate the imagination." See Peter Blegvad, "On Numinosity," in *Amateur,* n.d., www.amateur.org.uk/numinosity/explain.htm (accessed January 31, 2009).

22. Peter Blegvad, "Imagined, Observed, Remembered," in *Amateur,* n.d., www.amateur.org.uk/ior/ior.htm (accessed January 31, 2009).

23. Siegfried Zielinski, "Modelling Media for Ignatius Loyola: A Case Study on Athanasius Kircher's World of Apparatus between the Imaginary and the Real," in Kluitenberg, *Book of Imaginary Media,* 30.

24. Ibid., 30–31.

25. Zielinski, *Deep Time of the Media,* 5.

26. Ibid., 6.

27. Lewis Mumford, *Technics and Civilization* (1934; repr., New York: Harcourt Brace Jovanovich, 1963).

28. Peter Blegvad quoting Benjamin Walker's *Encyclopedia of Esoteric Man: The Hidden Side of the Human Entity* (London: Routledge and Kegan Paul, 1977), in his *Book of Leviathan* cartoon on the DVD accompanying Kluitenberg, *Book of Imaginary Media* (2006).

29. Austin Lescarboura, "Edison's Views on Life after Death," *Scientific American,* October 30, 1920.

30. Zoe Beloff, "Towards a Spectral Cinema," in Kluitenberg, *Book of Imaginary Media,* 215–36.

31. Edwin Carels, "Résurrection à la Carte," in Kluitenberg, *Book of Imaginary Media,* 202.

32. Michel Carrouges, *Les machines célibataires* (1954; repr., Paris: Éditions du Chêne, 1976).

33. Erkki Huhtamo, "The Pleasures of the Peephole: An Archaeological Exploration of Peep Media," in Kluitenberg, *Book of Imaginary Media,* 136–39.

34. Michael Adas, *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance* (Ithaca: Cornell University Press, 1989).

35. Siegfried Zielinski, "Media Archaeology," *Ctheory,* November 1996, www.ctheory.net/articles.aspx?id=42.

4

On the Origins of the Origins of the Influencing Machine

Jeffrey Sconce

By the close of 2003, no fewer than four homicides in the United States claimed an interface with *The Matrix,* the inescapable science-fiction franchise of the new millennium starring Keanu Reeves as lowly hacker turned avenging avatar. Raiding the elegant poetry of Jean Baudrillard to create a more multiplexed vision of simulation as an opportunistic CGI infection, the three films embedded their cyber-stoner premise in the visual kinetics of a prolonged arcade fight: Neo the seeker of material truth versus an unending digital stream of sober-suited authoritarians—Agents Smith, Jones, Brown, and so on. In May of 2000, less than a year after the first and most explicitly paranoid installment of the trilogy, Vadim Mieseges murdered, skinned, and dismembered his landlord before leaving her body in a dumpster in San Francisco's Golden Gate Park. Defending this former mental patient and obviously still troubled computer science major, Mieseges's lawyers convinced the court that the murder was the product of a psychotic break triggered by a volatile combination of crystal meth and Mieseges's delusion that he had been "sucked into *the Matrix.*" Tonda Ensley appears to have suffered similar distortions when she murdered Sherry Lee Corbett, a professor at the University of Miami-Ohio. The local press noted the *Matrix* connection during an early court appearance, writing, "The science-fiction film, acclaimed for its impressive special effects, suggests reality may not be as it appears."[1]

Living in their own world of simulated reality, media pundits responded to this franchised body count with the usual panic about the media as a catalyst for violence, some even resurrecting the epidemiologist Brandon Centerwall's hysterical claim in 1992 that had television "never been invented, the United States today would experience 10,000 fewer murders, 70,000 fewer rapes, and

700,000 fewer injurious assaults each year."[2] Missed in this preprogrammed stampede from Bobo to Neo was a more fundamental truth and diabolical irony at the heart of the *Matrix* defense. These homicides—each committed by a killer eventually adjudicated to be a paranoid schizophrenic—were not the product of a desensitization to violence; rather, the murders offered a wholly logical response to *The Matrix* as the most vivid dramatization ever staged of a certain idée fixe harbored by psychotics for over a century. In translating "simulation" into a crude technological mirage, *The Matrix* merely dramatized the lurking suspicion that electronic media have the ability to control reality and the mind through the transmission of "invisible influence," a force produced along the conflated semantic and institutional borderlines of power as both electromagnetic transmission and sociopolitical regimentation.[3]

Psychiatrists call this condition "the technical delusion"—the electronic manifestation of "thought insertion" and/or "thought broadcasting," each in turn a "first-rank symptom" in Kurt Schneider's influential criteria for schizophrenic diagnosis.[4] In "thought insertion," the subject attributes voices or ideation to some external agency, frequently a powerful force demanding compliance or submission, while in "thought broadcasting," as the name implies, the subject comes to believe that his or her private thoughts are somehow streaming out to the public at large. While the exact etiology of these alienated discourses remains unknown, electronic media continue to function as logical relays for such delusions, providing subjects with a plausible "technical" explanation as to how their thoughts might become implanted or removed.[5] Here too attends the symbolic investment in tinfoil as a means of defending against such electromagnetic interference in the mind.

While it is tempting to locate the "technical delusion" as a direct product of media technology, or more generally as a side effect of a saturated media environment, a historical excavation of this symptom suggests that such delusions have their genesis more in modernity than in the "matrix" and are attached not so much to specific technologies as to a vernacular theory of power forged at the end of the nineteenth century. Victor Tausk's crucial paper of 1919, "On the Origins of the Influencing Machine in Schizophrenia," is generally regarded as the first significant clinical presentation of patients claiming to be under the influence of machines—mysterious devices composed of "boxes, cranks, levers, wheels, buttons, wires, batteries, and the like."[6] Summarizing the perceived effects of the "influencing machine," Tausk notes that it is frequently an instrument involved in the nefarious transmission of information and power, "inserting" and "broadcasting" "thoughts and feelings by means of waves or rays or mysterious forces which the patient's knowledge of physics is inadequate to explain." The influencing machine, then, is fundamentally a telecommunications device, though a medium so distorted by psychosis that its exact functionality remains unclear. As

Tausk observes, "Large parts of it are completely unimaginable," adding that even when "the patient believes he understands the construction of the apparatus well, it is obvious that his feeling is, at best, analogous to that of a dreamer who has a feeling of understanding, but has not the understanding itself."[7]

Interestingly, nowhere in his essay does Tausk acknowledge that the projected pictures, invisible wires, and various electromagnetic rays, impulses, and waves that plague his patients, far from being some wholly hallucinatory technology, are in fact a rather logical and quite specific displacement of the era's new wonders in telecommunications: namely, the cinema, telegraphy, telephony, and wireless.[8] Dedicated to the idea that the influencing machine, as Freudian symptom, can speak only to internal psychic conflicts, Tausk generally ignores the more social etiology of these hallucinatory devices as emerging media, limiting his comments in this regard to brief mentions of "technical knowledge" and the "progressive popularization of the sciences."[9] Once this sociological distortion is addressed, however, it becomes clear that the "influencing machine" is not only a symbol of a patient's disturbed ideation but also the psychotic component in modernity's larger conversation over the implications of new information technologies. Both then and now, "influencing machines" allow abstract anxiety over the convergence of political, technical, and electronic power to take concrete form, conveniently localizing this general paranoia in a more manageable technocratic conspiracy. While Tausk remains fixated on the machine as a symbol bound to libidinal dysfunctions, his study also suggests, at least implicitly, that the "technical delusion" is as much about "techniques" of power as it is about phantom "technologies." Variously deployed to "insert" and "broadcast" thoughts, the machines themselves function as an index for larger concerns about the subject's vulnerability in a social field increasingly suffused by the invisible energies and occult influences so central to the modern imagination.

As numerous cultural historians have noted, possible relationships between ego, energy, and the "occult" held great fascination for a variety of thinkers at the turn of the century, drawing together not only avowed "psychic researchers" but physicists, neurologists, physicians, and other prominent men of science who, in the hubris of modernity's accelerating mastery of all knowledge, shared an interest in reconciling once and for all the realms of physics and metaphysics. As Alex Owen writes in her history of this intellectual moment, "What united many of these different trends and factions was a loosely Neoplatonic belief in an occluded spirit realm and a broadly conceived sense of an animistic universe in which all of creation is interrelated and part and expression of a universal soul or cosmic mind."[10] Owen also argues, "While occultism blurred the distinctions between 'rational' and 'irrational,' occultists themselves epitomized an unbending faith in rationality worthy of any Victorian proponent of scientific naturalism."[11] Tausk's foundational study suggests that "irrational" psychotics were no less engaged in "rationally" theorizing this unseen universe; indeed, their deteriorating links with social reality made cultivating such knowledge especially crucial. One could argue that the added dimension of "paranoia" actually gave these psychotic theorists advantages in sorting out the growing alliance between political and technological power in mediating occulted worlds.[12] Even today, in the era of the "*Matrix* defense," the technical delusion would appear to focus more on a suspicion about the application of power than on the actual devices themselves, which again are only an index, a "symptom," of the more sinister social formation that would have need for such a device. If the influencing machine remained "largely unimaginable" in the minds of Tausk's patients even as they experienced its effects most profoundly, no doubt this was a function as much of intellectual uncertainty as of libidinal disturbance, a "feeling of understanding" for modernity's emerging techno-social order rather than "the understanding itself." Like canaries in modernity's coal mine, these "influenced" schizophrenics were perhaps the first to comprehend the implications of inhabiting a world where media technology—devices capable of converting various modes of power to energy and energy to power—might enact the secret agendas of more sinister sociopolitical forces.[13]

PSYCHOTIC ENERGY

Though academic, vernacular, and spiritualist science at the turn of the century remained "inadequate to explain" the exact nature of the motive powers at work in mind and universe, psychics, scientists, and psychotics alike increasingly placed their confidence in the era's "feeling of understanding" for "radiant energy." As Roger Luckhurst documents in his history of telepathy, many prominent physicists of the late nineteenth century (many of whom were also actively engaged in psychical research) turned to electrical induction to explain mind-to-mind contact as only one of several "inter-phenomena" wholly consonant with the principles of scientific naturalism, a material theory of the occult that provided a crucial theoretical cornerstone for all subsequent psychic research.[14] Luckhurst places particular emphasis on an influential address by William Barrett, a physicist from Dublin, to the British Academy of Arts and Sciences in 1876. Barrett's paper, "On Some Phenomena Associated with Abnormal Conditions of Mind," used the still mysterious physics of induction to argue, "When a person is thrown into a hypnotic or passive condition, the nervous action associated with thought can be excited by a corresponding action in an adjoining individual, and this across space without the intervention of recognized organs of sensation."[15] Earlier generations of spiritualists had held similar theories about the transmission of psychic power, producing the elaborate technical protocols of "mediums," "channeling," and "spiritual telegraphy" in the mid–nineteenth century.[16] Barrett's paper, however, introduced a plausible material explanation for the purportedly supernatural activities of telepathy and "thought transference" and thus proved pivotal in scientific naturalism's rewriting of spiritualist mysticism.[17] Thus did "induction," "radiation," "ether," and "fields" become pivotal in modernity's animistic search for "universal mind," a vocabulary increasingly common to both the materialist and spiritualist factions engaged in this quest.

Given the nineteenth century's increases in education, literacy, and popular scientific culture, these theoretical debates were well within the reach of any reasonably well-read middle-class psychotic, some of whom took a quite active interest in speculating on the scientific principles at work in their own symptomatology. In 1889, the *American Journal of Psychology* published a case study in paranoia based in large part on the patient's own autodidactic diary. Intriguingly, this patient "heard voices" that took as their primary mission to explain how and why he was hearing voices, in effect instructing him in the sciences of telepathic hallucinations. The patient's diary reads like a veritable index of popular radiant theory. "I heard a great deal about 'inducting, ' 'conducting,' 'sphere of influence,' sometimes even 'poles,' positive and negative, and my brain was constantly compared to a magnet. I could find no better explanation myself for a long time than the theory of a fluid, similar to or the same as electricity, uniting brains."[18] Here we see Tausk's "feeling of understanding" rather than the "understanding itself" at its most acute. An indistinct sense of how magnets, poles, induction, fluids, and brains might be interrelated is projected back out into a phantom social field, and the subject, confronted by inexplicable hallucinations and surrounded by incomprehensible powers, reorders his vulnerable place and understanding of this world though an alienated program of pedagogical hallucinations, a study made even stranger in that the voices seem to appear for the sole purpose of theorizing their existence!

But this patient's education in media theory did not end there. After describing how the voices taught him the language of magnetism and electrical fluids so that he might understand his own telepathic control, the patient continued by elaborating a delusion that linked these mysterious powers to an equally hazy understanding of an emerging public sphere. Through his voices he learned the story of an "English physician" familiar with the patient's "magnetic properties" who, from the very beginning, was "directing the experiment." As the patient writes, "He was stated to have been the first to form a perfect communication with the inducted brain, and he had drawn off my entire memory back to childhood, and had delivered it verbally in the presence of reporters from the city who had taken it down. . . . It was further asserted that he continued in communication with my thoughts, and that wherever he went, every one to whom he told the story of the new marvel was also set in connection with the magnetic currents flowing from my head, and began to participate in my thoughts."[19] Here a mysterious physician—an abstract man of abstract science—emblematizes the world where science and technology take place (England, apparently)—a distant technocratic order beyond the daily experience and control of the patient. It is also significant that the "influencing machine" of this patient, who is hallucinating in the era of telegraphy (still the prime method of international telecommunications circa 1888) is not so much an actual device as the typical sociopolitical function of this technology in the abstract—the gathering of information (in this case in the form of memories) for distribution, via reporters, to the older medium of the printed newspaper. In fact, this particular delusion condenses the entire history of communication in a single transaction—speech, print, and telegraphy conspiring to make the patient's private memories available for public consumption. Clearly a precursor to the influencing machine proper, this elaborate delusion is more about techniques of power and transmission than about actual communications technologies; indeed, the only new technical "marvel," apparently, is the patient's own "magnetic" yet presumably still organic head. More important is the physician's pioneering of a still unexplained technique (the "perfect communion with the inducted brain") in the service of a still unexplained agenda (why are the patient's memories being distributed?).

The historical specificity of the "influencing machine's" imminent (and even necessary) emergence can be gauged by the strange paradoxes presented by this patient's "system" of external control. On the one hand, he perceives his thoughts and memories as harvested by telepathic/telegraphic induction for distribution on the printed pages of the British press. Yet this same agent of inductive control, the English physician, also has the power to facilitate a "vast network" of immediate mental contact by linking the patient's "magnetic head" to a larger public "one person at a time." Examining the illogic of this delusion (why would this miraculous doctor bother at all with print?), it would appear that this patient—who had previously claimed not to understand how electromagnetic induction operated—was struggling to negotiate, not only modernity's deluge of scientific information, but also the various ways such powers of inductive transmission might be innovated, implemented, and exploited. Reading between the psychotic lines of his diary, there is the suggestion that his memories must be harvested so that they can be *written down* (thus preserving his "past" in the press). Meanwhile, though the mysterious physician has the power to create "live" connections between strangers and the patient's brain (and presumably his contemporaneous experience), he can only do so "face to face" and "one person at a time." In the end, the patient's delusions mix, not only "media," but also temporalities and interpersonal/mass modes of contact. It is a paranoia that does not yet quite know exactly what to be paranoid about—"thought broadcasting" as performed through the traditional public venue of the newspaper as a record of events, or through the "new marvel" of a "magnetic head" transmitting radiant energy in a simultaneous network. One could even argue this patient's diary anticipates "wireless" as a technical principle and "radio" as a social institution. Equating telepathy with what would soon be known as wireless is perhaps less than remarkable; indeed, the arrival of Marconi's breakthrough in 1895 was, for many, simply a confirmation of the telepathic potential perceived in radiant energy. On the other hand, anticipating the use of wireless telepathy to link a "vast network" of strangers, as in broadcasting, presents a use of the technology that corporate interests in radio would not fully realize, conceptually or technologically, until the early 1920s.

Such "transitional" paranoia is equally prevalent in the delusions of psychiatry's most famous psychotic—Judge Daniel Schreber. As is well known to students of modernity and psychoanalysis, Schreber wrote an exhaustive and strangely lucid account of his mental struggles following his "nervous collapse" in 1893. Published in 1903 as *Memoirs of My Nervous Illness,* Schreber's singularly bizarre text has become, somewhat ironically, the most emblematic account of psychosis in Western thought, attracting the critical attention of Sigmund Freud, Jacques Lacan, Gilles Deleuze, Michel de Certeau, and Friedrich Kittler (among many, many others). In the *Memoirs,* Schreber as theorist presents with analytic precision—complete with supporting citations drawn from prominent scientists and philosophers of the era—the harrowing account of how his mind became entangled in an energetic network linking Schreber to God, his doctor, and countless souls—living and dead—through a system of "nerve," "nerve force" and "nerve-language." "The human soul is contained in the nerves of the body," he writes as the opening, foundational proposition of the *Memoirs,* soon adding that God "to start with is only nerve." Capable of seemingly infinite (if inexplicable) transmutations, Schreber's God transformed this nerve force "into all things of the created world; in this capacity they are called rays; and herein lies the essence of divine creation."[20] Like Georg Simmel, Max Nordeau, and many other self-aware moderns, Schreber recognized that a "growing nervousness among mankind"—a disturbance with both social and electromagnetic implications—was on the horizon.[21] Schreber believed that God himself, typically interested only in "uploading" souls from the nervous systems of corpses, was now "attracted" to the living soul of Schreber as a man with nerves "in a state of *high-grade excitation.*" In a typical yet magnificently realized delusion of grandeur, Schreber believed that God's attraction to his "nerves" constituted a grave threat to all of creation and portended an impending religious crisis of unprecedented magnitude. With this novelistic touch, the promise of a looming cosmic collapse, the *Memoirs* go on to reveal the more notorious details of Schreber's "nervous" intercourse with God: stories of "fleetingly improvised men," "missing organs," and, most infamously, Schreber's belief that the constant bombardment by God's divine rays had the effect of slowly transforming Schreber into a woman.

The cosmology Schreber explores in the *Memoirs* is at once wholly insane and strangely consistent with theories advanced by modernity's legion of more "rational" occultists. And like his psychotic colleague under the influence of a mysterious English physician, Schreber (under similar delusions of control by his own flesh-and-blood doctor, Professor Flechsig) proposed a model of "nerve" that presented its own paradoxical relationship to transitional understandings of energetic transmission and telecommunicative circulation. The *Memoirs* frequently present "nerve" as an articulated network, evoking the familiar image of the nervous system as conductive tendrils of electrical transmission. In this regard, Schreber regarded the physical body's nerve tissue as both a storage center (containing a person's memories and soul) and a metaphysical aerial sensitive to vibratory influence ("I receive light and sound sensations which are projected direct on to my inner nervous system by the rays, for their reception the external organs of seeing and hearing are not necessary").[22] At the other end of the spectrum were an oceanic series of substitutions: God as nerve as "divine rays" as all of creation. God functions in this scenario as both technology and operator, an "Entity" composed of nerve using nerve to communicate in a universe of nerve turned divine creation. In this continuum of transmitting gods and godly transmitters, Schreber articulates his own unique inflection on occult modernity's more secular search for the radiant foundations of universal mind, presenting a more residually religious (yet scientifically informed) model of the inductive cosmic links between matter, thought, and reality. Working with conductive wires and inductive fields, nervous physics and metaphysical nerves, he proposes a variety of telecommunication scenarios deploying discrete nerve and omnipresent ray in ever more bizarre formations. Dreams, poetry, and "hallucinations" (so-called, for Schreber) are all the product of infusion by nerve, a process different from and yet seemingly similar to the briefly mentioned phenomena of "light telegraphy." One of the most strangely poetic constructs is the "tying-to-celestial-bodies," in which Schreber imagines an occult cable linking his mind to distant stars. "I realize such a conception, according to which one must think of my body on our earth as connected to other stars by stretched out nerves, is almost incomprehensible to other people considering the immense distances involved," writes Schreber. "For me however as a result of my daily experiences over the last six years there can be no doubt as to the objective reality of this relation."[23] In a postscript to the *Memoirs,* Schreber finally names the operative model at the heart of this cabled connection: "It is presumably a phenomenon like telephoning; the filaments of rays spun toward my head act like telephone wires; the weak sound of the cries for help coming from an apparently vast distance is received only by me in the same way as telephonic communication can only be heard by a person who is on the telephone."[24]

In *Discourse Networks,* Friedrich Kittler stresses the unity of Schreber's delusional universe in terms of its ability to inscribe and store information. Like the camera and gramophone, Schreber transcribes the Real directly without any recourse to the Symbolic, his endless storing of information—in his body and in the cosmos—functioning as technical recording "without any Geist." In this Lacanian-inflected concept of the psychotic as dislodged from conventional orders of language and meaning, "The paranoid machine operates like an integrated system of all the data-storage devices that revolutionized recording circa 1900."[25] Equally interesting here, however, are the many *discontinuities* in Schreber's endless modeling of telecommunications systems. Like his paranoid peer under the influence of British brain induction, Schreber's attempts to theorize his new subjectivity through his last remaining attachments to the Symbolic produce perplexing fissures in the logic by which nervous data are gathered, transmitted, and controlled. For example, after describing the complex, mysterious, and at times painful procedure of the "tying-to-celestial-bodies," Schreber immediately links this mode of intergalactic nerve contact to a radically different medium, what he terms the "writing-down system." "*Books or other notes* are kept in which for years have been *written-down* all my thoughts, all my phrases, all my necessaries, all the articles in my possession or around me, all persons with whom I come into contact." This is a centuries-old delusion, of course, no doubt tied in large part to the idea of God's "Book of Life" (or, in the delusion discussed earlier, British newspapers).[26] On the precipice of the new century, Schreber seeks to theorize this medieval mode of the ego's supernatural illumination with more scientific precision. "I presume the writing down is done by creatures given human shape on distant celestial bodies . . . , but lacking all intelligence; their hands are led automatically, as it were, by passing rays for the purpose of making them write-down, so that later rays can again look at what has been written."[27]

Here again is a paradox of mixed, rival, and redundant systems: information telephonically extracted by the rays is reduplicated by humanoid writing machines who, also under the power of the divine rays, are engaged in a form of "automatic writing," a well-known medium of spiritualist contact in the late nineteenth century. Having extracted and supervised the recording of the nervous information, the rays (God?) return a third time at some unspecified point in the future to "read" the transcriptions. Schreber's extraordinary vision of his own Gutenberg galaxy would be equally at home in two briefly overlapping genres of the 1890s: the science fiction of extraterrestrial rays and beams (in ascendance) and spiritualist accounts detailing the soul's astral projection to other planets (in decline). And like these other genres, Schreber's telematic scenario raises more questions than it answers. Why would the majesty of intergalactic wiring terminate in pen and paper? Why must God (as ray) return to these writings at a later date? Why do these alien scribes lack "intelligence," reduced again to recording "without Geist"? Is it to forestall layer upon layer of further transcriptions—each "intelligent" being necessarily connected to another soul transcription service in a network branching out into infinity? Whatever the exact genesis of Schreber's deranged train of thought, such passages speak to the *Memoirs'* rather consistent obsession with *appropriate* channels of contact. In fact, the crisis of Schreber's mind (and thus the universe) has its foundations in various entities either maliciously abusing or incompetently misusing the elaborate protocols of "nerve language," a telecommunicative debacle that has disrupted the "Order of Things."

If Schreber was, as Kittler asserts, a perfect mechanism of inscription, then Schreber's God was a less-than-perfect operator of nervous telephony. Indeed, Schreber's God—himself apparently caught unawares by a rapidly changing world of accelerating energy—is somewhat of a Luddite boob. Like an overstressed worker in a phone exchange, God simply cannot handle modernity's excessive nervous energy even as he is irresistibly attracted to it. As Schreber describes it, "There was no danger for God in approaching corpses in order to draw their nerves, in which self-awareness was not extinct but quiescent."[28] In other words, God had little difficulty uploading the energetic "book of life" written in the nervous tissue of the dead. But the "high excitation" of Schreber—a fleshy metonymy for modernity itself—"held such power of attraction for the nerves of God that He would not be able to free himself from them again, and would thus endanger his own existence."[29] In essence, God threatens to destroy himself and his creation by virtue of calling a wrong number, the living Schreber rather than the "quiescent" (but not extinct) ego residing in his body after death!

Even as Schreber extrapolated his own "nervous illness" into an idiosyncratic crisis of cosmic proportions, he replicated a widespread cultural logic in the late nineteenth century that repeatedly linked the perceived acceleration of the modern age with the threat of electrical and nervous dissipation. George Beard's study of 1881, *American Nervousness,* epitomizes this body of biosocial speculation.[30] Here Beard gave popular identity and scientific credence to the figure of the neurasthenic—that melancholy soul who responded to modernity's cataclysmic changes with fatigue, despair, and insomnia, among other symptoms. Primarily male, the neurasthenic stood in contrast and counterbalance to the overexcited nerves of the female hysteric—a modern reversal of the two sexes' "natural" energetic states. In his own mode of sociological "influencing machine," Beard attributed the world's "rapid increase of nervousness" to emerging reservoirs of power, communications, and information, specifically "steampower, the periodical press, the telegraph, the sciences, and the mental activity of women." Taxed by the world created through these emerging forces, the neurasthenic was for Beard drained of vital electrical force (and nearly forty years later, Tausk would find influencing machines involved in similar neurasthenic "draining," the devices using electricity and/or magnetism to produce "erections and seminal emissions . . . intended to deprive the patient of his male potency and weaken him").[31]

Beard's therapy for the condition involved a process of "general electrization" to restore the body's reserves of organic energy, a practice that survived in various sham cures well into the next century. As T. Jackson Lears notes, most of these cures were based on a principle of "psychic scarcity," a mental economy likening a "person's supply of nervous energy to a bank account." Though their symptoms might vary slightly, all neurasthenics were in some sense overdrawn and overtaxed, resulting in a total paralysis of will.[32] In the end, this would appear also to be the fate awaiting Schreber's God: irresistibly attracted to modernity's exuberant expenditures of nervous energy, the Almighty was himself in danger of lapsing into a neurasthenic state.

Few readers found themselves more nervously attracted to Schreber's theories than Freud, who famously extended his own work on libido, paranoia, and homosexuality through a close textual analysis of the *Memoirs.* [33] As Kittler notes, Freud was so unnerved by Schreber's seeming anticipation of key aspects of psychoanalytic theory—a perceived parallel between Schreber's "divine rays" and Freud's "libidinal cathexis"—that he invoked a colleague to testify that Freud's ideas predated Schreber's *Memoirs*.[34] What was really at stake in the two writers was "the nexus between psychophysics and psychoanalysis" (and, one might add, psychosis). As Kittler notes, "*The Project for a Scientific Psychology* and *the Memoirs of my Nervous Illness* are two continuations of a single discourse. No wonder they ran into plagiarism problems of being reverse sides of one another."[35] Schreber's knowledge of psychophysics was defensively instrumental, the product of the perverse tutelage of Flechsig, the renowned neurologist who, as Kittler argues so persuasively, is the real God at the center of Schreber's delusional universe.[36] It is not surprising that Schreber, trapped in an asylum and confronted on a regular basis with Flechsig, his diagnostic and legal master, seated before a giant photograph of a bifurcated brain, would essentially hallucinate himself into a nervous realm where the brain functioned as a universe and the universe functioned as a brain. Freud's training in psychophysics was more formal. Though he founded psychoanalysis on the insight that neurosis was purely ideational, Freud never renounced the mentoring principles of Ernst Brüche, the famous neurologist who had supervised Freud's early laboratory work in the dissection of nerve tracts and spinal cords. This experience no doubt attracted Freud to Joseph Breuer's model of cathexis—an economic theory of circuited psychic energies in search of transfer and balance.[37] In his physiological contribution to "Studies on Hysteria," Breuer echoed many contemporaries by arguing that hysterics were prone to "an abnormal excitability of the nervous system," a network that Breuer described in metaphors of tele-mediated electrical conductivity. Later in the essay, Breuer writes somewhat defensively, "I shall scarcely be suspected of identifying nervous excitation with electricity, if I return once more to the comparison with an electrical system."[38] Breuer's desire to distance himself from the electrical metaphor, even as he uses it once again, speaks to the ambiguous conflations inherited by Freudian cathexis. The nervous system (and by extension the psyche) is not *literally* an electrical system—yet both operate in every way as if they were a wired network of telephonic exchange.

If psychophysical speculation, both psychotic and psychoanalytic, could not resist the temptation of representing the mind as wiring, energies, and transmission, then it is only to be expected that the new century's psychotics would eventually translate these technical analogies back into concrete technologies of invisible power (schizophrenics, after all, are often identified by an inability to process metaphors). And this is precisely what Tausk encountered after World War I in the fully realized symptom of the "influencing machine"—a paranoid literalization of the electrical and technological metaphors used so often to illustrate the workings of the mind for the previous half century. Tausk's study proceeds somewhat counterintuitively by centering on an "atypical" example of the influencing machine: the case of Nataljia A., a thirty-one-year-old woman who believed she was under the influence of an electrical machine made in Berlin. She described the machine as a coffin lid in the shape of her own body, lined in its interior with silk or velvet. The inner portion of the machine consisted of "electrical batteries" meant to "represent the internal organs of the body." Nataljia A. not only saw the machine as a medium of control but also invested it with the more primitively animistic powers of "magical thinking." For example, she reported that if someone were to strike the machine she would feel the blow in the identical location on her own body.[39] She believed the apparatus to be in the service of a rejected suitor, a college professor, who was motivated by jealousy. Though the machine at first influenced only Nataljia, she eventually came to believe her mother, doctors, and friends to be under the device's control as well. Perhaps inevitably, she at last came to believe that Tausk himself was under its control and that "they could no longer understand one another," thus bringing an end to their sessions.[40]

Tausk acknowledged that the symptoms attending the influencing machine—delusions of telepathic contact, a dissolution of ego boundaries, feelings of external control—all predate the advent and clinical appearance of this hallucinatory technology. As to these centuries-old phenomena now taking the specific form of contemporary communications technologies, Tausk simply attributes it to "the need for causality that is inherent in man." Vitally important as a psychoanalytic "symbol" of narcissistic projection, the influencing machine's historical emergence as prevalent symptom thus amounts to little more than convenience; in fact, Tausk considered it be a rather redundant "terminal stage in the evolution of the symptom,"[41] suggesting that the era's expanding technical possibilities merely introduced an additional stage in the schizophrenic's teleological movement from an initial sense of "inner change" to more elaborate projections of external control. Attributing the advent of the influencing machine to "the need for causality that is inherent in man" begs many questions—historical and no doubt diagnostic as well. In casting the influencing machine as merely a "convenient" answer, a plausible explanation, for the schizophrenic's perception of "lost ego boundaries" and "thought broadcasting," Tausk ignores that "machines" were not benign objects in modern discourse. This was particularly true in the case of the era's multiplying wonders in telecommunications—the cinema, telephony, telegraphy, and wireless—the technologies that figure most prominently, albeit highly distorted, in the figure of the "influencing machine." A function of the popularization of science, certainly, the influencing machine also came attached with a set of associations drawn from the popularization of sociological speculation as to new possibilities of contact and control made possible in Western technocracies. Without accounting for these sociopolitical dimensions of the influencing machine, its emergence within a specific historical horizon, there would have been little reason to expect modernity's psychotics to abandon earlier models of control—Gods, spirits, curses, witchcraft, and so on. If the machine is indeed a symptom, as both Freud and Tausk suggest, then it is equally a sign of displaced sociological ideation and intrapsychic conflict.

For example, Tausk notes that for Nataljia and many other patients under machine influence, "the persecutors are all persons who live at some distance from the patient, whereas the persecuted belong to the closest circle of acquaintanceship and . . . represent a kind of constantly present family."[42] Tausk again theorized this dyad—distant persecutor/intimate victims—through the concept of narcissistic libido (a concept, moreover, that Freud had first elaborated in his work on Schreber). Tausk speculated, "The demand for libido transfer with respect to members of the family is not felt either as requiring the overcoming of any great distance or any substantial sacrifice of narcissism."[43] It is different, however, for lovers, suitors, and physicians, who Tausk argues make extraordinary demands on the libido. "The fact that these persons are spatially distant evokes a feeling of distance on the part of the libido." And yet, as late nineteenth-century prototypes of the influencing machine suggest, the operator (or master) of such influence is just as often a government official, a complete stranger, a bureaucratic committee, or an abstract type (a.k.a., an anonymous "English physician"). The persecutor/persecuted dyad, then, speaks just as strongly to a social field defined by the family circle as a defensive perimeter against modernity's new institutions of power—the medical, the judicial, the governmental, and, in the twentieth century, the media—each a distant institution increasingly empowered to extend its administrative influence within the family circle itself (especially in the case of those afflicted with "nervous illnesses"). As many commentators on modernity have noted, in the era's new administration of the social, "power" increasingly emanated from elsewhere—the capital, the courts, the university—institutions beyond the immediate experience and comprehension of the individual subject.[44]

Nataljia A., it should be noted, believed that the electrical device controlling her from Berlin had been prohibited by the police—a layer of political authority and intrigue seemingly unnecessary for the machine's purely intrapsychic function.

Tausk also notes that, to his knowledge, operation of the influencing machine is reserved exclusively for "male enemies" of the patient—a trend that continues even in contemporary manifestations of the "technical delusion." Interestingly, Tausk does not consider the gendered nature of the operator in any real detail, perhaps because it presents potential dissonance with Freud's contention that paranoia is a function of homosexual repression (by this logic, Nataljia A should have imagined a female operator at the controls of her own peculiar influencing device). But if the male operator is placed back onto the field of history, this symptom takes on new significance, portending the eventual Lacanian shift in psychoanalysis from the penis to the phallus. If the influencing machine is more the historical psychotic's vernacular theory of *power* than a timeless object of libidinal projection, then who else but men would be expected to exploit such phallic knowledge of mechanics and power?[45] Here the sociology of gender is probably more important than the psychic mechanisms of sexuality. As the work of Carolyn Marvin and other social historians has demonstrated, the fundamental masculinity of science and technology was consistently reaffirmed in modernity by popular appeals to the antiscientific, irrational, and technophobic nature of women.[46] Given the historical field in which the influencing machine emerged as a psychotic side effect of more general technological development, it should be less than surprising that the operators of these machines would be consistently male.

BROTHER PSYCHIC

Three years after Tausk published his foundational study, "radio mania" swept through Europe and the United States. Wireless principles, felt but not completely understood in the first twenty years of the century, suddenly took central stage in the popular imagination of the modern world. In the radio set, spiritualists, scientists, and psychotics at last found the definitive conceptual and technological bridges between the physics of the ether and the metaphysics of the ethereal. By 1926, empirical verification of radiophonic telepathy seemed to be at hand in the work of the neurologist Ferdinand Cazzamali at the University of Milan. Cazzamali "treated the human brain as a broadcast station" in order "to see what radio signals sent out by the brain could be picked up by delicate radio receivers."[47] The experiments depended on "highly excitable persons as subjects" who, once under hypnosis, emitted signals "at the extremely low wave length of from four to ten meters," sounds that were "similar to wireless signals, but were often accentuated until they resembled whistling or the tones of a muted violin."[48] The reporter noted that the difficulties presented to Cazzamali in his experiments were almost identical to the main challenge facing the homebound wireless enthusiast—electrical interference. "The difficulty is not in detecting the supposedly feeble wave impulses sent out by the brain. It is in avoiding the simultaneous detection of hundreds of other electromagnetic impulses which are being sent out by other parts of the human body, by any other living creatures in the neighborhood, even by a variety of inanimate objects close at hand."[49] Yet despite such difficulties—a universe suffused with electromagnetic energies—a reporter for the *New York Times* believed the results to be encouraging enough to proclaim, "The scientific study of thought transference has suddenly become respectable."[50]

So astounding was this apparent verification of the brain as radio transmitter that the noted health enthusiast (and founder of Ralston-Purina) Edmund Shaftesbury dusted off his volume on thought transference from 1897 and reprinted it with a new preface detailing the work of Cazzamali. Like so many writers on health and "mental discipline" at the beginning of the century, Shaftesbury believed that the ability to control one's own mind amid an ocean of etheric influence was perhaps the key to remaining sane in the modern world, a sentiment no doubt shared by many under the insidious control of various "influencing machines." Even as Shaftesbury extolled the wondrous potentials of mental control and influence—the possibility of realizing one's ambitions by projecting positive will into the ether—he also understood the horrifying implications of a world where frequencies, organically and mechanically generated, integrated the brain into a larger network of public surveillance and indoctrination. Hoping to disavow this now seemingly very real threat through humor, Shaftesbury observed, "No longer will 'A penny for your thoughts' be the vogue, for science will already know your thought and will probably have decided that a penny would be an over-valuation of it."[51] Shaftesbury then addressed the real concern at the heart of this new scientific breakthrough. "Imagine what the world would be if the workings of the mind could be detected with scientific accuracy. . . . There would be no privacy of thought. Your brain would makes noises for all the world to hear. . . . There would always be someone 'listening in.' . . . " Perhaps rattled by the implications of this perfect union of mental and mechanical influence, Shaftesbury quickly returned to humor. "There are some people whose brains never function and who therefore would suffer no inconvenience from the radio eavesdropping, but for most people it would be a horrible thing."[52] And for psychotics who had for so long anticipated such a world, suspecting that modernity's occult energies might coalesce in ever more precise technologies of implantation and transmission, this was indeed a terrible thing. Predictably, radio-related devices would come to dominate manifestations of the technical delusion for the next several decades.

Freud's work also took a turn toward the occult following World War I, a trend especially apparent in his several essays on the question of telepathy. Having in his career described "omnipotence of thought" as a neurotic mode of infantile regression, having textually diagnosed Schreber's telepathic horrors as homosexual paranoia, and having just praised Tausk's work on the psychotic belief that minds could be influenced by invisible energies, Freud was nevertheless prepared by the midtwenties to endorse, at least privately, the probability of telepathic contact. Perhaps hedging his bets until all the research was complete, Freud's public writing on telepathy was notoriously conflicted, even as it gradually moved from suspicious rivalry to a more deliberate inscrutability. Yet in 1926, the year of his seventieth birthday (and of Cazzamali's experiments), Freud wrote to his future biographer Ernest Jones, "If anyone should bring up with you my Fall from grace, just answer calmly that my acceptance of telepathy is my own affair, like my Judaism and my passion for smoking, etc., and that the subject of telepathy is not related to psychoanalysis."[53]

Freud's motivation in embracing telepathy has been the cause of much speculation and has made these once-esoteric and long-marginalized portions of the *Standard Edition* increasingly central to recent studies of psychoanalysis.[54] Given his work in histology with Brüche, his study of hysteria with Breuer, and his distant but engaged relationship with Britain's Society for Psychical Research, Freud was no doubt well aware of the ongoing dialogue between electromagnetic science, neurological economies, psychic energies, and contemporaneous occult theory. And like Beard, Breuer, and Schreber before him, Freud inevitably returned to the technological metaphor in theorizing telepathic contact. "What lies between the two mental acts may very well be a physical process, into which the mental process transforms itself at one end and which is transformed back into the same mental process at the other. The analogy with other transformations, such as speaking and hearing across the telephone, is an obvious one."[55] In the end, Freud himself apparently decided there was "more truth in Schreber's delusion than other people are as yet prepared to believe," a final intellectual rendezvous born of their mutual investment in the energetic mechanics of psychophysical transmission.

Freud was thus true to neurology, psychic research, and psychoanalysis when he accepted as a matter of course that the passivity of sleep, a time of lower (and thus less "positive") electrical activity in the brain (as well as the ego's most undefended moment), would naturally create "favorable conditions for telepathy."[56] By the time of his nearly converted essay of 1925, Freud believed he had even located the exact transmission point of telepathic phenomena, one that again must be seen in terms of cathexis and energetic transfer. "On the basis of much experience I am inclined to draw the conclusion that thought transference . . . comes about particularly easily at the moment at which an idea emerges from the unconscious, or, in theoretical terms, as it passes over from the 'primary process' to the 'secondary process.'"[57] Freud even boasted of his ability to control such "transference" in his meetings with the inner circle. True to the often paranoid obsessions of psychoanalysis, Freud and his followers came to be concerned with telepathy as manifest chiefly at the moment of analytic countertransference—that moment when the analyst's unconscious thoughts might radiate in uncensored form back to the patient. This was the explicit topic of Deutsch's paper of 1926, "Occult Processes Occurring during Psychoanalysis,"[58] and speaks to what John Forrester describes in *The Seductions of Psychoanalysis* as the discipline's fascination with "leaked communication." "Once the psychoanalytic situation has been conceptualized as a semi-permeable discursive membrane," writes Forrester, "telepathy becomes a threat to that situation. The aim of the rules of analytic discourse is to regulate the flow across the membrane; telepathy represents a direct threat to this attempt at discursive regulation."[59] Underwritten, like the "influencing machine," by a half century of psychophysical conjecture, Freudian interest in telepathy ultimately manifested as a concern over "thought broadcasting," the very same "first-order symptom" of schizophrenia that maintained that the internal circuits of "private" intrapsychic exchange might be "plugged in," at least momentarily, to a network of public circulation.

Particularly sensitive to such hazards, the Hungarian analyst István Hollós took a most active interest in studying telepathic countertransference, proposing, after Freud, that these telepathic exchanges almost always involved a message "connected with a wish which is not yet in a state of repression, but is in the process of being repressed."[60] Working in dialogue with Sándor Ferenczi and an unnamed physicist, Hollós proposed a neurological theory that blended the Freudian thesis on primary and secondary processes with William Barrett's foundational speculation on telepathic induction some fifty years earlier.[61] The result was a kind of *quantum cathexis,* a process in which psychic material, much like electrons, gave off energy when "jumping levels," in this case between the orbitals of the primary and secondary process. At the heart of the theory was the inductive biophysics of "crossed nerve bundles," nodal points in the nervous system capable of transferring impulses through inductive association rather than conductive networking. "There is a genuine logical nexus between the explanation of the crossing of nerve bundles by means of 'neuromotor induction' and the induction process of the unconscious," argued Hollós. Thus, in the occult borderland between the conscious and unconscious mind, energy flowed through networked junctions of bundled nerves, physical nodal points of inductive contact that could radiate intersubjective, telepathic communication. During his period of public indecision on the topic, Freud often argued that psychoanalysis had little to say about the demonstrable reality of telepathic thought but could be of value in subjecting allegedly telepathic material, like dreams, to rigorous analytic dissection. But this disavowal, unblocked by Hollós's intervention, denied a material theory of telepathy already implicit in the energetic foundations of the Freudian project. Psychoanalysis *could* in fact locate the telepathic wave: physically as a type of "spark" set loose during cathexis, and situationally as an unconscious transmission from a "repressing" analyst to the contemplative and thus receptive mind of the reclining analysand.

Freud's final publication on telepathy, the 1933 lecture "Dreams and Occultism," continued the speculation on the psychic flows of energy that had occupied him for a half century. Of telepathy he wrote, "One is led to a suspicion that this is the original, archaic method of communication between individuals and that in the course of phylogenetic evolution it has been replaced by the better method of giving information with the help of signals which are picked up by the sense organs."[62] Presented in this form, telepathic power would be the fundamental wellspring of all subsequent manifestations of power—linguistic, psychical, political—a suspicion Freud confirmed through an oblique reference to Gustave Le Bon. "The older method might have persisted in the background and still be able to put itself into effect under certain conditions—for instance, in passionately excited mobs."[63] In Freud's scenario, telepathy, a by-product of consciousness and the origin of all language, lies as a dormant transmitter in the human mind until those moments when struggles over power become most naked—in mobs or on the couch. Such conjecture may be the closest psychoanalysis would ever come to providing a social theory of the influencing machine, albeit in reference to the very origins of the social itself in language and "primitive" networks of hived communications.[64]

FROM GODS TO BLOGS

Flows of electronic media have continued to present a challenge to schizophrenics over the past century. Studies indicate that auditory hallucinations in schizophrenia increase when subjects are either alone or, even worse, encouraged by radio and television to think they are not alone. "It is well known that the prognosis for patients with schizophrenia is better if they live in developing countries than in western industrialized societies," notes one psychiatrist, a counterintuitive difference he attributes to the Western schizophrenic's ongoing inundation with delusional material from television, radio, and the Internet.[65] Which returns us, finally, to the so-called "*Matrix* defense" in contemporary jurisprudence. By far the most infamous defendant linked to the film was Lee Boyd Malvo, a Jamaica-born teenager who, along with John Allen Muhammad, was arrested and convicted for the Beltway sniper attacks of October of 2002. Over a three-week period in Washington, D.C., Muhammad and Malvo murdered ten people from a sniper's perch in the trunk of a 1990 Chevy Caprice. At one murder scene, authorities found a Tarot "Death Card" inscribed with the message, "Dear

Policeman, I am God. Do not tell the media about this." Defense lawyers would later claim this note suggested that Malvo thought he was in a giant video game playing in the "God Mode," a code-cheat that allows the player's avatar immunity from all attack—virtual immortality. Asked to explain his motive in the shootings, Malvo told psychiatrists they could better understand him and his beliefs by viewing *The Matrix,* a film he claimed to have seen over one hundred times. Waiting to go on trial, Malvo produced dozens of jailhouse sketches that gave further clues as to the nature of his "mission." Under the tutelage of the older John Muhammad, the Morpheus to Malvo's Neo, Malvo had come to believe that white European culture, in an alliance of technology and capital, was intent on exterminating the other races of the world. Their mission was one of political and economic revolution with the ultimate goal of establishing "a utopian black colony in Canada based on racial and social justice."[66]

Crucially, when interviewed by the police, Malvo did not claim to be "in the matrix," only that the film would provide insight as to his motivations in the shooting spree. Unlike his "co-defendants" in the court of media effects, Malvo clearly saw the film as a fictional allegory made in Hollywood, one that he obviously identified with profoundly but never mistook as a literal rendering of his own life. *The Matrix* was instructive for Malvo, it would seem, not as a diabolically convincing proof of the technical delusion, the story of how computers might be used to orchestrate his own hallucinatory reality, but as a parable of the media's seemingly absolute power in creating and maintaining relations of social exploitation. Andy and Larry Wachowski, the theoretically versed creators of *The Matrix* (Neo is seen at one point with a copy of Jean Baudrillard's *Simulation and Simulacra*) could not have imagined a more ideal viewing subject for their work. Malvo's identification with the film was wholly in line with its most manifest thematic concern—the technocratic administration of political power through mediated simulation, a "message" Malvo rather understandably mobilized to explain and then strategize against the not wholly unreasonable proposition that "white" culture had indeed used capital and technology to disenfranchise, exploit, and perhaps even exterminate the world's "nonwhite" citizenry.

If Malvo did suffer from a "technical delusion," he realized it according to new models of mediated power and influence proliferating in the late twentieth and early twenty-first centuries. Malvo's more complicated, bipartite "delusion" was a belief that (1) he was *not* subject to external influences and in effect "saw through" otherwise exhaustive strategies of power; and (2) he might make a significant intervention in the sociopolitical realm through the manipulation of extant media. If we are to believe Malvo's explanations, the shootings were conceived and executed as a calculated "post-9/11" media campaign. Knowing that a series of sniper attacks in the capital of the United States would create a panic of continuous news coverage, Muhammad and Malvo believed waves of public paranoia would eventually provoke martial law, which in turn would "incite a racial revolution over the 'continued oppression of black people.'"[67] This tribulation, in turn, would ultimately lead to the founding of their idyllic Canadian colony. To further aid in this effort, Malvo left the enigmatic "I am God" Tarot cards at the crime scenes as a form of narrative branding, a "hook" that would further engage a mass audience with the crimes.[68] It is an "insane" plot, to be sure, yet there would no doubt be great disagreement as to exactly where this scheme becomes "psychotic": that is, at what point it actually breaks from shared and putatively "sane" social logic. After all, the pair did in fact create a twenty-four-hour news cycle of terror for almost two weeks.

If the classic technical delusion of modernity (and indeed the entire twentieth century) was the "influencing machine"—a fantasy born of psychophysical conjecture, technological acceleration, and technocratic proliferation—then cases like Malvo's portend an intriguing shift in these delusional visions of media power. Paranoid schizophrenics have struggled for decades with the delusion that they were suffering as coerced *targets* of invisible transmission, unwilling vectors of electromagnetic subjugation. Malvo suggests a future where an increasing number of psychotics will consider themselves to be willing *sources* of media content and transmission, subjects who see themselves as active shapers of the media environment. And just as the influencing machine assumes its full significance only through location in modernity's historical field of social and technological power, the logic of Malvo's demented scheme truly makes sense only when integrated in the emerging media-scape of the twenty-first century. Who, in the Western technocracies at least, does not see the media as the ultimate horizon of power, if not in explicitly conspiratorial terms, than through a vernacular internalization of Baudrillard's vision of simulation as the irrevocable collapse of the real world into spectacle, obscenity, and fascination? And, as Adorno once observed of advertising, such simulation succeeds only because we believe, impotently and irrationally, that we now "see through" the media, that we understand how media distortion really works and are thus immune to its otherwise all-pervasive influence. In such an environment, what more rational strategy of survival than to believe one is (or can be, or should be) an active collaborator in producing or "being" media content (even if it is only temporarily and confined to one of the media universe's many target-galaxies)? Psychotic delusions of individuated transmission are no doubt the logical end point of a mass subjectivity adjusting to broadcasting turned niche-casting turned nanacasting turned blogosphere. Just what is the structure of desire, psychotic or otherwise, that motivates a blogger to spend hours cultivating a site dedicated to transmitting the most mundane details of a drearily average existence, all for the "consumption" of an audience measuring in the single digits? Is this the new model for constructing "community" in a media-savvy generation, as some have suggested, or is it the perfect realization of an actual influencing machine, reverse-engineered and no longer displaced, that can at last invest phantom masses with the full intensity of one's narcissistic libido? The idea that anyone can and should be famous (or at least have an audience, any audience), even if only for sharing his or her sock-folding technique online, is in this respect a rather spectacular inversion of Schreber's delusional hubris that the Almighty God prepared a new and unique cloud of gnats every day to plague him while he strolled in the garden.

Similarly, how do we explain the public's tortured relationship to celebrities like Paris Hilton, figures who, for perhaps the first time in history, are famous for being famous for being famous and who thrive on a bemused (yet still bitter) public resentment that they have succeeded, as Malvo had hoped, to turn this technologized system of capital and spectacle against itself (albeit for the achievement of "fabulousness" rather than social revolution)?[69] How is it that the public has so thoroughly adopted "insider" media discourse, that terms such as *points, word-of-mouth campaigns,* and *opening wide* have become a part of everyday entertainment discourse? Albums are no longer released, they "drop," language that performs the speaker's intimate knowledge of how music participates in larger corporate schemes of strategic marketing and publicity. TiVo and the iPod, meanwhile, have given rise to the phenomenon of "ego-casting," a fantasy of mastery that allows highly targeted, controlled, and predictable consumers to imagine they are autonomous masters of their own entertainment universe.[70]

The above evidence is admittedly highly anecdotal, perhaps a "feeling of understanding" rather than the "understanding itself" for new social configurations binding self, power, and media technology. Still, when psychotics (or at least sociopathic murderers) understand how to simulate psychosis by leaving suggestive cinematic clues at the scene of the crime, and when they conceive of their overall mission as a media intervention in which they themselves "star" as terrorist revolutionaries, it is difficult not to suspect a fundamental shift is at work in how contemporary subjects imagine the mediated spheres of power and influence that surround them. Now that the invisible threats long anticipated by the psychotics of modernity have been made manifest and palpable—a world where every citizen is indeed continually bombarded by "voluptuous rays" of consumerism, politicking, and fear-mongering in a bid for social control—one would expect new iterations of persecution and paranoia. Over the centuries, schizophrenics have often coped with their feelings of external control by eventually identifying with the supreme powers of the persecutor, coming to see themselves as "God." But now that Schreber's conceptual struggle between the divine rays of a Protestant God and the secular science of emerging transmission networks has been definitively resolved, the next logical personification of external persecution is the media. In this respect, Malvo's "I am God" calling cards simulated an increasingly antiquated, one might even say "classic" psychosis. His actions, on the other hand, a media strategy for combating the media derived from the media, speak to a new order of powerlessness and persecution, one that would seem to lead inevitably to the delusion "I am the media."

NOTES

1. Janice Morse, "Insanity Plea Made in Killing," *Cincinnati Enquirer,* August 15, 2002.

2. Brandon Centerwall, "Exposure to Television as a Risk Factor for Violence," *American Journal of Epidemiology* 129 (1989): 643–52.

3. A. Kraus, "Phenomenology of the Technical Delusion in Schizophrenia," *Journal of Phenomenological Psychology* 25 (1994): 51–69.

4. See Kurt Schneider, *Clinical Psychopathology* (New York: Grune and Stratton, 1959).

5. For a recent intervention in understanding "thought insertion," see Christoph Hoer, "On Thought Insertion," *Philosophy, Psychiatry, and Psychology* 8 (June-September 2001): 189–200.

6. Victor Tausk, "On the Origins of the 'Influencing Machine' in Schizophrenia," in *The Psycho-Analytic Reader,* ed. Robert Fliess (New York: International Universities Press, 1948), 33. Originally published as "Uber den Beeinflussungsapparat in der Schizophrenie" (1919).

7. Ibid., 39.

8. Tausk does at one point acknowledge that a patient's belief that hallucinatory images appear in his mind because of a type of magic lantern device "does not reveal any error of judgment beyond the fact of its non-existence" (ibid.).

9. Tausk notes in full, "Patients endeavour to discover the construction of the apparatus by means of their technical knowledge, and it appears that with the progressive popularization of the sciences, all the forces known to technology are utilized to explain the functioning of the apparatus" (ibid., 33).

10. Alex Owen, *The Place of Enchantment: British Occultism and the Culture of the Modern* (Chicago: University of Chicago Press, 2004), 21.

11. Ibid.

12. Jean Laplanche, J. B. Pontalis, and Donald Nicholson-Smith note that the meaning of *paranoia* changed between the nineteenth and twentieth centuries. Before the turn of the century, German psychiatry used the term to designate "delusional states of all kinds." Later, of course, it designated a more restricted delusion of persecution. See Jean Laplanche, J. B. Pontalis, and Donald Nicholson-Smith, *The Language of Psycho-Analysis* (New York: W.{ths]W. Norton, 1974), 296–97.

13. In his book *The Air-Loom Gang,* Mike Jay makes a compelling case that these "paranoid" relations between technology and power, at least of the state, date back to the early nineteenth century, exemplified in the "delusion" of James Tilly Matthews that he was subject to the control of a giant "air-loom"—a device that could, in effect, "broadcast" magnetized gases for the purposes of somatic and psychic control. See Mike Jay, *The Air-Loom Gang: The Strange and True Story of James Tilly Matthews and His Visionary Madness* (New York: Basic Books, 2004).

14. Roger Luckhurst, *The Invention of Telepathy: 1870–1901* (New York: Oxford University Press, 2002), 60–117.

15. William Barrett, cited in ibid., 61.

16. For spiritualist concepts of mediumistic contact, see Ann Braude, *Radical Spirits: Spiritualism and Women's Rights in Nineteenth Century America* (New York: Beacon Press, 1989); Janet Oppenheim, *The Other World: Spiritualism and Psychical Research in England, 1850–1914* (Cam-

bridge: Cambridge University Press, 1988); Alex Owen, *Women, Power, and Spiritualism in Late Victorian England* (Chicago: University of Chicago Press, 1989); Jeffrey Sconce, *Haunted Media: Electronic Presence from Telegraphy to Television* (Durham: Duke University Press, 2000).

17. *Telepathy* and *thought transference* can be distinguished in terms of specificity and clarity of message. *Telepathy* refers to specific messages transmitted from mind to mind, whereas *thought transference* refers to the transmission of more abstract emotional states or general ideas.

18. Frederick Peterson, MD, *Extracts from the Autobiography of a Paranoiac* (Baltimore: American Journal of Psychology Reprint, 1889), 23.

19. Ibid., 23–24.

20. Daniel Paul Schreber, *Memoirs of My Nervous Illness* (New York: NYRB Classics, 2000), 21. Originally published as *Denkwürdigkeiten eines Nervenkranken* (1903).

21. Ibid., 40.

22. Ibid., 121.

23. Ibid., 123.

24. Ibid., 277. Schreber's "tethering" to distant celestial bodies had a variety of alarming effects, most unpleasant of which was Schreber's frequent sensation that his nerves were being torn from his body. "One can form some picture of the disagreeable sensations these happenings cause if one considers that these are the rays of a whole world—somehow mechanically fasted at their point of issue—which travel around one single head and attempt to tear it asunder and put it apart in fashion comparable to quartering" (147).

25. Friedrich Kittler, *Discourse Networks 1800/1900,* trans. Michael Metteer (Palo Alto: Stanford University Press, 1992), 299.

26. In a lengthy footnote, Tausk discusses the importance of God in ego formation and his usefulness to the educators of young children. As children become more confident in their ability to lie, "very soon the time arrives when recourse to the highest authority of omniscience becomes necessary." See Tausk, "On the Origins," 46.

27. Schreber, *Memoirs,* 123.

28. Ibid., 24.

29. Ibid.

30. George M. Beard, *American Nervousness: Its Causes and Consequences* (New York: G. P. Putnam's Sons, 1881).

31. Tausk, "On the Origins," 33–34.

32. T. Jackson Lears, *No Place of Grace: Anti-modernism and the Transformation of American Culture, 1880–1920* (Chicago: University of Chicago Press, 1992), 52–53.

33. Sigmund Freud, "Psychoanalytic Notes upon an Autobiographical Account of a Case of Paranoia" [1911], in *The Standard Edition of the Complete Psychological Works of Sigmund Freud,* ed. and trans. James Strachey (London: Hogarth Press, 1955), 12:9–82.

34. Ibid., 12:78–79.

35. Kittler, *Discourse Networks,* 296.

36. Kittler details Flechsig's belief that the etiology (and ultimately) diagnosis of mental disturbances could be achieved only through autopsy, thus demonstrating, like Schreber's God, little interest in "living humans" and preferring instead to retrieve information from the nervous systems of corpses. See ibid., 295–96.

37. For a discussion of Freud's histological influences, see Mark Solms, "Sigmund Freud's Drawings," in Lynn Gamwell and Mark Solms, *From Neurology to Psychoanalysis: Sigmund Freud's Neurological Drawings and Diagrams of the Mind* (Binghamton: State University of New York, 2006), 14.

38. Joseph Breuer and Sigmund Freud, "Studies on Hysteria" [1883–95], in Freud, *Standard Edition,* 2:203.

39. The fantasy/delusion/vision of building a mechanical analogue to the physical body certainly predates this appearance in Nataljia A. Followers of the mystic John Murray Spear attempted to build such a device in the 1850s. For an account of this project, see Sconce, *Haunted Media,* 39–40.

40. Tausk, "On the Origins," 41–42.

41. Ibid., 35–36.

42. Ibid., 61.

43. Ibid.

44. In an intriguing thesis on Schreber's psychotic break, Eric Santner notes that both of Schreber's nervous collapses followed a "crisis of symbolic investiture" attending his promotion to positions of greater public responsibility in the administration of the law. See Eric L. Santner, *My Own Private Germany: Daniel Paul Schreber's Secret History of Modernity* (Princeton: Princeton University Press, 1996).

45. Hanns Sachs takes up the relationship between the machine and unconscious projections of man's bodily structure in his essay "The Delay of the Machine Age," *Psychoanalytic Quarterly* 2 (1933): 404–24.

46. See Carolyn Marvin, *When Old Technologies Were New: Thinking about Electric Communication in the Late Nineteenth Century* (New York: Oxford University Press, 1990).

47. "Human Radio Emanations," *New York Times,* September 28, 1927, 27.

48. See ibid. For a full account of Professor Cazzamali's findings, see also "Says Human Brain Emits Radio Waves," *New York Times,* August 21, 1925, 1; and "Radio's Aid Is Invoked to Explore Telepathy," *New York Times,* August 30, 1925, XX3. These conclusions were also endorsed by the German neurologist N. W. Krainsky. See N. W. Krainsky, "Nerven-Psychische Emission und Radio-Prozesse im Lebenden Organismus" [Neuro-Psychological Emission in Radio Processes in Living Organisms], *Monatsberichte* 5, no. 1 (1936): 13–54.

49. "Radio's Aid Is Invoked," XX3.

50. Ibid. Not long after Cazzamali's experiments, Sir Oliver Lodge conducted a reverse experiment in wireless telepathy, broadcasting his "impressions" on the airwaves and inviting listeners to send in any messages they might receive. See V. J. Woolley, "The Broadcast Experiment in Mass Telepathy," *Proceedings of the Society for Psychical Research* 5, no. 38 (1928): 1–9. Radio experiments in telepathic transmission were attempted again in 1938. See L. D. Goodfellow, "A Psychological Interpretation of the Results of the Zenith Radio Experiments in Telepathy," *Journal of Experimental Psychology* 23 (1938): 601–32. Predictably, such experiments were attempted once again with television in 1957. See D. Michie and D. J. West, "A Mass ESP Test Using Television," *Journal of the Society for Psychical Research* 5, no. 39 (1957): 113–33.

51. Edmund Shaftesbury, *Thought Transference; or The Radio-Activity of the Human Mind Based on the Newly Discovered Laws of Radio-Communication between Brain and Brain* (Meriden, CT: Ralston Society, 1927), 3.

52. Ibid.

53. Sigmund Freud to Ernest Jones, March 7, 1926, in *The Complete Correspondence of Sigmund Freud and Ernest Jones, 1908–1939,* ed. R. Andrew Paskauskas (Cambridge, MA: Harvard University Press), 597.

54. The conceptual uncertainty haunting this work proved so inviting, in fact, that it could not help but attract the deconstructive attention of Jacques Derrida, who channels the voice of a telepathic Freud in his 1981 essay, "Telepathie." See Jacques Derrida, "Telepathy," trans. Nicholas Royle, *Oxford Literary Review* 10 (1988): 3–41. See also Maria Torok, "Afterword: What Is Occult in Occultism? Between Sigmund Freud and Sergei Pankeiev Wolf Man," in *The Wolf Man's Magic Word: A Cryptonomy,* ed. Nicholas Abraham and Maria Torok, trans. Nicholas Rand (Minneapolis: University of Minnesota Press, 1986), 84–106.

55. Sigmund Freud, "Dreams and Occultism" [1933], in *Standard Edition,* 22:31–57.

56. Sigmund Freud, "Dreams and Telepathy" [1922], in *Standard Edition,* 18:195–220. He repeats this claim in "Dreams and Occultism." These states of diminished consciousness would later become known as the "minus factor" in parapsychological research.

57. Sigmund Freud, "Occult Significance of Dreams," in *Psychoanalysis and the Occult,* ed. George Devereux (New York: International Universities Press, 1953).

58. Helene Deutsch, "Occult Processes Occurring during Psychoanalysis," *Imago* 12 (1926): 418–33; Fanny Hann-Kende, "On the Role of Transference and Counter-transference in Psychoanalysis," *Internationale Zeitschrift fur Psychoanalyse* 22 (1936): 478–86; Nandor Fodor, "Telepathy in Analysis," *Psychiatric Quarterly* 21 (1947): 171–89.

59. John Forrester, *The Seductions of Psychoanalysis: Freud, Lacan, and Derrida* (Cambridge: Cambridge University Press, 1991).

60. George Devereux, "A Summary of Istvan Hollós' Theories," in Devereux, *Psychoanalysis and the Occult,* 200.

61. For an account of Ferenczi's interest in telepathy and analysis, see Pamela Thurschwell, "Ferenczi's Dangerous Proximities: Telepathy, Psychosis, and the Real Event," *differences: A Journal of Feminist Cultural Criticism* 11, no. 1 (1999): 150–78.

62. Freud, "Dreams and Occultism," 55.

63. Ibid.

64. For a more detailed discussion of Freud's relation to "pulp" conventions and radio, see Jeffrey Sconce, "Wireless Ego: the Pulp Physics of Psychoanalysis," in *Broadcasting Modernism* ed. Debra Rae Cohen, Michael Coyle, and Jane Lewty (Gainesville: University of Florida Press, 2009), 31–50.

65. See L. Sher, "Sociopolitical Events and Technical Innovations May Affect the Content of Delusions and the Course of Psychotic Disorders," *Medical Hypotheses* 55 (December 2000): 507–9; L. Sher, J. Bohlken, and S. Priebe, "Political Change and the Course of Affective Psychoses: Berlin, 1989–1990," *Psychiatry Research* 55 (1991): 207–13; M. A. Marcolin, "The Prognosis of Schizophrenia across Cultures," *Ethnicity and Disease* 1 (1991): 99–104; P. Kulhara, "Outcome of Schizophrenia: Some Transcultural Observations with Particular Reference to Developing Countries," *European Archives of Psychiatry and Clinical Neuroscience* 244 (1994): 227–35.

66. David Lamb and Stephen Braun, "Snipers' Motives Start to Emerge," *Los Angeles Times,* December 14, 2003.

67. Ibid.

68. Here Malvo appears to have been influenced by the 1995 film *Se7en,* which in turn draws on the mythology of such "branded" criminals as "Son of Sam" and the "Zodiac Killer."

69. For a more detailed discussion of the Paris Hilton phenomenon, see Jeffrey Sconce, "A Vacancy at the Paris Hilton," in *Fandom: Identities and Communities in a Mediated World,* ed. Jonathan Gray, C. Lee Harrington, and Cornell Sandvoss (New York: NYU Press, 2007).

70. For a discussion of this development, see Christine Rosen, "The Age of Egocasting," *New Atlantis,* no. 7 (Fall 2004–Winter 2005), www.thenewatlantis.com/archive/7/rosen.htm.

5

Freud and the Technical Media

The Enduring Magic of the Wunderblock

Thomas Elsaesser

FREUD'S LEGACY AT HIS 150TH ANNIVERSARY: "BANKRUPT" OR "INSPIRING"?

The necessity of rethinking Freud's legacy with respect to the technical media may not seem obvious. After all, as the following passage suggests, his standing in the humanities is, to say the least, ambiguous: "The fate of Freud's writings in the late 20th and early 21st century has been a peculiar one. On the one hand, his work had been declared by many to be unscientific, intellectually bankrupt, and morally suspicious. On the other, his writings continue to be a source of inspiration and provocation, both directly and indirectly, not only to psychoanalytic theory, but to feminism, queer theory, film theory, literary and cultural studies, and throughout the arts and popular culture."[1] Yet inevitably the occasion of his 150th birthday in 2006 did lead to numerous reassessments, many of which produced variations on the question of whether it is sensible at all to have recourse to Freud as the source of a theory of the psyche, given that this word *psyche* is situated today somewhere—but where?—between the "soul" of religion, the "mind" of philosophy and the "brain" of neuroscience.

The dilemma is clear: on the one side, in the medical practice of psychology and psychotherapy, Freud's teachings have been either quietly abandoned or modified to such an extent that they are unrecognizable; furthermore, since the so-called "Freud Wars," psychoanalysis stands as a much-discredited doctrine of consciousness and the mind's pathologies, clinically as well as neurologically: behavioral psychology, even child psychology, not to mention cognitivism, evolutionary biology, and neuroscience, have left little of Freud's method and case history evidence intact.[2] On the other side, psychoanalysis is still one of the most widely used hermeneutics, or methods of interpretation, not only in the humanities but in everyday life when we try to interpret the behavior of those we communicate, negotiate, and come into contact with, especially our nearest and dearest, whom we constantly probe as to their unconscious motives. Given this continuous importance of psychoanalysis for the humanities, in particular for literature and cultural studies (which have always recognized Freud's preeminence as an analyst of "texts," both written and spoken, as well as his stature as a writer), is there another way of understanding Freud's legacy? For instance, can we make sense of Freud without taking at face value his various topographies of the psyche (so clearly reflecting his time); rethink the foundational significance of the Oedipus complex for human subjectivity, gender, and identity by drawing on other, evolutionary theories of gender division and the formation of primary bonds; finally, can we reformulate Freud's theory of the unconscious? Any of these revisionist moves might, of course, eviscerate and deplete Freud to the point of leaving just an empty shell, a mere name and a memory. But perhaps the risk is worth taking, especially when one comes to Freud as a historian of communication technologies or as, in the present case, a media archaeologist, who would want to ask: Can one regard Freud's work as addressing a number of problems of his time, other than the ones he is chiefly known for, but that for us in the twenty-first century have still retained their relevance and may even have increased in importance? Such revisionism would ignore much of what scholars in the humanities, including cinema studies, have come to associate with Freud. Yet by placing Freud more firmly in the context of his time, we might perhaps make him more comprehensible to our own. It makes sense to ask what sort of challenges psychoanalysis raised with respect to Western mankind's self-understanding when we remember that psychoanalysis emerged at the turn of the previous century, that is, between 1895 and 1914, and therefore at a time of major social upheavals and scientific breakthroughs. Investigating "Freud, the media theorist"—as one might call such a rehistoricizing enterprise—would then mean placing him alongside writers such as Georg Simmel or Walter Rathenau, as well as poets like Paul Valéry and Gottfried Benn, and reinscribing him into media history the way Walter Benjamin or Siegfried Kracauer have become key witnesses to the revolutions in media technologies and their impact on the human body and the senses. At the same time, it is important to remember that Freud, like all scientists, was a problem solver perhaps even more than a system builder and to recall Samuel T. Coleridge's famous dictum "Until you understand a writer's ignorance, presume yourself ignorant of his understanding,"[3] which here might mean, "Until you understand the question a writer is asking himself, presume yourself unable to understand the answer he gave himself." In other words, "What were the problems Freud thought that his new science of psychoanalysis might help to answer?"

The question suggests that we may still benefit from the questions he posed, even if some of the answers he provided no longer seem convincing and appropriate.

This chapter is a media-archaeological "deconstruction" of classical apparatus theory, but it takes a somewhat different route from the usual one, which has consisted of cognitivist attacks on perceptual illusionism in general and post-Freudian psychoanalysis in particular. The chapter makes a counterintuitive move in that it actually goes back to Freud rather than dismiss his work. It tries to make a case for Freud, a notorious technophobe, as a "media theorist" by once more investigating—in line with a number of other writers, including Jacques Derrida and Thierry Kuntzel—his "Notes on the Mystic Writing Pad" and shifting attention from perception and identity (the standard psychoanalytic paradigm) to memory and storage (the media-archaeological perspective). The chapter points to the fact that Freud's own theory of memory clearly distinguished between the perceptual part of the psychic apparatus (the "optical-acoustic part" of consciousness, if you like) and the storage and processing part (the recording and encoding apparatus, which previous writers on the "cinematic apparatus" had ignored or conflated) and that Freud's "discovery" of the unconscious, repression, and the rhetoric of dreamwork can be seen less as a psychological-physiological "fact" than as a necessary hypothesis to "fill the gap" left open and exposed by the discrepancy between the two system. In short, the chapter tries to understand the Freudian mystic writing pad or *Wunderblock* as giving us a potential model for comprehending an element of the cinematic apparatus that neither is entirely dependent on the visible nor refers back to the "geometry of representation" of Renaissance painting but points instead to inscription, trace, and "data management" (using both narrative and nonlinear "programs"), which are crucial aspects of an "archaeological" approach to media technologies.

SOME OF THE PROBLEMS TO WHICH FREUD THOUGHT PSYCHOANALYSIS WOULD PROVIDE THE ANSWER

Freud began as a physiologist and remained a convinced materialist all his life. Central to his convictions was the primacy of the body. Rather than acknowledging a philosophical mind-body split, Freud saw the body as the gateway to the mind and treated the body as a two-way communication device, as well as a producer of meaningful utterances: in this respect, both *The Interpretation of Dreams* (1900) and *The Psychopathology of Everyday Life* (1901) are books that have remained inspirational for the humanities and the arts because they show Freud as one of the foremost thinkers about close critical analysis and interpretation *in relation to the body and the senses.* They allow us to reevaluate him as a reader and hermeneutician—a reader of the mind's activities, of brain and the body as "loci" of agency, and a hermeneutician who not only considered human actions in their material consequences in a cause-and-effect schema but was able to conceive them as "texts" that needed to be deciphered, in the sense that mind, body, actions—in their material manifestations—constituted a form of writing or inscription, even if it was not entirely clear to him what the medium, the code, and the place of inscription might be.[4]

Let us start with Freud's *topography of the psyche* and his reflections about "nature" and "culture," or rather about human beings between nature and not-nature. In thinking this divide, for instance, in *Beyond the Pleasure Principle* (1920), Freud posited his famous split in the circulation and exchange of vital energy between *drive* and *desire,* which implies in some respects the possibility that the two are the recto and verso of each other, or stronger even: the question and answer to each other. To put it briefly, "drive" can be conceived as the totally deindividualized life principle: stupid, irrepressible, unstoppable, the part of nature that knows no individual death, only change and transformation, through repetition and the laws of thermodynamics. In this perspective, "desire" would be the answer to the drive, born out of the failure to submit to the drive and thus the always unfulfilled and unfulfillable movement to arrest the drive and to resist its depersonalizing force. Consciousness, or the individualized psyche, emerges as an accident of organic life, rather than its natural destiny, in the course of evolution.[5] It brings Freud's thinking closer to our contemporary understanding of other late nineteenth-century thinkers, notably, of course, Darwin and Nietzsche, emphasizing his role in displacing humanity from the center of creation and thus contributing to what have been called the "narcissistic wounds" inflicted on man's self-confidence.

Similarly, it may be possible to argue that sexual difference and the Oedipus complex are so fundamental and foundational not only because of the question of individual identity but because, in terms of evolution, sexual selection (as opposed to selection for survival) operates in such a way that skills we now call "aesthetic" or "symbolic" have these qualities not as an addition to their use value but rather in opposition to their use value. This, at any rate, is what evolutionary biologists are now arguing, which in no way contradicts Freud's "tragic" view of sexuality and sexual difference, certainly in an age when utilitarian efficiency and economic criteria were the "ground" of all thinking about evolution and adaptation.[6]

Finally, *the unconscious:* one can think of Freud's positing of the unconscious as trying to answer the question of human agency: Are we self-determined, do we possess individual agency, or are we never fully self-present in our actions, however rational they appear to us? But the unconscious can also be understood somewhat differently: as the necessary hypothesis in response to a problem for which no other assumption could provide a satisfactory or even plausible answer. In other words, it may be possible to consider the unconscious as a "placeholder" rather than an actual place. What if it named a virtual space, the locus where two apparently incompatible conceptions of the working of the psyche converge, remaining "in place" until a more satisfactory explanation was found? The consequence would be to assume that the unconscious is the "provisional" answer to a problem that Freud encountered. And what is this problem? My suggestion—and not only my suggestion—is that it is the question of "memory." As Freud boldly noted in 1895, "Any psychological theory deserving consideration must provide an explanation of memory."

PARALLAX VIEWS AND CONSTELLATIONS: THE MYSTIC WRITING PAD

In what follows, I shall concentrate only on this question regarding the nature of memory, by focusing in particular on those parts of Freud's work where he tries to tackle the problem of inscription/recording and of storage/retrieval, two essential aspects of memory. The best-known writings that confront the question of memory are "Project for a Scientific Psychology" from 1895, and "Notes on the Mystic Writing Pad (or *Wunderblock*)" from 1925, and although the two texts are thirty years apart they show a remarkable consistency of thinking. But they are also indicative of how persistently this question of memory preoccupied Freud without leading him to a satisfactory solution, a habit of mind very typical of Freud, who never seemed satisfied with any of the answers he was able to give to the problems he had discovered. Consider how in 1925 he summarized the problem of memory: "All the forms of auxiliary apparatus which we have invented for the improvement or intensification of our sensory functions are built on the same model as the sense organs themselves or portions of them: for instance, spectacles, photographic cameras, ear-trumpets. Measured by this standard, devices to aid our memory seem particularly imperfect, since our mental apparatus accomplishes precisely what they cannot: it has an unlimited receptive capacity for new perceptions and nevertheless lays down permanent—even though not unalterable—memory traces of them."[7]

In this and the passages that follow, where he explains how a simple mechanical device, the *Wunderblock,* combines an "ever-ready receptive surface" with the "permanent traces of the notes that have been made upon it," Freud is arguing that our senses along with our brain, when taken together as the "psychic apparatus," are able to accomplish something that for technical apparatuses is apparently impossible to achieve, namely to combine the function of (sense-data) transmission and the function of (sense-data) storage. It is as if psychoanalysis had to be invented to bridge this gap and to explain—via the positing of the unconscious—how the "perception-consciousness system" receives but does not retain perceptions, while the "system of the unconscious" preserves, not perceptions, but "excitations," which become "permanent," in the form of mnemic traces.

FEEDBACK AND CIRCUITS VERSUS STORAGE AND MANIPULATION

As not only the "Mystic Writing Pad" but also "The Project of a Scientific Psychology" made clear, consciousness and memory, transmission and storage are mutually exclusive. Consciousness (the perceptual system) should be imagined as a feedback system or a circuit and therefore must not retain any data; otherwise it could not respond to the environment and be self-regulating. Yet if that which Freud called the unconscious were unable to retain data and store unlimited quantities, there could be no "memory" of any kind, whether repressed, habitual, voluntary, or involuntary. By arguing that "any psychological theory deserving consideration must provide an explanation of memory," Freud posed a challenge to himself, namely how to conceive of memory, which is to say, how to picture the relation between input, storage, and processing. Thus, and this would be my hypothesis, the invention of the unconscious can be understood as a partial answer to this problem. But if the problem was already clearly posed in 1895 and only in 1925 found an apparent answer in "Notes on the Mystic Writing Pad," this in turn raises a lot of other questions, not least about the Mystic Writing Pad itself: What sort of an "answer" does it constitute? Is it a serious suggestion of a workable media technology? Is it a metaphor that alludes to a technical solution, which, by invoking what is essentially a child's toy, deliberately sidesteps the issue of media technology? Or is it no more than a personal joke that the master is playing with himself? After what has been said so far, it may indeed be the case that Freud deliberately used such an example, at first glance improbable and yet on second thought apt, precisely not to have to declare himself on the technical media of transmission and storage that were developing during his lifetime, because—rightly or wrongly—he judged that they did not fulfill his own requirements for a memory apparatus that could replicate or "improve" on human memory.

What, then, more specifically, justifies thinking of Freud as a media theorist? A first answer would be something like the following: Freud qualifies as a media theorist because he thought of the body/mind as a storage and recording medium as well as an input/output device, where what interested him were the parameters of sensory input (sound, vision mainly) and its output, representability (visualization, narrativization, and linguistic representation, including slips of the tongue, the parapraxes or *Fehlleistungen*). Second, Freud was interested in temporality (as rupture, gap, discontinuity, rather than time's linear arrow of sequence and succession). He speculated that time was a dimension that mankind had invented to protect itself from discontinuity and the contingent, that it was a subjective category (as opposed to the physical, thermodynamic principle of entropy), and he made famous the notion of *Nachträglichkeit,* deferred action, the reversal of cause and effect in our thinking about "origins" and "causes." Finally, and perhaps not coincidentally, he had a great interest in archaeology, that is, in the trace, the index, and the imprint as forms of inscription and recording, as well as in geological strata, which gave rise to another one of his topological models of the psyche. But however intriguing, these avenues of thought may still not be the appropriate ways of thinking of Freud as a media theorist if we cannot also account for his "negation," disavowal, or neglect of the technical media.

In other words, I want to consider Freud as a media theorist *malgré lui,* someone very aware of the technical developments of his time and yet not so much suspicious of them as in a constant contest and rivalry with them. How would such a possibility change our understanding of his attitude toward the technical media of his time, which of course included the cinema? In doing so, I seem to be leaving aside the Freud familiar to us from film theory, which, as is well known, evolved in a constellation characterized by the names of Jacques Lacan, Michel Foucault, and Gilles Deleuze (to which we could add Louis Althusser and Felix Guattari), French thinkers who intensively reflected on Freud, often from a critical perspective that centered on the Oedipus complex, the function of language in the formation of the unconscious, the narrativization (and discipline) of psychic energy, and the censoring of desire through "repression" rather than its liberation/proliferation through the drive.[8]

In film theory, this Freudian constellation was interpreted as being focused on perception, on visuality and the optical-specular, in that it centered on looking, the gaze, and their relation to identity and sexual difference, as well as the self-monitoring of panopticism as an aspect of self-consciousness and the formation of a socially adaptable ego.[9] The constellation I am invoking, by considering Freud as theorist of auxiliary memory and the technical media, and thus as a media theorist, shifts this perspective away from film to a more general consideration of the technical media. It is made up of Jacques Derrida (rereading Freud in his "Freud and the Scene of Writing"); Mary Ann Doane (rereading Freud through one of the precursors of the cinema, the scientist and chronophotographer Jules-Etienne Marey); and Friedrich Kittler (rereading Jacques Lacan and Lacan's interest in cybernetics and mathematics).[10] Their points of intersection—and their relevance for contemporary film theory—have to do with trace, inscription, and writing, with the function of speech and the voice, with the relation between print culture and the cinema, with the body as text, with woman and media machines, and, finally, with the conception of time and intermittence.

We can characterize these intersections, for the purpose of this chapter, by saying that if film theory in the last third of the twentieth century (i.e., from the 1960s to the early 1990s) has concentrated on Freud to understand questions of subjectivity and identity as they arise out of filmic spectatorship and the cinematic apparatus when conceived as a Cartesian optical theater (with the spectatorial and gendered body as the locus of inscription or "subject positioning"), then Freud, the media theorist of this other constellation—what I now call the "media/memory constellation"—proposes a theory of the visual and aural media that sees them more from the side of reproduction, as a problem of generation and replication, of storage and processing, which is to say, as a general mode of information transmission, of which "memory" in its widest sense (including history and cultural memory) is the special human form, but which, at the limit, encompasses the transmission of all information, including biological information (and thus allows for nonhuman forms of memory).

To focus a little more narrowly, one might say that the technical media in general, and the cinema in particular, "challenged" at the turn of the twentieth century the dominance of writing, and thus of symbolic notation, by emulating writing, that is, by reproducing the effects of the medium it sought to replace. The cinema, for instance, did so by developing a specific form of filmic narrative or storytelling ("classical cinema"), as well as by instantiating an ontology of trace and imprint ("realism," "photographic indexicality," different regimes of "verisimilitude"). Extrapolating from this historical moment, one could argue that the cinema today is itself being "challenged" by other kinds of data flows, which is clearly one of the reasons why media-archaeological investigations are so timely and topical. Contemporary data flows include, of course, sounds and images, but their "generation" is no longer conceivable solely on the analogue model of trace and imprint, nor can their quantity, frequency, and magnitudes be adequately processed and "linearized" through narrative: hence the current "crisis" in our understanding of cinema, which we increasingly have to learn to uncouple from narrative, just as we are revising our assumptions about photographic "indexicality" and evidentiary "trace." At the same time, the technical capacity of audiovisual media to generate somatic-sensory experiences of extreme physical presence and bodily proximity (now called "special effects" rather than "realism") raises formidable challenges to both "narrative" and "representation." It demands new forms of sorting and organizing data: popular culture copes with the problem in the form of simplified cosmologies or the revival of mythological archetypes, but the avant-garde (and aesthetic theory) are hard put to find the symbolic forms, the concepts, and the new modalities of mnemic traces that can register the shifts in scale and volume.

In short, the very amplification in the registration of audiovisual flows requires one to think differently about the cinema of the past, namely as an attempt to make art out of footprints (as Lev Manovich called it).[11] From this perspective, the cinema is one culturally specific way of dealing with the question of memory or mnemic traces and can be usefully contrasted with other (mechanical) forms of data registration, data storage, and data management. Among such comparable modes of technical memory and information transmission, one can think of the data-storing apparatuses of science and the state, such as administration archives, surveillance records, military reconnaissance files, and the records of visualized data used in, for example, medicine or meteorology. Filmmakers such as Harun Farocki and cultural theorists like Paul Virilio have productively explored the various affinities of the cinema with other "vision machines" and data-processing devices.[12] For our own field of film studies, such investigation might either revive an intense effort to reclaim the cinema as a (romantic) art form par excellence or lead to the invention of something like a postliterary hermeneutics, a desired aim: perhaps as techniques of "connected contingency" or "calculated improbability," but at any rate as a form of pattern recognition rather than "gestalt" recognition, with all the implications for both aesthetics and hermeneutics that this may have.[13]

It is in this context and from such a contemporary perspective that I want to consider the relevance of some of Freud's extremely bold models of interpretation for seemingly senseless and random data. It could also give us a new understanding of one of the most widely received ideas of Freud, formulated above all in *Beyond the Pleasure Principle,* and taken up by Walter Benjamin in his conception of modernity as the cultural response to technical media's impact on the human perceptual system (what Benjamin called "the optical unconscious"), namely the idea that consciousness does not seek contact with the environment but aims at *reducing contact* and is thus best understood as a kind of protective shield, evolved over time to neutralize sensory overload and prevent perceptual overstimulation.[14] This would be in line with the claim of today's cognitivists that perception is a mere sampling of visual data, reconstituted and processed by the brain, a view also endorsed by system theorists and their notion of consciousness as self-reference and autopoesis.[15] The idea of a protective shield is also present in Freud's discussion of the *Wunderblock*'s cellophane cover that protects the writing surface from dirt and damage. But above all, the structural asymmetry, in the case of human beings, between the quantities of data captured and the relatively restricted repertoire of data processing (if we regard our cultural store of narratives and stories as "processing programs") encourages one to think of Freud's theories of memory, or, more broadly, of the relation between the perceptual-conscious system and the mnemic-unconscious system, as also a problem of data management and to ask oneself exactly what role Freud assigned to the image and visualization, to sound and the voice, and to processing and programming in his version of the psychic apparatus.

To appreciate his boldness and innovative sweep, one needs to remind oneself once more of how Freud's concern with memory is inflected by a number of conditions typical of his age and general outlook. First of all, as already mentioned, Freud began his professional life as a neurologist and physiologist, and he retained a very high regard for the positivist methods of empiricism and the goals of scientific rigor typical of his time. As is well known, he worked as a researcher in the laboratory of the biologist Ernst Brüche's Physiological Institute, he did experimental work with magnetism, he studied with Charcot in Paris, and with his colleague Joseph Breuer he published a study of hysteria.[16] The natural and human sciences were, during the 1870s and 1880s, at the brink of a major reordering of knowledge, thanks to the impact of some breakthrough technologies in the fields of biology, immunology, heredity, and evolution, but also with respect to transport, energy, and communication (steam and the railways, the telegraph and the telephone, the wireless and other developments around electricity). Toward the end of the nineteenth century there was also a growing fascination with thermodynamics, entropy (i.e., the irreversible relation between order and chaos), and the social calculus of work, effort, fatigue, and regeneration, the outcome of which was to generate theories of psyche that were fundamentally economic (as was Freud's, at least in one of its versions or topologies).[17]

Freud never abandoned the empirical sciences, as can be seen from the importance he attached to the key document of his early career, the tellingly entitled "Project of a Scientific Psychology" (1895). And while he is, of course, best known as a therapist opposed to using medication in the treatment of mental illness, he conducted considerable work on the effects and even benefits of cocaine (of which he was himself a user). Nonetheless, his very familiarity with the major technological breakthroughs of his age, and his often oblique response to them, do present us with a paradox. On the one hand, there is much evidence in his work that he knew about the revolutions in energy and transport, such as the steam engine, hydraulic systems, and railways: for instance, the steam engine and hydraulic systems figure as theoretical motifs in his energy model of the psyche, while his experiences on the railway frequently served him as examples of shock, trauma, or the uncanny.[18] Furthermore, there is clear evidence of Freud's awareness of the many innovations in the understanding and applications of electricity, such as electromagnetic fields, electric generators, and electricity storage. Key notions of his psychoanalytic terminology, such as resistance, transference, excitation, discharge, cathexis, induction, and conductivity, make sense only against the background of the discovery of the properties of electricity, so much so that one sometimes suspects that Freud thought of the psyche as a species of electric battery.[19]

This is one side of Freud. But the paradox arises when one recalls Freud's well-known and often-discussed ambivalence regarding modern technology, especially media technologies. Freud was, on the face of it, more interested in the human body/psyche as (technical) medium than in the technical media as such: in the face of the invasion of especially mass media, he was very much a conservative, as if his invention of psychoanalysis were aimed at trying to preserve the embodied and gendered nature of communication against its increasing disembodiment, mechanization, decontextualization, and automation. Thus, by all accounts, Freud was quite a technophobe, in the sense that he made little use of modern technology in his everyday life. He did not like radio, he was shy of photography, he used the typewriter sparingly and preferred to compose in longhand, he refused to have the telephone connected to his consulting room or his private office, and he disapproved of the cinema, withdrawing his cooperation from a famous filmmaking project initiated by one his disciples to popularize psychoanalysis, G. W. Pabst's *Geheimnisse einer Seele* (though he did seem to enjoy quite a few films on his visit to the United States, and even the case of *Geheimnisse einer Seele* is a little more complex than my summary suggests).[20] Finally, given that the basic technique of psychoanalysis is that of recording speech (the talking cure), it is surprising to say the least that he did not use the Dictaphone or any other recording technology of speech and the voice. So: let us keep this apparent paradox in mind, namely that Freud may not have utilized the technologies of his day, that these were in fact largely absent from his practice, but that they were nonetheless all too present in his theory.

JACQUES DERRIDA

The first commentator to suggest that Freud possessed a media theory was Jacques Derrida, who in his essay "Freud and the Scene of Writing" extensively discusses "Notes on the Mystic Writing Pad."[21] Derrida showed how Freud hesitated between thinking of the psyche as an optical system and as an "inscription" or "writing" system. Visual metaphors predominate in *The Interpretation of Dreams,* where one finds an entire scenography of telescopes, cameras, microscopes, and magnifying glasses. By contrast, once Freud begins to speak of memory, as he does in the "Project of a Scientific Psychology" and "Notes on the Mystic Writing Pad," the language is one of "memory traces," of the violence with which sensory data break themselves a path (*Bahnung* in German) into the mental-material substratum and generally force their way into memory. Derrida notes how the *Wunderblock* as a children's toy inscribes marks or grooves on a wax background and how one can then "mystically" erase these by lifting the plastic cover sheet. Memory here clearly recalls the ancient practice of the palimpsest, the writing process whereby mnemic impressions emerge, merge, and re(e)merge through acts of layering and superimposition.

Derrida's interest in the Mystic Writing Pad is multiple. First, it confirms his general thesis, namely that the metaphysics of presence in Western philosophy is underwritten by a repression of writing, which nonetheless organizes every representational system so far devised. Second, Derrida is able to show how the priority given to speech in psychoanalysis is still grounded in writing because its effects on the psyche are described exclusively in terms of imprint, inscription, and trace (*frayage,* as Derrida translates *Bahnung*), while the categories of Freud's dreamwork, such as condensation and displacement, are, as we know since Roman Jacobson, analogous to the rhetorical strategies of metaphor and metonymy, themselves modeled on certain dysfunctions of the brain. But in his book *Archive Fever* Derrida also comments on the paradox noted above, namely the peculiar status of media technologies as at once absent and present in Freud, something Derrida sees—in a manner borrowed from Freud—as itself a repression haunted by the possibility of its return. I quote: "One can dream or speculate about the geo-techno-logical shocks that would have rendered unrecognizable the scenery of psychoanalysis . . . if . . . Freud, his contemporaries, collaborators and immediate disciples, instead of writing thousands of letters by hand, had had at their disposal AT&T telephone credit cards, portable tape recorders, computers, printers, faxes, television, teleconferencing and above all electronic mail."[22]

Derrida evidently enjoys this little game of anachronisms and hypotheticals, in which one can read his auto-portrait of "deconstruction" as itself an effect of media technologies, precisely the ones that he names, but that he also covers, by imagining their devastating effect on the father of psychoanalysis. Nonetheless, his *jeu d'esprit* contains at least one serious suggestion about this *Nachträglichkeit,* or retrospective action or retroactive revision—this reversal of cause and effect—that invariably accompanies any attempt at a media archaeology of the kind I am exploring here when one is trying to "write into" *(sic)* the history of cinema and its theorization a figure as unlikely, canny, circumspect, and, finally, recalcitrant as Sigmund Freud.

I make this cautionary remark, as I am about to introduce not so much an anachronism as a synchronism and simultaneity that must be thought of as at least as troubling but also as revealing as Derrida's image of Freud with an AT&T phone card at, presumably, JFK Airport. This figure of troubling contemporaneity with Freud is Thomas A. Edison. If we see Freud's metaphoric chains and semantic clusters in the "Mystic Writing Pad" essay as referring less to writing, to hieroglyphs and palimpsests, than to Edison's successful attempts to record vocal and aural data on wax cylinders and tinfoil, and if we add to this the knowledge that Edison developed the kinetoscope originally to complement the phonograph and synchronize it with an image machine, then the Mystic Writing Pad becomes in a sense even more mysterious and magic in that it reproduces at the level of a *jeu d'enfant* that is also a *jeu d'esprit* an ambivalence also present in the cinema, at least as conceived of by Edison, where *graphein* (writing) and *scopein* (seeing) are kept in play and in suspension.[23] Seeing and writing hover over the technical media that make up the cinema both in its basic apparatus as well as in its theoretical elaborations, referring back to the very beginnings of cinema the vexed question of indexicality and iconicity of filmic recording, and suggesting that if we follow Edison and give priority to sound recording, understood as the laying of tracks of physiological data, then the cinematic image is the index of a sound emanation or of a physiological-somatic presence, and only secondarily the imprint of a perception. The aesthetics of Jean Marie Straub and Danielle Huillet, with their demand that one see their films with one's ears and hear them with one's eyes, would seem to have taken up Edison's thinking and literalized its implications.[24]

MARY ANN DOANE

Another theorist who has commented extensively on Freud's "Mystic Writing Pad" essay is Mary Ann Doane. In her book *The Emergence of Cinematic Time: Modernity, Contingency, the Archive,* she constructs yet another contemporaneity with Freud around the cinema, this time not with the acknowledged fathers—the Lumière Brothers or Thomas Edison—but with Étienne-Jules Marey, also a physiologist and scientist, known to students of the cinema as one of the co-founders (with Eadweard Muybridge) of chronophotography.[25]

Her project is apparently quite different from the one I have so far being trying to identify, but Doane, too, is prepared to take Freud seriously both as a materialist and as a media theorist. Here is Doane's own description:

> Accompanying the cinema as a new technology of temporality was a sustained discourse on time in the philosophical, psychoanalytic, and scientific realms. . . . In Freud's work, time . . . seems to operate as a symptom whose effects are intensified by the excessive trauma of modernity so that modernity becomes, in part, a pathology of temporality. The impasse of his spatial model of memory forces him to produce a theory of temporality as the discontinuous mode of operation of the psyche itself. Time is not "out there," to be measured, but is instead the effect of a protective configuration of the psyche. Freud chooses for his exemplary machine and model, not the cinema, photography, or phonography, but the comparatively old-fashioned Mystic Writing-Pad. In contrast, Etienne-Jules Marey marshalled the latest technologies of sequential photography (and, in most historical accounts, anticipated the cinema) in order to capture and measure an objective temporality that nevertheless always seemed to elude representation. Together, Freud and Marey figure the limits of the representational problematic within which the cinema developed as a specific mode of organizing and regulating time. Both theorists conceptualized time as a problem of storage or of representation and its failure.[26]

In other words, Doane takes up a number of themes I have already touched upon, including Freud's theory of consciousness as a protective film or shield against shock and trauma. But she also stresses that the promise of preserving and representing time in a continuous flow of images and sounds might not only overtax the individual perceptual apparatus but also threaten—with its "too much" of aural and visual data—the very capacity of culture to represent itself to itself, as literary texts or musical notation has done, and instead lead to culture's pathologizing itself by trying to read mechanically reproduced audiovisual data across culturally encoded "representation." This pathology of modernity—theorized by Benjamin as the difference between *Erfahrung* and *Erlebnis,*[27] the cinema, in its industrial and institutional form, addresses by turning toward narrative and generating out of the undifferentiated flow the hierarchized, regulated forms of discontinuity that we know as editing or montage in order to retrieve meaning from total representation by an act of semiotization. Freud, on the other hand—and this may furnish a more theoretically cogent argument for his dislike of cinema—does not trust this superficial form of narrativizing the contingent and the continuous, deciding that time can only be experienced as unrepresentable. In its emphasis on surface appearances and its reveling in the accidental, the cinema must have struck Freud, Doane remarks, "as a veritable reservoir of meaninglessness."[28] Whereas psychoanalysis repairs the discontinuity and apparent meaninglessness of visual recall by retrieving and restoring the layers of data no longer accessible, the cinema, as it were, parodies psychoanalysis by imposing on perception the logic of an order of the visible that ignores the very "work" that in the psychic apparatus goes into representation and legibility.

If, in the light of what was said earlier about the problem of combining perception and data input with storage and data processing, we venture to draw some conclusions that Doane might not draw herself, we could say that the cinema has to be understood as an apparatus concerned with perception and the optical only as an initial step but that its full conceptualization requires an additional dimension, namely that of storage and processing, which—and here Freud was right—cannot be solved by narrative. For those who have taken a historical, or rather "archaeological," perspective and have reexamined the so-called "origins of the cinema" ("early cinema" in English, "le cinéma des premièrs temps" in French), this conclusion is almost self-evident.[29] Both early cinema (or what is now called "the cinema of attractions") and the avant-garde have consistently refused narrative as a "solution," even if they have done so for different reasons and with very different arguments. Freud's contribution to this debate would be his insistence, so forcefully but also so obliquely expressed in the *"Wunderblock"* essay, that an apparatus, considered as archive or memory, needs to clearly differentiate and separate the transmission function (mirror) and the storage function (memory). Between perception (and immediate forgetting) and the unconscious (unlimited storage), Freud, as it were, comes close to specifying the machine requirements for an input/processing/output system. The input would be our "classical" model of film theory and psychoanalysis, with its the emphasis on vision and the gaze, the mirror phase, or, put more generally, on all forms of input that have a mirroring or duplication function and thus refer to our feedback loops with the environment, including our relations between the self and the other as well as our forms of (self-) consciousness. The storage part would be the unconscious, which retains the "memory traces" while remaining open for new "impressions." The processing part, or "program," would be the psychoanalytic-therapeutic process, that is, the "talking cure" itself, understood as the combination of free association and what Freud himself in *The Interpretation of Dreams* called "work" (i.e., the data recalled across the different rhetorics of the unconscious and logico-linguistic operations, such as condensation, displacement, and the interface of representability), to which the analyst applies the techniques of translation and transcription (i.e., verbalization and visualization).

Since the two functions of perception and memory for Freud come together only in the virtual space that is the unconscious, the cinema would need to have the equivalent of a media unconscious, a virtual space in which its perceptual optical data (the inscription of a perceiving subject) and its mnemic trace (the presence of an object) could come together. Until now, theories of the cinema have tended to oscillate between these two possibilities, either privileging perception and the spectator (in semiotic and psychosemiotic theories) or privileging the object and its material traces (in realist, materialist, or "ontological" theories). Perhaps one of the many seductions that Gilles Deleuze's theory of the cinema has for us today is that it seems to both sidestep these alternatives and at the same time, with his formula of "The brain is the screen," offer a way of understanding the cinema as both perceptual fact and material fact.[30]

But this is where Freud's conceptualization of time—if we follow Doane—would put a serious obstacle in our way. Time, in Freud, is the protective-compensatory effect of a subjective experience of intermittence, of rupture, a failure and loss of signal even, occurring in the transition between recording and storage. The indexical-iconic data of perception cannot be joined with the data of "time" (understood as the experience of "narrativized" intermittence), so that time as *durée* (in Bergson's sense) is not its "primary" state but already the processed result, such as we know it in the time-based arts, including the cinema, divided between *chronos* (linear time) and *kairos* (the moment of recognition—anagnorisis—and of "closure"). It is therefore only logical that Deleuze should not refer to Freud, but he might have—instead of Bergson—called upon Marey. For as Doane points out, whereas Freud conceives of time as the effect of "this discontinuous method of functioning of the system perception-consciousness" and thus as a "subject-effect," Marey tried to capture time as pure process, as the movement of objective "becoming," when he devised so many different methods of recording natural phenomena—from the human heartbeat to the gallop of horses, from the phases of motion of the wings of bees and birds to the patterns of turbulence formed by air and smoke as hot and cold air come into contact with each other. In all these phenomena, Marey attempted to let movement and motion, vibration and oscillation "write" themselves, without the intervention of the human hand or any kind of symbolic notation, such as language. And unlike

Muybridge, whose recordings of movement were generated by the intermittence of different still images, sequenced one after another, Marey tried to capture movement without any "loss" or intermittence, producing the famous blur or continuous line, by abstracting as much as possible from the plenitude of sensory data. For instance, he reduced the human body to a set of luminous dots, which yielded the motion graph against a black background that we have become so familiar with.[31] We might say that while Muybridge, as a photographer and artist, strove to use chronophotography as a means to "gestalt" recognition, Marey's method as a scientist was closer to what I earlier called "pattern recognition." But as Doane also points out, Marey's attempts to capture movement as a full continuum, and thus to record time without intermittence, was as much haunted by failure as was Freud's attempt to imagine an apparatus that could combine perception-consciousness with memory-trace recall, without inventing "repression," the "unconscious," and the hermeneutics of "dreamwork."

Mary Ann Doane is an important figure in the history and formalization of feminist film theory; her previous book *The Desire to Desire* and her collection of essays entitled *Femmes Fatales* have been required reading in film theory classes all over the world. A question that thus might arise is how and where her work in feminist film theory and on female subjectivity intersects with this interest in early cinema and even precinema, as manifested in "Temporality, Storage, Legibility: Freud, Marey, and the Cinema." One possible answer could be sought by returning to the origins of psychoanalysis and the fact that—as all feminists have noticed—Freud's initial patients and the subjects of his first case histories were predominantly women. In Doane's analysis of the representation of psychoanalysis in Hollywood cinema, one of the strongest motifs is the medicalization of femininity and the inevitable erotic entanglements between doctor and patient that seem to accompany the representation of psychoanalytic therapy, as if female subjectivity itself were the pathology that psychoanalysis set out to cure, to the benefit of patriarchy.[32]

DRACULA: FREUD, LITERATURE, THE CINEMA, AND PSYCHOANALYSIS

Against this "medicalization" of women in mainstream Hollywood, as documented and analyzed by Doane in *The Desire to Desire,* our combined effort to present Freud the media theorist might allow us to give another turn to this trope as well by suggesting that Freud can also be understood as having not so much medicalized female subjectivity as "medialized" women. This is one of the abiding subjects of a third thinker who has commented extensively on "The Mystic Writing Pad" but whom I want, by way of conclusion, to introduce through yet another possible but unlikely contemporary of Freud. The commentator is Friedrich Kittler, and the perhaps unexpected contemporary is Bram Stoker's Dracula. I do not need to—nor do I have time to—say much about the abiding affinity of the cinema with the Dracula figure as the archetypal embodiment of the uncanny undeadness and in-between-ness of cinematic life and its preservation or storage. Instead, what I want to draw attention to is Kittler's take on *Dracula*—Bram Stoker's novel from 1897, rather than say, F. W. Murnau's *Nosferatu* from 1921—because of the way Kittler reads the novel as a commentary on the media origins of psychoanalysis at just about at the same time as its principles and first therapeutic practices were being formulated by Freud. For Kittler, Dracula is a creature driven not by desire but by some other force and energy: that of a technical media revolution, as it has affected the domains of information and communication. As such, he may be the only original and authentic myth that the age of mechanical reproduction has produced, so that Dracula stands for the eternal repetition of mechanical inscription, which has entered the Western world with the typewriter, the gramophone/phonograph, and the cinema.[33]

Besides a book entitled *Gramophone, Film, Typewriter,* Kittler is best known for the book *Aufschreibsysteme 1800/1900,* translated into English as *Discourse Networks 1800/1900.*[34] There he presents a reading of German Romantic poetry as the consequence of new media technologies, notably the widespread alphabetization undertaken by Prussian school reform. This put woman at the center of a double regime: in the figure of the mother she inducted the male child into discovering through silent reading a new form of inwardness and subjectivity, and in the figure of the female reader she helped create the artist-poet, with his pen as the embodiment of a form of masculinity that impregnated and engendered through paper and ink, and by extension through writing and print. Kittler's thesis is that literature as we know it in the modern age is the result of the coming together of two technologies and a universalizing educational discourse: it was necessary to join to the printing press the postal system, and to public education the literate mother. I have travestied a complex historical thesis (which has revolutionized the discipline of *Germanistik* at German universities in the 1980s and created the field of *Medienwissenschaft*), mainly in order to introduce a larger historical scheme into which Kittler's analysis of Dracula fits and where feminist film theory might find itself in some sense both historicized and given a function beyond the emphasis on specularity, vision, and the male gaze.

Kittler in effect, argues that *Dracula* (1897) is the story of how women become themselves media, how their susceptibility and sensitivity are, in the middle of the nineteenth century, discovered as a resource and a raw material. Charcot, Janet, Breuer, Freud—for Kittler they all line up as men who "harvest" the mediatic powers of women, and it is Bram Stoker who calls their bluff, as it were, because in *Dracula* he both exposes the patriarchal mechanisms underlying their psychophysiological analysis and at the same time offers the imaginary solution that allows Victorian/Western society to live with this shocking realization and its real contradictions. In the contrasting and complementary figures of Nina and Lucy, and in the descriptions of their symptoms, Stoker makes hysteria, paranoia, and somnambulism appear as embodiments of electromagnetism and the human equivalents of wireless transmission. Stoker was no doubt aware that Marconi had patented his wireless telegraphy system in 1896, even if he could not have known that as early as 1898 Marconi would successfully transmit radio signals across the English Channel. On the journey in pursuit of Dracula back to Transylvania, Nina serves the men as both medium and messenger: that is, thanks to her vampiric contact with Dracula, she is able to receive the transmissions emanating from him on the high seas and on land, thereby helping to track his (global) position. Being familiar with a technically advanced, symbolic encoding device, the typewriter, she records the "messages" sent by Dracula as they travel to the Carpathian mountains, acting as a kind of moving (wireless) receiver *and* recorder. As Kittler dryly remarks, women around 1890 had only two choices, to become hysterics or typists, and Nina, after the demise of Lucy, is both.

Psychoanalysis and the cinema—yes, they were born together, but they have also been on a collision course ever since, or rather, they compete with each other and in the process produce the famous "excess" or surplus that, in various formulas ("woman as excess" in musicals and melodrama, violence as special effect, body-horror and pornography), film studies, too, has been trying to come to grips with. Psychoanalysis and cinema are thus the enemies and rivals who—according to the double negative of "my enemy's enemy is my friend"—nonetheless come together at the close of the nineteenth century to put an end to literature and the literary author.[35]

In Kittler's scheme of things, technological media and psychoanalysis thus compete around literature's legacy, trying to take on the various information-processing tasks and cultural memory mandates that used to be literature's monopoly: the recording, storing, and repeating of experience in sounds and images, text and traces, embodied or imagined, manifested as physical symptoms or as phantom sensations. Where film and the cinema (or the audiovisual media generally) accomplish such recording by mechanical means, and on synthetic material supports, psychoanalysis has retained the body and voice as its material support. Yet it, too, tries to "automate" the recording process as much as possible through free association and the seemingly esoteric but strictly controlled body of techniques that make up "analysis."

To conclude with another speculation: Kittler, it would appear, is trying to indicate how in three different epochs, women have been crucial in "naturalizing" a new media technology as well as problematizing its effects on gender relations. If, around 1800, women were essential to the idea of literature as a profession and an autonomous practice, it was the female body and voice that introduced and "naturalized" the cinema around 1900 (if we can accept his reading of *Dracula* as an allegorical prefiguration of audiovisual media). The question with which this leaves us is whether, around 2000, a return to Freud—now as media theorist rather than medical therapist—can tell us something about the "unconscious" of our current media technologies. In the emphasis on such traditional attributes of the female mind as "parallel processing," "distributed attention," and "collaborative intelligence," the digital media find themselves naturalized by virtue of being "feminized," perhaps to keep at bay—and to control—another form of the undeadness of data, the "too much" of stimuli that threaten the very possibility of perception and comprehension, and thus the very manageability of processing. If T. S. Eliot, in 1936, famously asserted that "human kind cannot bear too much reality,"[36] it would seem that Freud likewise suspected that humankind could not bear much *media reality.* Where, then, one is tempted to ask, is the Freud of the twenty-first century who reinvents the "unconscious" appropriate to the information media age? To encourage us to think about this further, let me end with a quotation from Freud's *Beyond the Pleasure Principle* that uncannily predicts one of our current predicaments: that our senses are mere "samplers" of data and our consciousness the protective shield that enables us to survive their contact with the world: "It is characteristic of [the sense organs] that they assimilate only very small quantities of the outer stimulus, and take in only samples of the outer world; one might compare them to antennae which touch at the outer world and then constantly withdraw from it again."[37] Freud the media theorist may still "amount to" someone who increasingly speaks to our age: to cognitivists, biologists, and perhaps even some to whom psychoanalysis now appears so "bankrupt" and "discredited."

If media archaeology is trying to step into the breach that has opened up between a film history (or a television history) that is no longer possible for the twentieth century and a media anthropology that is not yet feasible for the "media convergences" or even "a-mediality" of the twenty-first century, then a figure such as Sigmund Freud—precisely because of his "negative epistemology" about the technical media and his skeptical insistence on persistent problems of memory in relation to consciousness and communication—can stand as a milestone and marker on a road that is direct or linear neither in temporal succession nor in topological extension.

NOTES

1. Mark Miller, "Reading Freud," course description, University of Chicago, Winter 2007, http://english.uchicago.edu/content/reading-freud.

2. For a useful exposition, a flavor of the polemics, and a thorough analysis of the "Freud Wars," see John Forrester, *Dispatches from The Freud Wars: Psychoanalysis and Its Passions* (Cambridge,

MA: Harvard University Press, 1999), and Frederick Crews, ed., *The Memory Wars: Freud's Legacy in Dispute* (Oxford: Granta Books, 1997).

3. Samuel Taylor Coleridge, *Biographia Literaria,* ch. 12 (1817).

4. On Freud's hermeneutics, see, among others, Paul Ricoeur, *Freud and Philosophy: An Essay on Interpretation* (New Haven: Yale University Press, 1970), and Richard Rorty, "Freud, Morality, and Hermeneutics," *New Literary History* 12 (Autumn 1980): 177–85.

5. Such a view has most forcefully in recent years been argued by Slavoj Zizek, notably in his chapter on neurobiology in *The Parallax View* (Cambridge, MA: MIT Press, 2006), 200–251.

6. See Geoffrey Miller, *The Mating Mind: How Sexual Choice Shaped the Evolution of Human Nature* (London: Vintage, 2001).

7. Sigmund Freud, "The Mystic Writing Pad," in *The Standard Edition of the Complete Psychological Works of Sigmund Freud,* ed. and trans. James Strachey (London: Hogarth Press, 1955), 19:228.

8. It would be futile to list all the writings by French philosophers that refer to Freud, but the key texts that have proved relevant to film studies are Jacques Lacan, "The Mirror Stage as Formative of the Function of the I as Revealed in Psychoanalytic Experience," in *Écrits: A Selection,* trans. Alan Sheridan (London: Routledge, 1977), 1–7; Louis Althusser, "Ideology Interpellates Individuals as Subjects," in *Identity: A Reader*, ed. Paul du Gay, Jessica Evans, and Peter Redman (Thousand Oaks, CA: Sage Publications, 2000, 31–38,; Gilles Deleuze and Félix Guattari, *Anti-Oedipus: Capitalism and Schizophrenia,* trans. Robert Hurley, Mark Seem, and Helen R. Lane (New York: Viking Press, 1977); Michel Foucault, *The History of Sexuality,* trans. Robert Hurley (New York: Pantheon Books, 1978).

9. Among the numerous writings on cinema and psychoanalysis, see E. Ann Kaplan, ed., *Psychoanalysis and Cinema* (London: Routledge, 1990); Constance Penley, ed., *The Future of an Illusion: Film, Feminism, and Psychoanalysis* (Minneapolis: University of Minnesota Press, 1989); Janet Bergstrom, ed., *Endless Night* (Berkeley: University of California Press, 1999).

10. Jacques Derrida, "Freud and the Scene of Writing," in *Writing and Difference* (Chicago, University of Chicago Press, 1978), 196–224; Mary Ann Doane, *The Emergence of Cinematic Time* (Cambridge, MA: Harvard University Press, 2002); Friedrich Kittler, *Gramophone, Film, Typewriter,* trans. Geoffrey Winthrop-Young and Michael Wutz (Stanford: Stanford University Press, 1999).

11. Lev Manovich, *The Language of New Media* (Cambridge, MA: MIT Press, 2001), 295.

12. Harun Farocki, *Nachdruck/Imprint* (New York: Lukas and Sternberg, 2001); Thomas Elsaesser, ed., *Harun Farocki: Working on the Sightlines* (Amsterdam: Amsterdam University Press, 2004); Paul Virilio, *Guerre et cinema I: Logistique de la perception* (Paris: Etoile, 1984).

13. On the former, see, for instance, Jacques Ranciere, *La fable cinématographique* (Paris: Seuil, 2001); on the latter, see the "tag clouds" generated by online databases such as the Internet Movie Database (www.imdb.com).

14. Sigmund Freud, *Beyond the Pleasure Principle,* in *Standard Edition,* 18:153; Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction," in *Illuminations* (New York: Schocken Books, 1972). See also Rosalind Krauss, *The Optical Unconscious* (Cambridge, MA: MIT Press, 1993).

15. For a concise statement in English, see Niklas Luhmann, *Theories of Distinction: Redescribing the Descriptions of Modernity* (Stanford: Stanford University Press, 2002).

16. On Freud's early years, see Ernest Jones, *The Life and Work of Sigmund Freud* (New York: Basic Books, 1953–57), vol. 1, as well as Frank J. Sulloway, *Freud, Biologist of the Mind: Beyond the Psychoanalytic Legend* (New York: Basic Books, 1979).

17. Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (New York: Basic Books, 1990).

18. See the opening passage of Freud's famous essay "The Uncanny," in *Standard Edition,* 17:219–56.

19. On this, see Christoph Asendorf, *Batterien der Lebenskraft: Zur Geschichte der Dinge und ihrer Wahrnehmung im 19. Jahrhundert* (Giessen: Anabas, 1984). Quite generally, one could argue that each of Freud's three different models of the psyche—the topographic (spatial), the structural (ego, superego, id), and the economic (preservation of energy, based on steam pressure)—represents/implies a different concept of medium, while each also relates to a contemporary technology or science, including archaeology.

20. On these and related topics, see Thomas Ballhausen, Günther Krenn, and Lydia Marinelli, eds., *Psyche im Kino: Freud und der Film* (Vienna: Filmarchiv Austria, 2006).

21. Derrida, "Freud and the Scene of Writing," in *Writing and Difference* (London: Routledge, 1985) 196–230.

22. Jacques Derrida, *Archive Fever: A Freudian Impression,* trans. Eric Prenowitz (Chicago: Chicago University Press, 1996), 24.

23. On Thomas Edison's thinking on audio-vision, see Gordon Hendricks, *The Edison Motion Picture Myth* (Berkeley: University of California Press, 1961).

24. See Serge Daney, "Cinemeteorologie," *Libération,* February 20–21, 1982.

25. Mary Ann Doane, "Temporality, Storage, Legibility: Freud, Marey, and the Cinema," in *The Emergence of Cinematic Time* (Cambridge, MA: Harvard University Press, 2002), 33–68.

26. Ibid., 34–35.

27. On Benjamin's distinction, see Martin Jay, *Cultural Semantics: Keywords of Our Time* (Amherst: University of Massachusetts Press, 1998), 110–24.

28. Doane, "Temporality, Storage, Legibility," 167.

29. See Thomas Elsaesser, ed., *Early Cinema: Space Frame Narrative* (London: British Film Institute, 1990).

30. Gilles Deleuze, "The Brain Is the Screen: An Interview with Gilles Deleuze," trans. Marie Therese Guiris, in *The Brain Is the Screen,* ed. Gregory Flaxman (Minneapolis: University of Minnesota Press, 2000).

31. On Marey, see Marta Braun, *Picturing Time: The Work of Étienne-Jules Marey, 1830–1904* (Chicago: Chicago University Press, 1992).

32. Mary Ann Doane, *The Desire to Desire: The Woman's Film of the 1940s* (Bloomington: Indiana University Press, 1987), and *Femmes Fatales: Feminism, Film Theory, Psychoanalysis* (London: Routledge, 1991).

33. In the original: "die endlose Wiederholung durch automatische Aufzeichnung," Friedrich Kittler, *Draculas Vermächtnis* (Leipzig: Reclam, 1993), 12.

34. Friedrich Kittler, *Discourse Networks 1800/1900,* trans. Michael Metteer (Stanford: Stanford University Press, 1990).

35. See Kittler, *Draculas Vermächtnis,* 96, who in this respect contradicts but also complements Stephen Heath, "Cinema and Psychoanalysis: Parallel Histories," in Bergstrom, *Endless Night,* 46.

36. T. S. Eliot, "Burnt Norton," no. 1 of the *Four Quartets* (London: Faber and Faber, 1945).

37. Freud, *Beyond the Pleasure Principle,* 153.

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PART II

(Inter)facing Media

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Media archaeology travels not only across time but also across media. This section focuses on interfaces that link machines with their users but also connect different media with each other. Whereas the convergence of media has often been seen as a defining characteristic of the digital era, media archaeologies broaden the analysis of the relationships of media devices, formats, genres, and aesthetics far beyond the digital, tracking convergences, divergences, crossing paths, and overlappings within a much wider cultural space. The following chapters offer different takes on such intermediality, complementing but also revising existing ideas.

Machiko Kusahara's chapter articulates intermediality as an implicit critique of Anglo-American and Eurocentric approaches by focusing on modernity and media in early twentieth-century Japan. By concentrating her analysis on the Baby Talkie—a forgotten Japanese optical toy that combined the principle of the zoetrope with the gramophone—she addresses encounters between cinema and music, the modern and the traditional, and the "Western" and the "Japanese." The Japanese Modern period was closely connected with international trends in media, fashion, and art; as a cultural interface object the Baby Talkie connected international influences with Japanese aesthetics and narratives. Although it focuses on an earlier era, Kusahara's excavation of a little-known phenomenon (even in Japan) is of interest for the era of cross- and multicultural media as well, demonstrating the microphysics of cultural influences through the vicissitudes of a seemingly superfluous object.

Wanda Strauven's chapter aligns itself with the new film history, excavating links between early optical toys and current forms of tactility in electronic gaming. Drawing on Nicolas Dulac's and André Gaudreault's work on optical toys and on Erkki Huhtamo's research on the archaeology of interactivity, she argues that games are not only a distinct form of media but a mode within other media as well—including film.[1] The *relations* between media define their characteristics. Strauven argues for a revision of cinema's history from the viewpoint of gaming. At a time when cinema supports itself through its outside (spoilers, Internet discussion boards, games, etc.), its intermedial ties become even clearer. Hence, understanding cinema as an articulation of modalities of various media systems (seeing, touching, sensing—and in general synesthesia) also gains importance. Cinema is transforming itself into a kind of touch medium, reconnecting with its origins in devices like the thaumatrope, the phenakistoscope, the zoetrope, and the praxinoscope.

Claus Pias also presents an archaeology of digital game culture, exposing the layers of the "real-time" user-friendly interface. Instead of a linear history of gaming, he proposes an archaeological mapping of nonlinear trajectories of play in culture. Having been a defining feature of the human being, play has reached a nonhuman dimension with the "Ping-Pong" communication that characterizes the subrepresentational machinics of the computer. From an anthropology of play Pias moves toward computer games as an index of the fundamental temporality, rhythm, and control that the computer game frames for the human user. Digital technologies are ontologically much too fast and small for the human sensorium, so interface design is always a matter of translation of such processes from their radical temporality to visuals and haptics that synchronize the human user with the computer. Pias's thinking derives from the "school" of German media archaeology inspired by Friedrich Kittler's work, but it also draws on Gilles Deleuze's notion of "machinics," introducing new theoretical inputs to the media-archaeological discourse.

Wendy Hui Kyong Chun's chapter addresses the structures of temporality in contemporary digital culture by investigating the programmability of networked media. Digital memory is often seen as stable and eternal, but Chun emphasizes its forgetfulness and erasure. Digital media are *defined* by the process of degeneration, which is a challenge for archiving, both concretely and conceptually. Digital media are less about the illusion of permanence than about the practices and processes that enable the ephemeral to endure. Chun's position within media archaeology relates to the exploration of the archive in the digital era. For her, media archaeology is not only about macro-level historical events and narratives, but also about micro-level time-critical processes that define what technical media are.[2]

NOTES

1. Nicolas Dulac and André Gaudreault, "Circularity and Repetition at the Heart of the Attraction: Optical Toys and the Emergence of a New Cultural Series," in *The Cinema of Attractions Reloaded,* ed. Wanda Strauven (Amsterdam: Amsterdam University Press, 2006), 227–44. This text was previously published online as "Heads or Tails: The Emergence of a New Cultural Series, from the Phenakisticope to the Cinematograph," *Invisible Culture* 8 (Fall 2004), www.rochester.edu/in_visible_culture/Issue_8/dulac_gaudreault.html. Erkki Huhtamo, "Slots of Fun, Slots of Trouble: An Archaeology of Arcade Gaming," in *Handbook of Computer Game Studies*, ed. Joost Raessens and Jeffrey Goldstein (Cambridge, MA: MIT Press, 2005), 3 –21.

2. On such approaches, see the work done on media archaeology in the context of the Humboldt-University in Berlin: Axel Volmar, ed., *Zeitkritische Medien* (Berlin: Kadmos, 2009).

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6

The "Baby Talkie," Domestic Media, and the Japanese Modern

Machiko Kusahara

Some time ago I happened to find an interesting old Japanese optical toy named Baby Talkie, preserved in its original box together with its "software" (figure 6.1). It is a version of the zoetrope meant to be placed on the gramophone turntable for the purpose of enjoying animations, accompanied by music—or the other way around, as the description on the box says: "[With this device] records you have got tired of will be fun again." The basic idea behind this device was not new. Optical toys known as zoetropes were already used in the Western world in the nineteenth century. Versions were still produced after the arrival of the cinema, but these were small "kids' versions" typically made of cardboard, paper, and wood. The Baby Talkie, however, seems to have had a more ambitious aim: the reintroduction of the zoetrope as a new medium. It is closer to a full-size zoetrope, stylish in design, and sturdy—made of sheet metal and cast iron. It has a feature neither the traditional zoetrope nor the "talkies" had yet achieved: it presents moving images in full color accompanied by sound. At least that is what it was meant for.

The quality of the Baby Talkie is confirmed by the nearly forty picture strips published for this device. They have been printed in full color on paper, and their themes clearly differ from the familiar motifs of the Western zoetrope strips, which were copied over and over again for years. While some of the strips—especially the later ones—are meant for young children, many of the themes, it seems, have been chosen to amuse teenagers and adults. As we will later see, they include an interesting mixture of Japanese and "Western" motifs—a Buddhist priest, samurai fighting, a skeleton dance, Charlie Chaplin, baseball players, and soldiers, among others. The quality of the illustrations and the printing associates the product with the blossoming of the internationally minded modernist culture that emerged in

FIGURE 6.1. Baby Talkie. Machiko Kusahara Collection.

Japan in the mid-1910s and was brought to an end by the emergence of nationalism in the 1930s and ultimately the outbreak of the Second World War.

The Baby Talkie and its imagery reflect many issues that were prevalent in the Japanese culture and society in this era, including attitudes toward Western culture, new technology, and such modern media as the gramophone and the cinema. However, this exceptional object should also be "questioned" about its relationship to Japanese traditions, particularly with regard to the very peculiar role of technology in Japanese history. It is to this issue that we will turn first, before having a closer look at the Baby Talkie itself and the meanings it promises to unleash.

ENTERTAINMENT, MEDIA, AND THE MEIJI RESTORATION

Japan had its borders closed from the rest of the world for nearly two and half centuries during the Edo era (1603–1868) except for limited trade with China and

Holland. The situation made the history of science and technology very different from that of the West. As Timon Screech has observed, the isolation was never absolutely total.[1] Although only limited communication was officially allowed, Japanese scholars, scientists, and enthusiasts managed to exchange information with Dutch delegates who lived on a small artificial island in the bay of Nagasaki, while scientific objects were brought into the country as gifts or by secret trade. This was the case of the magic lantern, which became known in the eighteenth century. The Japanese created an idiosyncratic version of the magic lantern show known as *utsushi-e,* which differed from the Western one in several respects. Peep shows were also extremely popular both as a street entertainment and as a domestic pastime for well-to-do people.[2] The zograscope is seen in use in a famous woodblock print by Harunobu, *Tamagawa in Koya,* depicting the interior of an expensive pleasure house.[3] Optical discoveries and inventions were not introduced systematically; in a society that was facing neither serious warfare nor an industrial revolution, new technologies were typically appreciated as curiosities and entertainment. The absence of warfare helped visual entertainments to flourish; they were mixed with art, design, and crafts in ways that erased any clear borders between them.

When vessels from Russia, England, France, and the United States appeared along Japan's shores toward the mid–nineteenth century to require the opening of trade relations, things began to change drastically.[4] A few ports were opened by the mid-1850s, and in 1867 the Meiji Restoration took place, ending feudal society and giving supreme power to the emperor. The new government was determined to modernize the country as quickly as possible in order to avoid what had happened to China, which had lost the Opium War in 1842. Most people were excited about the new ideology of "civilization and enlightenment" *(bunmei kaika),* sharing the feeling that one should not be left behind.[5]

After the Meiji Restoration many ambitious people looking for new ideas and opportunities lived in Tokyo, including foreign specialists invited by the Meiji government. The following episode, dealing with the introduction of the phonograph in Japan, will illustrate the atmosphere. In January 1879 (Meiji 12), less than a year and a half after Edison's invention had been made public, Thomas Corwin Mendenhall, an American physics professor at the Imperial University (currently University of Tokyo), gave a series of public magic lantern lectures on electricity and magnetism, including its applications in sound communication; the hall was already completely full three hours before the scheduled starting time.[6] In the following March, another Imperial University professor, James Alfred Ewing from Scotland, gave a public demonstration of a phonograph he had himself constructed.[7] The event was enthusiastically reported in all the major newspapers. When invited to record a message with the phonograph, the multitalented journalist Genichiro Fukuchi joked: "This sort of machine will cause troubles to our newspaper business."[8]

This anecdote shows how fast new media technologies were introduced in the feverish atmosphere of Meiji Japan. Only ten years after the Meiji Restoration had taken place, Japanese society was ready to start catching up the Western civilization. The drastic transformation of society was evident everywhere, from food, fashion, and hobbies to transportation systems, education, and the economy. However, centuries-long cultural traditions don't change so quickly. There were juxtapositions and conflicts between those who believed in the new values and those who respected the old. It took decades before a new urban culture developed. The Japanese equivalent of the worldwide Twenties culture is called Taisho Modern (the Taisho era took place between 1912 and 1926) and Showa Modern, which continued through the later 1920s and the first half of the 1930s.[9]

Japanese Modern was part of international modernism but also had its own features that resulted from a mixture of Western influences and traditional culture.[10] Democracy and liberalism, as well as the impact of Dadaism, surrealism, and other contemporary art movements, were felt, nurturing a rich body of work in art, design, photography, literature, theater, children's books, comics, cinema, animation, and other fields. Signs of a sense of freedom and creativity in mixing the old and the new, the Western and the Japanese, can be seen in many areas. In the field of fashion, amazingly modern patterns were designed for kimono textiles, including ones depicting music scores, newspapers, cinemas, gramophones, and urban landscapes, to name just a few examples (this was facilitated by the introduction of wool and the latest dye technology from the West).[11] Public mass entertainments may have focused more on traditional aesthetics, but new media technologies such as cinema and the gramophone were also rapidly integrated into the Japanese context.[12]

THE BABY TALKIE AS A MANIFESTATION OF ITS ERA

Little has been known about the history of the Baby Talkie. The box does not give any information about its maker or production date.[13] It is easy to see that the Baby Talkie is a professionally designed and manufactured product; judging from the number of picture strips and their iconographical variety, a certain quantity must have been put on the market.[14] However, a surviving Baby Talkie is extremely hard to find today.[15] An interesting set of questions arises: How can we make such a device "talk" not only about itself but also about its users and the historical period it was part of?

After years of searching, I recently found three newspaper advertisements for the Baby Talkie, all from 1932. The one in *Yomiuri,* dated May 20, claims: "New invention, an application of gramophone, Baby Talkie appears!" It reveals that the product is manufactured by Mikado Shokai and is distributed by Nihon Tokingu Shokai (Japan Talking Company), based in Kanda, Tokyo.[16] The name of the distributor clearly refers to "talkies." The list of the "major vendors in Tokyo" includes four department stores, a famous toyshop (Hakuhinkan), and the newly opened Subway Store in Ueno.[17] All of them are located in Asakusa, Ueno, and Ginza, the area favored by tourists in the eastern part of Tokyo.[18] The advertisement calls for new dealers as well. The illustrations show a Baby Talkie, characterized as *katsuga-ki* (a device for moving images), a picture strip forming a loop (*katsu-ga,* film), and a Baby Talkie placed on a record played on a gramophone. The price, 1 yen 50 sen (i.e., 1.5 yen), includes six strips and free shipping to all over the country.

Apart from such practical information, the first line of the message is surprisingly scientific. "Since this device is placed at the center of the turntable, only a very small amount of power is needed for the rotation. Therefore it can be used with any small gramophone, is easy to set up, and usable forever." Not many readers would have understood the relationship between torque and energy, yet probably it was a core part of the invention that the unknown inventor was so proud of. The ad suggests that if you buy the device "at the cost of one record any old record will become really interesting and lively, pleasing both your eyes and ears as if you were watching a real talkie." It goes even further: "You will no longer be satisfied with a gramophone that is merely for listening." The gramophone is almost accused of reproducing only sound! With the arrival of the "talkies," it needs to take a step further, and the Baby Talkie will do it! "Already twenty-six films *[sic]* are available, five sen each," the ad concludes.

Another advertisement appeared on June 5 in *Yomiuri's* biweekly Sunday special *Yomiuri Shonen Shimbun (Yomiuri Newspaper for Boys).*[19] Targeted at families with teenage children, it shows the same image as the box cover—a family sitting around a gramophone. Along with other images, a section of a picture strip is pictured, depicting a boy dressed as a soldier marching and holding the national flag, while a cupid doll smiles at him. The text is the same as in the other ad, except that the note about the twenty-six "films" and their cost is missing. The third ad appeared on June 20 in *Asahi Shimbun.* Under the caption "Picture Dances on Baby Talkie" it reports that the Baby Talkie "has recently become available at department stores and gramophone shops" and adds that "an inserted strip of film (either drawn as in *manga* or photographic *[sic]*) endlessly reproduces an entertaining dance, making your old record interesting once again."

Interestingly, the *Asahi* ad assures the reader that "we are told that it does not damage the wind-up mechanism of the gramophone," perhaps implying that there had been concerns about the consequences of placing a heavy iron-made device on the precious gramophone. The pricing remains the same, but already thirty picture strips are said to be available. Although no manufacturer's name is mentioned, the distributor is given as the "Talking Division" of "Koraku Shoten" (Koraku Store).[20] Further research has revealed that Mr. Sutejiro Koraku's successful shop specialized in radios, gramophones, and their parts.[21] Although much information is still missing, these advertisements give concrete clues about the introduction of the Baby Talkie. We know now that it existed by late May 1932 and was then considered "new." What can the Baby Talkie and its picture strips tell about the period when it flourished and eventually disappeared?

Commercial talking pictures were first shown in Japan in 1929, and the first Japanese sound film was produced in 1930.[22] This was the time when many cinema palaces flanked the streets of the entertainment district Asakusa in Tokyo, and modern culture prospered in big cities like Tokyo and Osaka. At the same time Japan was beginning to decline into militarism. In 1937—a year after the Second Sino-Japanese War started—the production of metal toys was banned and the government eventually started collecting metal objects from households to get scrap metal for military use.[23] Being of metal and meant for amusement—not for education or propaganda—most Baby Talkies must have been collected and melted. Some children may have kept their favorite paper strips, but Tokyo, Osaka, Kobe, Hiroshima, and other big cities were burned to ashes in the Second World War. Small magic lanterns and toy projectors were allowed to be kept during the war for the purpose of showing propaganda slides and films, but the Baby Talkie had few chances to survive.[24]

Within the short period between the late 1930s and the early 1940s the cultural atmosphere went through a drastic change. The use of English words—very common in the 1930s—was practically banned when Japan entered the war with the United States. The choice of "Baby Talkie" must have seemed unfortunate. The use of "luxurious" things was also considered antipatriotic. Listening to a gramophone at home could cause problems as well.[25] To summarize, the Baby Talkie was a product of the short but special period of "modern Japan." This essay tries to figure out what this forgotten gadget meant in that historical context, focusing particularly on the relationship between modern and traditional lifestyles reflected in its name and the imagery it presented.

THE ZOETROPE AS AN OPTICAL DEVICE

To gain an understanding of the Baby Talkie as a media-cultural object, it is necessary to study the history of the zoetrope. The idea of a moving picture drum for viewing sequences of figures in motion was presented almost simultaneously by the Austrian Simon Stampfer (1833) and the Englishman William George Horner (1834), who named it the "Daedaleum."[26] The device was a variant of the phenakistiscope, again independently invented by Stampfer and the Belgian scientist Joseph Plateau in 1832. Both devices emerged from the context of the research on the physiology of vision, meant to demonstrate the effect now known as persistence of vision. Within months of its introduction, the phenakistiscope was turned into a fashionable "philosophical toy" sold by printers and booksellers in London and elsewhere. However, for reasons that are not yet known, the picture drum, now known as the "zoetrope" or "wheel of life," was not introduced as a commodity until the second half of the 1860s.

From around 1866 on, large and sturdy zoetropes were manufactured by several makers.[27] So that exchangeable strips could be used, there seems to have existed a de facto standard size for the larger zoetropes. The diameter of a typical full-size zoetrope drum is about 30 cm and the height 20 cm. There are twelve or thirteen viewing slits around its perimeter, corresponding to the number of images ("frames") on each strip. The images have been printed on normal paper strips, typically with black ink and one or two additional colors such as red or green or blue. The strips were sold at low prices, sometimes as folding booklets from which the buyer had to cut them out him- or herself.[28] Compared with Émile Reynaud's beautifully colored and detailed animation strips for his praxinoscope (an improvement of the zoetrope invented in 1878), normal zoetrope strips are usually quite crude and focus on cartoonlike exaggerated movements and transformations.[29] The motifs they depict are generic, with no links to actual events or personalities.

The zoetrope is often considered a precinematic device, but this concept is a misnomer, for such devices were still used as toys after the cinema had made its breakthrough. Novelty curiosities like biscuit tins doubling as zoetropes were introduced. New versions of the zoetrope kept on appearing in the early twentieth century, claiming to offer "home movie" experiences. A product named Moviefun was advertised on the cover of its box as "ANIMATED CARTOONS IN COLORS: The Home Cinema COMPLETE WITH 10 FEATURES."[30] A similar idea was associated with the Ronson Moviescope, a mechanical phenakistiscope-type toy produced in the United States in the 1910s or 1920s. On the box it says, "Amazing! Amusing! Alluring! Marvelous Moving Picture Machine."[31] The iron wheel, which is only 10 cm in diameter, can be rotated by turning a crank on its side, an action that recalls the film projectors of the day.

Another interesting invention, one that bridged optical toys and the gramophone, was the Gramophone Cinema, to which the maker also gave the name "The Kinephone."[32] It is a kind of phenakistiscope that utilizes the gramophone turntable to automatically rotate the disc (*replacing* the sound record; both cannot be enjoyed simultaneously). Judging from the texts and illustrations on the box covers, as well as from the chosen materials, these small zoetropes and other similar devices were mostly meant for children to enjoy short cartoonlike cyclic animation sequences. An American device named Witte's MovieScope (ca. 1920) gets closest to the Baby Talkie.[33] On the box it says, "4 in 1"; four illustrations show it used on the table, as a hand-held, and either placed directly on the gramophone turntable or attached to a wooden stand above it, so that gramophone records can be played simultaneously. The modest small zoetrope is made of paper and unpainted wood. The drum has eleven slits; each paper strip contains ten to eleven black-and-white illustrations.

Of course, labeling these toys as "home cinema" devices was an exaggeration; they were even simpler than their precinema ancestors in terms of both the illustrations and the material used. Compared with the Kinora, a successful moving picture viewer for the home that displayed short films from mutoscope-like picture reels (the frames had been copied on paper slips bound around a core), Moviefun or Witte's MovieScope is only remotely associated with cinema. On the other hand, the appropriation of the gramophone for other than its standard uses is an interesting media-archaeological topic that should be researched further.[34] In Japan there are patent applications from 1932 and 1933 introducing panorama toys, for which gramophones are used to automatically scroll the pictures.[35] Whether these toys were realized or not is not known.

In the Meiji era many optical devices were introduced for the purpose of scientific education as part of modernization. While professional magic lanterns became widely known and were used for both educational and entertainment purposes, zoetropes seem to have been only occasionally used in demonstrations of the persistence of vision. Shimadzu Corporation, a well-known manufacturer of medical equipment, produced a zoetrope in 1896 for scientific education.[36] Otherwise there is not much information available about zoetropes in Japan. I have a series of zoetrope strips with woodblock illustrations printed on Japanese paper in my own collection. The strips show a mixture of well-known Western motifs and Japanese ones, including a scene of two men massaging each other. These strips are certainly Japanese and fit into a standard large zoetrope. It is impossible to tell if they were used with an imported zoetrope or one made in Japan.

The zoetrope does not seem to have been very successful in Japan. In the Irie Collection there is a rare small zoetrope from the Meiji era made of tin and unpainted wood with a candle stand at the center. Whether the idea of using a candle came from Émile Reynaud's praxinoscope or from the traditional Japanese (originally Chinese) rotating lanterns that were often sold at fairs, or both, is impossible to tell. A patent application for a toy praxinoscope exists from 1906, the time when mechanical toys with cranks, including panorama toys, were becoming popular in Japan.[37] Toy manufacturers were eager to introduce and invent new and attractive toys, including optical devices.[38] Small and inexpensive zoetropes made of wood and paper were sold at fairs and are said to have been "extremely popular" during a short period between 1891–92; they disappeared soon thereafter, without leaving behind even a standardized name.[39] They should probably be considered a short-lived fad—a phenomenon typical in Japan. Devices such as magic lanterns, kaleidoscopes, and stereoscopes gained appropriate names in Japanese, and terms such as *panorama* and *diorama* were widely accepted and became part of Japanese language, but the zoetrope seems to have failed in finding a place in the Japanese visual culture. In that sense the Baby Talkie was in fact a new medium.[40]

ENTERTAINMENT FOR THE MODERNIZED FAMILY

The logo "BABY TALKIE" is painted in gold on the black metal body of the picture drum.[41] By no means was it meant to attract primarily young children, when a wide variety of vividly colored toys were available.[42] The black and gold color scheme is seen on other optical toys such as toy cameras or toy projectors sold at department stores or through mail order.[43] It is difficult to say if this choice reflects Western aesthetics, or that of Japanese traditional high-end lacquered commodities, or both. The fact that the name was in English, as well as the way the toy functions, suggest that Baby Talkie was a product that represented the modern urban lifestyle of the era—the exciting but short-lived era of "modern Japan."[44]

Such an atmosphere can be detected in the illustration on the box (figure 6.2).[45] A family—father, mother, grandmother, teenage boy and girl, and their young brother in his mother's arms—are sitting on armchairs at a round table, on which a gramophone with a Baby Talkie has been placed. Having a *yo-ma* (a Western-style room) was itself a symbol of a modern family. A round table and big chairs or sofa were the necessary items for the *yo-ma*, which was used to welcome guests and for after-dinner family assemblies. The scene shows an ideally democratic family relationship, with the parents offering the best seats to the children and the grandmother to enjoy the animation. The sense of equality among the family members is rather impressive, given that traditional paternal ideology was still strong in many families. The image suggests that this device offers ideal entertainment for such a "modernized" family. It is neither a cheap toy that children could buy from a little corner shop nor a onetime entertainment that would be abandoned soon. At least that is the message from the manufacturer. The *yo-ma* was considered a special space in which only quality (and mostly Western) items were allowed to be kept.

Another interesting issue is clothing. The mother and the grandmother are wearing traditional kimonos, while the children have been dressed up in Western-style garments and the father even wears a necktie. Probably we should imagine that he just came home and could not wait to show the new machine to the family members. It is possible that the image on the box needed to have him in a "modern" Western outfit that would represent his social status. It was normal for housewives, though, to wear a kimono all day.[46] That the children are in Western clothes immediately indicates they are from a better family. The use

FIGURE 6.2. The label on the Baby Talkie box. Machiko Kusahara Collection.

of these cultural codes to project an image of a modern, "progressive," but still stable family reveals how traditional and Western cultures, each representing a specific value system, were combined in daily life.

THE HARDWARE CONFIGURATION

How could one play music and watch an animation at the same time on a gramophone? To understand the nature of Baby Talkie we must investigate its "hardware" features. A typical zoetrope consists of a cylindrical drum and a heavy base connected by an axis with a screw. The drum part freely rotates horizontally when turned by hand.[47] Baby Talkie shares a similar composition, except for a few unique features that correspond with its function. The drum is not cylindrical, consisting of two (upper and lower) parts; there are almost twice as many slits as in a standard zoetrope; and the screw must be fixed tight to make the base and the drum rotate together.

As can be seen from the illustration on the box, the Baby Talkie is meant to be placed on the label of a standard record rotating on the gramophone. Its diameter is 24 cm, which matches that of a 78 rpm (rotations per minute) SP record.

The device is a little smaller than a full-size Western zoetrope (such as Milton Bradley's, which measures 30 cm), but it is still a "serious" zoetrope in terms of both its size and the material used.[48] The cast-iron base is much narrower than the ones used for typical zoetropes. Its diameter measures only 6 cm—exactly the size of the record label. With its weight and a hole deep enough to house the central metal pin of the turntable, Baby Talkie stays stable. The distance between the record and the bottom of the drum allows just enough space for the gramophone's arm and reproducer to move and play music.

As mentioned earlier, the drum consists of upper and lower parts that need to be assembled together when the device is put to use. The upper part, which has the slits, is not cylindrical but narrower at the top, giving Baby Talkie a unique look. Why was it designed in such a manner? The illustration on the box gives us a clue. By actually trying to place the Baby Talkie on a gramophone, one comes to understand that this was needed so that the zoetrope would fit in the narrow space between the turntable and the lid of the gramophone box, which typically opens only halfway when in use. A zoetrope of this size would not fit in the space without "cutting the corner" of its drum. Dividing the body into two parts may have been a practical solution making the manufacture easier, yet another merit also exists. It becomes possible to store the whole device in a rather flat box, measuring 25 by 25 by 7 cm, that would fit inside a record storage cabinet, taking only as much space as a dozen discs.

Another unique feature is the number of slits. Baby Talkie has twenty-three slits, while a typical zoetrope has only twelve or thirteen regardless of its size. Each paper strip for the Baby Talkie contains twenty-one to twenty-three frames. Why has the number of the slits been almost doubled (compared with standard slits)? A possible answer is the need to compensate for the low spinning frequency of the gramophone turntable, which is 78 rpm. This is much slower than manual rotation. If a zoetrope with twelve or thirteen slits is spun on a gramophone, its frame rate will be 15 to 17 fps (frames per second), which is not enough to achieve a smooth animation.[49] Increasing the number of slits makes the frame rate go up closer to 30 fps, enabling a much smoother motion.[50] Another possibility is that the inventor tried to create a more cinema-like effect by increasing the number of frames and producing colorful original strips.

To sum up the hardware analysis, it can be said that every detail of the Baby Talkie has been carefully designed on the basis of a clear understanding of how a gramophone functions and how the Baby Talkie could extend its role within the home. The idea of adding a new function (i.e., viewing moving pictures) to an already existing device (i.e., the gramophone) is something often seen in Japanese products. The effort to make it compact without sacrificing the maximum effect is also something often considered typical of Japanese design. Whoever the inventor may have been, he meant to create a "home movie machine" at a moment when talking pictures for the home were still hard to imagine. Baby Talkie may have been just a short-lived toy for home entertainment, but it anticipated forms of audiovisual entertainment for home use such as television and DVDs, net videos, and other media to come.

THE PICTURE STRIPS AS EVIDENCE OF THE ERA

A zoetrope strip is a long and narrow illustrated piece of paper. A Baby Talkie paper strip measures 5.7 cm by 78 cm and contains twenty-one to twenty-three frames. On some of the strips the number of "frames" is not clear—the frames are not discrete because there are multiple characters passing each other. All the strips are numbered. There are thirty-one different strips in my collection, which seems to be the largest variety of subjects known to survive.[51] They came from several different sources. Unfortunately strip no. 1 is missing from any collection known. The last number is 39, and it is in my collection, but it is not known if this was the last strip produced. Almost all the strips are in full color with shading, except for two early strips—depicting a skeleton dance (no. 5) and a black native dancing (no. 6)—that have a rather flat coloring. The quality of the printing is very good (figure 6.3).

The strips include some clues for understanding the era they represent. The themes are mixed, containing both Western and Japanese subjects. Strip no. 2 shows two girl dancers wearing red and blue dresses. It is likely that the image depicts "Girls' Opera," which had been extremely popular since the late 1920s. Takarazuka Revue (1914–) had a huge success with their French-style revue *Mon Paris,* performed in 1927, which inspired Shochiku, a major theater and film production company, to launch Shochiku Kageki Dan (SKD) in 1928.[52] SKD became known for line dance as a highlight. Besides performances at their theater in Asakusa, Shochiku used SKD for "stage presentations" between films.[53] The new attraction was introduced around early 1929 to cinema palaces specializing in Western films, followed by its Japanese version—traditional songs or dances to accompany Japanese films.[54] It is possible that strip nos. 18, 27, and 34 refer to Japanese dances that were shown between "talkie" films rather than simply to regular stage performances or sound records.[55]

Strip no. 3 (Irie Collection) shows soldiers marching in front of men and women waving flags in a scene that may depict soldiers departing to China.[56] The Japanese army invaded China in the 1930s, beginning with the "Manchurian Incident" in 1931. An increasingly militaristic atmosphere is evident in strip no. 7, the one that was pictured in the June 5, 1932, Baby Talkie ad. Still, the presence of the very Western cupid doll figure (which had become popular by then) demonstrates that militarism was not yet always connected with cultural nationalism.[57] Strip no. 10 clearly depicts a "heroic" episode that took place during the Shanghai

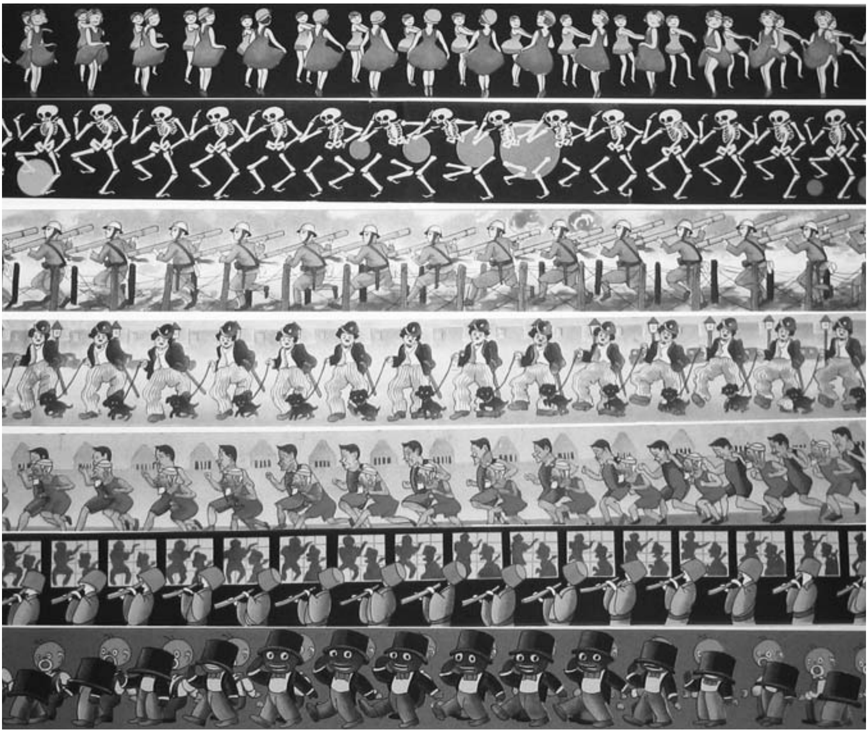


FIGURE 6.3. Picture strips for Baby Talkie (from top to bottom), nos. 2, 5, 10, 12, 23, 24, and 39. Machiko Kusahara Collection.

War in February 1932, followed by strip nos. 11, 15, and 16, featuring more battle scenes.[58] These strips show signs of overt militarism entering into the realm of home entertainment.

In between these propaganda motifs we find others representing "modern" entertainment. Strip no. 4 depicts horse racing. While horse racing as a noble sport started in the 1880s, it was only in 1923 that betting on horses was legalized, making it popular among ordinary men. By 1930 horseracing tracks had proliferated throughout the country, and the first Japan Derby took place in April 1932 with live radio broadcasting. Strip no. 5 shows a skeleton dance. Skeleton dance was brought to Japan in 1894 by the British marionette company D'Arc Troupe and continued to be an extremely popular regular program at Hanayashiki, a well-known amusement park in Asakusa, Tokyo.[59] Strip no. 9 depicts a baseball game between Waseda and Keio Universities. The annual game between the two universities started in 1903 and became a favorite national sports event. After a legendary heated match took place in 1929, nine songs and stories featuring the games were recorded, including a 1931 reenactment of the game that sold 150,000 discs.[60] Another strip depicting baseball is no. 19, which shows Japanese and Western players. It is likely that the topic is the first U.S. national team's visit to Japan in fall 1931, which was received with enthusiasm.[61]

Some of the strips refer to popular films of the time. Strip no. 12, immediately after the battle piece, shows Charlie Chaplin and his dog with a Western-style street lamp behind him, most likely depicting *City Lights* (1931).[62] Chaplin was extremely popular in Japan, and newspapers regularly wrote on him, while record companies published songs such as "Hello Chaplin" or "Uncle Charlie" around the time of his long-awaited visit to Japan in May 1932.[63] Strip nos. 13 and 14 are the only ones that seem to be based on photography. While a Japanese woman wearing a dress is seen dancing in no. 13, no. 14 depicts a Japanese man in a Fred Astaire–style outfit, holding a cane and dancing with a woman. Astaire's and Ginger Rogers's films were extremely popular in Japan, and many show dancers performing in the theaters and revues of Asakusa are said to have copied their routines.[64] On the other hand, strip no. 29 depicts two samurai fighting in the typical manner familiar from Japanese silent films.

Strip no. 20 depicts sailors dancing. However, judging from their hairstyle they may be girls rather than real sailors, probably from the aforementioned revues. Romantic comedy around sailors—a cliché in early American films—was introduced as a theme in Japanese popular culture, possibly because the modern military system had been successfully introduced by then. Either in a Western style or with a more traditional tune, various songs depicting sailors were published in the 1930s. Users could have played such songs on their gramophone while enjoying an animation as another "talkie" experience.[65] In strip no. 25, a policeman is seen directing traffic with "go" and "stop" signs in English. The Western traffic system was introduced around 1930 in Tokyo and Osaka. A play titled *Go Stop* that featured a fight between a labor union and *yakuza* (Japanese Mafia) was enacted by a leftist theater company in 1930 in Tokyo, while in 1933 a street fight in Osaka between a policemen and a soldier who did not obey the traffic signal led to a political conflict.[66] *Go Stop* was in fact a sign of increasing tension between democracy and militarism.

Strip no. 23 shows two men running in front of the National Assembly building in Tokyo, the old man passing the young, to the viewers' surprise. The new National Assembly building was completed in 1936 after sixteen years of construction and troubles, and a city marathon competition commemorated its inauguration in November. But the strip belongs to the first twenty-six that were supposed to be already available by May 1932. How could we explain it? Newspaper articles from 1930 inform us that the new building was to be the highest one in Japan once accomplished. Since the Great Earthquake in 1923 had destroyed the famous twelve-floor tower in Asakusa, the capital had been missing a landmark. The new National Assembly Building was thus a cultural as well as a political symbol. By 1930 the exterior of the building was ready, and in November 1931 the building was lit up. On the other hand, a city marathon around the palace took place in March 1931 and attracted attention.[67] It is impossible to tell if these two events were combined in the design of the picture strip or if there already was a plan for the event to celebrate the inauguration.

A strange strip, no. 26, shows an octopus catching the attention of a woman in a bathing suit by the sea. Very likely it refers to a newspaper comic strip titled *Tako-no Hacchan (Hacchan, the Octopus),* by Suiho Tagawa. It began appearing in June 1931 on *Hochi Shimbun*'s family page and was published as a book in 1935.[68] Tagawa was a former Dada artist, best known for his comic strip *Norakuro* that was launched in the same year, depicting dogs as soldiers.[69] *Tako-no Hacchan* told humorous, educational, and often ironical stories of an octopus and his pupils who had begun living with human beings and learning about human culture and society.

Although there is not enough space here to examine all the strips, it may make sense to analyze some of them from the point of view of the user's assumed age. Some of the strips are obviously meant for young children, depicting well-known songs they would sing at elementary school (nos. 28, 31, and 33), or featuring the circus and animals. However, dance scenes, both Western or Japanese style (nos. 8, 18, 27, and 34), are not so likely to be attractive to children. Scenes from films are also for adults rather than for children.

Judging from their style, the strips are the work of several different illustrators. Could they have been illustrators for quality books and magazines for children (many were published reflecting the modernist and liberal ideology of the era), or comic artists and animators who were willing to experiment with cyclic loops in color?[70] Only when seeing the strips in rotation do we realize one of their unique features. The motion has often been designed in such a manner that one character or object passes another. This effect would not work without a sufficient number of frames. The strips create an amazing effect of depth, as if the runners were passing each other or the dancers twirling around each other in a three-dimensional space.[71] This feature corresponds to characters drawn with shading on their clothes, which has been rather unusual in the history of Japanese illustration from *ukiyo-e* woodblock prints to contemporary animation.[72] Shading could have been used to give a three-dimensional effect, or as a part of "Western and modern" iconography, or to simulate a "movie" experience.[73] Whatever the reason may have been, the effect of three-dimensional moving images could not have been fully realized if the characters had looked like two-dimensional paper cutouts. On the other hand, more realistic illustrations might have caused a certain blurriness.

To conclude, the Baby Talkie and most—if not all—of the existing strips were produced in the early 1930s, when the "talkies" were a "hot" entertainment, and the production must have ended by 1937 at the latest.[74] In terms of the images it offered it was not a direct descendant of the traditional zoetrope. Many of the strips reflect contemporary culture and media events. A connection to cinema exists on multiple levels.[75] The influence of fashionable Western culture is evident, but there are also traditional dance scenes where the figures are dressed in kimonos, possibly to entertain grandmothers (as in the picture on the box cover).

GRAMOPHONE CULTURE: BETWEEN WESTERN AND JAPANESE, LOCAL AND GLOBAL

"[With this device] the records you have got tired of will be fun again." This statement from the cover of the Baby Talkie box implicitly points out how widespread the habit of listening to gramophone records had become in Japan by the 1930s. Not only does it remind us about the accumulation of private record collections; it also refers to the changing tastes (something that is especially prevalent in today's Japanese music scene, where artificially created pop stars come and go every year) that made some of the records obsolete. Like a magic wand, the Baby Talkie would make them all seem fresh and new again.

The gramophone reached Japan at an early stage. The first phonographs and graphophones were used as attractions at places like the above-mentioned Hanayashiki amusement park, and on the streets of even minor towns. It was soon found out that Japanese oral entertainment needed to be recorded as well because that was what people wanted to listen to.[76] Besides commercially published records, private recordings by storytellers or groups of traditional musicians for their own use were made. As people now knew that any voice could be recorded, the gramophone began to appear as a discursive motif in comic, detective, and horror stories, as well as in jokes. In one such story the second wife of a rich businessman spends a rainy day listening to any kinds of records, mixing traditional songs, Western music, different types of storytelling, and mimicry by famous actors (a popular performance of the time). Suddenly she hears something frightening—the voice of a ghost! Her husband's first wife (now dead) is jealous of her and wants her to disappear! Later it is found out that the recording was secretly made by her maid, who has been having a relationship with her husband and wants to chase her away.[77]

Interestingly, two of the Baby Talkie picture strips in my collection have stamps suggesting musical compositions to be combined with them (both strips also exist as copies *without* such stamps). On strip no. 19, which depicts a baseball game, the stamp says, "Nitto Record #5220 *Odoru Wakamono* [Energetic Youth]." This is the title of a film that was shown in June 1931, and Nitto quickly produced a record after its success. The film depicts the love adventures of a handsome and energetic sportsman and his beautiful sister.[78] However, the hero is a decathlon athlete, not a baseball player.

On strip no. 15, which depicts a war scene, another record is recommended: "Nitto Record #5211 *Kogeki* [Attack]," a record that appears in a May 28, 1931, ad for Asahi.[79] It is difficult to say what exactly was the purpose of these stamps and when they were added. Were they added by a gramophone seller? Could the record company or its distributor have had something to do with the production and marketing of the device? This is an interesting question, since the patent applications for zoetrope-like devices the author has found from this era are from the Osaka region.

Nitto Records was founded in Osaka in 1920 and operated nationwide. In the first five years of its existence Nitto published two thousand records and contributed to the record industry not only its high production capability but also its monthly publication, *Nitto Times*.[80] Beside lists of records, it included essays and articles contributed by readers.[81] Reflecting the nature of the business, the style of its cover illustrations varied between traditional and modern. It was a fully owned domestic company—its entire output consisted of records made in Japan. As its quality recording facility was widely known, many major musicians visiting from abroad also recorded in its studio.[82] Nitto was most significant for its vast coverage of Japanese sound entertainment, including storytelling, and the promotion of local performers in Osaka.[83] Concerts were organized for invited customers featuring programs that consisted of mixtures of Western music and Japanese performances. The company sold its own gramophones as well, both tabletop and portable models.

Nitto Records was one of numerous companies that existed all over Japan in the 1920s and 1930s. Some of their colorful record labels give a taste of the gramophone culture of the era.[84] Nitto had a swallow; Towa Records, a pigeon; Angel Records, a Japanese girl with butterfly wings; Nipponophone, an eagle; Hikoki Records, an airplane; Tsuru Records, a crane; Taisho Records, a cock; Uguisu Records, a nightingale; Butterfly Records, a butterfly; Tombo Records, a dragonfly; National Records, a polar bear; Rabbit Records, a rabbit; Menophone, a lion; and Orient Records, a camel.[85] This variety gave a special flavor to the experience of playing the record. The swirling colors on the turntable were different from but not totally unlike the visual treats of the Baby Talkie.

One wonders why so many labels featured birds, flying insects, and running animals. To emphasize the speed with which music and sound entertainment could reach even small towns? To "transport" the listener to a concert hall or theater, where a famous musician from Europe or a legendary Japanese storyteller was performing? Be it as it may, these domestic record companies gradually lost their market share. The gramophone was turning into a medium for mass entertainment. Records were becoming less expensive and the market more competitive. Responding to the fast-growing nationalism, Tokyo-based major record companies artificially developed hit records using mass media.[86] Censorship of records started in 1934, targeting particularly publication of performances with social satire. Not much room was left for provincial or minor companies.

In a sign of the times, Nitto Records disappeared in 1942. The winners were the major companies with international backgrounds, such as Polydor, Victor, Columbia, and King, whose records had—perhaps symbolically—colorless, boring, and standardized labels.[87] Their business emphasized large-scale production and distribution, which was in line with the totalitarian ideology of the nation as a single "family" and the emperor as the father.[88] In such an atmosphere there was no room for personal or family audiovisual entertainment like the Baby Talkie, so it faded out of the cultural memory. Still, as this chapter has demonstrated, in retrospect it can function as a key to an era that has fascinating—and often forgotten—stories to tell.

NOTES

1. Timon Screech, *The Lens within the Heart* (1996; repr., Honolulu: University of Hawai'i Press, 2002).

2. It has been speculated that the street peep show was introduced from China.

3. The very detailed representation shows a typical British zograscope, which may mean that the artist used an actual imported one as a model. Zograscopes were also made in Japan.

4. Shanghai and Hong Kong had become bases for trade in the Asian region, and American whaling boats needed a port to get water and food supplies. In 1825 the Edo Shogunate attempted to repel foreign boats offshore, only to realize its own inferiority in war technology.

5. Since Francisco Xavier visited Japan in the sixteenth century, foreigners have considered curiosity to be a major feature of the Japanese. The sociologist Kazuko Tsurumi analyzes curiosity as an important element in Japanese culture in *Kokishin-to Nihonjin* [Curiosity and the Japanese] (Tokyo: Kodansha, 1972).

6. Yoshihiro Kurata, *Nihon Rekodo Bunkashi* [Cultural History of Records in Japan] (Tokyo: Tokyo Shoseki, 1979), 12. The advertisement for the lecture series, published in *Tokyo Nichinichi Shinbun* [Tokyo Daily News], shows that this was possibly the earliest record of a Western-style illustrated magic lantern lecture in Japan. (Magic lantern shows by foreigners go back to 1872.) See Yoshihiro Kurata, *Meiji-no Engei* [Shows and Amusement in the Meiji Era] (Tokyo: Kokuritsu Gekijo Chousa Yoseibu Geinou Chosabu [Research Section of the National Theater], 1980), 1:127. *Meiji-no Engei* is a compilation of newspaper articles and government announcements regarding sideshows, spectacles, and performances during the Meiji era.

7. Ewing (1855–1935) had arrived in Japan in 1878. He made the machine soon after his arrival in only fifty days, after seeing a newspaper article describing Edison's invention, and showed it to his Japanese friends in December. Ewing's phonograph was rediscovered in the storage of the National Science Museum in 1958 (Kurata, *Nihon Rekodo Bunkashi,* 14).

8. Ibid., 13–14. This is a famous episode. Fukuchi (1841–1906) was already specializing in Western culture and language in the Edo era. Besides being known as a journalist and founder of a newspaper, he wrote many kabuki plays and was active as a politician. As a talented amateur musician he

was chosen as one of the first Japanese recording artists for the British Gramophone Company when Fred Gaisberg, Emile Berliner's collaborator, visited Japan in 1903.

9. The term *Taisho Roman* is also used, reflecting elements of Romanticism in literature and popular culture. In this essay I use *Taisho Modern* because the theme is the modernity that continued up till the prewar Showa era.

10. *Haikara,* a term that derived from the high collar of the Western men's shirt, was a keyword referring to modern Western ideas and lifestyles. By 1920s *mobo* (modern boy) and *moga* (modern girl) familiarized themselves with Western music, art, and literature, chatting in bars, cafes, or "milk halls" while smoking cigarettes.

11. Since strict cultural "rules" existed for the choice of textiles according to one's sex and age and the season, these patterns were often used in children's kimonos and adults' underwear.

12. The *benshi,* the Japanese narrator of silent films, is a well-known example. The traveling film show that featured the *benshi* fell within the same framework of show business that handled traditional storytelling and musical performances. Kumio Maekawa, *Sukoburu Hijo! Kaijin Katsubenshi Komada Koyo no Jungyo Kibun* [Extraordinary Episodes by Koyo Komada] (Tokyo: Shincho-sha, 2008).

13. Toys sold by mail order through multiple distributors often did not have manufacturers' names on them. In the 1930s toy manufacturers' associations fought against distributors for a better trade relationship. Shoichi Fukaya, ed., *Nihon Kinzoku Gangu-shi* [History of Japanese Metal Toys] (Tokyo: Chuo Koron Sha, 1960), 304–13.

14. The toy history specialist Toshikatsu Tada thinks Baby Talkie must have been quite popular and considered a quality item (pers. comm., 2007). Tada's *The Toy Museum: A Short Historical Survey of Japanese Toys,* 24 vols. (Kyoto: Kyoto Shoin, 1992) is the most comprehensive visual resource on Japanese toys. Tada was a consultant to the late Masahiko Irie, who systematically collected toys, including optical toys, from the Edo era to the 1970s and even later. The Irie Collection is now in the Hyogo Prefectural Museum of History.

15. So far I have located eight of them. There are four Baby Talkies, four boxes, and altogether 110 paper strips in the Irie Collection. My own collection includes the original box, 49 strips, and some fragments. Antique dealers who specialize in optical toys have told me they have seen a few Baby Talkies over the years but not more than that.

16. The area between Akihabara and Kanda is known as "Electric Town," while Asakusa is known for its toy industry. Toy wholesalers flocked to the Kanda area. No address of the manufacturer is given.

17. The listed Mitsukoshi and Matsuya department stores were particularly known for high-end toys, often sold by catalogue orders. The Subway Store opened in Ueno on December 1, 1931, as a department store with "quality goods for less." Japan's first subway line opened in 1927 connecting Asakusa and Ueno.

18. Toy shops in Asakusa were popular among both tourists and Tokyo residents along with numerous toy kiosks on the streets of Ginza, according to a 1939 report for the toy dealers association. 70-shunen Kinenjigyo Iinkai [Committee for the Commemorative Event of the 70th Anniversary], ed., *Tokyo Gangu Ningyo Tonya Kyodo Kumiai 70-nenshi* [70 Years of Tokyo Association of Wholesale Sellers of Toys and Dolls] (Tokyo: Tokyo Gangu Ningyo Tonya Kyodo Kumiai, 1956), 403–9.

19. The word *shonen* meant "teens," while *yonen* meant "children."

20. Both have the same address and account number. Probably it is an old technique used for marketing research purposes. By using different names a seller could see which newspaper ad was more effective.

21. Koraku ads go back to 1926. The shop in front of the Kanda station was advertised as "the most professional gramophone shop," while its branch in the prestigious Research Institute of

Electrics in Ginza (Tokyo Denki Kenkyujo, founded by the city of Tokyo in 1921) focused on radio and its parts. After the war Koraku specialized in professional measurement devices. This and other evidence shows that Sutejiro Koraku had a keen interest in both new technology and cultural activities. It is an interesting question to what extent he may have been involved in the production of the Baby Talkie.

22. Moving pictures were first shown in Japan in 1896. The first Japanese films were made in 1898.

23. After 1939, magic lanterns and toy projectors for home use were made of wood and paper. There are examples in my own collection.

24. Propaganda slides for children were produced during the war. Excerpts from propaganda animation and newsreels were sometimes reproduced as paper films for home use.

25. The rise of nationalism changed the music scene. For example, the 1940 Polydor catalogue (author's collection) still includes "Blue Hawaii," sung by Bing Crosby, but the song has disappeared from the 1941 catalogue. By 1943, American and British music was officially banned, and records were confiscated from the shops. Jazz was considered the worst. Although listening to German or Italian music was legally allowed, people in the neighborhoods would not have noticed the difference. Stories about classic music fans listening to the gramophone under a blanket in a closet during wartime are commonplace.

26. Laurent Mannoni, *Le grand art de la lumière et de l'ombre: Archéologie du cinéma* (Paris: Nathan, 1994), 206–7. Mannoni mentions three patents for the zoetrope from 1867. However, "The Zoetrope" is already listed, obviously as a brand-new novelty for Christmas, in an advertisement for Milton Bradley and Co.'s games and amusements in *Colman's Rural World,* December 15, 1866, 377. The zoetrope was also called the "zootrope" or "wheel of life."

27. Manufacturers included the London Stereoscopic and Photographic Company and H. G. Clarke (United Kingdom), Milton Bradley (United States), and Delacour et Bakes (France). Zoetropes were mostly considered educational parlor amusements but were also used by scientists such as the French physiologist Étienne-Jules Marey and the German photographer Ottomar Anschütz to study "chronophotographic" sequences of photographs in motion. Anschütz also manufactured zoetropes for sale.

28. A "Condensed Catalogue and Price List," added to the booklet *The Philosophical Principles of the Zoetrope, or Wheel of Life, Fully Explained* (Springfield, MA: Milton Bradley, n.d., ca. 1860–70s), lists two different zoetropes (prices five and four dollars), six numbered sets of "zoetrope pictures" (one dollar each), and "Zoetrope Pictures, Grecian Bend, single strips" (twenty-five cents each). The price of the zoetrope was relatively cheap compared with that of the strips; perhaps the focus of the business was already on the "software" (thanks to Erkki Huhtamo).

29. The famous illustrator George Cruikshank designed a series for the London Stereoscopic and Photographic Company. Simplification was needed because the image tended to look blurry when seen through the slots of the spinning drum. See David Robinson, *Masterpieces of Animation/ Capolavori dell'Animazione, 1833–1908,* exh. cat. (special issue of *Griffithiana,* no. 43 [December 1991]) (Gemona: La cineteca del Friuli, 1991).

30. Moviefun was produced by Mastercraft Toy Company, Inc., 19 West 24 Street, New York, NY (my own collection).

31. It was manufactured by Art Metal Works, Inc., Aronson Square, Newark, NJ. Both the viewer and the box say "patent pending" (my collection).

32. The box label of my Gramophone-Cinema reads, "REID & CO. PIANO & MUSIC SALOONS, Seconderabad (Daccan)," which means the device was sold at a music instrument shop in India. All known examples bear the same label, which points to the discovery of a dead stock. Small and mainly made of paper and wood, this device must have been sold at a low price.

33. A copy with its original box is in the Erkki Huhtamo Collection.

34. A well-known case is the Rotoreliefs by Marcel Duchamp, optical illusion discs meant to be animated with a standard gramophone. See Erkki Huhtamo, "Mr. Duchamp's Playtoy, or Reflections on Marcel Duchamp's Relationship to Optical Science," in *Experiencing the Media: Assemblages and Cross-overs,* ed. Tanja Sihvonen and Pasi Väliaho, Media Studies, Series A, no. 53 (Turku: University of Turku, School of Art, Literature and Music, 2003), 54–72. Novelty devices of the early twentieth century, such as "phonograph dancers," mechanical miniature figures that were attached to the gramophone and danced in rhythm with the record, would be worth associating with the culture of the moving image as well.

35. *Jitsuyo Shinan Koho* [Patent Application Bulletin], 1932–33, Tokkyo-kyoku (Bureau of Patents), Yasuhiro Kuroda Collection, Hekinan, Aichi Prefecture.

36. From leaflet titled *Shimadzu Foundation Memorial Hall,* distributed in the mid-2000s. An anonymous column entitled "A Zoetrope (from Shimadzu Museum)," *Physics Education* 55, no. 4 (2007): 384, introduces a zoetrope produced in 1911. Shimadzu also produced stereoscopes for educational purposes, and magic lanterns as well. (A Shimadzu stereoscope is in my collection. There is a magic lantern in the Memorial Hall, which was established in 1975 in Kyoto.) High-end devices for scientific experiments were sold to universities and normal schools all over the country to educate future high school teachers.

37. *Jitsuyo Shinan Koho* [Patent Application Bulletin], 1906, Tokkyo-kyoku (Bureau of Patents), Yasuhiro Kuroda Collection, Hekinan, Aichi Prefecture.

38. Fukaya, *Nihon Kinzoku Gangu-shi,* 171.

39. The device was called *kaiten katsudo-ga* (rotating moving picture), *katsujin-ga doro* (tableau vivant lantern), or *mawari doro* (rotating lantern). Masanobu Kagawa, ed., *Shinseiki Kodomo Hakurankai* [The New Century Fair for Children), exh. cat. (Himeji: Hyogo Prefectural Museum of History, 2003), 85; Masanobu Kagawa, ed., *Irie Korekushon 2 Kogaku Gangu* [Irie Collection 2: Optical Toys], exh. cat. (Himeji: Hyogo Prefectural Museum of History, 2008), 31, 63. A Japanese paper zoetrope in the author's collection is titled *mawari katsudo* (rotating cinema). It was a giveaway paper toy for a popular magazine *Shonen Kurabu* [Boys' Club], published by Kodansha since 1914. Illustrations are simple and mostly on circus and athletic themes. The author has not been able to date it except that it is before World War II and possibly from the same era as Baby Talkie.

40. The Kuroda Collection contains a patent application from 1930 for a handheld metal zoetrope with seventeen slits under the title *katsudo e-gangu* (moving image toy). The design and the material have certain similarities with the Baby Talkie. The inventor was from Osaka.

41. Two different logo designs are known. The "normal" one is shown in the photo. One of the Baby Talkies in the Irie Collection has a logo with fine black stripes on it, which is associated with another type of known "moving image toy." This toy, which was popular among children and also exported, consists of a paper roll, with black-and-white illustrations of characters in motion painted as vertical stripes, and a transparent film, also with black-and-white stripes. Moving the paper produces an animation effect. The toy was called *katsudo manga,* the word *katsudo* (action) meaning "cinema" in the daily language of the time. A similar device called *Ombro Cinema* was produced in France in the 1920s. The variation might have been produced for a short period at a certain point.

42. From the 1920s on, the Japanese toy market flourished. Innovative products were introduced, including ones with sophisticated mechanical movements. These were sold internationally until the late 1930s. The year before the use of metal for toys was banned, 1937, is considered to have been the best year for the Japanese prewar toy production. After the ban, toymakers were allowed to produce toys with material they had in hand, but eventually production came to a halt. See *Nihon Kinzoku Gangu-shi,* 402–38.

43. Mail-order advertisements can be found from boys' magazines such as *Shonen Sekai* (Hakubukan Publishing). These were meant for high school boys and their families (many advertisements

in these magazines are directed to adults). Judging from the articles and "letters from the readers," these magazines were meant for young adults from intellectual families all over the country who wished to go on to universities. Writers included the best-known essayists of the time, and there are many articles on the latest discoveries in science and technology. Scientific toys became popular among intellectual families in the early twentieth century as more attention was given to the education of children. See 70-shunen kinenjigyo iinkai, *Tokyo Gangu Ningyo Tonya Kyodo Kumiai 70-nenshi,* 34.

44. By then Pathé Baby was heavily advertised and used in Japan for a "home cinema" experience, with many imported and domestic titles, including animation as well as the latest footage from Chinese front. It is possible that the English word *baby* was chosen because of this association to quality and portable home entertainment.

45. The box says "patent applied," which seems to mean "patent pending."

46. Working women such as teachers would have worn Western clothes.

47. There are also models that can be rotated mechanically by a cranking mechanism.

48. A standard paper strip for a full-size zoetrope is approximately 90 cm long; a strip for Baby Talkie is 78 cm. The picture part is 74.5 cm long. There are margins on both ends of each strip to make it a loop.

49. Twelve to fifteen frames per second used to be a typical refresh rate for a video conferencing in early days. At this rate movement is reproduced, but motion does not look smooth. Cinema has 24 fps.

50. The frame rate of the current NTSC TV standard is 30 fps.

51. Strip nos. 1, 3, 13, 16, 32, 35, 36, and 37 are missing, while there are doubles and triples of others. The Irie Collection contains all strips between no. 2 and no. 31.

52. The Takarazuka Revue (Takarazuka Kagekidan) was founded in 1913 by Ichizo Kobayashi, who opened the Hankyu railway line, the department store, and the vast residential area between Osaka, Kobe, and Takarazuka. Romantic stories and revues performed by girls (who are called "students") attracted a female audience. Beside its grand theater in Takarazuka, the company regularly played in Tokyo. The Takarazuka Revue represented modernity, in contrast to the traditional Kabuki played by men only. SKD was more spectacle oriented and had a flavor of eroticism.

53. Atsuhiro Fujioka, *Nihon Eiga Kogyoshi Kenkyu: 1930 nendai ni okeru gijutsu kakushin oyobi kindaika to firumu purezenteshon* [Study on the History of the Film Business in Japan: Technical Innovations, Modernization, and Film Presentation in the 1930s] (Kyoto: CineMagaziNet, 2002), www.cmn.hs.h.kyoto-u.ac.jp/CMN6/fujioka.html.

54. Ibid. Originally from *Nihon Eiga Jigyo Soran* [Japanese Film Business Almanac), (Tokyo: Kokusai Eiga Tsushinsha, 1930), 55.

55. Strip no. 34 shows Yasukibushi, a local comical dance that became known nationwide in 1920s. The song is listed on Nitto Record's ad from 1925 to 1930.

56. Information on strip nos. 3, 13, and 16 was kindly given by Masanobu Kagawa from the Hyogo Prefectural Museum of History, who edited the catalogues of the Irie Collection.

57. A copy of Nitto record no. 6277, entitled *Omocha-no Kanpeishiki* [Military Review of Toys' Parade], played by Haseyama Hinagiku Ongakudan, a major junior music group, is in my own collection. The illustrations and a text on the accompanying pamphlet show a story of a boy soldier marching with popular characters such as Norakuro and Mickey Mouse, who teases a cupid doll for not wearing a military uniform. A similar title, *Ningyo Kanpeishiki* [Military Review of Dolls' Parade], Nitto record no. 445, is sung and acted by Nitto Kagekidan [Nitto opera] (*Nitto Times,* February 1931). The idea was probably taken from Leon Jessel's "Parade of the Wooden Soldiers," which was widely known in Japan.

58. The story known as "Nikudan Sanyushi" [Three Human Bullets] or "Bakudan Sanyushi"

[Three Human Bombs] is about three soldiers who committed a heroic suicide bombing on February 22, 1932. The episode was immediately reported and was fully used by the military as a symbol of patriotism. Both the Asahi and Mainichi newspaper companies held competitions within a week to produce songs that praised the three soldiers. Before the submissions were closed they received 124,561 and 84,177 entries respectively in just eleven days (Kurata, *Nihon Rekodo Bunkashi,* 384–85). There have been doubts about the facts of the incident.

59. The term *skeleton dance* is metaphorically used as the title of an newspaper essay that Toko Kon (1898–1977) wrote in April 1930 regarding increasing censorship in publication (part of his article is in fact erased as the result of censorship). The skeleton dance was also depicted on kimono textiles (examples in my own collection).

60. Kurata, *Nihon Rekodo Bunkashi,* 378–79.

61. Since there was no professional baseball league then, players were selected from major university teams. Readers of *Yomiuri Shimbun,* the major sponsor of the event, were invited to vote for their favorite players to be on the first national baseball team. See the *Yomiuri Shimbun* online database, www.yomiuri.co.jp/rekishikan/.

62. In Japan it was finally shown in 1934 after a problematic negotiation process between Chaplin and Japanese distributors, which was constantly reported on the press.

63. From the time his visit was confirmed on March 4, 1932, to the time he arrived on May 15, seventy articles including related comics appeared in *Yomiuri Shimbun* alone, at the rate of an article per day.

64. Besides the visual aspects, the impact of cinema on the acceptance of Western music should not be forgotten. Although the gramophone was used to provide sound to films only during a short period, even a small town had its own orchestra for cinema. They played "Western" music such as jazz because traditional music was too slow for popular slapstick comedies, thus providing the first encounter with "Western music" for many Japanese. Tunes combining Japanese melodies and Western influences were composed and are considered an ancestor of *enka,* a contemporary Japanese style of popular song.

65. For example, Victor's May 1932 ad lists a song with the title that translated is "I Love Sailors." The ad also includes two songs on Chaplin titled "Chappurin" and "Harou! Chari," and a *naniwabushi* (a kind of sung narrative) on Nikudan Sanyushi.

66. The play by Yoshi Hijikata, a leading figure of the leftist theater movement, was based on a real case. It was performed by his company from August 29 in 1930 with a dramatic ending scene that took place on May Day. The Osaka incident in June 1933 developed into a political conflict involving the government and the military, revealing the increased power of the latter, and was called the "Go Stop Case."

67. It is not known if the marathon was organized every year.

68. Tagawa is an academically trained painter who was a member of the Dadaist group MAVO (1923–25) before turning into a pioneer of Japanese *manga.* The book (in the author's collection) was published in July 1935 from Kodansha, which had bought the newspaper company in 1931. Two later postwar versions can be viewed at the International Library of Children's Literature, http://kodomo4.kodomo.go.jp/web/ippangz/html/TOP.html (accessed August 3, 2010).

69. *Norakuro* has been published since 1931 in *Shonen Kurabu* [Boys' Club], a magazine published by Kodansha. In 1933, 1934, 1935, and 1938, animation films based on the comic strip were produced. A record enacting the story for children was already published in 1932 by King Records, which has been (until recently) a division of Kodansha.

70. Japanese animation films were already being produced in the 1910s.

71. One of Émile Reynaud's praxinoscope strips (no. 8, "Les chiens savants") produces a somewhat similar effect. It shows two little dogs running around a performer and jumping through a hoop.

72. Traditionally there is neither shading nor shadowing in Japanese paintings because the light source and viewpoint are not specified. The logic differs from that behind the Western notion of perspective. Perspective prints for peep shows and oil paintings brought by the Dutch toward the end of Edo era influenced painters such as Hokusai. See Screech's *Lens within the Heart* and Machiko Kusahara, "Nicht-perspektivische Darstellung als symbolische Form: Blick auf die Japanische Kultur im Spiegel Digitaler Medien," *Kunstforum* 151 (July–September 2000): 64–72, 203.

73. Typical illustrations for children's books, postcards, and ad illustrations from the same era do not have shadings. From the end of the Edo era onward, some of the woodblock print artists began applying shading only to "foreign" objects such as foreigners, elephants, and camels, while the Japanese were illustrated without shading within the same scene. Yoshiiku Ochiai, who was known for illustrations of novelties and later became a publisher of an illustrated newspaper, was one of them. There had been a strong traditional iconography in illustrating/painting objects familiar to the Japanese, but it didn't apply to things new to people. Probably for both practical and symbolical reasons different ways of painting were applied to Japanese and foreign objects. In Baby Talkie strips, faces were not shaded either because it would look too alien or because the illustrators did not know how to do it.

74. There is a 1938 patent application from Hyogo Prefecture (closer to Osaka) for a device that resembles Baby Talkie. It looks almost like a classic table lamp with a shade that has twenty-four slits on it. It has a small base that fits on the label of a record placed on a gramophone. A mirror for viewing is attached to the gramophone box with a screw, as a separate piece. Except for the screw there is no mention about the use of metal. The "lampshade" could have been made of paper. Could it be a modification of the Baby Talkie trying to minimize the use of metal? *Jitsuyo Shinan Koho* [Patent Application Bulletin], 1938, Tokkyo-kyoku (Bureau of Patents), 1938, Yasuhiro Kuroda Collection.

75. While records were published after films, films were produced after popular songs from the late 1920s onward. Kurata, *Nihon Rekodo Bunkashi,* 333–35.

76. According to Shogetsu Yamamoto, "the model [of the phonograph] similar to those later seen on streets and at fairs" was shown in Asakusa around 1892, but the audience was not excited because only Western music and songs were played. "So it was decided to record something for Japanese, such as mimicry of famous actors and Japanese music," and a "mimicry performer named Tatsu who lived in Asakusa was brought for recording [mimicry of famous Kabuki actors], but he got too nervous." An old lady was invited to sing while playing the *shamisen* (a Japanese guitarlike string instrument). Finally, the marching band of Hiromeya (an advertising agency) was brought in playing *Sanbaso* and *Echigojishi,* both traditional tunes. This finally worked very well. Shogetsu Yamamoto, M*eiji Seso Hyaku-wa* [100 Episodes from Meiji Society and Culture] (1936; repr., Tokyo; Chuko Bunko, 1983), 25–26.

77. From Suiin Emi, "Urami no Chikuonki" [The Gramophone of Grudge], *Bungei Kurabu* [Literature Club] magazine, May 1907, 256. Digitally available from Yagi Shoten, Tokyo, as a DVD.

78. *Odoru Wakamono* is a Toa Kinema film directed by Hideo Oe with the action star Hideto Hayabusa. A review harshly criticizes the impossible and unrealistic story but adds, "The film is popular." *Kinema Junpo,* June 1, 1931, no. 402. (Thanks to Ichiro Kataoka.) It is also introduced in *Yomiuri,* June 1, as a new arrival. The film has been lost and details are unknown.

79. The title is not included in earlier ads or in the *Nitto Times,* February 1931, in my collection. It was performed by the Toyama Military Band.

80. Nitto published and advertised actively in the first half of 1930s. It had forty-two ads in 1931 and forty-six ads in 1935 in the newspaper *Asahi Shimbun* alone.

81. For a detailed study of Nitto Records, see Hiroshi Watanabe, *Nihon Bunka Modan Rapusodi* [Japanese Culture Modern Rhapsody] (Tokyo: Shunjusha Publishing, 2002), 189–218. Kurata's *Nihon*

Rekodo Bunka-shi gives detailed information on the record companies and their activities from the Meiji to the Showa era.

82. Watanabe, *Nihon Bunka Modan Rapusodi.*

83. Ibid.; Kurata, *Nihon Rekodo Bunka-shi.*

84. This research on the Japanese record labels owes to the generosity of a collector of labels, who also maintains the Web site SP Rekodo Reberu Zukan [SP Record Labels Collection], http://zarigani.web.infoseek.co.jp/hp5.htm (accessed February 27, 2009).

85. A record company often had several labels. Twenty-four companies with more than one hundred labels are listed on the Web site above.

86. A typical example was "Tokyo Ondo," a newly created song to accompany traditional folk dancing. It became a big hit in Tokyo in the summer 1933.

87. Eventually Columbia and Victor were bought by Toshiba to be domesticated. Polydor remained an affiliate to the German company Gramophone. Kodansha launched its record division under the name King in 1930. It was affiliated with Telefunken and focused on militaristic records and children's songs, including a Hitler-Jugend series. King Records still exists. See Kurata, *Nihon Rekodo Bunkashi,* and the King Records catalogue (October 1939) in my own collection. Record companies changed their names into Japanese between 1942 and 1943; Polydor became Daitoa Chikuonki Records, Victor Nihon Onkyo, Columbia Nicchiku, and King Fuji Onkyo.

88. The expression "we, the Emperor's *sekishi*" was widely used in official speeches during the war. *Sekishi* literally means a newborn baby but metaphorically extends to the nation's people, who regard the emperor as a merciful parent. *Daijisen Dictionary,* Web version, 2008, last updated in 2010, http://dictionary.goo.ne.jp/jn/.

7

The Observer's Dilemma

To Touch or Not to Touch

Wanda Strauven

THE RULES OF THE (MEDIA-ARCHAEOLOGICAL) GAME

After one hundred years of existence, cinema's position in media and art history has been questioned by several scholars, leading to the assumption that it was either an "intermezzo" (Zielinski) or a "detour" (Uricchio) in the history of television, a sidetrack in the history of animation (Manovich), or simply a new form of painting (Michaud).[1] Especially from the digital perspective, Lev Manovich has made a strong point by claiming that the default mode of cinema is graphic instead of photographic, allowing us to make a bridge between Robert Rodriguez and Frank Miller's *Sin City* (2005) and Émile Reynaud's pre-cinematic "Pantomimes Lumineuses" of the early 1890s.[2] Or to quote Manovich himself: "Born from animation, cinema pushed animation to its boundary, only to become one particular case of animation in the end."[3] In this chapter, I would like to push this view a bit further and inquire whether a similar assertion cannot be made about gaming, especially when keeping in mind not only the "new wave" of mind-game cinema but also the ever-growing market of film-based computer games (such as the PSP *Godfather* game) and computer game-based films (such as the *Lara Croft* series).[4] Has cinema not just become another type of gaming in today's game culture? And, to echo Manovich's statement, was cinema after all not "born" within the context of optical toys and arcade games?

To propose a revision of cinema's history from the viewpoint of gaming (or, more generally speaking, playing), I will first problematize the notion of "pre-cinematic" as commonly used in film historical overviews.[5] My general goal is to rethink cinema's position within media history. My media-archaeological agenda as a film scholar is to point out both how film is embedded in a much larger media (historical) context (not limited to moving images but extendable to painting, arcade games, manual machinery, telecommunication, etc.) and how some elements of what is traditionally considered cinema's prehistory (such as optical toys) actually better fit in a different history that is not specific to cinema. In contrast with, or rather to complement, Erkki Huhtamo's "archaeology of arcade gaming," I will focus on optical devices designed for home entertainment—in particular the thaumatrope, the phenakistoscope, the zoetrope, and the praxinoscope—and only marginally take into consideration token-operated viewing machines, such as the kinetoscope and the mutoscope, that diverted the precinematic spectator in the public sphere of penny arcades, amusement parks, and fairgrounds.[6] The reason for this perspective is twofold. First, by making an abstraction of the public "playground," I hope to be able to concentrate my analysis on the man-machine interaction, on the role of the (manipulating/touching) hand, and on the hardware-software distinction in order to question the (embryonically) *cinematic* dimension of the optical toys. Second, I eventually want to reposition cinema as a home entertainment device, as it became with the advent of home video in the late 1970s and of home cinema (with surround-sound system) more recently. For my analysis of optical toys, I will partly rely on the essay "Circularity and Repetition at the Heart of the Attraction: Optical Toys and the Emergence of a New Cultural Series," by Nicolas Dulac and André Gaudreault.[7] Unlike Dulac and Gaudreault, I am not so much interested in the formal principles (of circularity, repetition, etc.) as in the interaction between the precinematic spectator and the optical device.

Following Jonathan Crary's *Techniques of the Observer,* I will name the precinematic spectator an *observer* to avoid the connotation of "passive onlooker at a spectacle" and to call attention to the "prescribed set of possibilities" in which the act of looking takes place.[8] According to Crary, the conditions of the observer drastically changed in the 1820s and 1830s because of new theories about human vision and the mechanics of the eye that involved a shift from a Cartesian conception of monocular and "bodiless" vision to a more embodied conception of vision. This shift is embedded in the technological difference between the camera obscura (perspectival vision) and the stereoscope (binocular vision). If photography and cinema might seem to suggest a return to the perspectival vision of the camera obscura, it is important to repeat with Crary that they emerged "within a social, cultural, and scientific milieu in which there had already been a profound rupture with the conditions of vision" presupposed by the Renaissance optical device.[9] The nineteenth-century so-called precinematic devices, which supposedly announced or prepared the birth of Lumière's Cinématographe, perfectly embody this rupture; instead of offering an objective, rational view of the world, they rely on the specific physiology of the eye, on its persistence of vision and its capacity of perceiving (or creating) nonobjective illusions. That the validity of the persistence-of-vision theory has recently been contested within film studies is irrelevant for my argument here. What should instead be emphasized is that the precinematic observer was living in an epoch prolific of (pseudo)scientific experiments with the afterimage and that he or she was likely to be familiarized with these experiments thanks to their popularization through home entertainment optical devices. Since most of these devices involved the illusion of motion, it is understandable that they were included in the prehistory of cinema (or *kinema*), but it should be recognized that some precinematic optical toys, such as the stereoscope and the thaumatrope, were not (primarily) concerned with movement.

Moreover, with the "collapse of the camera obscura model of vision," perception was no longer considered to be a passive mode of reception but an active process. As Crary argues in *Suspensions of Perception,* the brain of the nineteenth-century observer was psychophysically educated to become an instance of "*making* of perception."[10] Instead of passively absorbing images, the nineteenth-century observer actively grasped them. The verb *to grasp* should be understood here in both its figural and its literal meaning, that is, of mental (cerebral) comprehension *and* manual (corporeal) grip. In the modernist vein, (historical) studies tend to focus on the fragmentation of the human body and to ignore the human presence in the wide range of the nineteenth-century media devices, ranging from optical toys and other entertainment applications (such as the phonograph) to telecommunication technologies (such as the telegraph and the telephone). Yet as Jonathan Auerbach notes in his introduction to *Body Shots: Early Cinema's Incarnations,* "The multitude of 'graphs' naming these various technologies [clearly] modeled after the corporeal act of writing."[11] My interest here is less in the act of writing than in the act of operating or touching the apparatus. In both cases, the key (f)actor is the hand of the observer.

FROM HAND-HELD TO HANDLED OPTICAL TOYS

Unlike the imprisoned cinemagoer of institutionalized cinema, the nineteenth-century observer is not fastened in a seat and does not merely look at the spectacle of the afterimage; on the contrary, he or she controls the spectacle by interacting directly, bodily, with the apparatus. Let us first consider the thaumatrope, which is the most simple optical device. It consists of a small cardboard disk and two pieces of string attached at opposite sides of its contour. The observer can spin the disk by first twirling one piece of string and then holding and gently pulling both strings. The rotation or "turning" *(trope)* is necessary to perceive the "wonder" *(thauma)* of how two separate images, drawn on each side of the disk, melt into one image. The faster the rotation, the better the illusion. The allegedly first thaumatrope, dating from the mid-1820s, allowed the observer to create the "bird-in-the-cage" effect; other famous examples are the horse and the horseman, the bare tree and the leaves, and the vase and the bouquet of roses. The phenakistoscope (or, after Joseph Plateau, *phénakistiscope*), like the thaumatrope, requires a double-hand operation by the observer, at least in its original design of 1832, where one hand holds the stick on which the disk is mounted and the other hand puts the disk into rotation to create the "deceptive" *(phenakos)* view. Some later models provided a stand and could therefore be operated by one hand only. The hand-held phenakistoscope exists in two variants: a single-disk one and a double-disk one. In both variants one has to look through cutout slits to observe how separate images (i.e., the successive moments of an action) blur into one (i.e., the action itself, in motion). The first variant is easier to handle because there is only one disk to rotate, but it needs a mirror to compensate for the "missing" disk with the series of images. From the single disk, which is facing the mirror, the images are reflected back toward the observer (through the slits).

The thaumatrope and the phenakistoscope are comparably distinguishable from other optical toys because of the simplicity of their format (disk), their mode of operation (one person, or "user," at a time, employing both hands), and their conflation, so to speak, of hardware and software (each disk is concurrently viewing apparatus and view).[12] The zoetrope and the praxinoscope, on the contrary, require some (very basic) preparation before the actual viewing can take place; a selection must be made among the available strips with images, and the selected strip must be placed, appropriately, inside the cylindrical drum. Once the drum is ready for use, more persons can take part in the viewing process and enjoy "life" *(zoo)* or "action" *(praxis)* in motion from various positions around the drum, looking, respectively, through the cutout slits or at the prism of mirrors in the center. The zoetrope functions according to the same principle as the two-disk variant of the phenakistoscope, with the two disks replaced, as it were, by the two opposite sides of the drum, that is, the exterior side near the observer and the interior side distant from the observer. Although later models would come with a crank or handle, the most basic zoetrope is manually spun around its axis just by seizing and turning the drum with one or both hands. The praxinoscope, patented in 1877 by Émile Reynaud, gets rid of the viewing slits of the zoetrope and reintroduces the mirror of the one-disk variant of the phenakistoscope, which is now placed in the middle of the apparatus. Its dodecagonal prism of mirrors allows the reflection of each of the twelve images of the strip individually and therefore produces, during gyration, a perfect illusion of a moving picture, clear and bright, without flicker. Normally spun by hand, one of the models was provided with a hand crank.

Although Roger Caillois's classic game theory places "games of illusion" within the category of *mimicry,* without explicitly mentioning optical illusions, I would argue that the nineteenth-century optical toys rather belong to the category of *ilinx,* since they provoke a form of vertigo due to the rotation of the apparatus (which is somehow comparable to the vertigo caused to the body in the children's game of "whirling" described by Caillois).[13] The rotation of these optical devices is indeed vital. Furthermore, it is important for my argument to highlight their *manual* operation. In fact, the involvement of the observer's hand(s) allows for some *manipulation* or "interactivity" during the viewing process, since the speed of rotation can be altered, the action can be interrupted abruptly and/or reversed. In Caillois's terms, it means that this form of *ilinx* is closer to *paidia* (free, aimless play) than to *ludus* (ruled, goal-oriented game), just like the game of "whirling."

As Dulac and Gaudreault have pointed out, it is precisely because of their basic interaction that these nineteenth-century devices were true toys: "The pleasure they provided had as much to do with manipulating the toy as it did with the illusion of movement. The device obligatorily supposed that its 'user' would become part of its very functioning, not merely a viewer watching from a distance." They continue: "In this sense so called 'pre-cinema' could be seen . . . as a 'pre-computer game.'"[14] With respect to the zoetrope, however, Dulac and Gaudreault immediately attenuate this statement by suggesting—in a rather teleological way—that the separation between apparatus (hardware) and strip (software) is symptomatic of "the movement towards a 'viewer mode of attraction' as opposed to what we might describe as a 'player mode of attraction,'" since, "with the apparatus on one side and the strip of images on the other, the user of the zoetrope . . . felt the presence of the apparatus a little less during the viewing."[15] If the "player mode" of the zoetrope maybe tends to be less *during* the viewing process, the input of the user *before* the viewing is crucial, especially when it comes to combining or overlapping strips of different actions (according to prescribed or freely made-up patterns). This peculiarity of the zoetrope would have allowed for some creativity from the side of the observer, turning him or her into a "precinematic" editor.[16]

The so-called viewer mode of attraction becomes more manifest in later applications of Reynaud's praxinoscope, that is, the praxinoscope theater (1879), the projection praxinoscope (1880), and, eventually, the optical theater (1889), which is no longer a toy for home entertainment but a *dispositif* for public viewing.[17] The praxinoscope theater can be said to be, teleologically (and therefore, contestably), the first step toward the viewing position of the imprisoned cinemagoer of classical cinema. It is an ingenious wooden box with a praxinoscope placed inside. The box is provided with a double viewing aperture: one in the lid of the box and one in the inclined panel posited between the (opened) lid and the praxinoscope drum. The aperture in the inclined panel is covered with a reflecting piece of glass that serves to mirror the drawing of a fixed (interchangeable) backdrop at the opposite side, inside the lid. By looking through the aperture in the lid, the observer perceives a moving figure that is not only *surrounded* by a theater-style proscenium arch drawn on the inclined panel but also *superimposed* on the backdrop reflected from within the lid. The moving figure actually appears in the front of the stage. For this three-dimensional optical illusion (or "sense of spatial dislocation") to be effective, it is imperative that the praxinoscope figures be drawn on a black strip.[18] And, as is more important for my argument, the 3D effect can be viewed only from a privileged position, that is, from one side of the box, through the viewing aperture. This fixed position also offers an enhanced illusion of motion due to the contrast with the immobile surroundings and background. Yet the "banal" illusion of motion remains perceivable from all sides of the drum, thus admitting more spectators to join the spectacle, as in the case of the original praxinoscope. Likewise, the projection praxinoscope is accessible to multiple viewers at a time. Relying on the magic lantern principle, this model of the praxinoscope replaces the candle with an oil lamp on which two optical systems are mounted: one for the projection of the fixed background and one for the projection of the moving images (still "limited" to twelve). Both layers are projected onto a flat surface, creating a spectacle visible/viewable for a large nonactive audience. The optical theater, at last, takes another step "forward," by moving the projection machine outside the home into the public sphere and by allowing for longer strips (and thus longer narratives). Three years before the official birth of the Cinématographe, the cinematic *dispositif* is in place; on October 28, 1892, Reynaud gives the first public performance of the "Pantomimes Lumineuses."

As underlined earlier, the optical theater is no longer an optical *toy*. Because there is no longer direct contact with the apparatus, the observer cannot physically manipulate the moving image and instead finds him- or herself "embedded in a [new] system of conventions and limitations"—to rephrase Crary's definition.[19] Or as Dulac and Gaudreault put it: "In the case of optical toys, the viewer became one with the apparatus; he or she was in the apparatus, became the apparatus. In the optical theater, the image put into motion was, on the contrary, completely independent of the viewer. The viewer was cast beyond the limits of the apparatus and was kept at a distance from it, no longer having anything to manipulate." And they pursue: "If all the classical historians of the cinema see in Reynaud the decisive figure of what they call 'pre-cinema,' it is because the optical theater resolutely kept its distance from the paradigm of the 'pre-computer game.' Here the game player's gyration, repetition and participation give way to linearity, narrative development and the viewer's self-effacement."[20] If indeed with the advent of the optical theater in the early 1890s the so-called viewer mode of attraction takes over from the player mode of attraction, transforming the observer from a user of apparatuses (hardware) into a consumer of images (software), the idea of the embodied vision so central in the nineteenth-century physiological experiments should not be dismissed all at once. The persistence of vision allowing for the perception of optical illusions is not taking place outside the body, even when the observer is kept at a distance. And, as emphasized earlier, the nineteenth-century observer had become familiarized with some basic optical principles thanks to the conversion of science tools into optical toys. I believe that in the case of the optical theater this "knowledge" was not suddenly erased; on the contrary, it enriched the viewing experience and turned the player more consciously into a perception maker.[21]

If I have highlighted in my description of optical toys the importance of the hand—and I could have included other manually operated optical toys, such as the flip book, the kaleidoscope, and the choreutoscope—it is because I wanted to underline how the precinematic observer is playing, interacting with the toy, or—to put it differently—how the eye is depending on the hand. Within the context of the emerging technical media at the turn of last century (and the appearance of wireless telegraphy operators and typists), the key element of the human body is the hand, that congenital prosthesis distinguishing men from animals. Thanks to his skilful hands, man is a technical animal. And—according to the anthropologist André Leroi-Gourhan—thanks to man's vertical walking, the hand is linked to the face, that is, to the talking instance: gesture and word are fundamentally intertwined, making therefore impossible or at least futile the opposition between *Homo faber* (with his lithic tools) and *Homo sapiens* (with his verbal tools).[22] In this respect, it is interesting to note that the optical toy is sometimes called a "philosophical toy." The eye communicates with the brain—or better: the eye fools the brain, via the hand. What is at stake in the optical toy is not the objective vision of the camera obscura but the subjective, embodied vision of Crary's nineteenth-century observer. In the end, it is the brain of the observer that ought to make sense of all the illusions that the hand has put into action, into motion.

When talking about "precinema" versus "pre–computer game," it is important to keep in mind this (Bergsonian) chain of action/perception. For the understanding of "precinema," the eye-brain connection seems far more relevant than the hand-brain connection, whereas for the "pre–computer game" the opposite is true; one need only draw attention to the presence of handles, levers, cranks, pistons, plungers, and so on in arcade games, or joysticks and keyboards in video games. In his above-mentioned article on arcade gaming, Huhtamo comments on the importance of the "keyboard tradition" by starting off with a quotation of David Sudnow, who in the early 1980s compared playing the piano with mastering an Atari home video game console. Sudnow writes: "Pushing the hand to its anatomical limit, [the piano] forces the development of strength and independence of movement for fourth and fifth fingers, for no other tool or task so deeply needed. This piano invites hands to fully live up to the huge amount of brain matter with which they participate, more there for them than any other body part."[23] The nineteenth-century optical toys, of course, did not require such sophisticated finger skills, but the comparison nonetheless stands; the hand of the precinematic observer had to be active in order to make the toy function and the images reach the "brain matter."

ARCHAEOLOGY OF THE "TOUCH SCREEN"

While Reynaud's optical theater was excluding direct contact with the apparatus, its advent did not mark the end of the optical toy. On the contrary, hand-cranked viewing machines were particularly popular at the turn of the century, that is, in the early years of cinema. The coexistence of these two paradigms—the player mode of the optical toy versus the viewer mode of the optical theater—can best be illustrated by the competition between the two major viewing machines of the 1890s, the kinetoscope and the mutoscope. As Huhtamo has pointed out, the mutoscope had the advantage over the kinetoscope of not being motor driven, since this allowed the user to "freely adjust the cranking speed, and interrupt the session at any point to observe a particularly interesting frame (perhaps a half-naked lady)."[24] Huhtamo also recalls that some of the first "real" cinemas, or nickelodeons, opened in the backrooms of existing penny arcades, thereby compelling the cinemagoer to walk through many "proto-interactive" mutoscopes in preparation for the (not so interactive) cinematic spectacle. Such a combination of arcade and cinema confirms the coexistence of two paradigms or, as Huhtamo puts it, the tension between "two modes of consuming moving images—the hand-cranked peepshows and the screen projection."[25]

The coexistence of these two paradigms in the 1890s might help to better characterize the double nature of early cinema: the cinema of attractions as theorized by Tom Gunning in the mid-1980s, and the cinema of contemplation and discernment "in which spectators engage in intellectually active processes of comparison and judgment," as recently proposed by Charles Musser.[26] The latter clearly favors the viewer mode of the optical theater (or the magic lantern show, or the tableau vivant, or visual arts in general), whereas the first can be said to be more inclined to the player mode. These two types of early cinema should be considered as two sides of the same coin, both requiring active participation from the nineteenth-century observer, in terms of perception making and meaning making, and both oscillating between *paidia* and *ludus* on Caillois's scale of gaming. The cinema of discernment might have been more "rule based" than the cinema of attractions, but it also allowed for improvisation and (unintended, unwritten) association. Early film spectators were challenged to make their own narratives either within one and the same program or beyond, that is, within their memory of previously viewed programs at the movie theater, or previously contemplated paintings in the museum, or "living pictures" on stage, or cartoons in illustrated magazines. While further research should be done in terms of reception, one might assume that the cinema of discernment involved some cerebral, yet playful *agôn* (competition) among the spectators ("Who discovers the intertext first?"); the cinema of attractions, on the contrary, rather belongs to the category of *ilinx,* given its visceral dimension, which is comparable to the roller-coaster experience.[27]

These two paradigms of early cinema still exist in today's film culture, which is fluctuating between intellectually challenging mind-game movies and breathtaking or "mind-blowing" special-effect spectacles, sometimes with both tendencies being masterfully combined in one and the same film (e.g., *The Matrix*). However, it should be recognized that the viewing context or *dispositif* of cinema drastically changed over the course of the twentieth century. For the understanding of the cinema of attractions it cannot be stressed enough that moving pictures for public consumption first appeared among slot machines and fairground attractions, in a context where bodily interaction with the apparatus was common. Viewing machines were supposed to be touched, manually operated by the viewers. If it is not astonishing that the cinema of attractions directly—or "exhibitionistically," according to Gunning—addressed fairgoers and arcade gamers, then it should not surprise us either that the first consumers of moving pictures sought a "close encounter" with the new viewing machine or even with the pictures produced by it.[28] Why, in the end, should moving pictures not be touched?

In this respect, it is significant that cinema reinvented, in its early days, the "rube" genre. As Miriam Hansen has pointed out in her study on early American spectatorship, the "country rube was a stock character in vaudeville, comic strips, and other popular media, and early films seized upon the encounter of supposedly unsophisticated minds with city life, modern technology, and commercial entertainment as a comic theme and as a way of flaunting the marvels of that new urban world (compare *Rube and Mandy at Coney Island* [Porter/Edison, 1903])."[29] Some rube films were taking place at the movie theater, proposing thus an early form of self-reflexivity and, as I will argue, an interesting case for the history of the "touch screen." A well-known example of this specific, metafilmic type of rube film is Edwin Porter's *Uncle Josh at the Moving Picture Show* (1902).[30] Here we see Uncle Josh watching, rather naively, two existing Edison films and one new attraction purposely shot for the occasion. The first film, *Parisian Dance* (1897), portrays a cancan-dancing lady who raises her skirt higher and higher, to the excitation of Uncle Josh. Soon he jumps on stage and starts flirting with her, but then arrives the rushing *Black Diamond Express* (also 1897), from which the terrified Uncle Josh runs away. He jumps back on stage with the start of the last film, *The Country Couple* (1902). This is a peaceful countryside scene with a courting couple at the well. When Uncle Josh thinks he recognizes his own daughter, he decides to punish the man who is flirting with her. But instead of grabbing the lover, Uncle Josh hauls down the screen and falls into the arms of the projectionist (behind the screen).

Even though it is tempting to read these early rube films in didactic terms, following Hansen among others, and to insist on their role as a counterexample of the "look, don't touch" rule, it seems more likely that *Uncle Josh at the Moving Picture Show* was merely meant as a farce, a comedy to amuse the early, yet by then no longer so inexperienced, cinemagoer.[31] But since these films are explicitly "promoting a form of spectatorship where the spectator watches, reacts to, and *interacts with* a moving picture," they could also be revealing some nostalgia for the more interactive days of so-called precinema.[32] *Uncle Josh at the Moving Picture Show* is restaging not only the direct, bodily contact with the viewing machine but also the possibility to control or manipulate the viewed image. Uncle Josh is able to end the courting scene, since by touching and pulling the screen he makes the (rear-projected) image disappear altogether. Such interruption could not occur in today's movie theaters—as is verified by Jean-Luc Godard's homage to the rube film in *Les Carabiniers* (*The Riflemen,* 1963)—since the image is projected from the projection booth in the back of the theater.[33] Indeed, the institutionalization of the cinema gradually got rid of all the features that determined the (potentially) interactive *dispositif* of early cinema, such as hand-cranked projectors, lecturers, live music, nonstop walk-in (and walk-out) screenings, and talking and smoking spectators. *Uncle Josh at the Moving Picture Show* may well be a turning point in this institutionalization process that inevitably suppressed the more active conditions of the nineteenth-century observer and turned the viewer mode into the dominant mode of moviegoing. Porter's rube film confronts the 1902 audience, in this sense, with a form of spectatorship in extinction.

Over the twentieth century, the player mode of cinema seems to occasionally reemerge or reactivate itself by giving an "active" role to the audience, as happens in sing-along versions of movies such as *The Sound of Music* (1965) or *The Rocky Horror Picture Show* (1975), in synesthetic experiments such as the Smell-O-Vision, in obscure avant-garde practices such as the mimicry screening demonstrated in Man Ray's episode "Ruth, Roses and Revolvers" in *Dreams That Money Can Buy* (1946), or in performances of narrative engines, such as Radusz Cincera's legendary "Kino-Automat" (1967), which allowed the audience to decide on the dénouement of the plot at various moments of the film shown. All these and other attempts of "interactive" cinema, which are considered dead ends or marginal experiments within the history of institutionalized cinema, are not of particular interest for my argument either, since they do not aim at a direct contact with the apparatus. I am more interested here in moments reminiscent of the corporal involvement in the viewing process of the optical toys. While tactile applications in the (large) field of expanded cinema are easily found and documented—the most apt example for an archaeology of the "touch screen" is undoubtedly Valie Export's *Tapp und Tast Kino* (*Tap and Touch Cinema,* 1968)—I am rather thinking of moments where the traditional or institutionalized film screen makes the spectator conscious of its own materiality and, therefore, tactility.[34] Some examples that come to mind are the final scene of *Entr'acte* (Rene Clair, 1924), where a man in slow motion jumps through the film screen and tears the word FIN; the scene at the movie theater in *Sherlock Jr.* (1924), where projectionist Buster Keaton attempts to enter the film-within-the-film and finds himself literally, that is, physically, rejected by the screen when a door is shut in his face; and Godard's above-mentioned rube scene in *Les Carabiniers* (1963) where one of the riflemen, Michel-Ange, climbs on stage to join the naked bathing lady of the film-within-the-film and hauls down the screen in his tender effort of touching. This motif of the screen's materiality indirectly invites the (external) disciplined spectator to "break" the rules of the institutionalized mode of viewing by reverting to the player mode and engaging in physical contact with the apparatus.

Other examples of explicit screen touching could be cited here, such as Tom Cruise's data-glove interaction with the huge transparent screen in *Minority Report* (Steven Spielberg, 2002) or James Woods's embracing of the TV screen in *Videodrome* (David Cronenberg, 1983). However, these and similar applications of the "touch screen" do not belong to the strict cinematic (or filmic) realm; both the computer screen and the TV screen seem indeed more tactile or touchable, thanks to our daily interaction with them. Film screens, on the other hand, are far more distant and therefore more "auratic" and immaterial. Despite the above examples of touchable diegetic film screens, it is only in avant-garde practices that (nondiegetic) film screens are actually touched. One could also object that the (nondiegetic) film screen has never been touchable in the restricted realm of (nonexpanded) cinema and that bodily interaction with the apparatus was possible only in the precinematic *dispositif* of domestic optical toys and public hand-cranked peepshows. And, one should add, these precinematic *dispositifs* were screenless *dispositifs*. The cinematic *dispositif* (re-)introduced the screen.[35] More rigorously than its predecessors, the film screen is a screen that protects the apparatus from the touching hand, creates a safe distance between the view and the viewer, and thus acts as "shield" (according to its uncertain etymology, presumably deriving from the Old High German *skirm, skerm*). N.B.: In metaphorical (or diegetic) terms, the cinematic screen is rather the opposite of a shield, since it bridges the (imaginary) distance between the spectator's world and the film world. This spatial annulment, however, does not concern a physical (tangible) distance and has no influence on the hand's reach.

TO TOUCH OR NOT TO TOUCH . . .

The more active conditions of the nineteenth-century observer might have been "repressed" by the institutionalization process of cinema, yet the conditions of *embodied* perception did not drastically change. Although not always rightly acknowledged by film theory, the twentieth- (and early twenty-first-) century cinemagoer's vision is (still) embodied. Besides, it is important to bear in mind that the tactility of images or screens is (still) a matter of embodied perception too, with the eye as link between the hand and the brain. This connection between the sense of touch and the activity of the brain was already thought of in the years of cinema's emergence by scientists and authors such as the French astronomer Camille Flammarion. In *La fin du monde* (*The End of the World,* 1894), Flammarion describes a futurological system of tele-multi-sensory communication as follows: "Immediately, telephonoscopy reported everywhere the most important or the most interesting events. A theater play performed in Chicago or in Paris could be heard and seen in all the cities of the world. . . . But not only could one hear or see at distance: the brainpower of man had even managed to transmit by cerebral influences the sensation of touch as well as that of the olfactory nerve."[36] Based on Albert Robida's *téléphonoscope,* Flammarion's invention of touchable (and smellable) perceptions depends entirely on "cerebral influences," that is, its working relies on the working of the brain. At the beginning of the twenty-first century, Flammarion's *dispositif* might still be science fiction in technological terms, but in terms of perception it is nothing special at all; because of the (non-Cartesian) communication between body and brain, (institutionalized) cinema can indeed transmit the sensation of touch (think of Vivian Sobchack's synesthetic reading of *The Piano,* "What My Fingers Knew"), as well as that of smell (see Sobchack's "The Dream (Ol)Factory"), which reinforces the thesis that there is still (or again) a profound rupture with the objective, "bodiless" paradigm of the camera obscura.[37]

What can be concluded from this all in relation to the gaming dimension of (institutionalized) cinema? In line with Caillois's game theory, the physical dimension of the touch screen cinema (at least in its rube version) calls for comparison with sports like boxing and fencing, whereas the cinema of discernment is much closer to chess. In Caillois's division of games, both boxing and chess are cited as examples of *agôn,* both tending toward *ludus*. Vis-à-vis early cinema, institutionalized cinema can be said to be more ruled mainly because of its more disciplining *dispositif;* in terms of competition, the game has therefore become more individualized, at least during the screening. According to Joseph Anderson, who clearly positions cinema in Caillois's category of mimicry, "The invitation 'Let's pretend,' the *personal* invitation to the *individual* viewer to voluntarily enter into the diegetic world and actively participate in the pretend play," coincides with the opening of any film.[38] The individual viewer is a (powerless) noncompetitive player.

Today cinema can be truly competitive only outside the movie theater (think of spoilers, discussion boards on the Internet, interactive DVDs, and, of course, computer games). During the (uninterrupted) screening at the movie theater, the cinematic game, corporal and/or cerebral, is purely imaginary and "played" individually, each film spectator on his or her own. A good example to illustrate this point is the film quiz in *The Dreamers* (Bernardo Bertolucci, 2004), played by its three main characters. Matthew, Isabelle, and Theo tease, provoke, and challenge each other by reenacting famous film scenes to be recognized and named. At the movie theater, any cinephile spectator is undoubtedly incited by such a (cinephile) game, which, however, cannot be joined physically but can only be watched at a safe distance and played silently, on one's own. At home, on the contrary, in the new setting of the surround home cinema, the quiz can be played with other players, that is, one's friends or family members. One can pause the film for reflection time, touch the screen to point out a certain detail, repeat a scene (oneself or by means of the replay button), and, eventually, also really imitate (instead of pretending to play) the main characters and reenact one's own favorite film scenes.

Home cinema brings the cinema back to its "cradle," that is, to the place of the so-called precinematic optical toys and other home entertainment viewing apparatuses, such as the magic lantern. At the same time, it also puts the cinema ahead and asks us to reflect on its function in the context of today's (and tomorrow's) "mediatization" of home entertainment. At the beginning of the twenty-first century, the cinema-at-home is indeed surrounded by a whole range of *post-cinematic* optical toys, some of which are particularly interesting for my argument because of their tactile interfaces (think of touch-screen–based cameras, cell phones, or PSPs, or—even better—Nintendo's Wii). This lineage somehow annihilates the importance of the "making of perception," so crucial to the nineteenth-century observer, but reinforces the potential game dimension of the cinema as domestic device. Furthermore, in the new setting of home cinema or home theater, the apparatus of the "cinematic" *dispositif* is literally domesticated: the pull-down projection screen, the film formatted on DVD or any other carrier, the DVD player or computer attached to a beamer, the all-round sound system, the projected image itself, all the components are nearby, within hand's reach, and therefore touchable. Unlike at the movie theater, the observer is not punished or (mis)taken for a country rube when touching the screen. Here we can all become Uncle Josh, Sherlock Jr., or Michel-Ange. To touch or not to touch: that is *not* the question.

NOTES

1. See Siegfried Zielinski, *Audiovisions: Cinema and Television as Entr'actes in History,* trans. Gloria Custance (Amsterdam: Amsterdam University Press, 1999); William Uricchio, "Cinema als Omweg: Een nieuwe kijk op de geschiedenis van het bewegende beeld," *Skrien* 199 (1994): 54–57;

Lev Manovich, "What Is Digital Cinema?" 1995, www.manovich.net/TEXT/digital-cinema.html; Philippe-Alain Michaud, *Le mouvement des images* (Paris: Centre Pompidou, 2006).

2. See Wanda Strauven, "Pre-Digital vs. Post-Analog," paper presented at "The Ages of the Cinema: Criteria and Models for the Construction of Historical Periods," Fourteenth International Film Studies Conference, Udine, Italy, March 20–22, 2007.

3. Manovich, "What Is Digital Cinema?" emphasis in the original.

4. On mind-game cinema, see Thomas Elsaesser, "The Mind-Game Film," in *Puzzle Films: Complex Storytelling in Contemporary Cinema,* ed. Warren Buckland (Oxford: Blackwell, 2009), 13–41. On the relationships between cinema and computer games, see, for instance, *ScreenPlay: Cinema/Videogames/Interfaces,* ed. Geoff King and Tanya Krzywinska (London: Wallflower, 2002).

5. It is not my intention to propose a new game theory or to systematically apply existing game theories. But I will allude to Roger Caillois's classic text *Les jeux et les hommes* [Man, Play, and Games] (1958), which is a common reference in recent theories on (digital) gaming and which is particularly useful because of its construction of a scale between *ludus* (the rule-based, goal-oriented game) and *paidia* (free, aimless play). Furthermore, Caillois proposed a categorization of four types of games: *agôn* (competition), *alea* (chance), *mimicry* (simulation), and *ilinx* (vertigo). By applying Caillois's theory, I will intentionally avoid placing cinema in the category of *mimicry,* even if that is where the spectacles of theater (and by extension cinema) belong. The reason for such strategy is that I am not interested here in the actor-spectator relation.

6. Erkki Huhtamo, "Slots of Fun, Slots of Trouble: An Archaeology of Arcade Gaming," in *Handbook of Computer Game Studies,* ed. Joost Raessens and Jeffrey Goldstein (Cambridge, MA: MIT Press, 2005), 3–21.

7. Nicolas Dulac and André Gaudreault, "Circularity and Repetition at the Heart of the Attraction: Optical Toys and the Emergence of a New Cultural Series," in *The Cinema of Attractions Reloaded,* ed. Wanda Strauven (Amsterdam: Amsterdam University Press, 2006), 227–44. This text was previously published online as "Heads or Tails: The Emergence of a New Cultural Series, from the Phenakisticope to the Cinematograph," *Invisible Culture* 8 (Fall 2004), www.rochester.edu/in_visible_culture/Issue_8/dulac_gaudreault.html. Under my editorial eye, it underwent substantial changes, especially in terms of "pre–computer game" history, the section from which I mostly quote.

8. Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: MIT Press, 1990), 5–6.

9. Jonathan Crary, "Modernizing Vision," in *Vision and Visuality,* ed. Hal Foster (Seattle, WA: Bay Press, 1988), 30.

10. Jonathan Crary, *Suspensions of Perception: Attention, Spectacle, and Modern Culture* (Cambridge, MA: MIT Press, 1999), 155.

11. Jonathan Auerbach, *Body Shots: Early Cinema's Incarnations* (Berkeley: University of California Press, 2007), 9.

12. On the hardware-software relation, see also Crary, *Suspensions of Perception,* 260.

13. Roger Caillois, *Les jeux et les hommes* (Paris: Gallimard, 1967), 69. See also Caillois's general description of *ilinx* games as "attempt[s] to momentarily destroy the stability of perception" (67). For Caillois's categorization of games, see note 5 above.

14. Dulac and Gaudreault, "Circularity and Repetition," 233.

15. Ibid.

16. Ibid., 236.

17. I will use the French term *dispositif* to refer to the specific viewing situation of an apparatus. Here I am following Frank Kessler, who has pointed out the problematic translation of *dispositif* into English, especially within the context of the so-called apparatus theory. See Frank Kessler, "La cinématographie comme *dispositif* (du) spectaculaire," *Cinémas* 14, no. 1 (2003): 21–34, and "The

Cinema of Attractions as *Dispositif,*" in Strauven, *Cinema of Attractions Reloaded,* 57–69. On Émile Reynaud's various devices, see also Crary, *Suspensions of Perception,* 259–67.

18. Quote from Crary, *Suspensions of Perception,* 263.

19. Crary, *Techniques of the Observer,* 6.

20. Dulac and Gaudreault, "Circularity and Repetition," 239.

21. See also Crary, who recalls that Reynaud's optical theater remained popular even after the advent of the Cinématographe: "Contemporary audiences, most of whom would also have been familiar with Lumière's films, did not regard Reynaud's handmade cartoonlike shorts as an inadequate or incomplete form of cinema but as attractions in their own right with their own particular pleasures" (*Suspensions of Perception,* 266).

22. André Leroi-Gourhan, *Le geste et la parole,* vol. 1, *Technique et langage* (Paris: Albin Michel, 1964). See also Nathalie Roelens and Wanda Strauven, "Introduction: Du prothétique à l'orthopédique," in *Homo orthopedicus: Le corps et ses prothèses à l'époque (post)moderniste* (Paris: L'Harmattan, 2001), 8.

23. David Sudnow, quoted in Huhtamo, "Slots of Fun," 3.

24. Huhtamo, "Slots of Fun," 9.

25. Ibid., 13. As Huhtamo points out, the "preshow" tradition goes back to Robertson's phantasmagoria spectacles of the 1790s and survives today in the attraction of the rides in theme parks. See also Lauren Rabinovitz, "From *Hale's Tours* to *Stars Tours:* Virtual Voyages and the Delirium of the Hyper-Real," *Iris* 25 (Spring 1998): 133–52.

26. Tom Gunning, "The Cinema of Attraction: Early Film, Its Spectator and the Avant-Garde," *Wide Angle* 8 (Fall 1986): 63–70; Charles Musser, "A Cinema of Contemplation, A Cinema of Discernment: Spectatorship, Intertextuality and Attractions in the 1890s," in Strauven, *Cinema of Attractions Reloaded,* 160.

27. In Caillois's division of games, fairground attractions are placed in the category of *ilinx,* slightly inclining toward the *ludus* side (Caillois, *Les jeux,* 91).

28. On the "exhibitionist quality" of early cinema, see Gunning, "Cinema of Attraction."

29. Miriam Hansen, *Babel and Babylon: Spectatorship in American Silent Film* (Cambridge, MA: Harvard University Press, 1991), 25.

30. Produced by the Edison Company, this film was a remake of Robert W. Paul's *The Countryman and the Cinematograph* (1901), of which only a fragment survives.

31. For a reading of the rube films in didactic terms, see, for instance, Isabelle Morissette, "Reflexivity in Spectatorship: The Didactic Nature of Early Silent Films," *Offscreen,* July 2002, www.horschamp.qc.ca/new_offscreen/reflexivity.html.

32. Thomas Elsaesser, "Discipline through Diegesis: The Rube Film between 'Attractions' and 'Narrative Integration,'" in Strauven, *Cinema of Attractions Reloaded,* 213, emphasis added.

33. On Godard's complex homage to the rube film, see Wanda Strauven, "Re-Disciplining the Audience: Godard's Rube-Carabinier," in *Cinephilia: Movies, Love and Memory,* ed. Malte Hagener and Marijke de Valck (Amsterdam: Amsterdam University Press, 2005), 125–33.

34. On Valie Export's *Tapp und Tast Kino* in relation to the rube film, see Wanda Strauven, "Touch, Don't Look," in *I cinque sensi del cinema / The Five Senses of Cinema,* ed. Alice Autelitano, Veronica Innocenti, and Valentina Re (Udine: Forum, 2005), 283–91. On tactile art in more general terms, see, for instance, Peter Weibel, "It Is Forbidden Not to Touch: Some Remarks on the (Forgotten Parts of the) History of Interactivity and Virtuality," and Erkki Huhtamo, "Twin-Touch-Test-Redux: Media Archaeological Approach to Art, Interactivity, and Tactility," in *MediaArtHistories,* ed. Oliver Grau (Cambridge, MA: MIT Press, 2007), 21–42 and 71–102, respectively.

35. The screen as projecting surface is, of course, not a new invention; it already existed in the

dispositifs of the *ombres chinoises,* the magic lantern show, the phantasmagoria, the projection praxinoscope, etc.

36. Claude Flammarion, *La fin du monde* (Paris: Flammarion, 1894), 251.

37. Vivian Sobchack, "What My Fingers Knew," *Senses of Cinema* 5 (April 2000), www.sensesofcinema.com/contents/00/5/fingers.html, and Vivian "The Dream (Ol)Factory," paper presented at the conference "The Realm of the Senses: Synaesthetic Aspects of Perception," Berlin, April 12–14, 2007.

38. Joseph D. Anderson, *Reality of Illusion: An Ecological Approach to Cognitive Film Theory* (Carbondale: Southern Illinois University Press, 1996), 122, emphasis added.

8

The Game Player's Duty

The User as the Gestalt of the Ports

Claus Pias

On-screen characters, for instance, become submarines, the ball becomes a torpedo; or the characters on the screen might look like skiers. So remember, play the game according to the directives.

—A GERMAN USER'S MANUAL FOR THE GAME CONSOLE *ODYSSEY*, 1973

In 1793 an unpaid, thirty-four-year-old professor, writing a thank-you letter to his financial supporter, established a new meaning for the word *play,* a meaning that would profoundly influence game theory for the next two hundred years.[1] In a development of his thought influenced by the turmoils of French Revolution, Friedrich Schiller stated that the concept of "playing" could describe the most complex as well as the most basic conditions, such as the "aesthetic state," which he described as "a state of the highest reality so far as the absence of all limits is concerned," and a state in which we would be able to experience a restored "unity of human nature."[2] This broadly defined concept could address questions of both political and anthropological theory. What intervenes and mediates between "life" and "form," "power" and "law," the "real" and the "problematic," the "state of nature" and the "state of reason," is something that Schiller calls "culture," or "the person," or "play." The definitions of these terms overlap since all three act to reconcile opposite tendencies and (depending upon the imagery one uses) mediate "interactions," allow "judgments," or even "balance the scales." "Culture," "the person," and "play" are—to quote Schiller—the arenas where the "material impulse" and the "formal impulse" interact reciprocally, in such a way that "the operation of the one at the same time confirms and limits the operation of the other, and each one severally reaches its highest manifestation precisely through the activity of the other."[3] Thus a kind of general mechanism of communication and control appears as a "game" in which one reaches decisions not only according to aesthetics but also according to the criterion of efficiency, and it describes the functions of art as well as, for example, the functions of "police" *(Policey).*[4]

The fact that the term *play (Spiel)* can be used here is—despite its Kantian grounding—still so astonishing that Schiller feels the need for some words of justification. Does it not vulgarize the aesthetic, he asks, to equate it with "the frivolous matters which have always been called by this name"?[5] No, is the answer. One must not think "merely of the games being played in *real life* and which are customarily directed only towards very *material objects*."[6] This is not about contemporary "frivolities" like faro or whist, or about tactical exercises like chess or *Kriegsspiele*—indeed not about "games" *(Spiele)* as such but rather about "play" *(Spiel),* about a playful attitude. Since then, it seems to me, most anthropological game theory has developed on the merits of excluding the materiality of games. Play, whether a natural teaching tool (J. J. Rousseau, etc.), an activity mediating between the inner world and the outer reality (D. W. Winnicott), an act of self-distancing (R. Schechner), a transcending of order and chaos (B. Sutton-Smith), a force that creates community (C. Geertz), a valve for excess energy (K. Groos), a socializing function (G. H. Mead), or a culture-building expression of the life force (J. Huizinga), is presented as a timeless concept, mostly independent of the history of particular games.

From such attempts to create consistent and general game theories one can arrive at methodological as well as historical and systematic questions. The questions are about the things themselves—about what one could call game design or the materiality of games. Anthropological theory since Schiller's time ascribes play to "humankind," and in such a generalized manner that any localized game playing is seen merely as a special case, thus neglecting the importance of all concrete games. Therefore it seems worthwhile to direct one's attention equally to all unusual things, tools, devices, quasi-objects, symbols, bodies, or institutions that are crafted, calculated, constructed, installed, and assembled into "gaming machines." I am using the term *machine* in a Deleuzian sense that refers to "the way in which arbitrary elements are made to be machines *through recursion and communication*."[7] A consideration of the ways and principles of establishing such machines in different domains, such as synchronization of hardware peripherals, human-computer interaction (HCI) design, and tennis games, seems far more promising for understanding what computer games are today than simply relying on "humanity" as the key to everything, the way Schiller and his followers did.

Thus I offer below several historical accounts of the development of gaming machines that, although in different domains of knowledge, are comparable on an archaeological level of discourse. Network protocols, computer games, military commands, tennis coaching, and philosophical statements are neighbors in "that foreign land [of discourse analysis] where a literary form, a scientific proposition, a common phrase, a schizophrenic piece of nonsense and so on are also statements, but lack a common denominator and cannot be reduced or made equivalent in any discursive way."[8] These accounts are developed and composed around the motif of question and answer and around the topic of timeliness and responsibility in communication. The metaphorical (but historical) concepts I am using to describe this similarity are a command called Ping and a game called *Pong.*

Computer games, however, modify Schiller's paradigm, in which "the human being" stood in the center and by playing—according to the dictates of his supposedly essential nature—combined and solved various contradictions in his gestalt. Specifically, something like an interface moves into this center and mediates the contradiction between machine and human, hardware and wetware, thereby both creating and formatting that which the human being as user actually is. At the interface, not only do players take control over a game, but a game also takes control over its players. Therefore I shall emphasize three points: first, computer games can manage entirely without humans; second, the humans or users playing such games are viewed from their least human aspect; and third, the human-machine construct is a mutual test that implements a totally ordinary sense of duty and being on-the-spot, which is normative and "technical" in a Kantian sense.

PING

On our computer center's "modem access to uni-network" Web page, the following memorable passage can be found:

> Simplest test of functionality
>
> In a DOS window, start the TCP/IP-Client Ping with *ping fossi or ping 141.54.1.1*
>
> Ping tests if there is a connection to a target computer. To this end the program sends test packets to the target computer and waits for an answer. Response time is displayed in milliseconds (ms). If the test is successful you see four lines like this
>
>> Reply from 141.54.1.1: bytes=32 time=152ms TTL=253
>
> Now you can use other TCP/IP-Clients.

Ping is a very simple program: it sends a single data packet to a particular IP address and waits for it to come back. *Ping* can thus test the basal function of any network and can provide some answers. The first and simplest answer is that there *is* an answer at all—that there *is* a channel. Second, *Ping* assigns a unique number to each packet and can therefore tell from the returning packets if any have been lost or duplicated or have not been delivered. Third, *Ping* provides every packet with a checksum to detect any damage. Fourth, *Ping* also provides each packet with the time of dispatch (timestamp) from which the duration of the trip can be calculated (round trip time or RTT). *Ping,* however, cannot give any information about why or where communication might fail. It can only say *that it does. Ping* reports only that something has responded too slowly, not at all, or unreliably. In short, it notes lack of response or "irresponsibility" without paying attention to the cause.

Just as all bureaucratic procedures have to become independent of individuality in order to process individuals, the problem of timeliness has to be made independent of personal reasons. The most prominent example in literature might be Heinrich von Kleist's drama *Prinz Friedrich von Homburg* (1809–11). It clearly shows the origins of the concept of punctuality in military command structures. Homburg, a dreamer who is unhappily in love with the prince-elector's niece, has a vision that he is chosen by fortune to achieve great things. Carried by that feeling of elation, he intervenes with his cavalry in a battle *before* the necessary command reaches him. Although his untimely attack causes a glorious victory and he is hailed as the "conqueror of Fehrbellin," the prince-elector court-martials him and sentences him to death. Homburg simply has done the right thing at the wrong time. And by the laws of a pre-Napoleonic battlefield, being unpunctual is a serious case of subordination. As the prince-elector makes clear to Homburg, the "field of battle" is regularly scanned with ordered maneuver sequences. Being incapable of following the "control message protocol" of the plan of action (which is broken down into orders, messages, and signals) is an offense that deserves strict punishment. Both prince-elector and packet transports on networks do not need a genius like Clausewitz whose actions set the standard for later generations; what they need is timely reliability.

But to get back to *Ping:* according to "The Ping Page," *Ping* is an acronym for "packet Internet groper," where *grope* means "feel for," as one feels for a light switch in the dark.[9] So *Ping* sends a signal out into the dark of the network, waits for its return, and analyzes distortions and the echo delay time. This leads directly to another story of the origin of the *Ping* command, as told by the *Ping* programmer Michael John Muuss, shortly before he died quite young.[10] In the early 1980s Muuss, whose last job was with the Army Research Laboratory, was working on echo-sounding methods and modeling problems of sonar and radar systems. He applied this paradigm to a different problem by using the echo-request and echo-reply functions defined in the Internet Control Message Protocol (ICMP)—in his own words, to determine "the 'distance' of the target machine." Thus *Ping* is not an acronym or a noun but rather a verb that describes an action. To radar technicians *RTT* simply means the travel time of the signal, and in U.S. naval jargon *to ping* means to send a sonar impulse. Appropriately enough, network technicians also say, "Ping a server to see if it's up." If it sounds back, there is a target.

The problem of locating one's enemy might be illustrated by a story that Steve

Hayman sent to a Usenet group in 1991. Hayman was confronted with the problem of finding a damaged cable in a TCP/IP network. Tired of wiggling each cable and then returning to his computer to send a Ping, he wrote a small routine that repeatedly kept sending Pings. Because his NeXT computer was equipped with good sound capabilities, he had every echo acknowledged by an acoustic sampled "Ping." With the loud "Ping, Ping, Ping" of data packets moving to and fro in the background, Hayman was able to walk through the building and wiggle each and every cable. He then found the bad one when the sound stopped. Through the "interactive" mobilization of the observer, *Ping* became a digital, monophonic locating procedure based on the difference between sound and silence or presence and absence.

INTERRUPTION (WHIRLWIND)

In 1944 Jay Forrester took over the Airplane Stability and Control Analyzer (ASCA) project from Louis de Florez, who later became the first director of technical research at the CIA. Forrester renamed the project Whirlwind.[11] What had begun as an analogue flight simulator became a digital flight simulator project in 1945 and was reconfigured in 1948 as a real-time early warning system. Finally, in 1950 a cathode ray tube was able to make the incoming radar waves from Cape Cod visible on a screen. This vector display could show lines as well as points and thus could depict text (like Cartesian coordinates) in a kind of cartographic state (i.e., writing letters as graphs). It is worth noting, however, that with the switchover from analogue to digital real time and the temporalizing of complexity, the problem of interaction and thus the question of presence or absence also came up. And this was true for friendlies and enemies detected by the radar as well as for the users detected by the computer. Therefore the computer repeatedly had to interrupt itself while processing the data in order to be able to query both sides. Although radar objects and users had the same logical status, this issue of interruption appeared to be, not a human-machine problem, but rather a possibility condition of machine-machine communication.

The signals entering Whirlwind from the radar array via telephone lines needed to be processed in real time. Input and processing also had to be scheduled discretely. Polling, that is, the temporally regular gathering of data, was conducted through a switch called Interrupt, a hardware line that at regular time intervals interrupted processing and could cause a jump to a subroutine, which was then capable of perceiving, for example, the "environment." Since there is no (inter)action without interruption, communication among input, logic, and output units became a time-critical issue, a matter of mutual and at the same time locally differentiated systematic rhythm. Triggering communication through an interrupt is the most efficient way to coordinate various peripheral devices with different bandwidths. Consequently, what is missing at a particular system location at the time of query, or has in the meantime been rebuffered, simply does not exist.

Whirlwind therefore connected its user as one *device* among many others and located this device in certain time intervals. When the user was not on location there was no input. Whirlwind's successor, IBM AN/FSQ 7 in the SAGE project, perfected this interrupt principle. This was the only way that the fastest computer yet known, with 75,000 32-bit instructions per second, could deal with the slowest component in the system—the user. And the user showed that he was there, being responsible, by answering the question of who the enemy was. The screen depicted flashing moving dots that had to be "hit" with an input device (lightgun). If the operator missed or wasn't fast enough, he was acting irresponsibly and in the worst case "lost" a "life" (not only symbolically) because, on account of its duplex architecture, SAGE could both play games and take control in an emergency.[12]

Here two kinds of rhythmic events can be distinguished: those with entirely predictable outcomes and those whose outcomes are uncertain. Simple examples are the events "clock" and "keyboard," both of which are controlled via interrupts. While the system time's register is increased by 1 every second with near 100 percent probability, the keyboard does not send a return symbol in response to every query, and when it does send a return, it is not sure which of the 102 keys was pressed. Thus clocks are totally redundant but keyboards are highly informative. In Aristotelian terms one might say that watches belong to the category of *automatons* without will and that keyboards implement the paradox causality of *tyche* (fate), in which two fully determined causal chains meet and bring about unexpected results.[13] Computer games are dependent on that kind of *tyche;* the game is a series of events that occur through coincidence but that in retrospect can be seen as nothing other than necessary. And here I shall turn to the more concrete games of *Ping* and *Pong.*

TENNIS FOR TWO

A bouncing ball was already being seen on the Whirlwind screen, thanks to Jay Forrester's team. To demonstrate the speed and graphics of the computer, they placed a glowing dot in the upper left corner of the screen that then, as if it had been dropped like a tennis ball, drew a series of parabolas of decreasing height that appeared across the screen in the real time of the bouncing ball. Following complex wartime ballistic calculations that required a great deal of computer power, this ideal tennis ball took the place in the system of an enemy moving unpredictably and thus became the agent of perhaps the first demo program ever.[14]

Barely ten years later the physicist William Higinbotham was reading the handbook to his computer at the Brookhaven National Laboratory.[15] Higinbotham—who had previously developed the Eagle radar display of the *B-28* bomber and who had been one of the designers of the ignition mechanism for the Los Alamos bomb as well as other measuring equipment—discovered in this handbook a programming example that showed how to depict a trajectory on the five-inch oscilloscope connected to the computer. And since open-house day was drawing near, for which only the customary displays of the incomparable speed and systemic invisibility of computers had been planned, Higinbotham put together a game of tennis based on the bouncing ball.

The oscilloscope shows the side view of a tennis court: one deflection in the middle for the net, two racquet lines on the right and left, and, in the middle, the bouncing ball. The angle of the serve could be set with the aid of potentiometers, and the push of a button provided the serve. Naturally, the visitors to the open house passed over the Chase-Higinbotham linear amplifier and stood in line to play *Tennis for Two.* So the following year an expanded version appeared in which the gravitational constant could be changed to make it possible to play tennis under the conditions found on the Moon or on Jupiter.

It must be noted that there is no direct selection of the moving dot in *Tennis for Two* (as there is in SAGE), but rather a meeting of racquet and ball. Ballistics and timing, Higinbotham's old problems, come together in the racquet, which has to be moved so that it can be hit by the ball. The game player's objective is to be the target and to be ready for the ball because it is the presence of the game player at a specific time that is read and acknowledged as successful communication. Ping. Like all early computer-based games, *Tennis for Two* works only with two players who have to take turns being in the ready position. Ping—Pong. Here "Ping a server to see if it's up" means "Ping the other player to see if he's present." One may also remember Hayman's search for defective cables: the only way that *Ping* makes sense is that it does not have to make sense, only to constantly make sure that there is a channel. The player's communication consists entirely of reporting, "I am here. I am in place. I am ready to be encountered." Playing tennis means becoming part of the "madness of the rapid pace" *(das Rasende des Bestellens),* which is—according to Heidegger—the very essence of modern technology.[16] But it also means scanning for another device and "simplest test of functionality." And since the computer has only two players at present, its priority is to measure two bodies against each other: playing tennis is the success of form under the aggravating conditions of temporality.

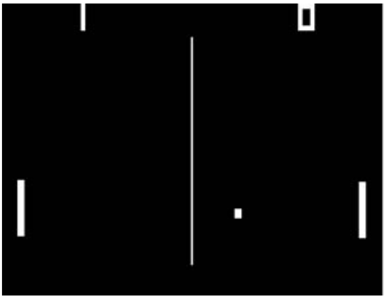
PONG

Two years later, at yet another open house (this time at MIT), three other demonstrations were on display.[17] The first was Forrester's famous bouncing ball on the Whirlwind screen. The second was Peter Samson's production of music on the TX-0. This computer had a loudspeaker under the control of the program that was running; it acknowledged, acoustically, a set bit 14 in the accumulator, so that an experienced programmer could hear which part of the program was being processed. At any rate, Samson had engaged the computer in meaningless loops whose sole purpose was either to set bit 14 or not to set it, and thereby to produce different sounds. While the control sounds of an efficiently running program produced only noise, Samson's amassed use of redundancy enabled meaningless recursion of a data mass up to the speed of perception of human senses, something like sound.

The third demonstration was one that turned John McCarthy's IBM *704* into a kind of color organ. This was an early example of a real hack job: despite its technical virtuosity, it managed to avoid the few available standard languages and made the most of proprietary hardware properties. The IBM *704* had a chain of control lamps, and the whole apparatus concentrated on addressing the individual device components in such a way that the control lights formed a given shape. A program was developed that consisted entirely of letting the lights light up one by one, thus producing a moving point of light that disappeared on the right only to reappear on the left. If a button was pressed just as the last light lit up, the moving point would change direction, as though it had bounced off the end and returned. A signal was thus sent into the darkness of the real, into the world of the user, who, by pressing a button, acknowledged that he was there at the right time. Tyche prevailed. The computer came across something and encountered something if it encountered a user who responded. Something echoed, "I'm up—*Ping* works." And maybe *Pong* too, for the 704's control board had become a kind of one-dimensional tennis match.

Here at the beginning of the 1960s, opinions split concerning *Ping* and *Pong.* The military chose *Ping,* and soon, in the *Dictionary of U.S. Army Terms,* defined *computer game* as a game computers play against and with each other and not with humans.[18] The hackers at MIT chose *Pong* and in two years presented their famous *Spacewar!* game for people to play on and with computers.[19] And because there were no other computer games at that time, *Spacewar!* was used in the Digital Equipment Corporation (DEC) technicians' tapes as a diagnostic tool for PDP-*1* computers.

At any rate, *Spacewar!* had an attentive player in Nolan Bushnell, who studied with Ivan Sutherland and later founded Atari.[20] Having recently completed his studies, he had achieved financial security through a job at AMPEX. In 1970 Bushnell started to re-engineer *Spacewar!* and soon realized that discourse foundations do not function merely by recording existing elements; they also require a certain elegance and an emergent surplus value. Or, in Bushnell's words: "To be successful, I had to come up with a game . . . so simple that any drunk in any



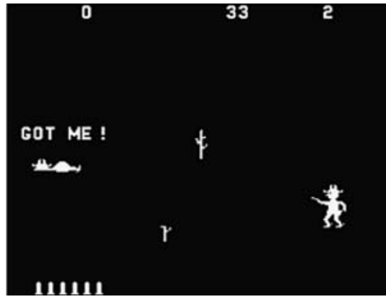


FIGURE 8.1. Screenshots of *Pong* (1972) and *Gunfight* (1975) where the absence of target was replaced with a presence of target. © Atari / © Midway.

bar could play."[21] Three of the elements derived from the MIT demo programs: first, a programmable dot on a screen; second, sound creation via computer; and third, time-critical user responsibility. Three other elements originated in the context of amusement arcades: first, the device did not require an attendant (i.e., everything that was needed to play was included in the device); second, the device did not require two players but had a single player mode; and third, the game had an end, so there was an economic relationship between investment, price, and duration of service. A final element, which came from a very different context, was a patent belonging to Ralph Baer, the senior engineer of the arms supplier Sanders Associates, who in 1968 suggested connecting a television to a computer. This replaced the cartography of vector displays with the pixel texture of raster screens. The whole device, which was more than the seven elements, was the well-known *Pong.*

Pong moved points of light across a screen, emitted sound, encountered its players, needed no external parts, had a single-player mode, kept score, and ran on old Hitachi television sets (figure 8.1). The "point" *(punctum)* of this computer game, as it was now called, since it was no longer made with analogue television technology, was of course the onomatopoetic "Pong."[22] Bushnell, who had studied the first anonymous player in computer game history in Andy Capp's Bar in Sunnyvale one warm August night in 1972, remembers: "The score was 5–4, his favor, when his paddle made contact with the ball. There was a beautifully resonant 'pong' sound, and the ball bounced back to the other side of the screen." First contact—the first "Pong," which at the same time is also a Ping. A "Pong" that acknowledges, as a Ping does, that the channel is up and that the echo reply is functioning. When the data packet or the ball then reaches the other side there is another "Pong," and, as I said above, rhythm becomes established as "the success of form under the aggravating conditions of temporality." Rhythm signals that the communication is communicating.

But rhythm is also, as Nietzsche said, "a compulsion, it produces an insatiable desire to give in, to comply, to join in; it's not just the feet, the soul follows the tempo as well—probably, one suspects, even the souls of the gods!"[23] An archaeological coincidence provides information about just which souls and which gods are involved in the rhythm of tennis in the early 1970s. Around the same time that *Pong* appeared, a book was published by Timothy Gallwey, the former tennis coach at Harvard. On the basis of his Asian experience of enlightenment, Gallwey had invented "yoga tennis" and founded his Inner Game Institute. The book reads:

> We have arrived at a key point: it is the constant "thinking" activity of Self 1, the ego-mind, which causes interference with the natural doing processes of Self 2. . . . Only when the mind is still is one's peak performance reached. When a tennis player is "on his game," he's not thinking about how, when, or even where to hit the ball. He's not trying to hit the ball, and after the shot he doesn't think about how badly or how well he made contact. The ball seems to get hit through an automatic process which doesn't require thought.[24]

The Californian conjunction of hippie esotericism and computer technology at the beginning of the 1970s makes clear what kind of programming we are dealing with in computer games.[25] In the first place, the player does not relate to the machine but rather is an embodiment of a particular kind of communication between devices. Thus players have to accommodate themselves to the communication standards for peripheral devices. Losing consciousness—what Gallwey calls the "second self"—is simply the moment of success in becoming a peripheral device and thus the possibility condition of a computer game. *Pong* seen as a problem of synchronization just reformulates the question that John Stroud posed to the irritated audience at the Sixth Macy Conference on Cybernetics in 1949: the question of a common carrier frequency in human-machine communication.[26]

PING OF DEATH

The homepage of the 3D Shooter clan called Ping of Death, founded in 1997, reminds us that, since Bushnell, computer games have had an ending point called "Game Over," a symbolic death of the player and an end to all communication. The issue of death—in shooters as well as tennis games—has nothing to do with hitting or being hit; rather, it is about the responsibility of timeliness. Like the fear of death experienced by the Prince of Homburg, who was in the right place at the wrong time, the death threat of the computer game results from a temporal displacement. Winning a computer game means making a Homburg of one's opponent. The fact that I am at the place where a shot lands, or that I am not at the place where a ball hits, is an error in my accommodation to the rhythm of the game. *Pong* is then also a game with weapons, a question of projection, as Deleuze would have said. The fact that pedagogical experts obsessed with the images and oblivious to the technology might miss this point is hardly amazing, because it is the goal of my opponent not to hit me but rather to catch my absence.[27] The enemy tennis racquet is a virtuality, a moving empty spot in my sights: the place where I ought to be but that I most probably cannot reach in time. Its target is my improbable timeliness. Its endeavor is to maneuver me into irresponsibility. The ball's trajectory is the projection of a question I will not be able to answer. No Ping, no Pong: Game Over.

Exactly this kind of virtuality of a present/absent target was a prominent topic of operations research during World War II. The methods developed for such issues were applied to tennis by the mathematician T. J. Bromwich in an article published in 1956 in *World of Mathematics*. Dealing with the probability of making a hit in tennis, Bromwich was trying to determine the undeliverability of the ball: depending on maximum and real ball speed and on the opponent's actual position, direction of travel, speed, and maximum running speed, it is easily calculated that there is an economy that determines how to force the opponent into irresponsibility without great effort.[28]

The playing field or tennis court then becomes a probability field. Each hit projects, as it were, a net of statistical curves on the target area and stochastically notches it. As Bromwich was using "classical" operations research methods, we can compare the tennis court to the example of a torpedo heading toward a submarine, which has various evasive options (figure 8.2).[29] The statistical field lines are the same as those in Bromwich's tennis analysis, and one may easily replace the submarine with the second tennis racquet and the torpedo with the ball. The only difference is that with the torpedo points are made by hitting the opponent, whereas in the tennis game points are made by not hitting him.

The submarine question brings us back again to *Ping*. The communications breakdown of not-hitting is also the point of the "Ping of Death." According to the RFC-791 standard, an IP package cannot be longer than 65,535 or $2^{16} - 1$ bytes. From this, 20 bytes must be subtracted for the header and 8 for the echo request, leaving 65,507 bytes remaining.[30] One may therefore send a Ping with a 65,510-byte data packet as a test:

ping -1 65510 any.ip.address

The standard demands that such a packet be fragmented and that each fragment be given an offset and reassembled into a packet again in the target computer. The simple result is that the last fragment is applied to a valid offset (i.e., smaller than 2^{16}), but its length causes an overflow. And even in 1997 in eighteen operating systems (such as Windows 95, NT, Linux, Solaris, Irix, and NeXTStep)

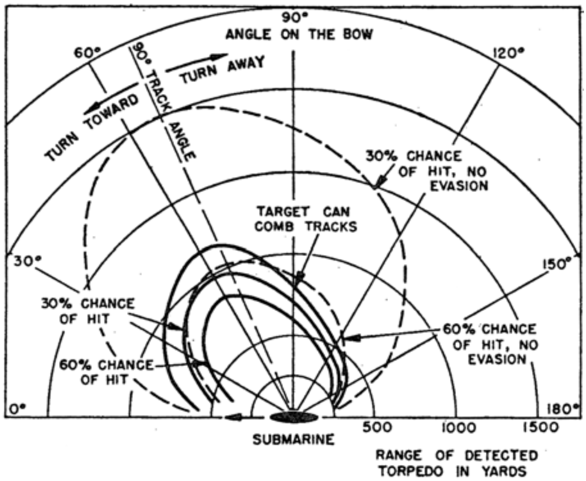


FIGURE 8.2. Maneuver of a submarine evading a torpedo on a map of virtual events. Philip M. Morse and George E. Kimball, *Methods of Operations Research* (New York: John Wiley, 1951).

this not only caused reboots, crashes, hang-ups, or kernel panic but also made routers and laser printers stall.[31]

Not only on the level of the human-machine communication found in *Pong,* but also on the level of machine-machine communication found in *Ping,* the symbolic death lies in the irresponsibility. One causes the opponent not to be able to respond by exceeding his address space, that is, by referring him to a place that is no longer under his control. Undeliverability means ordering someone or something to an impossible place. This issue is a very volatile question in media theory because if an impossible location is given it usually causes the medium to be addressed to itself. Post, for example—understood as that which itself has no address but administers all addresses—appears only and precisely when something is unaddressable. If *Ping* discontinues, then we will have to take a look at our computers.

SMURFS AND FILIBUSTERS

Since we usually don't want to see the medium itself, I shall move on from the general problem of rhythm to the particular aspects of optimal rhythm speed. When we look at the games of the last quarter century that have been resurrected in emulator circles, their old-fashioned slowness shows that accommodation is also a historical process, and a cultural diagnostician looking at such games might well claim that we have become faster. Yet all I want to do—and again between *Ping* and *Pong*—is point out that there is an economy of synchronization. This economy purports—as do all ergonomic theories—that long-term normality is the most probable work to be expected for any given unit of time. It also says that exceeding this to any great extent can be dangerous and becomes a workplace health and safety issue.

Such overwork has been known as denial-of-access attacks for several years and is one of the easiest ways to arouse the concern of workplace health and safety officials. And it is all based on *Ping*. The method is called smurfing, and it is quite simple.[32] A *Ping* packet is sent to the central direct broadcast address of a network, which then forwards this packet to a maximum of 255 other machines connected to this network. All of these obediently reply with an echo, which of course goes, not back to the sender, but to the forged return address of the intended victim that was given in the header. A cheap 28.8-K modem can "ping" 42 64-byte packets per second (multiplied by 255) so that 10,626 packets arrive at the victim's address per second, i.e. 5.2 MBits per second. And with this load, a T1 line (1.5 MBit/s) is dead. Hackers have been known to address more than one broadcast address at a time, so that, for example, with fifty addresses the victim is flooded by an answer stream of more than 530,000 packets. 28.8 KBit/s can become as much as 260 MBit/s. Through purely quantitative excessive demand, a machine can cause the symbol processing of other machines to collapse.

Not coincidentally, there is a historical analogy between too many packets and too many tennis balls. Joseph C. R. Licklider, a psycho-acoustician who attended the legendary Macy Conferences and was, among other things, one of the co-developers of SAGE's interface design, was the director of the Information Processing Techniques Office at the Pentagon's Advanced Research Projects Agency (ARPA) when he published his classic paper "The Computer as a Communication Device" in 1968.[33] Here, in the beta version of the concept of a future Internet, is a series of small sketches, which suddenly change from organic shapes into the visual language of comic-book drawings. The handshake between two message processors appears, not, despite the hands, as a handshake but rather as the catching of a ball that is then thrown on to the next node (figure 8.3).

Yet Licklider was not so much interested in machine-machine communication as in machine-human communication. After all, despite all the Kapp, Freud, and McLuhan theories of prosthesis, Licklider had approached the situation of "computer users" from the other direction and had spoken of the "humanly extended machine" in order to make this hierarchy collapse. In 1968, while Douglas Engelbart and his colleagues were already testing various input devices according to strict ergonomic rules and thus beginning to gauge the everyday normality of computer screen work, Licklider was thinking about how these would

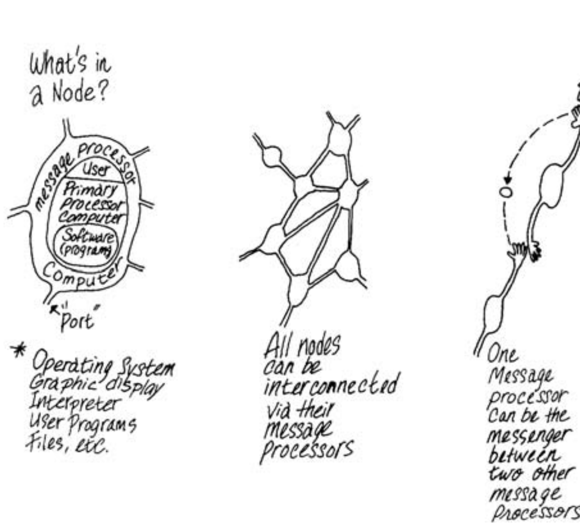


FIGURE 8.3. Illustrations to Licklider's network plans. J. C. R. Licklider, "The Computer as a Communication Device," [1968], reprinted in *In Memoriam: J. C. R. Licklider, 1915–1990* (Palo Alto, CA: Digital Equipment Corporation, Systems Research Center, 1990).

have to consist of both human and nonhuman components.[34] And, naturally, he included this in his mental image of the ping-pong game. Successful communication between machine and human is the alternation of answers; unsuccessful communication, the absence of any answer characteristic of an overload—a kind of denial-of-access attack against humans (figure 8.4). So we have to deal with a "switching" of the extensions, with an oscillation of the term between technocentrism and anthropocentrism and thus with what one could—in philosophical terms—call its "deconstruction."

Lest this all remain in the anecdotal category, let us remember that Licklider not only was interested in a traditional time-study of factory work but also, since 1961, had been trying to convince the Department of Defense of the necessity of a research program devoted to "time and motion analysis of technical thinking."[35] The main argument was that only in an optimized interaction of computer and decision maker would the latter not become a Prince of Homburg:

> Tomorrow you spend with a programmer. Next week the computer devotes 5 minutes to assembling your program and 47 seconds to calculating the answer to your problem. You get a sheet of paper 20 feet long, full of numbers that, instead of

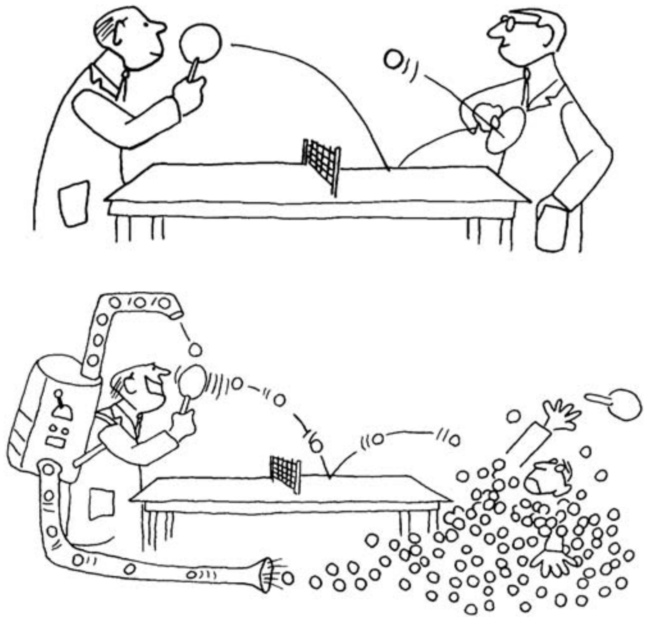


FIGURE 8.4. Illustrations of Licklider's optimized interaction. J. C. R. Licklider, "The Computer as a Communication Device" [1968], reprinted in *In Memoriam: J. C. R. Licklider, 1915–1990* (Palo Alto, CA: Digital Equipment Corporation, Systems Research Center, 1990).

> providing a final solution, only suggest a tactic that should be explored by simulation. Obviously, the battle would be over before the second step in its planning was begun. . . . The military commander, on the other hand, faces a greater probability of having to make critical decisions in short intervals of time. It is easy to overdramatize the notion of the ten-minute war, but it would be dangerous to count on having more than ten minutes in which to make a critical decision.[36]

After the cybernetic hope of achieving unity through a mutual sphere of understanding between humans and machines, after Chomsky's cognitive-psychological influence as well as the proposal for the Dartmouth Project on Artificial Intelligence, the concern was now about time-critical thinking together with computers—or, as Licklider called it, "man-computer-symbiosis." Human beings have some major disadvantages when compared to computers, but they also have some unbeatable advantages. From the machine's point of view this means that there are certain gaps to be filled in before symbiotic multivalent thinking can be possible: "Men will fill in the gaps," as Licklider said. The tennis game thus describes the possibility condition for human and machine together to be more than they are separately. The machine addresses the user, its extension, whose program is written, and the other plays something back. The user addresses a machine, whose program he cannot read, but which has, by means of visibility and slowness, made itself commensurable, and it plays something back. Thus Ping-Pong exists everywhere that humans are involved with computers, in the games of fire control systems as well as in Word, in "Igloo White" from Saigon as well as in the control of *The Sims,* in browsing the Internet as well as in navigating through *GTA 4.*

Thus the new media art of the 1990s, with all its supposedly "critical" experiments in interactivity, is not only behind the times but also merely reproduces the military logic of *Ping* or the industrial logic of *Pong.* Stelarc's 1996 *Ping Body,* for example, referred to by the artist as a "powerful inversion of the usual interface," simply reverses the relationships among user interfaces that have become commonplace, ending up back in the Whirlwind era, when humans were explicitly addressed as *devices.*[37] Replacing sender and receiver is—as Baudrillard (despite questionable consequences) so brilliantly has shown—a "strategic illusion" that remains entirely "in solidarity with the reigning practice."[38] *Ping Body* is not provokingly posthuman; rather, it reproduces an everyday life that has already left art behind.

Using *Ping* and *Pong,* I have tried to demonstrate by discourse analysis that there is a sort of responsibility common to games between human and machine as well as between machine and machine. This responsibility is called (in our example) "timeliness," "punctuality," or "being there."[39] This timeliness cannot (as the example of Homburg shows) be a matter of subjectivity. One can't play a computer game as though it had feelings—that would be as absurd as relying on one's sense of time in the day of the time clock. Rather, timeliness is a matter of "duty." But duty (as Kant remarked in *Groundwork of the Metaphysics of Morals*) has nothing to do with inclination.[40] Nor does it have its worth in the intent that would thereby be achieved. Duty is measured entirely according to the principle by which it has been defined and derives the necessity of an action from reverence for the law. I commit myself uniquely to this reverence when I enter a game. Any breach of duty is punished with a symbolic death, the end of the game. A game program is thus not only a set of instructions, a kind of law code for the world of the particular game, that I have the duty to follow when I am in the company of computers, but at the same time also a police agent that precisely monitors my actions. There is no such thing as a wrong computer game in the right.

This fulfillment of duty is subject to the "rules of skillfulness,"[41] or, to use Kant's term, the so-called hypothetical-problematic imperative. The hypothetical-problematic imperative is "technical" and thus belongs in the realm of "art."[42]

And Kant notes that all skillfulness (related to duty) is indifferent toward its objectives: doctors can save lives just as skillfully as murderers can destroy them. Playing to perform one's duty has no other objective than to prolong the playing, that is, not to become guilty of failing in one's duty.

Thus there is reason to assume that, for example, the entire pedagogical debate about violence in computer games und their psychological consequences is looking in the wrong place. It is looking, not at the "technology" and "pragmatics" of playing games or at the actual devices, but only at the iconography of the graphics and the content of the narratives. The splatter of indexed games ultimately says as little about the duties of the game player as the pink dinkiness of pedagogic correctness does, or even less, because we are not in the realms of conscience and morality but in the area of duty and law. The discourse elements of the computer game are not called "killing people" or "catching gold nuggets" but timeliness, rhythm, or control. And these are continuously tested in a symbolic identity of the player.

Digital computers can provide nothing comparable to the human senses—they are much too small and too fast. Thus there is no (inter)action without visual or haptic procedures—the computer has to be "humanized." On the other hand, coupling the real and the symbolic, the cleaving together (or *suturing*) of human bodies and machine logic, can be communicated only at the symbolic level—it is necessary for the human to become "machine shaped." Games are a test of this compatibility. I would therefore use a more Deleuzian machine term—as opposed to "hardware" (which only ever implies a border between soft- and wetware)—that could describe how machines are formed as all sorts of different things (humans, images, sounds, computers, etc.) that become connected through recursion and communication and acquire the ability to function as components of the machine.

Therefore the origins of the traditions associated with playing computer games can be found not only in visual and literary traditions but even more in experimental psychology and ergonomics, and in the theories of "scientific management," operations research, and cybernetics. This is not another appeal to see the circuit diagram as "the only thing that counts" in a computer game and to state a naive technological a priori.[43] I am far more interested in emphasizing technology in a broader sense *without* reducing it to extensions, devices, symbolisms, or functioning trivializations, as philosophers, historians, and anthropologists or constructivists tend to do. I would rather understand technology as a force or a character that organizes relationships, producing something new and unexpected within a strategic dispositive. Technology in this greater sense marches to its own rhythms. It is a transversal phenomenon in that all of its designated aspects are dynamic but it cannot be reduced to any of them. Technology is a relay between technical artifacts, aesthetic standards, cultural practices, and knowledge. In this sense technology doesn't participate in an ever-changing world of devices or, in the broader sense, in cultural technologies, a history of engineering achievements, or a world of activity, either in its aesthetic products or in its socioeconomic impact. It is not that technology *is* something but that it *does* something, and it does it in many places all at the same time: it produces aesthetic, practical, apparative, and epistemic *relationships* whose aesthetic, practical, apparative, and epistemic *consequences* are once again not ordered and not predictable. In this sense technology has also been—since it liberated itself from the arts and trades and became an independent program of discourse—a challenge to anthropological and culture-critical reflections.

We need to understand how this way of thinking about "technology" as such came about, especially in connection with the most recent technological developments. The computer game makes a very good test case because it resists the hegemonic demands of human "play" that control the anthropology of "play" Schiller showed us so long ago. Computer games are a plea in favor of the material intransigence of the concrete found in "games" and for the rehabilitation of the excluded "perversions" and "corruptions" (Roger Caillois) of the game, offering the chance for a critical examination of the genealogy of anthropological game theories whose concept of play merely disguises the fact that their purpose is to remove the paradox from the social organization. To the contrary, games should be taken seriously.

NOTES

1. The German word *Spiel* that Schiller used does not differentiate between "play" and "game." The only way to make a distinction is to use the singular (*Spiel,* play) or plural (*Spiele,* games).

2. Friedrich Schiller, *Über die ästhetische Erziehung des Menschen, in einer Reihe von Briefen* [On the Aesthetic Education of Man, in a Series of Letters], in *Sämtliche Werke,* vol. 5 (Munich: Hanser, 1962), 607.

3. Ibid., 611; Reginald Snell's translation, letters XIII and XIV, in Friedrich Schiller, *On the Aesthetic Education of Man* (1954; repr., Mineola, NY: Dover Publications, 2004), 72, 73.

4. Joseph Vogl, "Staatsbegehren: Zur Epoche der Policey," *Deutsche Vierteljahrsschrift für Literaturwissenschaft und Geistesgeschichte* 74 (2000): 600.

5. Schiller, *Sämtliche Werke,* 5:616.

6. Ibid., 5:617, emphasis mine.

7. Gilles Deleuze and Felix Guattari, *Anti-Ödipus: Kapitalismus und Schizophrenie* (Frankfurt: Suhrkamp, 1974), 498.

8. Gilles Deleuze, *Foucault* (Frankfurt: Suhrkamp, 1987), 34.

9. See "The Ping Page," updated March 2007, www.ping127001.com/pingpage.htm.

10. See "The Story of the PING Program," n.d., http://ftp.arl.army.mil/~mike/ping.html (accessed January 12, 2009).

11. Robert R. Everett, "Whirlwind," in *History of Computing in the Twentieth Century,* ed. Nicholas Metropolis, Jack Howlett, and Gian-Carlo Rota (New York: Academic Press, 1980), 365–84.

12. J. T. Rowell and E. R. Streich, "The SAGE System Training Program for the Air Defense Com-

mand," *Human Factors* 6 (1964): 537; Les Levidow and Kevin Robins, introduction to *Cyborg Worlds: The Military Information Society* (London: Free Association Books, 1989), 13.

13. Aristotle, *Physics* 2.5–6.

14. According to Benjamin Woolley, even with the first game, because the ball was supposed to "fall" into a "hole" on the abscissa. Benjamin Woolley, *Die Wirklichkeit der virtuellen Welten* (Basel: Birkhäuser, 1994), 46.

15. On the occasion of the fiftieth anniversary, the game was reconstructed and can be viewed at "Video of the BNL 1958 'Tennis for Two' Computer Game," n.d., www.pong-story.com/tennis1958.htm (accessed January 12, 2009).

16. Both of Heidegger's terms are ambiguous: *das Rasende* means both "madness" and "rage," and *Bestellen* means "to appoint" or "to order" and "to till." Martin Heidegger, *Die Technik und die Kehre,* 5th ed. (Pfullingen: Neske, 1982), 33.

17. For more detail, see Steven Levy, *Hackers: Heroes of the Computer Revolution* (London: Penguin Press, 1984).

18. U.S. Army, *Dictionary of U.S. Army Terms,* AR 320–5 (Washington, DC: Department of the Army, 1965).

19. J. Martin Graetz, "The Origin of *Spacewar,*" *Creative Computing,* August 1981, www.wheels.org/spacewar/creative/SpacewarOrigin.html.

20. Robert Slater, *Portraits in Silicon (*Cambridge, MA: MIT Press, 1987), 296.

21. Scott Cohen, *Zap! The Rise and Fall of Atari* (New York: Xlibris, 1984), 23.

22. The *Odyssey* game console of the television technician Ralph Baer was analogously constructed and generated the tennis game graphics from the logic of test pattern generators. The *Pong* machine of the computer scientist Bushnell reconstructed this aesthetic with digital means so deliberately and precisely that he later lost a lawsuit. On the details of this "secret" digitalization, see Claus Pias, "'Children of the Revolution': Video-Spiel-Computer als Kreuzungen der Informationsgesellschaft," in *Zukünfte des Computers,* ed. Claus Pias (Zurich: diaphanes, 2004), 217–40. The circuit diagram shows that the "Pong" sound was no more than the extremely intensified crackling in the lines counter. So what we hear when we successfully synchronize ourselves is actually the synchronization of the device itself.

23. Friedrich Nietzsche, *Werke in drei Bänden* (Munich: Carl Hanser, 1954), 2:93.

24. W. Timothy Gallwey, *The Inner Game of Tennis* (New York: Random House, 1974), 31.

25. For a broader discussion of this conjunction, see Fred Turner, *From Counterculture to Cyberculture* (Chicago: University of Chicago Press, 2006).

26. John Stroud, "The Psychological Moment in Perception," in *Cybernetics/Kybernetik: The Macy-Conferences, 1946–1953,* ed. Claus Pias (Berlin: diaphanes, 2003), 1:41.

27. The game manufacturer Midway would soon turn things around. The game *Gunfight* simply replaced absence with presence and the racquets with pixel cowboys to produce a controversial shooter. The tennis ball didn't have to be reprogrammed but could now be visually interpreted as a bullet.

28. Thomas John Bromwich, "Easy Mathematics and Lawn Tennis," in *The World of Mathematics,* vol. 4, ed. James R. Newman (New York: Simon and Schuster, 1956), 2450.

29. Philip E. Morse and George E. Kimball, *Methods of Operations Research* (New York: Wiley, 1951).

30. See "Ping of Death," Wikipedia, http://en.wikipedia.org/wiki/Ping_of_death (accessed January 13, 2009).

31. Collected on "Ping of Death," www.insecure.org/sploits/ping-o-death.html (accessed January 12, 2009).

32. See INFOSYSSEC, "Denial of Service Attacks," n.d., www.infosyssec.org/infosyssec/security/secdos1.htm (accessed July 20, 2010).

33. Katie Hafner and Matthew Lyon, *Where Wizards Stay Up Late: The Origins of the Internet* (New York: Simon and Schuster, 1996), 24; Joseph C. R. Licklider, "The Computer as a Communication Device" [1968], reprinted in *In Memoriam: J. C. R. Licklider, 1915–1990* (Palo Alto, CA: Digital Equipment Corporation, Systems Research Center, 1990).

34. William K. English, Douglas C. Engelbart, and Melvyn L. Berman, "Display Selection Techniques for Text Manipulation," *IEEE Transactions on Human Factors in Electronics* 8, no. 1 (1967): 5–15.

35. Joseph C. R. Licklider, "Man-Computer Symbiosis" [1960], reprinted in *In Memoriam: J. C. R. Licklider, 1915–1990* (Palo Alto, CA: Digital Equipment Corporation, Systems Research Center, 1990).

36. Ibid., 14.

37. Stelarc homepage, www.stelarc.va.com.au/pingbody/index.html (accessed January 12, 2009).

38. Jean Baudrillard, "Requiem für die Medien," in *Kursbuch Medienkultur,* ed. Claus Pias, Lorenz Engell, and Joseph Vogl (Stuttgart: Deutsche Verlags-Anstalt, 1999), 291.

39. The issue of timeliness mainly concerns "time-critical" action games. Adventure and strategy games, however, are "decision-critical" or "configuration-critical." On this differentiation, see Claus Pias*,* *Computer Spiel Welten* (Munich: Sequanzia, 2002).

40. Immanuel Kant, *Werke in zwölf Bänden,* vol. 7 (Frankfurt: 1977), 26.

41. Ibid., 45.

42. Ibid., 46.

43. Friedrich Kittler, *Grammophon Film Typewriter* (Berlin: Brinkmann and Bose, 1986), 5.

9

The Enduring Ephemeral, or The Future Is a Memory

Wendy Hui Kyong Chun

New media, like the computer technology on which they rely, race simultaneously toward the future and the past, toward what we might call the bleeding edge of obsolescence. Indeed, rather than asking, What are new media? we might want to ask what seem to be the more important questions: What were new media? And what will they be? To some extent the phenomenon stems from the modifier *new:* to call something new is to ensure that it will one day be old. The slipperiness of new media—the difficulty of engaging them in the present—is also linked to the speed of their dissemination. Neither the aging nor the speed of the digital, however, explains how or why it has become the new or why the yesterday and tomorrow of new media are often the same thing. Consider concepts such as social networking (MUDs to *Second Life*), or hot YouTube videos that are already old, or old e-mail messages forever circulated and rediscovered as new. This constant repetition, tied to an inhumanly precise and unrelenting clock, points to a factor more important than speed—a nonsimultaneity of the new, which I argue sustains new media as such.

Also key to the newness of the digital is a conflation of memory and storage that both underlies and undermines digital media's archival promise. Memory, with its constant degeneration, does not equal storage; although artificial memory has historically combined the transitory with the permanent, the passing with the stable, digital media complicate this relationship by making the permanent into an enduring ephemeral, creating unforeseen degenerative links between humans and machines. As I explain in more detail later, this conflation of memory with storage is not due to some inherent technological feature, but rather due to how everyday usage and parlance arrest memory and its degenerative possibilities in order to support dreams of superhuman digital programmability. Unpacking the theoretical implications of constantly disseminated and regenerated digital content, this chapter argues that these dreams create, rather than solve, archival nightmares. They proliferate nonsimultaneous enduring ephemerals.

THE FUTURE, THIS TIME AROUND

Prophesying the future of digital media is, once more, in fashion. With the now-embarrassing utopian and dystopian hype around the Internet and Y2K comfortably behind us (or at least archived), there is a growing impatience with the so-called critical hindsight that flourished after the dotbombs and 9/11. Rather than the sobering if banal reassessments of Internet communications as a "double-edged sword," the main focus of digital media analysis—popular and scholarly—is on future possibilities.[1] Howard Rheingold, who helped popularize virtual reality and virtual communities, has written a book on the next social revolution, smart mobs; everyone is now speculating about the Web 3.0, the semantic Web in which information and meaning will finally coincide.[2] Even long-standing critical organizations, such as the Australian organization fibreculture, dedicated to "critical and speculative interventions in the debate and discussions concerning information technology," have joined the bandwagon, entitling the 2007 Digital Arts and Culture (DAC) association's conference in Perth "The Future of Digital Media."[3]

This future 2.0, like Web 2.0 or 3.0, is not as utopian or bold as its mid-1990s predecessor, which was billed as *the* future. There are no upbeat yet paranoid commercials promising an end to racial discrimination and the beginnings of a happy global village; there are no must-read cyberpunk novels or films outlining its gritty, all-encompassing nature, although new media do now encompass bio- and nanotech.[4] This return to the future as future simple—as what will be, as what you will do, as a programmed upgrade to your already existing platform—will no doubt recede and then reappear. Its cycle is partly driven by economics. Silicon Valley has recovered from the demise of the "new economy." Google is trading well over four hundred dollars per share. I-Pods and BlackBerry devices are everywhere. There is a sense that something is and has changed. NBC announced layoffs in 2006 not only because its programming is doing poorly but also because kids just aren't watching TV on TV anymore.[5] Also, Facebook has moved successfully from college campuses to the English-speaking public in general, and Mark Zuckerberg is apparently replacing Larry Page and Sergey Brin as the Valley's new IT kid. YouTube is affecting U.S. presidential elections; CNN now covers blog content as breaking news; and Skype seems poised to make the videophone, conceived in the 1970s and 1980s, an everyday reality.[6]

This return to the future or to the "emerging" in new media and their study is also a reaction to a perceived crisis within net criticism. When, in 2001, Lev Manovich chastised scholars for focusing on future rather than already existing technologies—for conflating demo with reality, fiction with fact—and Peter Lunenfeld and Geert Lovink categorized much theoretical work as "vapor theory," their criticism seemed a much-needed admonishment.[7] It was a call for theorists to wake up from their virtual reality, or, to play with William Gibson's famous description of the matrix, their consensually hallucinated cyberspace. Even Gibson has started writing about actually existing technology.[8] Engaging the present, however, has not been so easy. Gibson's more recent books have not been as popular as his early ones. It would seem that currently existing media objects are rather boring or have a short life span. Indeed, in a way to avoid both the future and the present, Neal Stephenson now writes about the past, and the scholarly trend toward "media archaeology" is similarly retrospective, even if it is not traditionally historical or progressivist.

Speed and variability apparently confound critical analysis. According to Lovink, "Because of the speed of events, there is a real danger that an online phenomenon will already have disappeared before a critical discourse reflecting on it has had the time to mature and establish itself as institutionally recognized knowledge."[9] More broadly, McKenzie Wark has argued that traditional scholarship is incompatible with the types of images and events, produced and disseminated along lightninglike speed media vectors, that interrupt the homogenous and abstract formal time of scholarship.[10] In making this diagnosis, Wark draws from the work of Paul Virilio, who has argued that cyberspace has implemented a real time that is eradicating local spaces and times. This global one time threatens "a total loss of the bearings of the individual" and "a loss of control over reason," as the interval between image and subject disappears.[11] More narrowly, Manovich has argued that the critical blindness brought about by speed is peculiarly American: "The speed with which new technologies are assimilated in the United States makes them 'invisible' almost overnight: they become an assumed part of the everyday existence, something which does not seem to require much reflection. The slower speed of assimilation and the higher costs involved give other countries more time to reflect upon new technologies, as it was the case with new media and the Internet in the 1990s."[12] Manovich's geographic analysis and his linking of speed to cost is intriguing, but once again speed is labeled as the culprit. In addition to speed, malleability makes criticism difficult by troubling a grounding presumption of humanities research: the reproducibility of sources. The fact that we cannot all access the same text—because, for example, the page has simply disappeared—seems an affront to scholarly analysis.[13] This lack of verifiability gives a different spin to discourses of trust that dominate technology planning.

In response to these difficulties, Lovink and Wark both argue that the time of theory itself needs to change; Lovink's "theory on the run" and Wark's theory as "micro-event" take on the same temporality or speed as digital media, refusing to stand outside their mode of dissemination. Lovink's theory is a "living entity, a set of proposals, preliminary propositions and applied knowledge collected in a time of intense social-technological acceleration." It is on the run not only because it engages the present but also because it "expresses itself in a range of ways, as code, interface design, social networks and hyperlinked aphorisms, hidden in mailing-list messages, weblogs and chatrooms and sent as SMS messages."[14] Wark similarly discusses the work of tactical intellectuals as a kind of microevent in which "the media tactician presents an image that endangers the conventions of journalistic narrative time, yet which is capable of inserting itself into it."[15] That is, the microevent travels along the same media vectors as the mainstream event itself, displacing the event's terms in its travels. Wark's critical work exemplifies this kind of intervention; it appears first on the Net and then later in print. Although I am sympathetic to these efforts and agree that digital media criticism needs to be on the Net rather than simply about it, I also believe we need to think beyond speed.

The fact that the present is hard to engage or that scholarly certainty lags behind its object of analysis or that there is a need for intervention is hardly profound. Scholars studying global climate change, for instance, have consistently argued that by the time we know whether their predictions are true it will be too late. Thus one must act as though future predictions (models or demos) were fact in order to prevent the predicted future from taking place. Also, the lag between a digital object's creation and its popular or scholarly uptake—its nonsimultaneous dissemination—does not belie new media but rather, as I explain later, grounds it as new. Further, ephemerality is not new to new media. Television scholars have been grappling with this very question for years. Focusing on actually existing shows rather than future episodes, they have theorized TV content in terms of flow, segmentation, and liveness.[16] So, what is different or new about new media?

Most obviously, networked new media do not follow the same logic of seriality as television; flow and segmentation do not quite encompass digital media's ephemerality. Programming TV and programming new media are significantly different enterprises. To program a television show is to schedule or to broadcast it; to program a computer is to produce a series of stored instructions that supposedly guarantee—and often stand in for—a certain action. One is descriptive, the other prescriptive. Second (and not unrelated), digital media with their memory were supposed to be the opposite of or the solution to television. That is, new-media scholars' blindness to the similarities between new media and TV is ideological; it stems from an overriding belief in digital media as memory—and thus possibly memorable—and TV as liveness.[17] When TV was still TV, memory supposedly marked the difference between it and digital media; unlike TV, digital media's content, like the programs they run, was to be available 24/7. The always-thereness of digital media was to make things more stable, more lasting. Digital media, through the memory at their core, were supposed to solve, if not dissolve, archival problems such as degrading celluloid or scratched vinyl, not create archival problems of their own. The limited life span of CDs will no doubt shock those who disposed of their vinyl in favor of digitally remastered classics, that is, if they still use CDs or an operating system that can read them. Old computer files face the same problem.

The major characteristic of digital media is memory. Their ontology is defined by memory, from content to purpose, from hardware to software, from CD-ROMs to memory sticks, from RAM to ROM. Memory underlies the emergence of the computer as we now know it; the move from calculator to computer depended on "regenerative memory."[18] John von Neumann, in his mythic and controversial *First Draft of a Report on the EDVAC* (1945), deliberately used the term memory *organ* rather than *store,* also in use at the time, in order to parallel biological and computing components and to emphasize the ephemeral nature of vacuum tubes.[19] Vacuum tubes, unlike mechanical switches, can hold values precisely because their signals can degenerate—and thus regenerate. The Internet's content, memorable or not, is similarly based on memory. Many Web sites and digital media projects focus on preservation: from online museums to the YouTube phenomenon Geriatic1927, from Corbis to the Google data banks that store every search ever entered (and link each to an IP address, arguably making Google the Stasi resource of the twenty-first century). Memory allegedly makes digital media an ever-increasing archive in which no piece of data is lost.

This always-thereness of new media is also what links those media to the future as future simple, as what will be, as predictable progress. By saving the past, they were supposed to make knowing the future easier. More damningly, they were to put into place the future simple through the threat of constant exposure; as a *New York Times* article questioned in response to the posting on YouTube of a clip of Senator George Allen making a racist remark: "If . . . any moment of a candidate's life can be captured on film and posted on the Web, will the last shreds of authenticity be stripped from our public officials?"[20] Intriguingly, this formulation assumes that racist slurs are the authentic and the true and that the threat of public exposure always makes behavior more banal. However, given the legion of students with compromising Facebook entries who seem oblivious to the fact that potential employers can check these entries, and given that people increasingly record their own "transgressions" (as in the case of the English "happy slappers"), it is not so clear that this assumption will hold, even for politicians. Allen, after all, made his comment at a public rally and directly addressed the Indian American man holding the video recorder.

Regardless, digital media were supposed to—in their very functioning—encapsulate the Enlightenment ideal that better information leads to better knowledge, which in turn guarantees better decisions.[21] As a product of programming, they were to program the future.

AS WE *MAY* THINK

This desire for programmability, sustained by a conflation of description with prescription, is most evident in the canonization of Vannevar Bush's "As We May Think."[22] The significance of this text is not understated; it is on almost all Introduction to Digital Media course syllabi and is considered to be as influential as, if not more influential than, Gibson's *Neuromancer* because "pioneers" such as Douglas Engelbart and Ted Nelson have consistently listed it as an inspiration to them.[23] If *Neuromancer* has disappeared from syllabi as digital media criticism has moved away from the now embarrassingly fictional and utopian, the equally fictional and utopian "As We May Think" has survived because of this direct line of influence, which supposedly grounds it (particularly its validation of a massive branching structure) as a precursor to the World Wide Web.[24] However, the fact that the memex—the machine prophesied by Bush but never built—is considered a precursor should make us pause because the memex is linked to a mechanical, analogue future that has not and arguably *may not* come to pass.[25] Conflating the memex and the Internet covers over the ephemerality of digital media and, more importantly, turns questions of forgetting and degradation into problems for media to solve, as one medium becomes the "memory" of the next.

Bush, in "As We May Think," writing at the end of World War II, argues that the crucial problem facing scientists and scientific progress is access. He writes, "A record if it is to be useful to science, must be continuously extended, it must be stored, and above all it must be consulted." However, "Publication has been extended far beyond our present ability to make real use of the record. The summation of human experience is being expanded at a prodigious rate, and the means we use for threading through the consequent maze to the momentarily important item is the same as was used in the days of square-rigged ships." To adequately access the scientific record, he proposes a mechanical solution, the memex. The memex is was a desklike machine with two projectors that would enable its user to make permanent associative links between documents and to retrieve them at will. The documents were to be stored as microfilm and dropped into the machine as necessary. Documents could also be added; depressing a lever would cause contents placed at the top of the memex to be photographed into the next blank space in memex film. Although the compression offered by microfilm was important, associative indexing distinguished the memex, for Bush argued that the prime issue was selection; the human record was not being consulted because of cumbersome systems of indexing. Unlike these alphabetical systems, the memex was to create associative trails:

> When the user is building a trail, he names it, inserts the name in his code book, and taps it out on his keyboard. Before him are the two items to be joined, projected onto adjacent viewing positions. At the bottom of each there are a number of blank code spaces, and a pointer is set to indicate one of these on each item. The user taps a single key, and the items are permanently joined. In each code space appears the code word. Out of view, but also in the code space, is inserted a set of dots for photocell viewing; and on each item these dots by their positions designate the index number of the other item.
>
> Thereafter, at any time, when one of these items is in view, the other can be instantly recalled merely by tapping a button below the corresponding code space. Moreover, when numerous items have been thus joined together to form a trail, they can be reviewed in turn, rapidly or slowly, by deflecting a lever like that used for turning the pages of a book. It is exactly as though the physical items had been gathered together from widely separated sources and bound together to form a new book. It is more than this, for any item can be joined into numerous trails.

The memex was, through unseen connections in code space, to simulate the creation of new physical media. This code space functioned, not as the space of digital programming in which material was generated, but rather as an invisible space of place markers. This associative linking was to make the memex closer to the human mind, the inspiration for the memex. Describing the human mind, Bush wrote, "With one item in its grasp, it snaps instantly to the next that is suggested by the association of thoughts, in accordance with some intricate web of trails carried by the cells of the brain. It has other characteristics, of course; trails that are not frequently followed are prone to fade, items are not fully permanent, memory is transitory." In contrast, the memex's traces were not to fade, making it even better than its predecessor.

Bush did not undersell the importance of the memex. He argued that man "needs to mechanize his records more fully if he is to push his experiment [human civilization] to its logical conclusion and not merely become bogged down part way there by overtaxing his limited memory. His excursions may be more enjoyable if he can reacquire the privilege of forgetting the manifold things he does not need to have immediately at hand, with some assurance that he can find them again if they prove important."

Not only would we be granted once more the privilege of forgetting (as though any of us could ever be exempt from such a privation), but we would be saved from repetition—repetitive thought and repetitions in thought. According to Bush, man should not be burdened with repetitive thought processes like arithmetic, for which there are powerful mechanical aids. The creative aspect of thought, Bush writes, "is concerned only with the selection of the data and the process to be employed and the manipulation thereafter is repetitive in nature and hence a fit matter to be relegated to the machine." The memex could also prevent repetitive discoveries, for the danger of nonmechanically induced forgetting is repetition. In "Memex Revisited," which is itself an interesting repetition of "As We May Think," he contends:

> An Austrian monk, Gregor Mendel, published a paper in 1865 which stated the essential bases of the modern theory of heredity. Thirty years later the paper was read by men who could understand and extend it. But for thirty years Mendel's work was lost because of the crudity with which information is transmitted between men.
>
> This situation is not improving. The summation of human experience is being expanded at a prodigious rate, and the means we use for threading through the consequent maze to the momentarily important items are almost the same as in the days of square-rigged ships. We are being buried in our own product. Tons of printed material are dumped out every week. In this are thoughts, certainly not often as great as Mendel's, but important to our progress. Many of them become lost; many others are repeated over and over and over.[26]

Thus the scientific archive, rather than pointing us to the future, is trapping us in the past, making us repeat the present over and over again. Our product is burying us and the dream of linear additive progress is limiting what we may think; but the phrase "as we may think" is richly ambiguous. At one level, it refers to a technologically enhanced future: what we might think if we developed prosthetic machines to supplement and access the human record or what we might think without these devices. The word *may,* however, also refers to an authoritarian sanction; one is given the right to think *X,* one may think *X,* in which case the authority would be the machines themselves, our supposedly loyal servants. Most importantly for this argument, *may* is an uncertain link to the future; one may think this, but one is not sure. Reading against the grain of Bush's argument, I contend that this uncertainty stems not from the lack of devices such as the memex but from the act of reading itself.

In Bush's writing, and in prognoses for the information revolution more generally, there is no difference between accessing and understanding the record, between what would be called, perhaps symptomatically, machine reading and human reading and comprehension, between information and argument. The difficulty supposedly lies in selecting the data, not in reading them, for it is assumed that reading is a trivial act, a simple comprehension of the record's content. Once the proper record is selected, there is no misreading, no misunderstanding, only transparent information. If the scientific record has not been advanced, if thought is repeated, it is because something has not been adequately disseminated. Bush's argument assumes that human records make possible the construction of an overarching archive of human knowledge in which there is no gap, no absence—a summation of human knowledge. The scientific archive thus restores or should restore to man everything that has eluded him.[27] So if there is discontinuity in history it is due to a historical accident, to our inability to adequately consult the human record, to human fallibility. This accident, however, can be solved by machines, which are viewed here as surprisingly accident-free and permanent.

A machine alone, however, cannot turn "an *information explosion* into a *knowledge explosion*";[28] it cannot fulfill the promise of what Foucault has called traditional history. Even media as stable as microfilm fade and break, and this forgetting of the physics of the storage medium—this conversion of medium into storage—grounds Bush's progressivist and idealist ideology. Also, as the case of Mendel reveals, the problem is not access but rather larger epistemological frameworks. All three researchers who performed similar experiments to Mendel's thirty-five years after him consulted the scientific record and "found" Mendel, which means that Mendel's paper was not lost. The question is not, Why was Mendel forgotten? but rather, Why, in 1900, was he remembered (and exactly what was remembered) three times independently? And why, in the history of science, is Mendel constantly being rediscovered? As Jann Sapp argues in "The Nine Lives of Gregor Mendel," this constant reinvocation is linked to the desire, on the part of reformers, to pin Mendel down as the source of *their* genetics.[29] Repetition is thus not the evidence of thought wasted but of thought disseminated. Repetition, as Derrida has argued, makes the archival process both possible and impossible; it is the fever, the destruction, at the heart of the archive.[30] The pleasure of forgetfulness is to some extent the pleasure of death and destruction. It is thus no accident that this supplementing of human memory has also been imagined as the death of the human species in so many fictions and films and that déjà vu has been imagined as the mark of the artificial in *The Matrix*.

The example of Mendel is also revealing because this belief in sources—Mendel as the source of genetics, memex as the source of the Internet, and, as I have argued elsewhere, code as the source of our computers—is ultimately based on a conflation of storage with access, of memory with storage, of word with action.[31] This belief depends on our machines as being more stable and permanent and thus better record holders than human memory; it depends on an analogy between digital and analogue media. This belief is remarkably at odds with the material transience of discrete information and the Internet.

Digital media are not always there. We suffer daily frustrations with digital sources that just disappear. Digital media are degenerative, forgetful, erasable. This degeneration makes it both possible and impossible for them to imitate analogue media. They are perhaps history making, but only through their ahistorical (or memoryless) functioning, through the ways in which they constantly transmit and regenerate text and images. If, as Mary Ann Doane has argued, film as a historical artifact and the filmic moment as historical event are inextricably intertwined, the two are separated in digital media, and it is this separation that grounds computer memory as such.[32] The age of a computer memory device rarely corresponds with the age of the memory it holds; the device and its content do not fade together. If computer memory is like anything, it is like erasable writing; but if a penciled word can be erased because graphite is soft, a computer's memory can be rewritten because its surface constantly fades.

MOVING MEMORY

Von Neumann's *First Draft of a Report on the EDVAC* introduced the concept of stored-program computing and memory to the U.S. military and the academy. Intriguingly, it also began the freezing of memory and execution, key to the emergence of computers as media machines.

A hallmark of this report is its abstractness; rather than describing actually existing vacuum tubes and mercury delay lines, von Neumann used ideal "elements drawn not from telecommunications engineering but rather from Warren McCulloch and Walter Pitts's idealized, cyberneticized neurons (which were themselves inspired by the work of Alan Turing). These idealized neurons, like software after them, were based on a conflation of stimulus with action, word with result. McCulloch and Pitts sought to create 'a logical calculus of the ideas immanent in nervous activity' through a conflation of word with result, asserting that 'the response of any neuron [is] factually equivalent to a proposition which proposed its adequate stimulus.'"[33] That is, an instruction or program is functionally equivalent to its result. As I have argued elsewhere, this conflation grounds programming, in which process in time is reduced to process in space. As Edsger Dijkstra asserts in his famous "Go to Statement Considered Harmful," "The quality of programmers is a decreasing function of the density of go to statements in the programs they produce" because these statements go against the fundamental tenet of what Dijkstra considered to be good programming, namely, the necessity to "shorten the conceptual gap between the static program and the dynamic process, to make the correspondence between the program (spread out in text space) and the process (spread out in time) as trivial as possible."[34] That is, "go tos" make difficult the conflation of instruction with its product—the reduction of process to command, execution to legislation—which grounds the emergence of software as a concrete entity and commodity, which grounds programs as the source of a computer's actions. "Go tos" make it difficult for the source program to act as a legible source, painfully revealing the work necessary to make the source code a viable source and the fact that source code is only source code after the fact.[35] This glossing over of the vicissitudes of execution is also evident in von Neumann's discussion of memory.

Memory, which von Neumann initially viewed as afferent neurons, was also not a simple borrowing from biology. By calling certain parts of the computer a "memory organ," von Neumann was asserting, against biological evidence, that such an organ existed. This memory, unlike Bush's imaginings, was digital in form. Von Neumann's analogy between computer and human memory depended on a leap of faith. It was an analogy to something that, he admitted over ten years after the draft, was unknown but logically necessary. In *The Computer and the Brain,* von Neumann writes:

> It is just as well to admit right at the start that all physical assertions about the nature, embodiment, and location of [human memory] are equally hypothetical. We do not know where in the physically viewed nervous system a memory resides; we do not know whether it is a separate organ or a collection of specific parts of other already known organs, etc. It may well be residing in a system of specific nerves, which would then have to be a rather large system. It may well have something to do with the genetic mechanism of the body. We are as ignorant of its nature and position as were the Greeks, who suspected the location of the mind in the diaphragm. The only thing we know is that it must be a rather large-capacity memory, and that it is hard to see how a complicated automaton like the human nervous system could do without one.[36]

This statement, which seems so carefully qualified—we basically do not know what the memory is or where it resides—at the same time asserts the existence of a memory organ—or set of organs. This assertion assumes the separation of action from data, of order from machinic execution that was put in place by computers. That is, although stored-program computing stores instructions and data within the same memory registers, it also strictly separates process and data. This guess as to capacity assumes that the brain stores information as bits, which are then processed by it, and not as traces of events through the combination of neurons, which is a field-based or analogy-based system of memory. Von Neumann's nervous system is a digital calculator, not an analogue simulator.[37]

Von Neumann's concept of memory also blurs the boundary between machine and human. The machine memory was to contain values and orders that were usually stored in an outside recording medium, such as paper cards, but not all values were to be placed inside the machine at all times. The machine was to have a hierarchy of memories based on access time. The primary memory comprised expensive registers to be accessed quickly and, ideally, randomly. The Institute for Advanced Study machine used a Williams tube (basically a television tube) as its primary memory. This memory was supplemented by a secondary memory or storage medium that could hold in blocks values needed for a calculation.

Interestingly, the devices listed as possible secondary memories were also other forms of media: teletype tapes, magnetic wire or tapes, or movie film.[38] A third form of memory was "dead storage": the input or the output or, as von Neumann later put it in *The Computer and the Brain,* "the outside world."[39] This reference to the world outside the computer as memory conflates storage with medium, the dead with the live, the dead with the de/regenerative. It makes computer memory a form of filing, where the paper file—the natural automata's alleged secondary memory—is "ungenerative" and therefore deadly permanent.[40] Again, before the use of *regeneration,* the term in use was *store* (Charles Babbage's term), not memory. The predecessor to the EDVAC, the ENIAC, stored values in its function table, and although these were later used to store instructions, these function tables were not called memory. The term *memory* or, initially, *regenerative memory* enters with mercury delay lines and Williams tubes—nonstatic devices that can hold values because their signals degenerate. Quickly, however—indeed in the same document—the difference between dynamic and static devices is erased; as the modifier *regenerative* is dropped, all storage becomes memory.

Storage cum memory also links computers to genetics. Von Neumann included genes within his category of memory, erasing the difference between memory accessible to the human mind and memory accessible to the human body. Given the etymology of *mind* as the state of being remembered, this is an intriguing erasure. By making genes a form of memory, von Neumann also erases the difference between individual and transgenerational memory, making plausible Lamarckian transmission; if chromosomes are a form of secondary memory, they can presumably be written by the primary. This genetic linkage to memory makes clear the stakes of conflating memory with storage—a link from the past to the future. Indeed, stored instructions as genes (or an approximation of them) were key to von Neumann's theory of self-reproducing automata.[41]

Crucially, memory is an active process, not static. A memory must be held in order to keep it from moving or fading. Memory does not equal storage. While memory looks backward, according to the *Oxford English Dictionary,* to store is to furnish, to build stock. Storage or stocks always look toward the future. In computerspeak, one reverses common language because one stores something in memory. This odd reversal and the conflation of memory and storage glosses over the impermanence and volatility of computer memory. Without this volatility, however, there would be no memory. *Memory* stems from the same Sanskrit root for *martyr,* perhaps comparable to the ancient Greek term for "baneful," "fastidious." Memory is an act of commemoration—a process of recollecting or remembering.

The commemoration, of course, entails both the permanent and the ephemeral. Memory, especially artificial memory, has traditionally brought together the permanent with the ephemeral, for instance, the wax tablet with erasable letters—the inspiration for classical mnemotechnics. As Frances A. Yates explains, the rhetorician treated architecture as a writing substrate on which images, correlating to objects to be remembered, were inscribed. Summarizing the *Ad herennium,* she states:

> The artificial memory is established from places and images, . . . the stock definition to be forever repeated down the ages. A *locus* is a place easily grasped by the memory, such as a house, an intercolumnar space, a corner, an arch, or the like. Images are forms, marks or simulacra . . . of what we wish to remember. For instance if we wish to recall the genus of a horse, of a lion, of an eagle, we must place their images on definite *loci.*
>
> The art of memory is like an inner writing. Those who know the letters of the alphabet can write down what is dictated to them and read out what they have written. Likewise those who have learned mnemonics can set in places what they have heard and deliver it from memory. "For the places are very much like wax tablets or papyrus, the images like the letters, the arrangement and disposition of the images like the script, and the delivery is like the reading."[42]

Visiting these memorized places, one revives the fact to be recalled. This discussion of memory offers a different interpretation of the parallels between human and computer memory. The rhetorician was to recall a physical space within his mind; the image is not simply what is projected upon a physical space but also the space for projection. Similarly, computer memory (which too is organized spatially) is a storage medium *like* paper, but not quite. Both degenerate, revealing the limitations of the simile.

Memory as active process is seen quite concretely in early forms of regenerative memory, from the mercury delay line to the Williams tube. The serial mercury delay line took a series of electrical pulses and used a crystal to transform them into sound waves, which would make their way relatively slowly down the mercury tube (figure 9.1, top). At the far end, the sound waves would be amplified and reshaped.[43] One tube could usually store about one thousand binary bits at any given moment. Another early memory device, the Williams tube (figure 9.1, bottom), derived from developments in cathode ray tubes (CRTs); the television set is not just a computer's screen but was also once its memory. The Williams tube, when a beam of electrons hits its phosphor surface, produces not only a spot of light but also a charge. This charge will persist for about 0.2 seconds before it leaks away and can be detected by a parallel collector plate. Thus, if this charged spot can be regenerated at least five times per second, memory can be produced in the same manner as with the mercury delay tube. Current forms of memory also require regeneration. Today's RAM is mostly volatile and based on flip-flops, transistors, and capacitors, which require a steady electrical current. Although we do have forms of nonvolatile memory, such as flash memory, made possible by better insulated capacitors, they do have a limited read-write cycle.

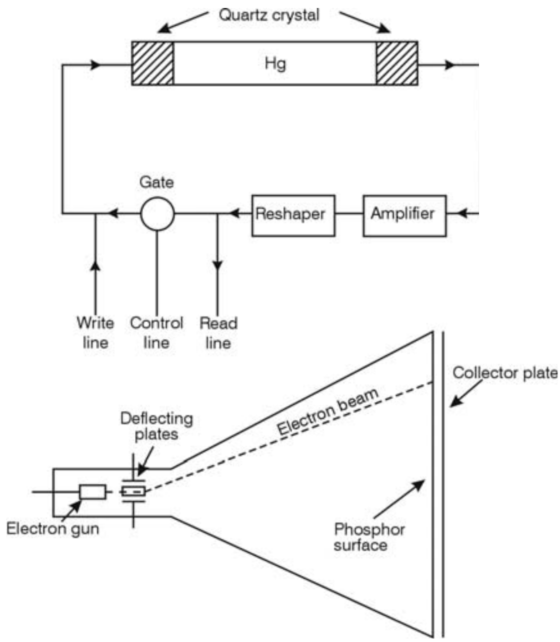


FIGURE 9.1. The mercury delay tube (top image) and the Williams tube (bottom). Drawings by Ian Bennett, based on originals by Michael R. Williams.

Thus, as Wolfgang Ernst has argued, digital media are truly *time-based media,* which, given a screen's refresh cycle and the dynamic flow of information in cyberspace, turn images, sounds, and text into discrete moments in time. These images are frozen for human eyes only.[44] Information is dynamic, however, not only because it must move in space but also, and more importantly, because degeneration—not regeneration—makes memory possible, while simultaneously threatening it. Digital media, which are allegedly more permanent and durable than other media (film stock, paper, and so on), depend on a degeneration actively denied and repressed. This degeneration, which engineers would like to divide into useful and harmful (erasability vs. signal decomposition, information vs. noise) belies the promise of digital computers as permanent memory machines. If our machines' memories are more permanent, if they enable a permanence that we seem to lack, it is because they are constantly refreshed so that their ephemerality endures, so that they may store the programs that seem to drive our machines.

This enduring ephemeral—a battle of diligence between the passing and the repetitive—also characterizes content. The Internet may be available 24/7, but specific content may not. Further, if things constantly disappear, they also reappear, often to the chagrin of those trying to erase data. When Article III Groupie (A3G), the gossipy conservative and supposedly female author of underneath theirrobes.blogs.com, came out as a thirty-year-old Newark-based U.S. attorney named David Lat in an interview with the *New Yorker,* his site was temporarily taken down by the U.S. government.[45] Archives of his site—and every other site that does not reject robots—however, are available at the Internet Wayback Machine (IWM, web.archive.org) with a six-month delay.

Like search engines, the IWM comprises a slew of robots and servers that automatically and diligently, and in human terms obsessively, back up most Web pages. Also like search engines, they collapse the difference between the Internet, whose breadth is unknowable, and its backups; unlike search engines, the IWM uses these data not to render the Internet into a library but rather to create what it calls a "library of the Internet." The library the IWM creates, though, is certainly odd, for it has no coherent shelving system; the IWM librarians do not offer a card catalogue or a comprehensive content-based index.[46] This is because the IWM's head librarian is a machine, capable only of accumulating differing texts. That is, its automatic power of discrimination detects only updates within a text. The IWM's greatest oddity, however, stems from its recursive nature, it and its archives (the IWM diligently archives itself) are themselves included among the objects of its archive.

Logically, IWM is also recursive; the imperfect archives of the IWM are supposedly crucial to the ongoing relevance of libraries. The creators behind IWM state, "Libraries exist to preserve society's cultural artifacts and to provide access to them. If libraries are to continue to foster education and scholarship in this era of digital technology, it's essential for them to extend those functions into the digital world."[47] The need for cultural memory drives the IWM and libraries more generally. Noting the loss of early film archives due to the recycling of early film stock, the archivists state that they are building an "Internet library" because

> without cultural artifacts, civilization has no memory and no mechanism to learn from its successes and failures. And paradoxically, with the explosion of the Internet, we live in what Danny Hillis has referred to as our "digital dark age."
>
> The Internet Archive is working to prevent the Internet—a new medium with major historical significance—and other "born-digital" materials from disappearing into the past. Collaborating with institutions including the Library of Congress and the Smithsonian, we are working to preserve a record for generations to come.[48]

The IWM is necessary because the Internet, which is in so many ways *about* memory, has, as Ernst argues, no memory—at least not without the intervention of something like the IWM.[49] Other media do not have a memory, but they do age, and their degeneration is not linked to their regeneration. This crisis is brought about also because of the blind belief in digital media as memory. This belief in the Internet as cultural memory, paradoxically, threatens to spread this lack of memory everywhere and plunge us negatively into a way-way-back machine: the so-called digital dark age. The IWM thus fixes the Internet by offering us a "machine" that lets us control our movement between past and future by regenerating the Internet on a grand scale. The IWM is appropriate in more ways than one; because Web pages link to, rather than embed, images, which can be located anywhere, and because link locations always change, the IWM preserves only a skeleton of a page, filled with broken—rendered—links and images. These pages are not quite dead, but not quite alive either; the proper commemoration requires greater effort. These gaps or this skeleton visualizes not only that our constant regenerations affect what is regenerated but also how these gaps—the irreversibility of this causal programmable logic—open the Web as archive to a future that would not be a simple memory upgrade of the past. Repetition and regeneration open the future by creating a nonsimultaneous new that confounds the chronological time they also enable. Consider, for instance, the temporality of weblogs. Blogs seem to follow the timing of newspapers in their plodding chronology, but they contain within themselves archives of their posts, making the blog, if anything, like the epistolary novel. Unlike the epistolary novel, which, however banal, was focused around a plot or a moral, the blog entries are tied together solely by the presence of the so-called author. What makes a blog uninteresting is not necessarily its content, which often reads like a laundry list of things done or to do, but rather its immobility. The ever-updating, inhumanly clocked time in which our machines and memories are embedded and constantly refreshed makes its material stale. The chronology, seemingly enabled by this time, is also compromised by these archives and the uncertainty of their regular reception. An older post can always be "discovered" as new; a new post is already old. This nonsimultaneity of the new, this layering of chronologies, means that the gap between illocutionary and perlocutionary in high-speed telecommunications may be dwindling, but—because everything is endlessly repeated—response is demanded over and over again. The new is sustained by this constant demand to respond to what we do not yet know; the goal of new media czars is to constantly create desire for what one has not yet experienced.

To put it most bluntly, this nonsimultaneity of the new—this enduring ephemeral—means we need to get beyond speed as the defining feature of digital media or global networked communications. Virilio's constant insistence on speed as distorting space-time and on real time as rendering us susceptible to the dictatorship of speed has generated much good work in the field, but it can blind us to the ways in which images do not simply assault us at the speed of light.[50] Just because images flash up all of a sudden does not mean that response or responsibility is impossible or that scholarly analysis is no longer relevant. As the new obsession with repetition reveals, an image does not flash up only once. The pressing questions are, Why and how is it that the ephemeral endures? And what do the constant repetition and regeneration of information effect? What loops and what instabilities do they introduce into the logic of programmability?

Digital media networks are based not on the regular obsolescence or disposability of information but rather on the resuscitability or the "undeadness" of information. Even text messaging, which seems to be about the synchronous or the now, enables the endless circulation of forwarded messages, which are both new and old. Reliability is linked to deletion; a database is considered to be unreliable (to contain "dirty data") if it does not adequately get rid of older inaccurate information. Also, this repetition, rather than detracting from the message, often attests to its importance. Repetition becomes a way to measure scale in an almost inconceivably vast communications network.

Rather than getting caught up in speed, then, we must analyze, as we try to grasp a present that is always degenerating, the ways in which ephemerality is made to endure. What is surprising is not that digital media fade but rather that they stay at all and that we stay transfixed by our screens as their ephemerality endures.

NOTES

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1. After 9/11, the discourse of the Internet as inherently good came under attack. Steven Levy, among other authors who had fought against the Communications Decency Act, suddenly "discovered" the dark side of the Internet, writing, "Modern technologies that add efficiency, power and wonder to our lives inevitably deliver the same benefits to evildoers. The Internet is no exception" (Steven Levy, "Tech's Double-Edged Sword," *Newsweek* [Nexis], September 24, 2001). After the dotcom boom, criticality was also the buzzword in more academic circles. For instance, the Inter-Society for Electronic Arts 2004 symposium, one of the largest and longest-running international digital art symposiums, emphasized themes such as critical interactivity and had a reflective focus. In contrast, the 2006 symposium emphasized themes such as "transvergence," arguing, "New ideas and possibilities never before considered become evident when diverse disciplines intersect" (Steve Dietz, "ZeroOne San Jose / ISEA2006 Themes," February 17, 2006, 01sj.org/content/view/188/30/). Hyperpolis 3.0, a small annual new-media conference, also emphasized "really useful media" for its 2006 conference, arguing that we already know too much about "media communications technologies as instruments of social control . . . about media discourses as, on the one hand, 'popular culture': alienated and commodified cultural forms; and on the other, 'cultural theory': paranoid cosmologies of hyper-rhetoric, and the ubiquitous inevitability of evil" (Integrated Digital Media Institute, "Call for Papers/Proposals," June 15, 2006, TedLog, www.tedfriedman.com/cfps/2005/06/61506_hyperpoli.php). Importantly, the criticality discovered after 9/11 also rewrote history, erasing the critical strains in digital media that had always existed.

2. See Howard Rheingold, *Smart Mobs: The Next Social Revolution* (Cambridge, MA: Perseus,

2002); John Markoff, "Entrepreneurs See a Web Guided by Common Sense," *New York Times,* November 12, 2006.

3. See the Web site www.fibreculture.org/.

4. For more on the mid- to late-1990s utopian vision of the Internet, see Wendy Hui Kyong Chun, *Control and Freedom: Power and Paranoia in the Age of Fiber Optics* (Cambridge, MA: MIT Press, 2006).

5. See David Lieberman, Peter Johnson, and Gary Levin, "NBC Universal Plans Cost Cuts, Layoffs," *USA Today,* October 20, 2006.

6. See Michael Arrington, "85% of College Students Use FaceBook," *TechCrunch* 7 (September 2005), www.techcrunch.com/2005/09/07/85-of-college-students-use-facebook/, and Ryan Lizza, "The YouTube Election," *New York Times,* August 20, 2006

7. See Lev Manovich, *The Language of New Media* (Cambridge, MA:, MIT Press, 2001); "Interview with Peter Lunenfeld," interview by Geert Lovink, July 31, 2000, www.nettime.org/Lists-Archives/nettime-l-0008/msg00008.html.

8. See William Gibson, *Pattern Recognition* (New York: Putnam Adult, 2003).

9. Geert Lovink, *My First Recession: Critical Internet Culture in Transition* (Rotterdam: V2 / NAi Publishers, 2003), 12.

10. See McKenzie Wark, "The Weird Global Media Event and the Tactical Intellectual [Version 3.0]," in *New Media, Old Media: A History and Theory Reader,* ed. Wendy Hui Kyong Chun and Thomas Keenan (New York: Routledge, 2006), 265–76.

11. Paul Virilio, "Speed and Information: Cyberspace Alarm!" *CTheory,* August 27, 1995, www.ctheory.net/articles.aspx?id=72, "The Visual Crash," in *Ctrl [Space]: Rhetorics of Surveillance from Bentham to Big Brother,* ed. Thomas Y. Levin, Ursula Frohne, and Peter Weibel, exh. cat., Center for Art and Media, October 12, 2001–February 24, 2002 (Cambridge, MA: MIT Press, 2002), 112, and "Red Alert in Cyberspace!" 1995, www.watsoninstitute.org/infopeace/vy2k/red-alert.cfm.

12. Lev Manovich, "New Media from Borges to HTML," in *The New Media Reader,* ed. Noah Wardrip-Fruin and Nick Monfort (Cambridge, MA: MIT Press, 2003), 13.

13. If the validity of the scientific method rests on (hypothetical) experimental reproducibility, the validity of a humanities-based critique depends on access to cited documents. The fact that criticism still happens reveals the extent to which both humanities and scientific scholarship itself depends on a "virtual witnessing." For more on the importance of virtual witnessing to the scientific method, see Steven Shapiro and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton: Princeton University Press, 1989), and Peter Dear, *Discipline and Experience: The Mathematical Way in the Scientific Revolution* (Chicago: University of Chicago Press, 1995).

14. Lovink, *My First Recession,* 15, 42.

15. McKenzie Wark, "Robot Journalists and the Ironies of Tactical Media," May 15, 2002, www.nettime.org/Lists-Archives/nettime-l-0205/msg00093.html.

16. Most influentially, Raymond Williams has theorized television in terms of flow in his *Television: Technology and Cultural Form* (London: Routledge, 1974), and Jane Feuer has analyzed the ideology of liveness and the relationship between flow and segmentation in "The Concept of Live Television: Ontology as Ideology," in *Regarding Television: Critical Approaches—An Anthology,* ed. E. Ann Kaplan (Frederick, MD: University Publications of America, 1983), 12–22.

17. Manovich, in *Language of New Media,* for instance, makes parallels between new media and film, virtually ignoring TV altogether. For TV and the ideology of liveness, see Feuer's "Concept of Live Television." For more on the differences and similarities between TV and the Internet, see Wendy Hui Kyong Chun, "Why Cyberspace," in *Control and Freedom,* 37–76.

18. The move from calculator to computer is also the move from mere machine to human-emulator; the term *computer* was first resisted by IBM because computers were initially human. To

call a machine a computer was to imply job redundancy; see Martin Campbell-Kelly and William Aspray, *Computer: A History of the Information Machine* (New York: Basic Books, 1996), 115.

19. See John von Neumann, *First Draft of a Report on the EDVAC,* in *The Origins of Digital Computers,* ed. Brian Randell (Berlin: Springer, 1973), 357.

20. Lizza, "YouTube Election."

21. For more on this ideal and its incapacity to explain public behavior, see Thomas Keenan, "Publicity and Indifference (Sarajevo on Television)," *PMLA* 117 (January 2002): 104–16.

22. See Vannevar Bush, "As We May Think," *Atlantic Monthly,* July 1945, www.theatlantic.com/doc/194507/bush.

23. See Douglas Engelbart, "Augmenting Human Intellect: A Conceptual Framework," 1962, www.bootstrap.org/augdocs/friedewald030402/augmentinghumanintellect/ahi62index.html; Ted Nelson, *Literary Machines: The Report on, and of, Project Xanadu Concerning Word Processing, Electronic Publishing, Hypertext, Thinkertoys, Tomorrow's Intellectual Revolution, and Certain Other Topics Including Knowledge, Education, and Freedom* (Sausalito, CA: Mindful Press, 1981).

24. See Manovich, "New Media."

25. Indeed, Bush deliberately contrasted the memex to expensive digital computers in his "Memex Revisited," in Chun and Keenan, *New Media, Old Media,* 85–95.

26. Ibid., 85.

27. This is Foucault's description of traditional history in his *The Archaeology of Knowledge,* trans. A. M. Sheridan Smith (New York: Pantheon, 1982).

28. Wardrip-Fruin and Montfort, introduction to "As We May Think," in Wardrip-Fruin and Nick Monfort, *New Media Reader,* 35.

29. See Jann Sapp, "The Nine Lives of Gregor Mendel," in *Experimental Inquiries: Historical, Philosophical, and Social Studies of Experimentation in Science,* ed. H.E. Le Grand (Dordrecht: Kluwer, 1990), 137–66.

30. See Jacques Derrida, *Archive Fever: A Freudian Impression,* trans. Eric Prenowitz (Chicago: University of Chicago Press, 1996).

31. See Wendy Hui Kyong Chun, "Code as Media," unpublished paper.

32. See Mary Ann Doane, *The Emergence of Cinematic Time: Modernity, Contingency, the Archive* (Cambridge, MA: Harvard University Press, 2002), 223.

33. Warren McCulloch and Walter Pitts, "A Logical Calculus of the Ideas Immanent in Nervous Activity," in McCulloch, *Embodiments of Mind* (Cambridge, MA: MIT Press, 1965), 21.

34. Edsger W. Dijkstra, "Go to Statement Considered Harmful," in *Software Pioneers: Contributions to Software Engineering,* ed. Manfred Broy and Ernst Denert (Berlin: Springer, 2002), 352.

35. The argument that source code is only source code after the fact draws from my work in "Code as Media." In it, I stress the fact that source code is historically posterior to object code—source code emerged with the introduction of higher-level programming languages and early programmers debugged the "object" rather than the source code. Source code is not executable. For it to become so, it must be compiled or interpreted, and this making-executable of code is not a trivial action; compiling code is not the same as translating a decimal number into a binary one. Rather, it involves instruction explosion and the translation of symbolic into real addresses, that is, a breakdown, using numerical methods, of the steps needed to perform what seems a simple arithmetic calculation. This is most clear in the use of numerical methods to turn integration—a function performed fluidly in analogue computers—into a series of simpler arithmetical steps. Also, some programs may be executable, but not all compiled code within that program is executed; rather, lines are read in as necessary. So source code only becomes source after the fact.

36. John von Neumann, *The Computer and the Brain* (1968; repr., New Haven: Yale University Press, 2000), 61.

37. For more on the brain as an analogue simulator, see Alain Berthoz, *The Brain's Sense of Movement,* trans. Giselle Weiss (Cambridge, MA: Harvard University Press, 2000).

38. See Arthur W. Burks, Herman H. Goldstine, and John von Neumann, *Preliminary Discussion of the Logical Design of an Electronic Computing Instrument* (Princeton: Princeton University Press, 1947), 6.

39. Von Neumann, *Computer and the Brain,* 36.

40. This notion of memory as static files is linked to von Neumann's suspicion, perhaps drawn from psychoanalysis, that memories never die. McCulloch's paper "Why the Mind Is in the Head" followed von Neumann's "General and Logical Theory of Automata" at the same Hixon symposium; in it, McCulloch writes:

> I see an argument that one might make against the view that memory in any form actually resides in the neurons. It is a negative argument, and far from cogent. How reasonable is it? This is the argument: There is a good deal of evidence that memory is static, unerasable, resulting from an irreversible change. (This is of course the very opposite of a "reverberating," dynamic, erasable memory.) Isn't there some physical evidence for this? If this is correct, then no memory, once acquired, can be truly forgotten. Once a memory-storage place is occupied, it is occupied forever, the memory capacity that it represents is lost; it will never be possible to store anything else there. What appears as forgetting is then not true forgetting, but merely the removal of that particular memory-storage region from a condition of rapid and easy availability to one of lower availability. It is not like the destruction of a system of files, but rather like the removal of a filing cabinet into the cellar. Indeed, this process in many cases seems to be reversible. Various situations may bring the "filing cabinet" up from the "cellar" and make it rapidly and easily available again. McCulloch, *Embodiments of Mind:* 92–93. Von Neumann's move to files is intriguing, especially given the importance of files—and of disposing files—to modern bureaucracy and state power. For more on this, see Cornelia Vismann, *Files: Law and Media Technology,* trans. Geoffrey Winthrop-Young (Stanford, CA: Stanford University Press, 2008).

41. See John von Neumann, "The General and Logical Theory of Automata," in *Papers of John von Neumann on Computing and Computer Theory,* ed. William Aspray and Arthur Burks (Cambridge, MA: MIT Press, 1987), 421.

42. Frances Yates, *The Art of Memory* (Chicago: University of Chicago Press, 1966), 6–7.

43. See Michael R. Williams, *A History of Computing Technology* (Englewood Cliffs, NJ: Prentice Hall, 1977), 306–16.

44. See Wolfgang Ernst, "Dis/continuities: Does the Archive Become Metaphorical in Multimedia Space?" in Chun and Keenan, *New Media, Old Media,* 118. Although this is certainly true for CRT screens, it is not necessarily true for LCD screens, which operate more like blinds that allow certain portions of light through or not.

45. See Jeffrey Toobin, "SCOTUS Watch," in "The Talk of the Town," *New Yorker,* November 2005.

46. This is because there are no shelves, no fixed relation between what is storable and the place where they are stored. As Harriet Bradley has argued, the Internet breaks the bond between location and storage; if before "only what has been stored can be located," now "memory is no longer located in specific sites." Harriet Bradley, "The Seductions of the Archive: Voices Lost and Found," *History of the Human Sciences* 12, no. 2 (1999): 113.

47. "About the Internet Archive," n.d., www.archive.org/about/about.php (accessed July 28, 2010.

48. Ibid.

49. See Ernst, "Dis/continuities," 119.

50. See Virilio, "Visual Crash" and "Speed and Information."

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PART III

Between Analogue and Digital

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MEDIA ARCHAEOLOGY HAS FOCUSED EXTENSIVELY on screen cultures and visuality but to a lesser extent on issues such as sound media and computer software (despite Friedrich Kittler's personal interest in both). The writings in this section address both of these lacks, emphasizing that media culture is grounded in issues like technically mediated materiality, noise, trash, and computational processes specific to software systems.[1] The section can be read as a contribution toward rethinking media archaeology in terms of failure and noise at the core of new technologies. Instead of considering such contexts as "accidental" or sporadic, the viewpoints provided by the authors can be mapped onto the normalized narratives of digitality.

Paul DeMarinis and Jussi Parikka offer "noisy" archaeologies related to decay, misinformation, and miscommunication. As a media-archaeologically inclined artist, DeMarinis focuses on the artistic appropriation of media history. His version of media archaeology is informed by his own interest in the odd materialities of technical media. His own work since the 1980s has introduced creative reenactments of media history and brought the past into active proximity with the ideological discourses surrounding new media like digital sound and the Internet. DeMarinis also excavates early technologies of communication by discussing artistic projects by others, including Yasunao Tone and Jocelyn Robert. The chapter maps the processes of recording and notation as practices of material inscription. The early inventors Samuel Finley Breese Morse, Thomas Edison, and Raoul Hausmann are revisited, also to illuminate the present. The current media culture appears as one of marks and noises. Every shift between sensory modalities involves losses and gains, just as any translation (e.g., from analog to the digital) involves erasure.

Wolfgang Ernst's chapter emerges from the context of "media materialism" associated with Kittler, polemically arguing that media archaeology should be less about writing a narrative human history of media than about excavating the material modes of inscription inherent in technical media such as phonographs. For Ernst, media-*archaographical* writing machines are the real subjects of media archaeology. Instead of human textuality and cultural semiotics, machines in their mediatic logic rely on digital signal processing as their cultural technology. For Ernst, technical media inscribes much more than the human senses can even perceive.

Jussi Parikka's chapter elaborates on the themes of noise and the seemingly unwanted trash culture that permeate digitality as well. In its peculiar materiality noise seems to escape the semiotic logic of cultural analysis. Parikka shows that the unwanted part of communication—noise—has been an integral part of the German brand of media archaeology from Kittler to Ernst. "Noise" is not merely an unwanted side effect; it can be conceptualized as part of the tactics and politics of media as well, for example, through designed interceptions and interruptions of communication by the military. Although the chapter does not discuss the practices of cyberwar, such implications should be clear. Power is embedded not only in functioning technologies but also in dysfunctionality, the breakdown and destruction of communication.

Casey Alt approaches the archaeology of software with the help of Gilles Deleuze, focusing on the notion of object-oriented programming (OOP). For Alt, OOP is an "abstract machine" whose role extends beyond computing culture. The emergence of OOP transformed computers from "number crunchers" to visual design machines. With object orientation, computerized media becomes a pervasive part of noncomputational world, and the logic of software interfaces with everyday life.[2] Finally, Alt revisits the writings of computer pioneer Alan Kay, who felt he had concretized through software techniques Marshall McLuhan's idea about media and environment: "Once we have shaped tools . . . they turn around and 'reshape us.'"

Noah Wardrip-Fruin also develops a media archaeology of software cultures, but in a context that could befit the notion of "imaginary media" as well. He moves from an emphasis on "meaning" to the material processes that govern the surface. Analyzing Christopher Strachey's "Love letter Generator" (1952) and its software structure, the chapter bridges the early phases of computer culture and contemporary digital art. It concludes with is a nod toward specifying digital media archaeology as software studies of processes; the inherent and designed "failure" of the Strachey-Generator is a parody of practices of writing love letters—but hence also an index of temporal processuality of digital machines. This observation has implications for the methodology of media archaeology, argues Wardrip-Fruin, and points toward the need to critically inspect the underlying logic of software processes that increasingly govern the narratives and visual surfaces of contemporary culture. Software studies as a field needs its own archaeologists, the chapter argues.

NOTES

1. The archaeology of sonic media has been recently addressed by a wide array of pioneering research. See, for example, Douglas Kahn, *Noise, Water, Meat: A History of Sound in the Arts* (Cambridge, MA: MIT Press, 1999); Emily Thompson, *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900–1933* (Cambridge, MA: MIT Press, 2004); Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Production* (Durham: Duke University Press, 2003). In addition, Kittler has written extensively on music in his *Musik und Mathematik,* vol. 1, *Hellas* (Munich: Wilhelm Fink, 2006). The study is part of a much more extensive project that maps the interconnections of music and mathematics in Western culture.

2. In *The Language of New Media* (Cambridge, MA: MIT Press, 2001), Lev Manovich argued that one of the crucial analytical frameworks for understanding new media was the interfacing of the computational with the cultural and that media studies needed to turn into software studies. In addition to the computational grounding in numerical and algorithmic executions of software, the cultural interface adopted much of its characteristics from cinema as the key reference point in its narrative techniques and form.

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10

Erased Dots and Rotten Dashes, or How to Wire Your Head for a Preservation

Paul DeMarinis

We are the first culture to experience our own archaeology on a daily basis. Consider all the drawers, closets, and garages full of obsolete technological junk that only a few years ago represented a healthy investment and pride of ownership, not to mention an aura of utility. We endure the reek of flopping diskettes, the embarrassing bulge of zip drives, and a plethora of unplayable interactive CD-ROMS. There they rest, undergoing a slow decay—the bleeding out of readability. The codes present on their surfaces require other codes resident in no longer supported mass storage hardware, to be offered up by no longer extant operating systems to software applications that are no longer maintained. These codes are rendered unreadable not only by obsolescence but by contagion. They suffer the unavoidable disease of bit rot, because there isn't any pure information devoid of material. The bits of information are stored as modulations in the structure of material objects—as color, reflectivity, residual magnetism, buried charge—and these materials change form, composition, and position over time, erasing the data stored there.

If we, as the Good Book says, are ashes, then digital memory is rust. This is made palpable by the almost surreal sensation of latency we endure as we play with our digitalia. It is surreal in the sense that we have become accustomed not to notice it. During the interval while we wait for a file to copy or for an Internet download, we experience a nonduration, measured out not in coffee spoons but in accumulated microseconds of denial. Certainly, electrons could travel around the earth millions of times in that interval. So why the wait? Because as data pass through servers and routers, or from one application to another, they are alternately stored as speed-of-light charge packets in semiconductors, wires, and waves, and then as tiny patches of magnetic flux on iron oxide–coated spinning platters in disk drives—from ether to rust and back again, over and over. Relay, Delay, Memory. In the vast flux of signs going between ether and rust, the moment of transfer from energy to matter is heralded by a click. This primordial sign of the passage of meaning from one phase to another was first defined by the click of the telegraphic relay, and it continues to reverberate in the noise of the digital, in the torrents of state transitions between 0s and 1s. It is this noise, and the potential bridge it offers between seeing and hearing, that emerges as the apotheosis of our age.

In this chapter I will discuss a series of technological devices and several contemporary art practices that forge as well as break links between marks and noises, between physical records and sensations. Therefore of particular interest as a starting point would be the lines drawn among sounds, recordings, and notations. Wittgenstein makes specific reference to a proposed logic: "A gramophone record, the musical idea, the written notes and the sound waves, all stand to one another in the same internal relation of depicting that holds between language and the world. They are all constructed according to a common logical pattern."[1] But this logic begins to break down as soon as we encounter the lossy relations that exist between material and code. The world, Wittgenstein's *Tractatus* proposes, is the totality of facts, not things. The immediate problem that arises is that when facts are encoded as things we must somehow come to terms with the relation between the fact and its material encoding, transmission, and processing. The distinctions among, and connections between, sensation, memory, and physical record stand at the center of our discussion, and a host of philosophical and scientific theories arrange and connect them.

Two paradigms have been posed for encoding and recording, commonly referred to as analogue and digital. Practitioners with unconsciously technofuturist thought habits commonly err when they refer to analogue as "old" and digital as "new." They furthermore imagine the "real" world to be analogue in nature, instead of merely material. Analogue and digital, in historical terms, are two concepts with a common origin, although they have been cast as a contradistinctive pair to make a point about computational methods as applied to machines and also to illustrate how material substances can be made to represent information about position, energy, and sequence.[2]

If memory is linked to neural processing of place sequence, as recent studies of learning within the hippocampal areas of the brain suggest, then either model, digital or analogue, might apply. There is what we could term the Edisonian sort of analogue memory, akin to the phonograph record, with its soft, homogenous, and impressionable wax that offers itself up to receive any impressions in a trace that bends and curves sinuously across its surface. On the other hand, there is the telegraphic type: the digital system of relays, the repetitive measuring of physical state, followed by the erasure and rewriting of that state, propagating recursively through space and time. In this memory sequence the instant of erasure is a moment of suspension, a thermodynamic inflection of eternity. These two models—the delicate memory we dare not revisit for fear of altering it and the memory we drill into ourselves with repeated practice ("use it or lose it")—resonate well with our inner mental life. They propose alternately a personal and a social model of self-knowledge. It may be that we remember, or know, or locate meaning in the relaying of stimuli from one sense to another. Historic models of the senses asserted that the sense of touch links together the other senses and thereby underlies cognition.[3] This model of memory, more closely allied with the telegraphic, appears to offer some insights into the loss and gain of meaning in digital media.

The artifacts of digital degeneration are by no means newcomers to the content of artworks. Not limited to looping and skipping, accumulated errors and mistranslations, normalization, or mapping of data sets onto a multiplicity of sensory domains, they have become too widespread in artistic practices over the last decade to permit a comprehensive survey of any but the most superficial sort. A historical line from the pixelations of 1968's *Cybernetic Serendipity* through classic works by Vuk Cosic and Gerfried Stocker in the early 1990s to the current plethora of museum-worthy ornaments would attempt to cover too much aesthetic territory and likely bog down in the crosscurrents of cultural intentions.

While these ideas could suggest a point of departure for a discussion of a number of contemporary artists' works, the works of Jocelyn Robert and Yasunao Tone offer good opportunities for a media-archaeological investigation. Both artists employ technological error as a creative tool and in ways that touch directly upon the transformative vulnerability of digital storage. Both use the translative powers of digital systems as a way to navigate oceans of meaning between the shores of marks and noises. They both tickle at the very edges of the media they use and confront the cultural milieus of their presentation and the forms of sensory attention they engender. Though hardly household names, both artists were pioneers in this sort of work and have continually been at the forefront of its development over the last two decades. Moreover, both artists use the media in highly nuanced ways that I believe to stand in full awareness of the historical context of contemporary media technologies. In particular, they understand the position of the textual object as it intersects the two apparently noncongruent planes of image and sound.

Robert's peripatetic practice employs object, sound, video, electronics, and text singly and in combination. His frequent focus on errors, both machine- and manmade, as a generative tool and as a subject of reflection, and his use of existing corpus-objects like pianos and dictionaries as self-referencing lookup tables, pose questions for the viewer that can be answered only by a deep probing into the nature of the technological materials he treats. Tone's work may be regarded as an almost unbroken line of transfer and evolution of a core set of materials, commencing with a series of eighth-century texts that are translated in turn from sign to image to sound to object and back again, each piece building upon the ashes of the previous. Most importantly, however, both artists use the media to make transfers between sounds and signs in a manner that is highly significant to my understanding of the origins of media technologies.

As a practicing artist myself, I do not pretend to offer a definitive interpretation of the manifold connections and evolving meanings of these artists' works. Although neither artist adheres to a media-archaeological agenda, I think that such a treatment can offer a context for their works, and perhaps the works of others, within a broader history of culture, ideas, and technology. But it first requires a suitable backdrop: in the following exposition of electronic media history I offer an idiosyncratic take on historical facts in the hopes of reaching a conclusion admittedly rife with contradiction, controversy, and unresolved questions but hopefully congruent with the peculiarities of the artworks in question.

The disembodied minds of inspiration floating over this essay are easily named: the inventors Samuel Finley Breese Morse, Thomas Edison, and Raoul Hausmann—two of whom were also artists. The inventions (by which I mean the complex of devices, practices, and expectations) that I will examine are Morse's electric telegraph, Edison's mechanical phonograph, and Hausmann's optophone. As in a media-archaeological context, these distant artifacts are recast as tools to excavate the present. It is my intention to show how these three primary devices are not only related in their technological wherewithal or social setting but intimately connected in the fabric of our media culture—the culture of marks and noises. In the case of the telegraph and the phonograph, the etiology of that connection is well documented if not widely appreciated. But the optophone, a device that has been widely discussed in the context of sensory theory—in large part because of its (admittedly late) adaptation by Hausmann—appears in much critical literature to be a device apart. By tracing its antecedents and its relations to the telegraph and the phonograph, I hope to tap into deeper cultural sources that shed light on contemporary practices in media art.

The telegraph, the optophone, and the phonograph are all devices that perform interchanges between marks and noises. In this interchange the acts of encoding, storage, retrieval, and interpretation exist as stages, acts that are at the whim of unspoken conventions and habits and forms of attention, both human and systemic. When those unrecorded conventions change, the system breaks down. But more important, these unrecorded conventions can serve as a surface for free interplay among the marks and noises, as will be shown in an examination of the works of the artists discussed here. Noise—an immaterial and transient sign—is a precursor of all signals, whether ether waves, pulses of current in a wire, or photonic flashes, while marks are prototypical of all types of materially encoded data: scratches, magnetic domains, pits in a specular surface.

Another point I will be examining is that, where noises are heralds of a presence—a surplus, so to speak—marks are invariably encoded as material absences. The pits on a CD, even the groove of a record—both of these are sculptural excisions, but more profoundly, the technical fact that telegraphic signals were conveyed by cutting the flow of electricity rather than turning it on may call into question the whole idea of electrical communications as *communication*.

To construct a sufficient technological background for my examination of these artists' works, and one with the right feel for the material, I will embark on an excursion into three key devices that cast light on my artistic subjects. The material covered is fairly canonical and has been treated extensively in histories of technology, but several of the insights I offer are perhaps unique, and these will help me lay out my program and in the end achieve an appropriately unorthodox conclusion.

MEMORIES ARE MADE OF THIS

The electromagnetic relay is among the simplest electrical devices possible: a coil of wire, energized by an electric current, generates a magnetic field and pulls a bar of iron toward it. This bar moves a set of electrical contacts to complete another circuit that energizes the next electromagnet down the line. Aware of this amplifying effect as early as 1837, Morse felt assured from the start that it did not matter if the force of the coil was enough to make a mark. As long as it could make any movement at all, this movement could be amplified by another set of electrical contacts and a local set of batteries. The "relay" system not only acted as a means for amplifying and propagating a signal across space but served as a primitive memory element in the telegraphic system, a dynamic factor that could store the message, however briefly, so that it could be sent the next twenty miles.[4] Imagining the sequential volleys of relays stretching from coast to coast, one might consider it, as it was considered by its contemporaries, to be a nerve network. In some sense, then, the vast terrain traversed by wires and repeater stations becomes part of the known world, perhaps as much as if it had been picked over by teams of botanists, ethnologists, and photographers.

If memory is just a specialized case of delay, then the electromagnetic relay, I propose, is the first instance of a storage medium that shares key properties with subsequent and current forms of computer memory. As such, it offers insights into our electronic media and media art practices. In particular the dynamic nature of these memory technologies is important in arriving at an understanding of the roles of bit rot, loss, preservation, and degradation at play in the works of contemporary artists.

A surprising variety of technologies have been used as mechanical memory in the decades following the invention of the computer. A number of characteristics are common among most of them and present in the many forms of digital memory employed in today's computers. These include unit cells that can be saturated in one of two informational states (bit), vector- or arraylike configurations that facilitate addressing, some means of separating the acts of reading and writing, and, very often, the requirement that data be read and rewritten, or updated.

Electromagnetic relays almost identical to Morse's design became the very first form of electronic memory technology in digital computers. Their saturated activated and inactivated states could be used to represent 0s and 1s as conductive paths of electric current through a system. Later innovations replaced the relays with vacuum tubes, but both forms were prohibitively expensive for all but the most numerically intensive elements of the computer. Early forms of mass storage were realized with a number of dynamic memory schemes. The mercury delay line used acoustic waves traveling along a channel of liquid mercury as a recycling storage medium for data. At one end a small vibrating transducer created precisely ordered ripples in the surface of the liquid metal. These waves propagated to the other end, where they were received by a microphone-like device, translated back into digital electronic signals and into the central memory of the computer. At this point the computer could modify, or not, the data and send them back to the start of the delay line again. This cycle of eternal return was mandatory, or the data were lost.

Another remarkable dynamic memory device from the 1950s was the Williams tube—in essence, a television that no one was watching, or a television that was watching itself. It consisted of a cathode ray tube, with an electron gun and magnetic deflection, but with a front surface—the place where the image is usually viewed—covered by a metal plate that acted as a kind of electronic mirror to trap charges. The computer could write blips of light to the phosphor on the screen that would represent a bit of data. The charge stored between the point of light and the metal plate would endure for a brief period during which the electron beam could revisit, read, and rewrite the bit. Any memory not revisited soon enough would vanish, converging nicely with notions of short- and long-term memory then emerging in cognitive models of human memory. Although no one was watching this little green TV screen, it did enact a translation of data into image, a crucial part of the task under study here.

The inclusion of these seminal and fragrantly hybrid contraptions of computer history would be something of a media-archaeological flourish here were it not for the fact that most contemporary computer memory is dynamic too. *Dynamic* lays eponymous claim to the letter D in DRAM, the sort of memory craved by the gigabyte in all our computers. Thousands of times per second, circuitry internal to the chips reads, erases, and rewrites each memory cell, and each time a judgment call must be made as to the state of the bit—a 0 or a 1. This dynamic quality accounts for the loss of memory when the computer is turned off as well as the lengthy boot process while it is reloaded from magnetic mass storage—again, the delay in going from rust to ether.

Each of these dynamic memory systems uses the forward propagation of signals in time and loops the end back to the beginning to produce the illusion of a steady record. All suffer, however, from the degradations that time itself imposes. Taken on a physical level, this is the "entropy" of thermodynamics. Stephen Hawking has even used computer memory itself as a figure to explain the directionality of time:

> A computer memory is basically a device containing elements that can exist in either of two states. . . . Before an item is recorded in a computer's memory, the memory is in a disordered state. . . . After the memory interacts with the system to be remembered, it will definitely be in one state or the other. . . . However in order to make sure that the memory is in the right state, it is necessary to use a certain amount of energy. . . . This energy is dissipated as heat and increases the amount of disorder in the universe. . . . The direction of time in which the computer remembers the past is the same as that in which disorder increases.[5]

Long speculation about the reversibility of order on a cosmic scale has variously imagined a collapsing universe in which fragments of teacups fly together to make a whole, people walk backwards, and logs arise out of ashes, as in a film running backwards. The astrophysical consensus, though, is that even in a reversal of the expanding universe things still fall apart. As we will examine in Jocelyn Robert's *State of the Union,* such grand unifications may be effected by a reversal of memory.

TELEGRAPH

The electric telegraph is often posed as a predecessor of the electronic network communications systems we use today that shares certain key features with them.[6] Among the most obvious similarities are use of electricity to transmit messages, a network infrastructure, a set of codes to translate human language into on-off pulses of electricity, and the use of devices to assist in the retranslation and printing of the messages for human readability. The electric telegraph was, of course, not a single invention but a host of inventions that required the span of two centuries to completely realize. The earliest proposals using static electricity and voltaic piles alike were alphabet-centric, animating that ancient sequence as an organizing principle and arranging material, space, and human resources to fit its gamut.[7] These proposals and early systems, however, eventually converged on a small universal set of core devices and practices, characterized by a single wire, a sequential code, and a series of amplifying repeaters, all features set forth in U.S. Patent 1647, awarded in 1840 to the American painter Samuel Finley Breese Morse.

Morse's path to the telegraph was distinctly American. Trained as a painter, he met with only middling success despite his talent, ambition, and high ideals for the role of the arts in the new republic.[8] During an inspirational voyage home after a grand tour in 1832, Morse fell into conversation with some fellow passengers about the new sciences of electricity and magnetism. In what was apparently a novel idea to him, he imagined a way this new technology could be used to transmit messages over distance. Although Morse was fairly uneducated in the sciences, upon his return he set out to wind an electromagnet of bare copper wire in order to test the practicability of his idea. No doubt such futile efforts would eventually have led him to abandon the project had he not made the acquaintance of Alfred Vail, a young and very competent assistant, who helped realize Morse's plan and contributed key features to the patent.

A glance at the patent drawings reveals an apparatus of conspicuously artistic provenance being used for unexpectedly new functions. It is a transmitter made of a typesetter's rule and a receiver built on a painter's canvas stretcher (figure 10.1). The earliest versions of Morse's invention sent a code consisting of numbers of ticks, which were keyed to an index of words in a codebook. In a later realization Morse introduced the eponymous code of long and short electrical pulses to construct an alphabet.

Key features of Morse's original proposal, such as composing the messages to be sent as a line of electrically conductive movable type, and the automatic printing of the received messages on paper, were omitted in the realization of his system in America. These features tagged along, however, with the system as it was implemented in many other parts of the world, blossoming into a heterogeneous network of diverse specialized machines organized according to the laws of international cartels and large monopolies.

Morse's original design of a typeset-message transmitter and a printing receiver was soon replaced by human operators, who brought speed and reliability. As early as 1844, telegraph operators had discovered that one could "read" messages by listening to the patterns of two distinct sounds caused by the electromagnetic receiving apparatus in operation. Using their ears as receivers, practicing telegraphers soon learned to hear the encoded text first as letters, then as words and whole sentences, and finally were able to read even the personal identity or "fist" of the transmitting operator from the rhythms of the pulses. The entry of touch, via tapping, into long-distance text transmission reaffirms the unifying role of that physiological sense in the formulation of knowledge within the physical medium of transmission.

Other competing systems of telegraphy like the Cooke-Wheatstone needle-

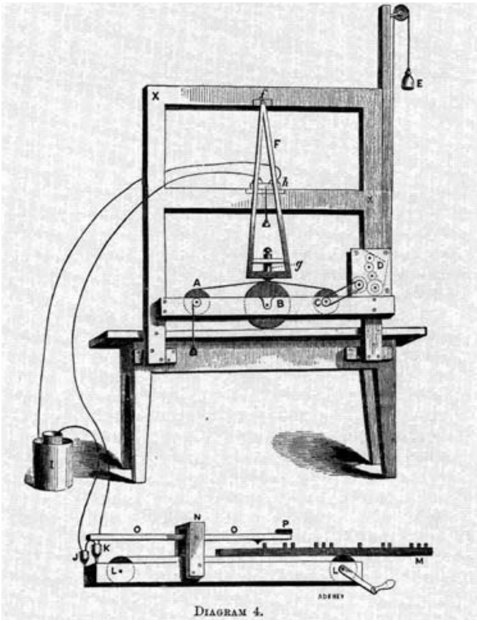

FIGURE 10.1. Samuel Morse's telegraph of 1840, built on an artist's canvas stretcher. Samuel Irenaeus Prime, *The Life of Samuel F. B. Morse, LL.D.* (New York: D. Appleton, 1875), 761.

galvanometer system were terminally optic in nature. Because they used properties of current as a representation of position in the alphabet, they were what we would now categorize as analogue devices. And because they had no real equivalent of the relay, their accuracy diminished with distance. Using a multiplicity of compass needle–like pointers suspended in galvanometer coils, they operated more along the lines of Ouija boards, pointing to alphabetic characters arrayed over their surface. Having much in common with the earlier alphabetic proposals for telegraphs of the eighteenth century, they presented an unbroken white space that the dance of needles would embroider with words spelled out one letter at a time. Additionally, the Cooke-Wheatstone system caused electrical current to pass only when a needle deflection was required. To alert the receiver that a message was about to begin, a separate "alarum" circuit was required, and this minor role was the only use to which their system accorded the vast amplifying and repeating potentials of the electromagnetic relay.[9]

Three features that distinguish the Morse telegraph from other early realized forms—the audible tapping, the normally electrified wire, and the relay—are the salient points that relate to our present discussion. The relay, as we have seen, acts as a temporary or dynamic storage cell. The move from an optic to an acoustic telegraph signals the entry of a shift in sensory modalities opened up. Another feature of the Morse system, the continuous activation of the line by electrical current, with signs consisting of interruptions of current, was a solution to the problem of broken and cut telegraph wires. In this way the line is continually under test.[10] It attempts to serve as a reassurance but later will be seen as a factor that invites parasitic data to enter, as will become evident in Tone's work.

For an optic regime to be maintained, other senses must be actively suppressed. While sight is privileged and highly directional, sound is omnidirectional and promiscuous. In the realization of the penal panopticon at Philadelphia's Eastern State Penitentiary (1836), the water pipes running to each cell were routed back to a central reservoir rather than from cell to cell in relay style precisely so that prisoners could not communicate by tapping. This audible tapping of codes predates the telegraph—prisoner tapping had been around for ages and continues to be a mode of communication in desperate situations where people are trapped, including collapsed buildings after earthquakes and the ruins of the Twin Towers. The condemned, like the damned of the Siberian gulags, often recapitulate the same simple codes that Morse initially proposed but later rejected,—one tap for an "A", two for "B," and so forth.[11] The doomed and nearly dead just tap randomly, and in spiritualist séances it is this noncode that signals the emergence of the uncanny, as in the coeval "Morsing" of the spiritualist Fox sisters in the 1840s.

In other fatal and apocalyptic visions, telegraphic transmitters achieved an autonomy that could outlive both the senders and the recipients of Morse messages. The 1959 film *On the Beach* depicts a world destroyed by thermonuclear war, with a few survivors in Australia who keep receiving a persistent but meaningless Morse code message being tapped out real time. The radioman hears some meaningful words and conjectures that the message has the sound of an untutored "fist," or telegraphic equivalent of an accent, not that of a professional telegrapher or an automatic mechanical sender. The radio signals are traced to San Diego, known to have been cleansed of life, like the rest of the Northern Hemisphere, by a scintillating blanket of fallout. The hope that people may still be alive in the dead zone bolsters hopes that the radioactive cloud now approaching the antipodes may not be as lethal as predicted. A submarine crew sets out across the Pacific to track down the transmitter, which they finally locate at a smoothly running power station that is still humming along, producing infinite reservoirs of electrical power, long after the end of all human life. Suited up in rad-safe clothing, a crewman enters the plant and discovers a partially full Coke bottle resting on the key of a telegraph transmitter. The bottle is tied to a rollup shade over an open window. The gentle hand of the breeze tugs the shade, tapping the telegraph key to rhythmically interrupt the continuous reservoir of electric current flowing from the humming dynamos: perhaps a last-ditch attempt to use the signaling system in futile communication, or a grim *morituri te salutant*. Eruptions of the uncanny or systematic production of excess, a decoupling of the impulses to move or to communicate from the actions that realize them, are invariably the source of these spooky messages. One imagines the impossible task of Kafka's messenger in "The Great Wall of China" or the efferent impulse sent from the brain via the nerves to muscles that have been evaporated by a nuclear blast.[12]

PHONOGRAPHY

Thomas Edison, even in his heyday as the world's greatest inventor, kept a down-home persona tucked away in his vest pocket—that of the youthful telegrapher. Although afflicted by deafness, he was fond of flaunting his otic skills as part of a virtuoso telegraphic act. Challenging a group of professional telegraphers to a competition of speed and accuracy, the Wizard of Menlo Park would pluck a coil of perforated paper tape out of his vest pocket, insert it into an automatic transmitter, and start playing it back at twenty-five words per minute, gradually raising the speed higher and higher until, at forty-five words per minute, the others would drop out. Edison kept writing, though. Long after the tape had finished playing, he continued transcribing the lengthy message, apparently having retained the full text of dots and dashes in his memory, without an error. This feat never failed to astonish those who witnessed it, to the degree that no one ever dared ask the great man to repeat it with a tape not out of his own pocket.[13]

Edison's most famous invention, the phonograph, has its origins in several other telegraphic and telephonic inventions that his laboratory was working on simultaneously: a printing telegraph, a telegraphic fax machine, and a loudspeaker to compete with Bell's telephone. All used electrical signals to make some sort of vertical indentation or mark on a rotating cylinder. They all made sound, either intentionally, as in the case of the speaking electromotograph, or as the result of frictional squeaks akin to lathe chatter. The serendipitous path by which the Edison team arrived at a nonelectrical invention of sound recording in 1877, at approximately the same time as Charles Cros in France, thus appears to have an independent origin in the tapping out of sounds to create signs in a network of telegraphic transmission, recording, and reception. Edison's earliest drawing of ideas for the phonograph in 1877 includes the embossing of sounds on a roll of waxed paper tape that could pass from one recording head to another playback head, again suggesting memory as a delay line.

When early phonographers set out to record a sound, they soon discovered upon playing it back that they had recorded not one sound but a multiplicity of sounds. The first, of course, was the sound they had intended to record; a second set, though, consisted of the sounds present in the environment, the background sounds no one had ever taken notice of; a third set consisted of the various squeaks and rumblings of the machinery itself, the whirring of gears and the bumps of unwinding steel springs; and a fourth would be the sound of overdubbing that soon emerged in public presentations where a single cylinder was recorded over and over again during successive demos, the new sound not totally erasing the memory of previous markings. This overdubbing effect is also present in the most undesirable sounds of recordings—the accumulation of scratches and warps that encode the autobiography of the specific record surface. Media artworks like Christian Marclay's 1985 *Record without a Cover* address this surplus dimension of sound by specifying that the record is to be left unprotected in order to muster its own unique sound, a kind of autobiography or immune response to the exigencies of storage.[14]

We might look at the history of sound recording, with its decoupling layers of technologies, practices, and situations, as a history of control of these surplus sounds formerly known as noises. Microphones, high-signal-to-noise-ratio media, padded recording booths, and sound-stage protocols all conspire to eliminate undesirable sounds. On the other hand, we could consider the development of sound practices in the arts, both commercial and individual, as widening to include these other, extraneous sounds. Such art forms as Soundscape, originated by Murray Schaeffer, which insist on the sonic life and wholeness of a place, would hesitate to exclude any acoustic source, while rigorously excluding the sound of the machine on which that sound is recorded. Another example of the second type might be performative sounds added out of context to serve as diegetic sounds in Foley tracks of film sound. Electronic and computer music certainly might be recognized as instances of the third set of sounds, machine rumblings that have been independently valorized. Practices relating to the fourth kind, like overdubbing, that were used for a kind of comic special effect before the Beatles are now too central to musical practice to merit elaboration, except for the fact that this palimpsestic effect underlines the crucial difference in erasure between the two modes of memory we are examining. The phonograph, incapable of complete erasure, always obscures by adding overlays of new traces.[15]

Analogue phonograph records store the pressure of sound waves as a continuous position on a curve that spirals into the center of the disk. Because of the close (positional rather than coded) relationship between the curves and the sound, the one is an "analogue" of the other. Any erosion of the trace, even the caress of diamond needle, is detrimental to its preservation. The earliest analogue recordings did not distinguish between recording and playback, and sounds present at the time of playback would also lodge themselves into the grooves. Thus a never-played phonograph disc will sound, for all eternity, sweeter still.

A digital compact disc represents sound as a numerical code of nonreflective dashes and dots etched in the mirrorlike surface of a similarly spinning disc. The accepted ratio of signal to noise for a bit of digital storage is about50:1. As described earlier, the forces of bit rot are continually at work, moving molecules of aluminum and polycarbonate around from here to there and randomly diffusing this numerical ratio. Playback by a laser beam does not contribute appreciably to this process; a greater threat to the integrity of the data is the choice of materials and the ever-present potential for obsolescence. While the digital nature of the data with their built-in redundancies gives a fair reassurance that the data can be regenerated, this regeneration is not optional but essential. As material absences, these "bits" are not so definite in form, yet they must be copied to other, dynamic memory cells as they are relayed forward to the digital-to-analogue converters and thence to the loudspeakers and the air. How these digital phonographic errors are treated in playback will be central to my discussion of Yasunao Tone's works for CD, in particular his *Music for Wounded CD.*

One of the outcomes in this formula is that analogue media, to be preserved, must not be played: each replay is a partial erasure and a new recording—an overlay. Digital preservation relies instead on the frequent rereading, erasure, and rewriting of the content. This feature of reading and rewriting is the most characteristic aspect of digital memory systems from their origin right down to the expensive lump of rust sitting on the desktop. But the brief moment of erasure between reading and rewriting provides an instant of fracture where the unthinkable may creep in.

OPTOPHONE

The analogue phonograph record retains some of the qualities of the soft wax of early cylinders. Is the wear and degradation it acquires with each playing not, to some extent, caused by the sounds present in the room and within the machine, and implicitly by the superimposition of the form of the needle on the original, pristine signal? The medium of the digital compact disc, however, suggests a sort of inflexible durability with aspirations to the monumental. All that would appear lacking is a plan made in abstraction, outside the realm of the senses, to be realized as a CD. Yasunao Tone's CD projects like *Musica Iconologos* realize this goal, but a host of predecessors line the byways of media art, with a significant way station at the optophone of Raoul Hausmann, one of the founding fathers of Dada—a device we must visit to complete our tour of technologies.

The idea of a machine that could be put to the purpose of bridging the gap between sight and sound not only offered, in the nineteenth century, a space for speculations about the grounding of the senses in the body, but also surrounded itself with high ideals for the improvement of society. Leon Scott, whose phonautograph of 1853 is often, probably mistakenly, cited as an early instance of the phonograph, was in fact looking, not for a device to record sounds *qua* sounds for acoustic playback, but for a system of transcription that would enable the voice to write a text that could serve as a visible and legible record.[16] As evident from actual phonautograph traces, in particular the five upper traces in figure 10.2,

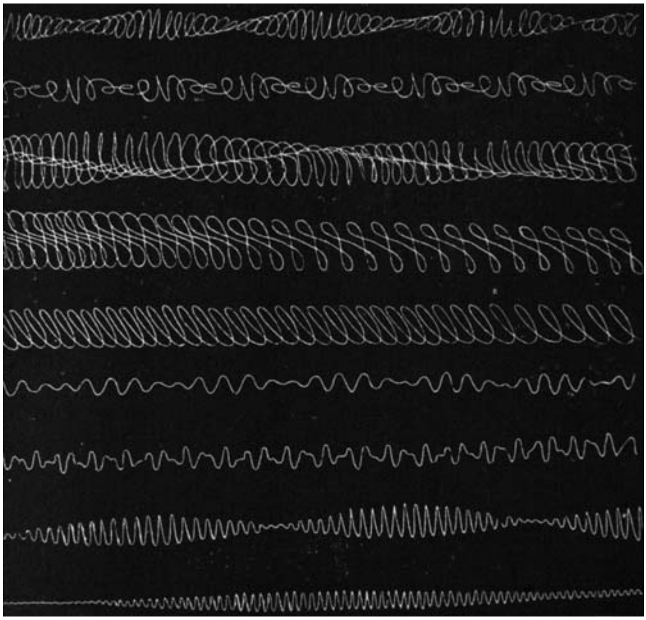

FIGURE 10.2. Phonautograph traces. The graphic writing of the phonautograph, wiggling forward and backward along the time-axis, approaches the graphical fluidity of the Palmer method of handwriting. James E. Homans, *The ABC of the Telephone* (New York: Theo. Audel, 1904).

many of the twitches of its pig bristle made serpentine excursions in two dimensions, creating scriptlike traces that were in no way reproducible as sound, since they failed to separate the dependent variable of air pressure from the independent variable of time. These sound figures possessed a continuous calligraphy that filled a black space made of carbon soot smoked onto a recording drum in precisely the same way that the cursive script of the poets had covered the smooth white surface of paper. Like the idealized penmanship of the Palmer method, they formed a continuous line inscribed upon a predefined surface without the pen ever being lifted.

That certain materials possess the property of turning light into electricity turned out to have profound implications for our present ideas of a material universe, and even Einstein's Nobel Prize was awarded not for his then controversial theory of relativity but for his explanation of this photoelectric effect. An accidental discovery of the photoelectric properties of selenium resistors on the transatlantic telegraph cable by Joseph May in 1873 had been published soon after the event by Willoughby Smith in *Nature,* and a host of proposed applications

FIGURE 10.3. Method of the optophone of Fournier d'Albe, 1914.

rushed in to fill the space of that discovery: among them, television, optical fax machines, and the optophone, a device that would convert images or text into an audible form that could offer the possibility of sight to the blind.[17]

An early (1914) practical realization of this device was developed by the British physicist E. E. Fournier d'Albe as a reading aid for the blind (figure 10.3).[18] The system was based on a column of photocells arranged vertically along the lines of a musical staff—a row of lines and spaces corresponding to the notes of the musical scale. The black-on-white text would scroll player piano–like across the photocells, playing the notes that were covered by a vertical slice of the letter. This succession of tone clusters corresponded to the sequence of letters and, given a consistent font, would converge on the fifty-two lower- and upper-case graphemes as a precise set of semimusical sounds that could be distinctly recognized. If viewed as a predecessor of contemporary reading machines for the blind, Fournier's work would appear merely prescient. But more imminent cultural uses were to repurpose this technology to quite different ends.

Many ideas appear again and again during a period of time, and it is no small wonder that even an artist like Raoul Hausmann, with interests very far from Fournier's, should have independently conceived and patented a remarkably similar device. Hausmann's optophonetic poetry of the early Dada years employed precisely that element that had made Fournier's work impractical—variation of typeface and font—as an expressive tool to create scores that suggested auditory effects or were to be realized by vocal performance.

The optophone, as conceived by Hausmann in the 1920s, was to be a system that used the same selenium cell to translate light reflected from patterned "microreliefs" from a moving channel into sounds on a loudspeaker.[19] In Hausmann's drawing for the idea of the optophone, the optical path is drawn in such a way that the image of the microreliefs will always be seen simultaneously with the sounds they produce. As realized in his patent design of 1936, the optophone was modified by an engineer to utilitarian purposes deemed patentable, becoming a reconfigurable but not programmable device for printing railway tickets according to a price scheme.[20] Ultimately, the optophone as conceived by Hausmann was a closed system, a utopian proposal that reiterated, now in mechanical terms, the reversible translatability among score, music, and recording media that Wittgenstein had heralded in the *Tractatus* in 1921. But Hausmann's conception posited that these sensory modalities were inherently connected, once again, through the unifying powers of touch and that the device would serve to reunify that which had been artificially split.[21] The idea of the optophone has continued to resonate with artists long after its abandonment as a technologically meaningful device, precisely because of its enticing potential as a bridge between sight and sound, between score and sensation.

TONE

The works by Yasunao Tone and Jocelyn Robert that will be covered as topics of the remaining portion of this chapter relate, I believe, most directly to issues of digital preservation and degeneration as they have been outlined in light of the three historical technologies developed above. The phonograph, the telegraph, and the optophone all serve to translate between marks and noises. The systems are all lossy but in different ways. The optophone suggests but cannot realize a lossless bridge among the senses external to the fleshy brain in order to bypass programmed culture. The phonograph acts as a receptive surface open for all time to overdubs, becoming less authentic with each playing. The telegraph, with its dynamic memory of relays, its propagation of information by the cutting of the flow of current—a kind of dark meaning traveling through space—offers the potential for generating meaning out of the void that exists between mark and noise.

Yasunao Tone's work may be regarded as a very long transmission line across which an initial impulse has propagated and dispersed into a spectrum of works. Born in 1935, Tone studied literature at the national Chiba University in Japan and wrote his graduate thesis on Dada. A founding member of the legendary Group Ongaku with Shuko Mizuno and Takehisa Kosugi and others, he became an early proponent of Fluxus in Japan in the 1960s and co-organized "Fluxus Week, A Tokyo Fluxus Festival," with the composers Toshi Ichiyanagi and Kuniharu Akiyama.[22] When he moved to New York in 1972, he brought with him a distinct set of practices and systems based in performance, repetition, randomization, and error (figure 10.4). In 1982, Tone commenced a series of pieces, starting with a performed film, *Molecular Music,* from which many subsequent works have sprung, in concept and process as well as source material.

Molecular Music is a Super-8 movie with sonic screen interventions. The idea of preparing the screen or modifying it during live performance has precedents in Japanese avant-garde work of the 1960s. Both Nam June Paik and Takehisa Kosugi performed actions that articulated the material reality of the projected image as it intersected the movie screen.[23] Tone's screen preparations, though, consisted of a number of audio oscillators fixed directly to the screen that were controlled by photosensitive devices of the type used to play the soundtrack of sound films, or the putative optophone. As portions of the screen became brighter or darker according to the images being projected, the oscillators changed in

FIGURE 10.4. Yasunao Tone performs *Geodesy for Piano* at Mills College, 1972. An aleatoric system applied to geological contour maps determined precise times and heights from which to drop objects into an enormously amplified grand piano. Courtesy Yasunao Tone.

pitch. The silent Super-8 movie projected on the screen consisted of a series of still images flashing in variable duration and sequence. Some images were repeated in a different order, some were only seen once. The images and the editing of the film both derived from a series of poems written in Chinese ideograms, three from the Tang dynasty and one from the eighth-century Japanese Manyoshu compilation. Tone gathered photographic images that related etymologically to each ideogram used in the poems. He filmed these on Super-8 film and cut the length of each shot to correspond with the duration needed to pronounce each of the words. The tonal variations corresponding to the meaningful sounds of each character were conveyed by zooming the image in and out. The result was a translation of grapheme via image into sound of the eight square-wave oscillators on the screen. In discussing his aims in creating *Molecular Music,* Tone referred to Norman McLaren's hand-drawn films of the 1940s as early attempts to unify the sound and image by using an identical means of production. Where McLaren's films like *Scherzo* (1939) assigned affective correspondences between the separate drawings in the film frame and the soundtrack, Tone's aim was to obliterate this separation and make the screen the space where sound and image fuse. Tone took special care to arrange the oscillators by chance processes so that no two presentations would be the same.

Yasunao Tone's *Musica Iconologos* of 1993 is in many ways a further realization of the concept of the optophone as imagined by Hausmann, and a continuation of *Molecular Music*. In *Musica Iconologos* Tone returned to the same corpus of still images that stood in for the early ideographic characters employed in the poems of the Tang era and the Manyoshu collection (figure 10.5). This time he used a flatbed scanner to digitize the images and create histograms of the pixels in the X and Y dimensions. These resultant data were then passed through a music-notation character recognition software application to generate sonic "grains," short snippets of abstract sound of about twenty milliseconds each that could be stretched or repeated to generate longer, audible signals. Retaining the same structure of duration as pronounced time that Tone had used in *Molecular Music,* the poems became sound works that have an unprecedented abstract quality but retain an indescribable juiciness of expression that has become a hallmark sound of Tone's output both on disc and in live performance. This sonic quality, I believe, is due to the radical way in which Tone engages the digital compact disc medium, using its material specificities not just for degradation, multiplication, and translation but for opening the medium to a radical break that exists within itself.

Tone has described *Musica Iconologos* thus:

> The piece did not exist until CD mastering because I designed the piece specifically for the medium. In other words, the entire process of producing [a CD] was a seamless part of my composition. The result was noise in all senses. To begin with, in terms of information theory, this is definitely noise. . . . I used visualized text (images) as source—that is, message—which was encoded and laid down on the CD. Now, when you play that CD, what you receive is not images as message, but sound which is simply an excess. According to information theory this is none other than noise; and as the French word for noise, *parasite,* indicates, it is parasitic on a host—that is, message. But in this case there is no host, only parasite on the CD. Therefore the CD is pure noise. Technically speaking, the sound of the CD is digital noise, also.[24]

But it doesn't stop there. Such "excess," once established as a marker of the gap between the input and the output, can be successively increased as distance grows between the object of the CD and the signal recorded on it. In a thermodynamic sense, the excess has its origins equally in the algorithms resident in the CD player's hardware. Despite the insistence of redundancy and error correction, the audio compact disc is capable of producing a now-familiar set of sounds, as

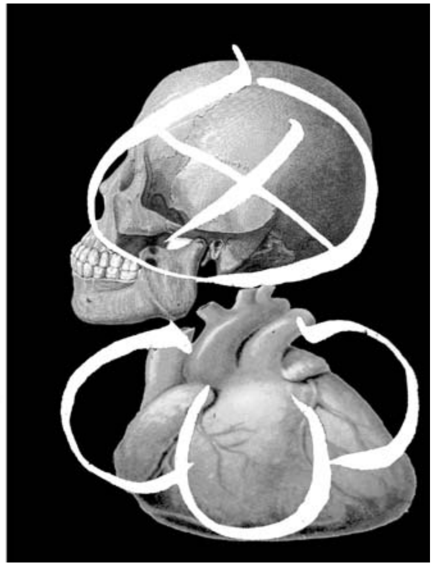

FIGURE 10.5. Mother and Baby, images and graphemes as employed by Tone in *Molecular Music,* 1982, and in *Musica Iconologos,* 1993. Courtesy Yasunao Tone.

a result of bit rot, that might be thought of as diegetic. Such reproductive failures may be promoted by direct intervention on the surface of the CD, and in the case of Tone's *Solo for Wounded CD* these interventions take a form in many ways referential to Cage's "prepared" piano, which was modified, by foreign objects inserted between the piano strings, away from being a tonal instrument and toward being a percussion machine.[25] By placing carefully sized and arranged pieces of matte cellophane tape on the playing surface of CDs, Tone creates a man-machine-disc performative situation in which he can replay the modified discs of *Musica Iconologos* to create such a new excess. While the underlying digital noises are familiar to those who have heard the original work, these excess sounds have a familiarity for everyone who has experienced errors on music CDs of any kind. We hear short frozen loops of sound chattering in the frigid wind of one-seventy-fifth-of-a-second data blocks, refreshing elisions and ellipses as the playing mechanism skips over entire tracks of corrupted data, and bone-shocking explosions as numerical inconsistencies erupt into forbidden areas of the digital-to-analogue converters, all egged on by the artist tapping the CD players with his hand. Such egregious violations of the code are possible only on very early vintage CD players such as the Sharp DX-100 that Tone uses to perform *Solo for Wounded CD.* More recent hardware musters immune responses to the attempted transfection and spits out the prepared discs or refuses to play them at all.

Tone's recent works, both on CD and for live performance on laptops, revisit the implicit slippage between text and sound in a way that further peels away the distance between the mark and the excess. Starting again with the Tang era and the Manyusho collections of poems, Tone uses a Wacom digitizing tablet to calligraphically enter the texts into the window of the audio editing application Sound Designer II, which allows for the manual entry of hand-drawn curves to generate sound waves. Until the moment the pen is lifted from the tablet, the text is represented legibly upon the computer screen. But the moment the pen is removed from the tablet, the software collapses the drawn pattern into a waveform that conforms to the law of the scratch, as the scratch conforms to the curve, the curve to wave and wave to the symbol, retreating into a no-longer retraceable sequence of facts. So in this moment when pen leaves paper, a split occurs—much is lost of the text, but, according to Tone, what is gained is the excess, the noise (figure 10.6). Recall here the traces of Leon Scott's phonautograph (see figure 10.2), which produced a calligraphic script like a penmanship exercise across the field of black soot. That script, too, needed a collapsing into the signal plane before it could become a playable phonograph trace. So all sound recording might entail a collapsing of dimensions and thus qualify as an excess of the type Tone describes.

Wittgenstein's idea of facts that connect the musical score, the music, and the phonograph groove without loss suggested universality, repeatability, and symmetry. On the level of symbols one could move freely among these characteristics. If there were computational qualities to the optophone, this might extend this idea and propose that by sending signals across the gap between the senses one could experience a kind of a whole, though quite differently from what Hausmann may have had in mind. Tone's procedures not only suggest the possibility that we might not be able to retrace our steps but also offer the impetus to follow paths, opened up by translational systems, that guarantee we will never be able to go home again, by any path. Tone, in his essay "The Sound of the Outside," written as liner notes for the 2003 CD release *Yasunao Tone* on Asphodel Records, suggests the importance of such a break, or slippage, to his aesthetic program, giving it a Lacanian spin. He quotes from Lacan the familiar story of an ancient Chinese sage. "In a dream Choang-tsu is a butterfly. When Choang-tsu wakes up, he may ask whether it is not the butterfly who dreams it is Choang-tsu." Tone continues: "As Lacan points out, this symmetrical relationship is an illusion: when Choang-tsu is awakened, he can think to himself that he is Choang-tsu who dreamed of being a butterfly, but when he was in his dream, when he is a butterfly, he cannot ask himself if when awoken, when he thought he was Choang-tsu, he was not this butterfly that is now dreaming of Choang-tsu. The question, the dialectical split, is possible only when we are awake." He goes on to relate how he has used "this asymmetry and its surplus in my method of text-to-sound conversion."[26]

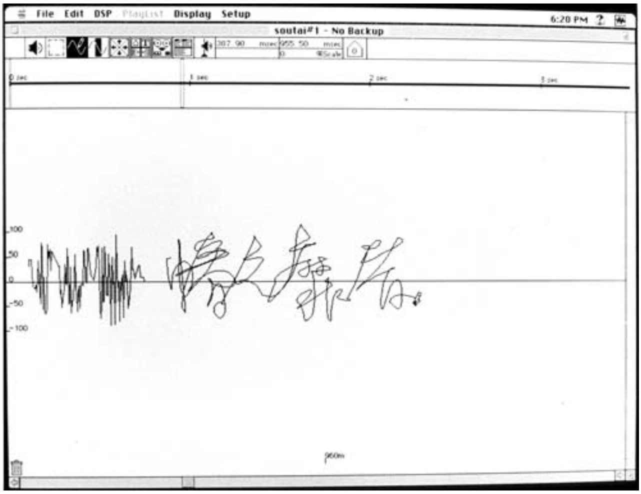

FIGURE 10.6. Yasunao Tone, *Wounded Manyo,* a calligraphic drawing of a line from a Man'yo-shu poem using a WACOM tablet in Sound Designer II. This was taken before lifting the stylus from the tablet. San Francisco: Asphodel, 2003, liner notes.

But humans and butterflies can serve as more than transmitters and receivers in the cycles of memory, loss, translation, and surplus. Any involvement in machinic cycles offers us the possibility of becoming machines as well. Indeed, starting with Descartes, the body and its cognitive functions have been figured as mechanisms to such a startling degree that it is a wonder that anachronisms such as blind faith and artistic practice persist. Our own wet and fluid memory, able to retain the kernels of hard facts over many decades, seems unable, nonetheless, to maintain an enduring order among them, as they toss around like so much flotsam on the surface of a turbulent sea. Crime witnesses and childhood trauma victims obviate the need for the study of exotic aphasias if we are trying to demonstrate the strange mixture of specificity and mutability that we call memory. The artist as human subject, like the telegrapher, can enter into this circuit as an exemplar.

One of the odd aspects of the phonograph's early appearances was the way it was regarded: not only as a teratogenic spawn, the illegitimate offspring of a ménage a trois among the telegraph, the fax, and the telephone, but also, in some scientific circles, as an utter fraud. So completely had physical models of sound-producing devices prevailed in preceding centuries that the creation of all sounds by artificial mechanisms brought with it the expectation that the device needed to replicate in form and operation the method of sound production of the original. Thus in devices like orchestrions and player pianos, codes and mechanisms imitated the performative part of the operation but left the creation of the sound to strings, whistles, and drums. These musical somnabulists posited further that vocal sounds needed mouthlike chambers, wheezing lungs, and rubber lips to make speech sounds audible and that the Edison phonograph being demonstrated must be a fraud perpetrated by clever ventriloquists. The separation into and connection by facts of code, mechanism, and record eliminated the hypothesis of the trace that could recreate itself.

ROBERT

In the early days of computers human error was often cited as the primary source of failure in man-machine systems, probably because of the inability of systems analysis to establish a quantifiable definition of human error. High-profile cases like deaths caused by software glitches in cancer treatment devices continue to surface, and human factors are still invoked—you can't sue a machine. But the last three decades have shown that the sort of generative power of the machine, its remarkable ability to transform data and submit them to the regimes of meaningfulness, suffices to create error of a more varied and interesting sort than we might have ever imagined. Much of the work of the Quebec artist Jocelyn Robert forms around such errors that systems create. Robert's work is as diverse as it is prolific, and this may be no surprise for the work of an artist who completed studies first in pharmacy, then in architecture, before making his first artworks.

Le piano flou (1992–93) is a collection of pieces created for a Yamaha Disklavier—a contemporary revisioning of the player piano.[27] A computer reads MIDI data files and controls a series of electromechanical actuators, one for each key or pedal, to play music. The device itself would appear to be an embodiment of the ideals referred to by the *Tractatus,* linking together seamlessly the music, the score, and the recording, and in itself it could serve as an intellectual companion to that work with regard to the present discussion. Or, by repositioning the complicated relationship between artist, piano, and composition, it may offer the possibilities of loss and gain along the lines previously discussed. Such a program may be seen at work in Jocelyn Robert's work. In *Le piano flou* he designed several short piano phrases and recorded them on the Yamaha Disklavier. Replaying the files actuated the keys of the piano with robotic precision. As the robot played, Robert played along in unison, and each human repetition was also recorded. As the computer program repeated each phrase with increasing tempo, in the manner of piano exercises with a pedantic master, gradually Robert's keyboard technique, unlike Edison's telegraphic performance, began to give way, creating a blur of errors around the original phrase. All the recordings were then normalized back to the original tempo and performed simultaneously with the original track, yielding a sort of dispassionate impressionism of sound rarely encountered in the piano literature. Unlike the roughly contemporaneous *Winke Winke,* by Gerfried Stocker, *Le piano flou* posits that the generative powers of such processes lie not in the evolution of successive error but rather in the ecology and habitat that result from such a diversification of related species.[28]

Another CD work that summons error as a generative impulse is *Les montagnes brusques* (2000), whose title may well allude to the bumpy ride over the hills and dales of Edisonian recordings as they encounter the terrain of the digital. The diminutive (three-inch) audio CD was released as part of issue no. 77 of the journal *Inter* and contains a piece made by CD-generated errors of another CD. Robert explains:

> I got a MusicWorks CD with the magazine, years ago. But my CD player (I got it for free) was not behaving great, and the CD itself (I was told with the next issue of the magazine) had pressing problems. Both combined, they gave this particular jumping when I played it the first time. Hearing what was happening, I immediately plugged in the tape recorder, and recorded about an hour of it. Then I put it in the drawer to sleep. . . . Later, asked by a magazine for a text on art and accident, I woke up the tape, edited parts of it, mastered it and offered the CD itself in place of a text. I asked for the permission to publish from Judith Cohen, the singer, who agreed after a very serious debate, with the condition that she could publish a text with it. The final project was the CD in an envelope pasted on a card on which her text was on one side, and mine on the other. My text was about "accident" being not what we don't expect to happen but rather what we expect will not happen (the difference being one is unexpected, while the other is expected but denied).[29]

If this recto-verso dialogue of disavowal, accompanied by the mechanical fidelity of the new CD release, makes clear the creative break between Robert's work and Cohen's, the question arises: How will we know, when the material of this CD starts to erode and create errors of its own, that we are still listening to Robert's work? The breaks, skips, and chatters will be of the very same kind and order as those that occurred in the originary mistranslation. Such questions prefigure a host of others that arise when we imagine the conceptual enormous challenges imposed by the very notion of preservation in the digital domain. The element of denial that Robert brings up looms large in discussions of artists' intentions surrounding much discourse on media preservation. Unlike projects based in the analogue mode of memory, like Christian Marclay's *Record without a Cover,* which encourage the user to let the recorded object acquire its own semi-autobiographical collection of unique scratches, Robert's *Les montagnes brusques* posits, in the musical sense of the word, a "cover" without a record.

After a two-year (2001–3) sojourn in Canada's southern neighbor, Robert produced a work that combines the processes of "digital error equals variation plus summation" with optic-otic transfers of data. *State of the Union* is an installation

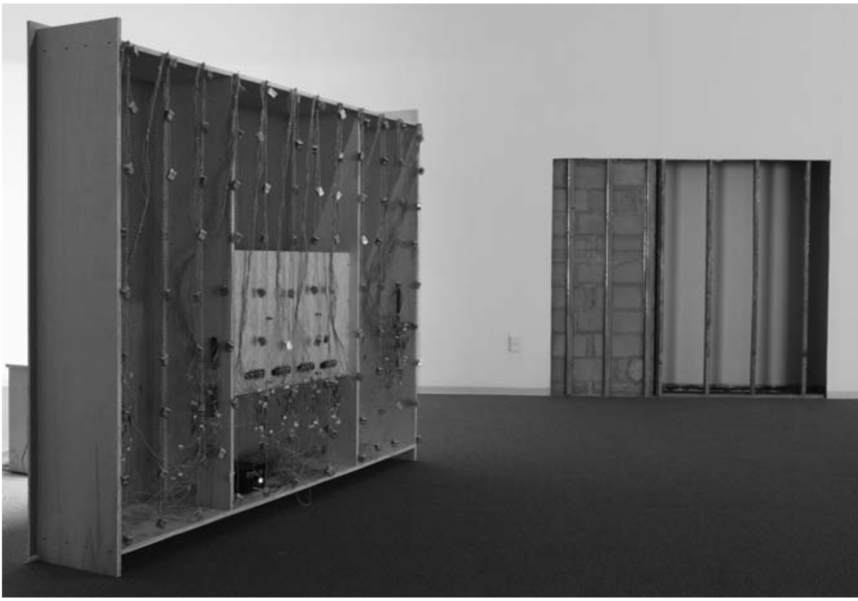

FIGURE 10.7. Jocelyn Robert, *State of the Union,* 2003, rear of installation with relays. Courtesy the artist.

FIGURE 10.8. Jocelyn Robert, *State of the Union,* 2003, detail. The image is projected on an optophonic screen of 108 photosensors.

work that proposes a domestic space for image viewing, suggested by a couch and a small table with a video projector that casts its image onto a screen about the size of a TV set (figures 10.7 and 10.8).[30] We see images of military parades, propeller planes flying in attack formations, tanks and big guns—all in grainy black and white, and all the films are run in reverse, backwards-marching across the diminutive screen, as if to remind us of Hawking's thought example about time's directionality once more. The screen, however, is, as in the optophone, composed of a matrix of photocells, each tuned to respond to a discrete change of light level by activating a small electromagnetic relay. The back of this wall, accessible to gallery visitors, is actually an empty bookcase, and a matrix of 108 relays, one for each photocell, is arranged in a corresponding grid over its surface. As the black-and-white images parade over the screen, the transitioning edges of dark and light trigger and release the relays, producing audible clicks. A squadron of war planes flying past summon a barrage of relay clicks in rapid succession moving spatially over the expanse of the wall, a sound that cannot help but suggest a volley of machine-gun fire. Here the space of history and the space of memory commingle in our imaginations, locked in by the technical associations of the equipment so transparently arrayed. Much recent research in sound has centered on spatial cues. In *State of the Union* the wheres and the whens but not the whats are communicated in the clicking of the terminal relays—the war correspondent has omitted this part of the news in the translation from visual to acoustic.

OVERSHOOT

A wax record may be created *in vacuo,* in some remote site, to be placed as a message in a bottle and ejected into unknown futurity. The gold analogue LP of the Voyager spacecraft cast into interstellar space by Carl Sagan and NASA, containing grooves of B.B. King, J.S. Bach, and Laurie Spiegel, is one such missive. We may well conceive of the sum total of radio-frequency output from our planet to be another. In contrast, though, a telegraph line presupposes an unbroken chain of relay stations, manned by faithful repeaters and fresh batteries, to read, erase, and rewrite the message as it steers toward a destination.

The reception of any transmission is attended with some anxiety. One might imagine Kafka, waiting for a message to arrive by wire. Uncertainty would begin to creep in—Did the sender, as promised, actually transmit the message? Was it held up in a remote relay station by an absent or delinquent telegrapher? Or was the wire cut by bandits or natives? Such uncertainties that early on led to the adoption of an electrical protocol continue to cast their shadow onto our present technologies: the wire is always electrified; the relay is always held tight by the current. To transmit a sign, the current is briefly interrupted by the stroke of the telegrapher's key. Thus each dot or each dash is an absence, a loss, a break in the circuit that connects us to the source. This persists in our day as mark-space in serial data protocols, the active low of open-collector and open-drain semiconductor circuitry. But it also insinuates its way into the very codes that permit the ruptures of the sort that Robert and Tone are using in the creation of their work. Consider a blank page, covered with white space: any mark upon it, even the vaguest smudge, may serve to state, to define, to fill, or, in juxtaposition with others, to craft a winding line of thought. A blank page, like the soft wax of Edisonian memory or the tabula rasa of Locke, is an underpostulated prairie waiting to become peopled with signs.[31]

But when a computer makes a text there is no white space, no preexisting *mater* waiting for imprint. As we have seen, the system of messaging consists of propagation of absences. Therefore a code must be designated to represent the white space where a mark itself is absent (ASCII symbol 32), another for an erasure (ASCII 8), and so on. It is this coding of nothing that supplies an invitation to the break, the rupture, the little moment of nonbeing that is incurred in faithful reproduction. Here Tone's parasite sneaks in, the noise, the excess. The creative possibilities of this break are of a kind and order totally different from those of the phonographic model.[32]

This may help explain the losses and gains that happen when mediated shifts from one sensory modality to another are made. If a circuit is to be built between seeing and hearing, it cannot fill the gap between them. When a translation occurs, an erasure is inevitable, and that briefest moment of erasure opens a gap. There is the ever present possibility of a break that will engender gains and losses. This further suggests that the complete processes imagined in the optophone are unattainable for material reasons. Reversibility itself is impossible not only on the cosmic scale but even at the local. And hopes for preservation, whether by rote copying or translation, may suffer the same fate of these optic-to-otic shifts, that of a creative afterlife.

NOTES

1. Ludwig Wittgenstein, *Tractatus Logico-Philosophicus* (London: Routledge and Kegan Paul, 1961), sec. 4.014, p. 39.

2. David A. Mindell, *Between Man and Machine* (Baltimore: Johns Hopkins University Press, 2002), 10, 174, 295.

3. Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: MIT Press, 1990), 59–64.

4. I do not wish to split hairs about the priority of invention of the electromagnetic relay, a device whose time was ripe, but only wish to point out not only that it was essential to the success of Morse's system but also that in this particular system's application of the binary code the relay further became a device for the translation of marks into noises. Joseph Henry preceded Morse by two years in this application of electromagnetism as a single-stage amplifier in 1835, but rather than con-

ceiving a single device that could enact an endless volley of impulses across an indefinite distance, he distinguished separate "intensity" electromagnets and "quantity" electromagnets, the former being used for distance, causing, in turn, the latter to effect local actions. Since this configuration, like so many other of his remarkable inventions, lacked killer-apps, Henry never published or patented it. See B. Taylor Henry, "An Historical Sketch or Henry's Contribution to the Electro-Magnetic Telegraph," reprinted in George Shiers, *The Electric Telegraph* (New York: Arno Press,1977), 34. As I point out later in this chapter, the Cooke-Wheatstone apparatus employed a relay only in a very secondary way. In addition, J. J. Fahie exclusively credits another telegraphic inventor, the forgotten Anglo-Australian Edward Davy, with the definitive invention of the telegraphic relay, which he termed "the electrical renewer." Fahie waxes rhapsodic on Davy's remarkable inventions, even suggesting that he anticipated the telephone as a transmitter of sounds in 1837–38. J. J. Fahie, *A History of the Electric Telegraph to the Year 1837* (London: E. and F. N. Spon, 1884), 359 n., 395.

5. Stephen Hawking, *A Brief History of Time* (New York: Bantam Books, 1988), 147.

6. Tom Standage, *The Victorian Internet* (London: Weidenfeld and Nicolson, 1998), 193.

7. I have written on some surprising aspects of these early telegraphs in greater depth in Paul DeMarinis, "The Messenger," in *Metronom, 1997–1998* (Barcelona: Fundacio Rafael Tous d'Art Contemporani, 1999), 73.

8. Paul J. Staiti, *Samuel F. B. Morse* (Cambridge: Cambridge University Press, 1989), 207–9.

9. Geoffrey Hubbard, *Cooke and Wheatstone* (London: Routledge and Kegan Paul, London, 1965), 65.

10. R. S. Culley, *Manuel de telegraphie pratique,* trans. H. Berger and P. Bardonnaut (Paris: Gauthier-Villars, 1882), 306–7. Some have suggested that the choice of normally closed circuits was initially made to match the discharge characteristics of the "gravity cells" or batteries, used on the early lines. See, for example, Lewis Coe, *The Telegraph* (London: McFarland, 1993), 71. However, the advantages gained by verification of the channel soon dominated, particularly in the American telegraph because the frequent cutting of lines. See Alvin F. Harlow, *Old Wires and New Waves* (New York: D. Appleton-Century, 1936), 113, 137, 157.

11. Anne Applebaum, *Gulag: A History* (New York: Anchor Books, 2003), 155–56.

12. Recent studies of so called "mirror neurons" in primate brains reiterate in scientific terms the psychological truth we feel is implicit in affective acts like messaging, that others will know what we mean, perhaps giving further confirmation to Keats's intuition that unheard melodies are sweeter. G. Rizzolatti and L. Craighero, "The Mirror-Neuron System," *Annual Review of Neuroscience* 27 (2004): 169–92.

13. Robert E. Conot, *A Streak of Luck* (New York: Seaview Books, 1979), 60.

14. Christian Marclay, *Record without a Cover,* Recycled Records, 1985, reissued by Locus Solus Records, 1999, LSV01.

15. The phonograph excluded certain sounds too: in particular, sounds below or above the midrange of frequencies that speech and notated music inhabited not only were eliminated by the physical process of recording but came to be ignored as recording became more and more a medium for music. Not until the 1950s did the notion of high fidelity become a central issue in the development of sound recording, and not until the 1990s were listeners again able to experience the full and palpable low-frequency energy where tactile vibration overlaps with hearing. Edison early on selected music and performers whose styles fit well into the medium. In the terms of signal theory, their dynamic bandwidth characteristics were well matched to the limitations of the acoustics of the machines. Signals that recoded well reproduced well and in turn copied well from generation to generation as discs superseded cylinders. Possessing an almost autopoietic quality, certain sounds insinuate themselves into grooves as they do into the acoustic mind and into our memories. Whether or not the common experience of a tune running through the mind was experienced in

earlier centuries, the preternatural haunting of memory with a musical phrase became a frequent poetic image in the early nineteenth century, when many of the ideas, listening practices, and apparatuses of the phonograph were gestating. If certain sounds have the parasitic ability to regenerate themselves without loss, at the expense of the host memory, they have made a first step toward a telegraphic sort of medium. But these parasites have a tendency to converge inevitably toward phonographic sounds of the third type, the recording of the machine itself.

16. Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham: Duke University Press, 2003), 45–46.

17. Willoughby Smith, "Effect of Light on Selenium during the Passage of an Electric Current," *Nature* 173 (1873): 303.

18. E. E. Fournier d'Albe was also the English translator of Baron Schrenk-Nötzing's book documenting the spirit medium Eva C. (Marthe Béraud). And he weighed souls, which may indicate that his interests in materialization and dematerialization, like those of many physicists of his age, went beyond the physical plane. On the weight of the soul, see *New York Times,* December 4, 1908, 1.

19. J. F. Bory, *Raoul Hausmann* (Paris: Editions l'Herne, 1972).

20. Cornelius Borck, "Sound Work and Visionary Prosthetics: Artistic Experiments in Raoul Hausmann," *Papers of Surrealism,* no. 4 (2005): 18–21; Jacques Donguy, "Machine Head: Raoul Hausmann and the Optophone," *Leonardo* 34 (2001): 217–20.

21. Marcella Lista, "Raoul Hausmann's Optophone: 'Universal Language' and the intermedia," in *The Dada Seminars* (Washington, DC: National Gallery of Art, 2005).

22. Yasunao Tone, *Noise Media Language* (New York: Errant Bodies Press, 2008).

23. Sheldon Renan, *An Introduction to the American Underground Film* (New York: E. P. Dutton, 1967), 247.

24. Yasunao Tone, *Musica Iconologos,* Lovely Music, 1993, LCD3041.

25. Yasunao Tone, *Solo for Wounded CD,* Tzadik, 1997, TZ7212.

26. Yasunao Tone, "The Sound of the Outside," liner notes to *Yasunao Tone,* Asphodel, 2003, ASP2011.

27. Jocelyn Robert, *Le piano flou,* Obscure, 1993, OBZ003/004.

28. Gerfried Stocker, *Winke Winke,* media art installation, in *Cross Compilation,* ed. Jutta Schmeiderer (Graz: X-space, 1994).

29. Jocelyn Robert, *Les montagnes brusques,* Avatar Quebec, 2000.

30. Jocelyn Robert and Louise Dery, *L'inclinaison du regard* (Montreal: Galerie d'UQUAM, 2005), 63.

31. Adorno suggested that the pact between sound and image in cinema relies on the sense of continuity provided by the slight noise of the optical sound track. This *Hörspielstreifen,* as he designated it, is made up of a combination of the electrical noise of the photo-detectors and amplifiers, to which is added a twenty-four-beat-per-second subsound, an artifact of the intermittent running of the film that cannot be filtered out by the loop between the gate and the sound head. This channel noise affords us the unconscious assurance that the projector is running, that the film has not broken, that no savage violence will erupt into the safe warmth of the station where we await the message from afar. Similarly, the warm and reassuring sound of the surface noise on phonograph records lends an aura of space and place to sound, even when no sound is present. Douglas Kahn, *Noise, Water, Meat: A History of Sound in the Arts* (Cambridge, MA: MIT Press, 1999), 181.

32. In contrast with Tone's work, Marclay's earlier, visually more radical interventions into analogue LPs, playing two different records that have been sawn in half and joined at the waist, do not produce any radical information ruptures when played. They simply adhere to the phonographic routine of a periodic click, twice per rotation, with some random skips. The sound content of the original discs continues to be heard as if it inhabited a separate, inviolate world.

11

Media Archaeography

Method and Machine versus History and Narrative of Media

Wolfgang Ernst

Media archaeology is generally associated with the rediscovery of cultural and technological layers of previous media—an approach that remains on the familiar side of historical discourse. Some authors take the term *media archaeology* at face value, almost metaphorically, as referring to the "digging out" of forgotten machinic visions of the past, of alternative, for example, baroque media, of media that never materialized or that are simply forgotten today.

The archaeological metaphor is difficult to resist and has sometimes led to a fatal misunderstanding of Michel Foucault's notion of an archaeology of knowledge.[1] The media-archaeological method as proposed here is meant as an epistemologically alternative approach to the supremacy of media-historical narratives. Equally close to disciplines that analyze material (hardware) culture and to the Foucauldean notion of the "archive" as the set of rules governing the range of what can be verbally, audiovisually, or alphanumerically expressed at all, media archaeology is both a method and an aesthetics of practicing media criticism, a kind of epistemological reverse engineering, and an awareness of moments when media themselves, not exclusively humans anymore, become active "archaeologists" of knowledge. This means that when media archaeology deals with prehistories of mass media, this "pre-" is less about temporal antecedence than about the techno-epistemological configurations underlying the discursive surface (literally, the monitors and interfaces) of mass media.[2]

While most current theories of media archaeology aim at formulating counterhistories to the dominant traditional histories of technology and of mass media, their textual performance still adheres to the historiographical model of writing, following a chronological and narrative ordering of events. Admittedly, the claim to perform media-archaeological analysis itself sometimes slips back into telling media stories; the cultural inclination to give sense to data through narrative structures is not easy for human subjectivity to overcome. It takes machines to temporarily liberate us from such limitations. Technology, according to Martin Heidegger, is more than instrumental, it transcends the human.[3] Media archaeology understood as an analysis of epistemological configurations (both machinic and logic) does not simply seek a redemption of forgotten or misread media of the past, nor is it confined to a reconstruction of the crude beginnings and prehistories of technical media. Rather than being a nostalgic collection of "dead media" of the past, assembled in a curiosity cabinet, media archaeology is an analytical tool, a method of analyzing and presenting aspects of media that would otherwise escape the discourse of cultural history. As long as media are not mistaken for their mass-media content, they turn out to be non-discursive entities, belonging to a different temporal regime that, to be analyzed, requires an alternative means of description.

A certain rejection of what cultural history had so far accumulated as technological knowledge was the bias that allowed human beings to produce electromagnetic fields (instead of just leaving electricity to manifest itself in spontaneously occurring phenomena, like lightning and thunder, that were seen as having natural or supernatural causes). Experimenters and scholars like Michael Faraday, James Clerk Maxwell, and Heinrich Hertz were convinced that they were tracing phenomena that were not simply a question of discursive cultural relativization but indicated physical laws that had a metahistorical and epistemological existence of their own. From the media-archaeological viewpoint (which is hypothetically partly the perspective of the media themselves), the cultural life span of a medium is not the same as its operational life span: a radio built in Germany during the National Socialist regime (the famous *Volksempfänger,* which notoriously was used to broadcast propaganda speeches) receives radio programs when operated today, since the stable technological infrastructure of broadcasting media is still in operation. There is no "historical" difference in the functioning of the apparatus now and then (and there will not be, until analogue radio is, finally, completely replaced by the digitized transmission of signals); rather, there is a media-archaeological short circuit between otherwise historically clearly separated times.

Archaeology of media is not simply an alternative form of reconstructing beginnings of media on the macrohistorical scale; instead, it describes technological "beginnings" *(archai)* of operativity on the microtechnological level. The real media archive is the *arché* of its source codes; *arché* as understood in ancient Greek is less about origins than about commandments. Media archaeology is about rereading and rewriting epistemological (rather than simply temporal) *momenta.* In his *Archaeology of the Cinema* C. W. Ceram states: "What matters in history is not whether certain chance discoveries take place, but whether they take effect."[4] When Hertz experimented with electromagnetic waves he meant to prove Maxwell's mathematical calculations of the electromagnetic field; almost by accident he thereby practically invented radio transmission technology.[5]

How to write media history when media systems create their *Eigenzeit*? Let us process the past media-archaeologically rather than historiographically. Archaeology, as opposed to history, refers to what is actually there: what has remained from the past in the present like archaeological layers, operatively embedded in technologies (the "archaeological" metaphor, as already mentioned, is hard to resist). It belongs to the specificity of technical media that they reveal their essence only in their operation, recalling Martin Heidegger's definition of "the thing" (German *Zeug*) in *Sein und Zeit*. "Historic" media objects are radically present when they still function, even if their outside world has vanished. Their "inner world" is still operative.[6] Both classical archaeologists and media archaeologists are fascinated by the hardware of culture, its artifacts—from ancient marbles up to electromechanical engineering products. Both approaches have a *fundamentum in re:* the hard-edged resistance of material objects that undo historical distance simply by being present. But what drastically separates an archaeological object from a technical artifact is that the latter discloses its essence only when operating. While a Greek vase can be interpreted by simply being looked at, a radio or computer does not reveal its essence by monumentally being there but only when being processed by electromagnetic waves or calculating processes. If a radio from a museum collection is reactivated to play broadcast channels of the present, it changes its status: it is not a historical object anymore but actively generates sensual and informational presence.

The relation between microprocessual timing (such as the coming-into-being of an electronic image on a video screen or real-time data processing in computers) and macrotemporal processes traditionally conceived as historical time is not just a relation between a micro- and a macro*kosmos*. From the development of mathematical stochastics and statistical dynamics in nineteenth-century thermodynamics (Ludwig Boltzmann's and Josiah Willard Gibbs's insight into the nature of entropy) up to Norbert Wiener's *Cybernetics,* the historical mode of describing temporal processes has been confronted with alternative modelings of time. When it comes to describing media in time, this aporia becomes crucial, since one can no longer simply subject media processes to a literary narrative without fundamentally misreading and misrepresenting their *Eigenzeit*. Historical media narratives take place in imaginary time. Storage technologies, on the other hand, take place in the symbolic temporal order, and the contingent can now be dealt with by stochastic mathematics as implemented in real-time computing.

Media are not only objects but also subjects ("authors") of media archaeology.

The term *media archaeography* describes modes of writing that are not human textual products but rather expressions of the machines themselves, functions of their very mediatic logic—just as photography in Henry Fox Talbot's *Pencil of Nature* registers physical (optical) reality in a way not performed by the painterly human hand anymore. Technological media that operate on the symbolic level (i.e., computing) differ from traditional symbolic tools of cultural engineering (like writing in the alphabet) by their registering and processing not just semiotic signs but physically real signals. The focus shifts to digital signal processing (DSP) as cultural technology instead of cultural semiotics. Technological media such as photography and computing became active archaeologists of physical realities that are often inaccessible to human senses, as in the case of ultraviolet photography of ancient manuscripts, or the reconstruction of "lost" sound signals in damaged Edison wax cylinders by optical scanning and digital processing.

For media archaeologists, the recent turn from the epoch of electronics to that of information means that although data-processing media are still rooted in archaeologically accessible materialities (hardware, physics), their archaeology of knowledge requires competence in informatics (mathematical logic, technique, and control). Media archaeology is primarily interested in the nondiscursive infrastructure and (hidden) programs of media. Thus it turns from the historiographical to the techno-archival (archaeographical) mode, describing the nondiscursive practices specified in the elements of the techno-cultural archive. Media archaeology is confronted with Cartesian and even trans-Cartesian objects, which are mathematizable things. By applying techno-mathematical analysis, media archaeology accesses the subsemantic strata of culture, being (to quote from a Pink Floyd song) "close to the machine." In a nonmetaphorical sense, this means dealing with the techno-archaeological artifact—and in a methodological sense, it means performing media archaeology by means of such machines (measuring, calculating).

MEDIA AS ARCHAEOLOGISTS (A PHONOGRAPHIC MISSION)

In contrast to two thousand years of basically written history, the advent of audio-recording media almost immediately led to genuinely media-based projects like the music-ethnological gramophone archives established in both Vienna and Berlin around 1900. But the treasures of culture are just one aspect of such a media archive, since such recordings contain—and thus memorize—a world of signals that operate beyond and below the cultural symbolism intended by the humans involved. Media archaeology (like the membrane of the microphone) dispassionately pays attention to the subconscious qualities of technical media.

The moment a singer of epics sings into a current recording device, two different regimes clash as human performativity is confronted with technological or algorithmical operations. While philological analysis of the marvels of oral poetry (Homer's epics in antiquity, Serbian *guslari* in the present) remains within the logic of cultural technologies (alphabetic writing and musical notation), media-archaeological analysis, by computer-aided fast Fourier computations, of speech below the elementary units of what can be expressed by letters (vowels, consonants) gives access to the material dimension (the physical world) of a cultural moment. Consequently, the cover of a book on the origins of the vocal alphabet shows both an image of the first Greek alphabetic inscription *and* the spectrogram of the same words in Greek (read and spoken by one of the most original scholars on that subject, Barry Powell).

The phonograph as media artifact not only carries cultural meanings like words and music but is at the same time an archive of cultural engineering by its very material fabrication—a kind of frozen media knowledge that—in a media-archaeological sense—is waiting to be unfrozen, liquified. Digital archaeology even operates below the sensual thresholds of sight and sound—a level that is not directly accessible to human senses because of its sheer electronic and calculating speed. Synesthetically, we might *see* a spectrographic image of previously recorded sound memory—a straight look into the archive.[7] The microphysical *close reading* of sound, where the materiality of the recording medium itself becomes poetical, dissolves any semantically meaningful archival unit into discrete blocks of signals.[8] Instead of applying musicological hermeneutics, the media archaeologist suppresses the passion to hallucinate "life" when he listens to recorded voices.

Media theories work only when being tested against hard(ware) evidence. Let us look at the epistemological revolution that was triggered by the "sonification" of the electromagnetic field for cultural and noncultural use. As soon as the German AEG-Telefunken magnetophone had been developed into a usable tool for recording sound in the mid-1930s, it was applied to ethnomusicological studies and field recordings.[9] Since no one can "record" Homer any more, Milman Parry of Harvard University by analogy went to Serbia and Montenegro to conduct a study in experimental philology, recording epic songs to discover how epics as long as Homer's *Iliad* and *Odyssey* could have been transmitted in a culture without writing. While Parry had used phonographic recording on aluminum discs to record evidence of oral poetry in former South Yugoslavia in 1933–35, his assistant and colleague Albert Lord later returned for the same reason, but with an electromagnetic wire recorder for registering such songs. While these machines were obviously used for philological reasons (with the recorded epics being transcribed later for philological analysis), what factually happened on the media-archaeological level was the (unconscious) replacement of the vocal-alphabetic code by an electromagnetic flux of electrons—which opened a different regime of signals operating as a substratum of cultural semiotics. This required not textual analysis but a close reading of the literal "wiring" of the recording machine, of its voice coil and the other techno-logical ingredients of this wondrous mechanism.[10]

Media archaeology adds to the study of culture in an apparently paradoxical way by directing attention (perception, analysis) to noncultural dimensions of the technological regime. What is indicated by the flickering lamp while the microphone is recording such Serbian *guslari* songs is the event of the voice itself, the very materiality of culture. The wire spool may metaphorically be interpreted as a kind of "writing"—but a writing that operates no longer on the symbolic level (the vocal alphabet, corresponding with Ernst Cassirer's definition of culture as a symbolic regime) but electro-physically.

A few years after Milman Parry's untimely death, Walter Benjamin, in his 1936 essay "Der Erzähler," stated that experience, when cut off from epic tradition, could not be communicated in a narrative way anymore. Indeed, cultural analysis nowadays belongs to computing and signal processing and is not narratable.[11] Parry and Lord used the most up-to-date recording device in the interest of philological research, finally transcribing the sound recordings into alphabetic texts. But *nolens volens* (on a level below cultural semantics), the act of electromagnetic recording allows for an analysis of the acoustic event from a media-archaeological perspective that is not exclusively a human cultural perspective (dealing with symbolic acts); the recording device itself becomes a media archaeologist of the signal processing of culture. Only such an electro-technical recording device can deliver the basis for a sonogram or spectrogram of such articulations, and these are measuring acts at the same time, since the apparatus unsemantically "listens" to the acoustic event, whereas the human ear always already couples the physiological sensual data with cognitive cultural knowledge, thus filtering the listening act. The measuring device, for a moment, suspends human perception from the limitations of its own subjectivity and culturality, though we take into account that any measuring configuration is itself marked by the historic index of its own epoch. This physical layer below symbolically expressed culture can be registered only by media themselves.

The blind spot of Parry's and Lord's research was the technology in which it was implicated:

> Some songs were taken down on aluminum wire, others on metal discs. In the Milman Parry Collection at Harvard, Albert Lord showed me . . . several rolls of this wire, hopelessly tangled in a drawer—what lost songs does this tangled text preserve? Aluminum wire . . . is not oral song, but a kind of text . . . . Parry's aluminum discs and wire, just as much as a papyrus with graphemes scratched thereon, provide a material basis—obviously liable to corruption—for a code impressed upon it. In either case the text depends on technological innovation: the

> Greek alphabet . . . , inscribed on parchment or papyrus, and electronic magnetization . . . . All texts are useless without the technology to decode its symbols: the rules of Greek alphabetic writing . . . , a tape-player.[12]

In this instance, media archaeology can sharpen our perception of the fundamental difference between two kinds of recording that might otherwise appear similar. While the Greek vocal alphabet probably was established for the special purpose of recording poetry (culture as symbolical operations), recording in the electromagnetic field, in a departure from the practices of cultural engineering with symbolic signs (alphabetic writing), builds a technological microworld of its own—media that behave "analogously" to physics itself. Ironically, digital code returns to the first forms of pre-Grecian writing, which were invented for *calculating* purposes:[13] now even poetry can be calculated on the level of digital signal processing with a precision in voice reproduction (according to the Nyquist/Shannon sampling theorem) that equals (literally "emulates" on and in computers) nature itself. Fourier analysis allows for the mathematical transformation of a temporal function or sequence of signals into a spectrogram; fast Fourier transformation is the "analytic" operation performed by the computer itself when translating a recorded voice event into a mathematical regime, thus making cultural analysis calculable in ways that only computing can do. At that moment, the machine is the better media archaeologist of culture, better than any human. At the same time, the results of such an analysis can again be rendered perceptible to humans by being translated into visual diagrams on the computer screen. Only by application of such medial-technological tools can we explain the microtemporal level of such events. What cannot be explained by such analysis is the cultural-semantic meaning of these microevents, since such voice analysis is unspecific and indifferent to "meaning," treating any random noise with the same technological fairness as it would a high-cultural *guslar* recitation. Taking into account these options and limitations, media-archaeological analysis opens culture to noncultural insights without sacrificing the specific wonders and beauties of culture itself.

Let us turn a notorious motif of Homer's *Odyssey* against itself: Ulysses had to be tied up to resist the seductive voices of the Sirens. The Webster Wire Recorder (type 80 from 1948), as *écriture magnetique* (the French way of naming such devices), is an anti-Ulysses, since the apparatus can resist the temptations of confusing beautiful voices with other kinds of acoustics and can instead pay equal attention to all kinds of sounds without ever being affected by their emotional value. With a cool archaeological sense for signals (instead of semiotics, as in cultural semantics), the machine registers all kind of electromagnetic vibrations—and thus comes closer to the real world than any alphabet can. Magnetic wire or tape registers signals—whether sound, images (video AMPEX), or data (IBM computers)—and makes no distinction between human, physical, and machinic senders of such messages.

From a similar perspective, the media-archaeological development period of radio "before radio" was not simply the technological prehistory of the mass medium but its alternative mode of existence, in which the range of the electro-acoustic field was not limited to broadcasting.[14] The media-archaeological level is structural rather than historical, making it possible (in this case) to think about the radio in terms of the electromagnetic field instead of limiting it to the semantics of cultural voices.

Today such continuous data flows of the acoustic world are being translated into discrete, quantified data—a process of digital quantization in which "the continuous" becomes itself a secondary effect of discrete enumeration to be approximated. In the presence of discrete data, "streaming" is a metaphorical disguise. But with accelerated data processing that is faster than what our optical and acoustic senses can consciously follow, discrete operations have become able to represent continuous ones, approaching the reality of physical signals themselves.

Marshall McLuhan emphasizes that the "archaeological" analysis of scientific research has been a by-product of the era of discrete letters; analysis in fact operates by de-composing a text into single elements (*elementa,* or even *stoicheia,* the Greek expression for both single alphabetic letters and atomic units in nature). It was a crucial moment—archaeological rather than historical, since it was not immediately reflected in cultural terms—when the invention(s) of the discrete alphabet (as opposed to ideographic writing systems like the Egyptian hieroglyphs) broke down human language into its smallest elements, which were meaningless in themselves—from "house" *(beth)* to "B" *(beta).* At this moment the machinic took over, since only machines could perform symbolic operations without the semantic referentiality that hindered effective data processing.

A fundamental epistemological gap lies between symbolically coded writing (the alphabet) and the gramophonic recording, which can record as well the accompanying noise (i.e., the index) of the physically real within and outside the recorded voice (intonations, timbre, the "grain" of the voice—as defined by Roland Barthes with respect to early gramophone recodings of Caruso's voice). But "neither Parry nor Lord . . . [was] interested in the nature or history of the technology that had made the text of Homer possible, any more than Parry investigated the history of the recording machine."[15] A media archaeology of recording is needed—both (and distinctly) for the cultural technology of writing (the alphabet) and for its technological alternatives (gramophone, electromagnetic recording). While apparently the Phoenician alphabet was modified to the familiar phonetic alphabet for explicitly poetic purposes, the development of phonographic recording stemmed from physiological inquiries into the nature of the voice itself.[16] The electromagnetic field was discovered through experimental chance, mathematical reasoning about the effects of inductivity, and a theoretical research interest (Oersted, Faraday, Maxwell); its application for wire or magnetic recording devices was nothing but a spinoff from diverse self-referential regimes.

Most of Albert Lord's wire spools have been transferred to tape. The wire recording device from the early 1950s in the collection is not functional anymore. In such migrations between hard- and software, at any point cultural memory runs the risk of being interrupted.[17] Some of these sound monuments, which have been converted from analogue recordings to digital fields, can be listened to on the Web site of the Milman Parry Collection of Oral Literature at Harvard University. The special media-archaeological interest is in the technological process of how these data were digitized. Such a data migration is a new form of "tradition" that stems from the genuinely inherent options of electronic media, allowing for new forms of reconstructing media-archaeological scenes. Media archaeology in its most obvious sense starts here: on the level of magnetic recording media (chemical tapes, steel wire, wax cylinders). Looked at in a both practical and theoretical way, these recording media reveal a fundamentally new epistemology, giving access to knowledge in the electromagnetic field that not only generated broadcasting media like radio and television but led to quantum physics as well (the most eminent provocation of media transmission theory to date). This materialist media archaeology is overlain by a logical level in the information age, when such tapes still recorded physical signals but the signals were encoded as information (bits)—*techno/logy* in its strictest sense.

PHONOVISIONS: DIGITAL RESTORATION OF GRAMOPHONIC ARTIFACTS

With the media mystery of physically real recordings of human voices since the advent of the Edison phonograph, culture experienced a temporal mirror effect that sublated the formerly clear-cut difference between presence and absence, present and past. For decades, early recordings on wax cylinder donated to phonogram archives (established almost contemporaneously since 1900 in Vienna and Berlin) were thought to be untouchable because of the possibility of their destruction by inappropriate technical replay. Strangely enough, today we can listen to these recordings in almost exactly the same quality as in the moment of recording by means of the opto-electronic media archaeology of sound, now embedded in cyberspace itself. Message or noise? The media-archaeological operation of reading the inscribed traces opto-digitally made the otherwise inaccessible sound recordings audible again—an unexpected inverted reminder of light-based sound inscription in early film. Media trigger media memory according to nonhistorical laws of their own. Synesthetically, by application of an equally virtual visualizing tool, we can *see* a spectrographic image of sound memory, taking an analytic look straight into the cultural archive. The opto-digital *close reading* of sound as image, however, dissolves any semantically meaningful unit into discrete blocks of signals. Instead of musicological hermeneutics, the media-archaeological gaze is required here.

In the phonographic archives, frozen voices, confined to analogue and long-forgotten storage media, wait for their (digital) unfreezing, their "redemption." At this moment the digital reprocessing of such data comes close to the human processing of sensory signals within the neuronal network of the brain itself. In the opto-analytic procedure to regain audio signals from the negative tracks in galvanized Edison wax cylinders, endoscopic recording devices "read" the sound traces graphically, retranslating them into audible sound by algorithmically transforming visual data into sound. Digital memory ignores the aesthetic differences between audio and visual data and makes one interface (to human ears and eyes) emulate another. For the computer, the difference between sound and image and text, if it counted, would count only as the difference between data *formats*.[18]

The very first recordings of experimental television by John Logie Baird, called *Phonovision,* dating from September 1927, show no humans, but instead a wooden puppet, "Stookie Bill" (since the extremely hot light source would have burnt human skin). Subsequent early TV recordings like the thirty-two-second *Looking In* (April 1933), the first TV revue of the BBC test program, hardly allowed identification of human bodies out of the noisy visual signals.[19] "From the dawn of our television technology age comes the restored wonders of original recordings made in the era of mechanically-scanned television! Not until the computer era came on us could we study these images"[20]—media archaeology as practiced by a different medium (computing). A media-archaeological shortcut takes place: "Now they can be seen in as close to their original quality as the latest techniques can take us."

Media-archaeological *aisthesis* (immediate signal perception as opposed to *aesthetics* in philosophical and cultural discourse) operates *transitively,* that is, in direct reference to and contact with its objects—just as technological media operate, not within a "deep" hermeneutic space, but on a "flat" level, both materially (as instanced by an electromechanic pickup deciphering the grooves of a musical record disk) and logically (as instanced by programming, which has a syntactical rather than semantic mode of operation). Technology knows this *avant la lettre.* In 1962, in his introduction to the technology of the television apparatus, Heinz Richter coined the term *immediate television* to define the nonedited use of cathode ray–based visual information, developed during World War II as the *Elektronenkartograph.*[21] Transitive television immediately couples human perception with the signal flow of technological media, with or without their translation into the iconological regime of cognition.

When media themselves become active archaeologists of data, the cold gaze of the machinic eye is an element in cybernetic feedback systems, as expressed Dziga Vertov's film *The Man with the Movie Camera,* with its emphasis on the camera-eye (KinoGlaz) itself. And the radar image as another form of "visual" intelligence is a very precise way of electronically translating the Greek notion of *theoría.* C3I-technologies (command, control, communications, and intelligence) favor the Nietzschean notion of pathetic distance (literally *tele*-visual, "Pathos der Distanz"), as analyzed by Paul Virilio for the conjunction of war and cinema. Media archaeology is more akin to the gaze of the optical scanner than to that of the anthropological observer. Going beyond Marshall McLuhan, the media in contemporary culture can no longer be simply "extensions of man."

Siegfried Zielinski asks for a balance between the "arctic freeze" of computer-centered media systems and "the warmth of strong imagination."[22] The (re)search for the wreck of the ocean liner *Titanic* has been a true act of submarine archaeology and historical imagination at the same time. While the gaze of the camera can look at the wreck archaeologically (i.e., purely evidentially in the sense of remotely sensing data), the human eye, confronted with an irritating material presence of the past, which by definition should be absent, immediately confounds evidence with magic. The film director James Cameron recollects: "Out of the darkness, like a ghostly apparition, the bow of a ship appears . . . just as it landed eighty-four years ago."[23] Initially Cameron felt like an astronaut who experiences the moon as a series of checklists and mission protocols—the true archaeological gaze. But at a certain point he abandoned this perspective "and allowed the emotional part of my mind to engage with the ship. It made all the difference in the world."[24]

Hermeneutic empathy here clashes with pure data navigation: there is a world of difference between an *archaeology of knowledge* and historical imagination, which seeks to replace positive evidence by an act of reanimation. But sonar echoing in submarine archaeology only rhetorically corresponds with empathetic *resonance;* let us not confuse data streams (even when computed in real time) with moments of live communication.

Sometimes the iconological impulse of human image reading and ear listening hinders knowledge and insight. Suspending human perception for a moment in favor of measuring instruments can reveal insights that cultural codes simply do not perceive—the blessing of the media-archaeological gaze. The electronic tunnel microscope does not actually transfer images of the atomic surface of matter but analyzes its object by matching data statistically and representing these calculations as images. Media-archaeological hearing similarly listens to sound as configurations of data (once oscillations have become calculable).

IMMEDIATE VIEWING, IMMEDIATE LISTENING

Let us investigate the notion of the cultural sonosphere. In a free interpretation of McLuhan, to listen media-archaeologically is to pay attention to the electronic message of the acoustic apparatus, not primarily to its musical content as cultural meaning. The media-archaeological ear listens to radio in an extreme way: listening to the noise of the transmitting system itself.

The audible difference obtained by changing the sampling rate significantly refers to the noise of the recording device (the ancient wax cylinder) rather than the recorded voice. Here the medium talks on the level of both enunciation and reference. What do we hear: message (the formerly recorded songs) or noise (the wax cylinder scratch and groove)?

In media-archaeological awareness, this recording primarily memorizes the noise of the wax cylinder itself—which is a different kind of "archive," not cultural-historical but cultural-technological, a different kind of information about the real. Media archaeology opens our ears to listen to this as well, not to filter it out (as opposed to the "cocktail party effect" of hermeneuticized psycho-acoustics).

Technical media have already developed a true media memory that differs from human remembrance. The experiment is very simple: imagine an early phonographic recording. Surely we acoustically hallucinate the scratching, the noise of the recording apparatus; true media archaeology starts here.

The media-archaeological exercise is to be aware at each given moment that when we direct our senses to human voices or images of the past replayed from media recordings we are not communicating with the dead; rather, we are dealing with the past as a form of delayed presence, preserved in a technological memory. Recording media operate in a temporal regime different from that of historical time (which is anthropocentric, as defined by Giambattista Vico in his *Scienza Nuova*). The noise, the scratch of the wax cylinder, is the pure message of the medium; in between, the human voice is literally incorporated. But what has continuously been preserved by analogue recording technologies becomes quantified in the transfer to digital recoding (CDs) instead of simply being analogue recording. This is epistemologically new—and dramatically so.

The media-archaeological desire to be freed by machines from one's own subjectivity (and desire for storytelling) is Foucauldean: in his *Archaeology of Knowledge* Foucault expresses his will to "define a method of historical analysis freed from the anthropological theme . . . a method of analysis purged of all anthropomorphism."[25] Media archaeology as well is interested in procedures and events that are not "historical" (i.e., narratable) but rather consist of "autochthonic transformations" (Foucault) within the realm of machines and their symbols. Words and things happens within the machine (computers) as logic and hardware. The media-archaeological gaze, accordingly, is immanent to the machine. Human beings, having created logical machines, have created a discontinuity with their own cultural regime.

"COUNTING BY NUMBERS" (INSTEAD OF NARRATIVE)

The cybernetic epistemology that is implied by the idea of a feedback loop between an analogue past and a digital present requires a "cold" reading technique different from "hot" historical (or historiographical) imagination, to use McLuhan's famous distinction in *Understanding Media*.

"Digital retro-action" dramatically takes place, actually, by digitizing analogue source material in the archives and bringing it into a technomathematicized present, thereby translating an analogous world into a digital matrix.[26] The microtemporality in the operativity of data processing (synchronization) replaces the traditional macro time of the "historical" archive (governed by the semantics of historical discourse)—a literal "quantization." Our relation not only to the past but to the present thus becomes truly "archival."

Media taken as physical channels of communication and as technical artifacts that are mathematically operated by symbolic codes and streaming data must be analyzed differently from cultural texts, art historical images, classical music, or works of art. The archaeological gaze ("theory," in the ancient sense of insight) is such a way of looking at media objects: enumerative rather than narrative, descriptive rather than discursive, infrastructural rather than sociological, taking numbers into account instead of just letters and images. Media "archaeology" discovers a kind of stratum—or matrix—in cultural sedimentation that is neither purely human nor purely technological, but literally in between (Latin *medium*, Greek *metaxy*): symbolic operations that can be performed by machines and that turn the human into a machine as well.

Henri Bergson insisted on human perception of time as duration (consciousness) as opposed to the chrono-photographical registering of temporal processes. Whereas narrative (see Gotthold Ephraim Lessing's argument in the *Laocoon*, from 1766) once was the art of time (time-based arts and literature), now time is being organized technologically.[27] Media archaeology deals with this crisis in the narrative memory of culture. Digital narrative, on a media-archaeological (not interface) level, is linked to discrete mathematics; in medieval German, the words for counting and narrating were etymologically the same. A computing culture, from a media-archaeological view, deals not with "narrative memory" but with calculating memory—counting rather than recounting, the archaeological *versus* the historical mode.

MEDIA, MATHEMATICS, ARCHAEOLOGY

So far in Western culture, narrative has been the primary mode of processing archivally stored data in the name of history, which on the surface of so-called multimedia continues in the form of stories (even in computer games, though in fragmented ways). Media-archaeological analysis, on the contrary, does not operate on the phenomenological multimedia level; instead, it sees all so-called multimedia as radically digital, given that digital data processing is undermining the separation into the visual, auditive, textual, and graphical channels that on the surface (interface) translated data to human senses. By looking behind the human-machine interfaces (such as the computer monitor) and by making invisible communication processing evident, an archaeology of media, as the notion implies, follows Foucault's *Archaeology of Knowledge* in not discovering metaphorical uses of media in public discourse but instead reconstructing the generative matrix created by mediatic *dispositifs.*

Athanasius Kircher's term for his machine for automatically composing music (as we learn from Zielinski's *Deep Time of the Media*) was, not coincidentally, *arca,* a term that in medieval Latin also meant "archive." Here the use of the term is Foucauldean *avant la lettre,* since it refers to the generative set of rules and material mechanisms that produce the musical impression (like the current software program SuperCollider, which can be used to create algorithmic audio compositions). Computer programming, the cultural force of today, is non-narrative; its algorithmic forms of writing—alternative forms of minimal, serial time-writing (as opposed to registering)—are close to the paradigm of computing itself.

Let us consider media archaeology in the sense of a mathematical way of doing Foucauldian "archaeology," one that would deal not only with the audiovisual or textual but with numbers as well, just as at the very origin of the vocalized Greek alphabet the single letters *(stoicheia)* were used for numbering as well, counting in an "elementary" way. Academic discourse in the humanities, we have to admit, is still primarily based on the narrative transfer of knowledge. The computer recalls an alternative mode of communication: Leibniz's dream of communicating by mathematical formulas, in symbolic language *(characteristica universalis).*

Friedrich Nietzsche once mused upon the close relation between mathematics and nature;[28] in fact, numbers have developed a culture of their own.[29] Quantum physics calculates nature by mathematizing it; nature, by media-technological measuring and calculating devices, is almost seduced to reveal its mathematical essence.[30] Whereas Pythagoras once saw numbers as embedded in nature (as in Leibniz's conception of the *deus calculans*), the computer literally numbers the world processually—closer to mathematical Fourier analysis of physical wave events (sound, light, heat, electromagnetic fields) than to any metaphysical *kosmos.*

Media "theory" recognizes that the links in Western culture between the optical regime and epistemological insight (the visual metaphor of *theorein*) are being replaced by the numerical sublime, that is, mathematical calculation.[31] Around 1900 a crisis of intuition in mathematics occurred: David Hilbert's mathematics led to a nonreferential use of mathematical signs, simply operative and thus engineerable (the Turing machine of 1936).

Since technologies changed from tools to machines, these techniques have comprised not only texts and images but numbers as well.[32] Media archaeology therefore is close to mathematics. As Martin Kusch says of the use of the term *series* in Foucault's *Archaeology of Knowledge,* the natural way of rendering these passages intelligible "is, obviously, to take the notion of a function at its mathematical face value."[33]

The media-archaeological aesthetic, so close to mathematics, accords with that of George David Birkhoff, who in a congress of mathematicians in Bologna in 1928 delivered a lecture proposing a nonphilosophical, mathematical measure for aesthetic impressions (the so-called *Gestaltmass* as ratio between order and complexity).[34] Here Birkhoff anticipated Claude Shannon's "mathematical theory of communication" (1948) and philosophers like Max Bense as well as artists who have made cybernetics and aesthetics converge.[35] Human culture does not lose but wins by such a nonhuman challenge. Let us employ media archaeology to suspend our subject-centered interpretations for a moment, while at the same time admitting that this techno-ascetic approach is just another method to get closer to what we love in culture. Media archaeology exposes the technicality of media not to reduce culture to technology but to reveal the techno-epistemological momentum in culture itself. "Reverse phonography" is an example of acoustic media archaeology, as described in a piece of science fiction: Gregory Benford's novel *Time Shards.*[36] Here a scientist at the Smithsonian Institution in Washington, D.C., tries to resurrect voices from 1000 AD by deciphering grooves on ancient pottery, a fiction that has become experimentally realistic with the technological development of microscopic reading of material surfaces on its most elementary, atomic level.[37] Media-archaeological analysis will be rewarded by the sweetness of the human voice.

NOTES

1. See Walter Benjamin, "Excavation and Memory," in *Selected Writings,* vol. 2, *1927–1934* (Cambridge, MA: Harvard University Press, 1999), 576. Benjamin compares "authentic memory" with "a good archaeological report."

2. An exemplary study is Claus Pias, *Computer Spiel Welten* (Vienna: Sonderzahl, 2002).

3. Martin Heidegger, *Überlieferte Sprache und technische Sprache* [lecture, 1962] (St. Gallen: Erker, 1989), 19.

4. Quoted in Erkki Huhtamo, "From Kaleidoscomaniac to Cybernerd: Notes toward an Archeology of the Media," *Leonardo* 30, no. 3 (1997): 221.

5. See Charles Süsskind, "Hertz and the Technological Significance of Electromagnetic Waves," in *Philosophers and Machines,* ed. Otto Mayr (New York: Science History Publications, 1976), 193.

6. Martin Heidegger, *Sein und Zeit* (Tübingen: Max Niemeyer, 1986), 380. "Inwiefern ist dieses Zeug geschichtlich, wo es doch *noch nicht* vergangen ist? . . . Was ist 'vergangen'? . . . Die *Welt* ist nicht mehr. Das vormals *Innerweltliche* jener Welt aber ist noch vorhanden. . . . Welt *ist* nur in der Weise des *existierenden* Daseins, das als In-der-Welt-sein *faktisch* ist."

7. See, e.g., the spectrogram of a reconstructed recording of Wedda chants in Ceylon in 1907 on the SpuBiTo Web page, www.gfai.de/projekte/spubito/index.htm (accessed December 11, 2008).

8. See Karl Sierek, "Die weiße Leinwand," in *Aus der Bildhaft: Filmanalyse als Kinoästhetik* (Vienna: Sonderzahl, 1993), 122. The passage refers to Umberto Eco's *Semiotik.*

9. See the reports contained in a file on early experimental use of the "Magnetophon" in the AEG-Telefunken-Archives, located at the Berlin Museum of Technology. Electronic recording of sound practically starts with Valdemar Poulsen's wire recorder, the Telegraphon (1898).

10. See Webster-Chicago Corporation, "A Photofact Standard Notation Schematic of Webster Wire Recorder Model 80–1," 1948, www.webster-chicago.com/80sch.jpg (accessed February 19, 2009).

11. Walter Benjamin, "Der Erzähler," in *Gesammelte Schriften,* vol. 2.2 (Frankfurt: Suhrkamp, 1972), 439ff.

12. Barry Powell, *Writing and the Origins of Greek Literature* (Cambridge: Cambridge University Press, 2002), 6.

13. Denise Schmandt-Besserat, *Before Writing,* vol. 1, *From Counting to Cuneiform* (Austin: University of Texas Press, 1992).

14. See Wolfgang Hagen, *Das Radio: Zur Geschichte und Theorie des Hörfunks* (Munich: Fink, 2005), 1–111.

15. Powell, *Writing and the Origins,* 7ff.

16. See Wolfgang Ernst and Friedrich Kittler, eds., *Die Geburt des Vokalalphabets aus dem Geist der Poesie: Schrift, Ton und Zahl im Medienverbund* (Munich: Fink, 2006).

17. See Wolfgang Ernst, "Dis/continuities: Does the Archive Become Metaphorical in Multimedia Space?" in *New Media, Old Media: A History and Theory Reader,* ed. Wendy Hui Kyong Chun and Thomas Keenan (New York: Routledge, 2006), 105–23.

18. See Artur Simon, ed., *Das Berliner Phonogramm-Archiv, 1900–2000: Sammlungen der traditionellen Musik der Welt* (Berlin: VWB, 2000), 209–15.

19. To see one of these early recordings, go to Thomas Weynants's site "Early Visual Media," 2003, http://users.telenet.be/thomasweynants/television.html.

20. Don McLean, "The World's Earliest Television Recordings," May 2007, www.tvdawn.com.

21. Heinz Richter, *Fernsehen für Alle: Eine leichtverständliche Einführung in die Fernseh-Sende- und Empfangstechnik* (Stuttgart: Franckh, 1962), 222.

22. Siegfried Zielinski, "Supervision und Subversion: Für eine Anarchäologie des technischen Visionierens," in *Konturen des Unentschiedenen: Intervevntionen,* ed. Jörg Huber and Martin Heller (Basel: Stroemfeld, 1997), 186.

23. James Cameron, foreword to *James Cameron's Titanic,* by Joel Avirom and Jason Snyder (New York: Harper Perennial), xii.

24. Ibid.

25. Michel Foucault, *Archaeology of Knowledge* (New York: Pantheon, 1999), 16.

26. The term *digital retro-action* is taken from the title of a conference organized by William Warner at the University of California, Santa Barbara: Digital Retroaction: A Research Symposium, September 17–19, 2004.

27. Paul Virilio, "Technik und Fragmentierung," in *Aisthesis: Wahrnehmung heute,* ed. Karlheinz Barck et al. (Leipzig: Reclam, 1990), 71. See Dieter Thomä, "Zeit, Erzählung, Neue Medien," in *Zeit—Medien—Wahrnehmung,* ed. Mike Sandbothe and Walther Ch. Zimmerli (Darmstadt: Wiss. Buchges., 1994), 89–110.

28. "Alles Wunderbare . . . , das wir gerade an den Naturgesetzen anstaunen, . . . liegt gerade und ganz allein nur in der mathematischen Strenge und Unverbrüchlichkeit der Zeit- und Raum-Vorstellungen." Friedrich Nietzsche, "Ueber Wahrheit und Lüge im aussermoralischen Sinne" [1873], in *Friedrich Nietzsche, Kritische Studienausgabe,* vol. 1, ed. Giorgio Colli and Mazzino Montinari (Munich: Deutscher Taschenbuch, 1988), 885f.

29. Martin Stingelin, "Das Netzwerk von Gilles Deleuze oder Der nichtlineare Begriff des Begriffs," *Kunstforum International* 155 (2001): 166.

30. "Die Natur wird daraufhin gestellt, sich in einer berechenbaren Gegenständlichkeit zu zeigen (Kant)." Heidegger, *Überlieferte Sprache,* 17.

31. The Greek notion derives from the linguistic root *w(e)id* = to see, to know—as in "video"—a derivation contested by Edwin D. Floyd, "The Sources of Greek *(H)Istor*—'Judge, Witness,'" *Glotta* 68 (1990): 157–66.

32. On the shift from tool to machine technology, see Bernhard Dotzler, *Papiermaschinen: Versuch über Communication und Control in Literatur und Technik* (Berlin: Akademie, 1996).

33. Martin Kusch, "Discursive Formations and Possible Worlds: A Reconstruction of Foucault's Archeology," *Science Studies* 1 (1989): 17.

34. George David Birkhoff, "Quelques éléments mathématiques de l'art," reprinted in *George David Birkhoff: The Collected Mathematical Papers* (1950; repr., New York: Dover Publications, 1968), 3:288–306.

35. "When Cybernetics Meets Aesthetics" was the title of a conference organized by the Ludwig Boltzmann-Institute for Media.Art.Research at Linz (Austria), August 31, 2006, on the occasion of the Ars Electronica festival of media arts.

36. Gregory Benford, "Time Shards," in *Universe 9,* ed. Terry Carr (New York: Fawcett Popular Library, 1979), 88–98.

37. Wolfgang M. Heckl, "Fossil Voices," in *Durability and Change: The Science, Responsibility, and Cost of Sustaining Cultural Heritage,* ed. W. E. Krumbein et al. (New York: John Wiley, 1994), 292–98.

12

Mapping Noise

Techniques and Tactics of Irregularities, Interception, and Disturbance

Jussi Parikka

In the theories surrounding media archaeology, noise, not meaning, is quite often the focus for histories of technical media. Especially the German materialist media archaeologies taking their cue from Friedrich Kittler have insisted that the "founding event" of modern media culture is Claude Shannon and Warren Weaver's mid-twentieth-century model of noise. The technical formulation of diagrammatics of noise and noise reduction acts as a recurring reference point for explaining the novelty of signal transmission and media in the age of telecommunications and digitality. Furthermore, the centrality of noise is used to illustrate the secondary nature of human hermeneutics for any cultural communication and the primacy of time-based modulations of technical signals. Technical media are posthuman media in the sense of addressing a whole other sensorium than that of the human being. The emergence of trash, contingency, and the unconscious in the archive is a theme of modernism that writers such as Sven Spieker analyze through artists such as Duchamp and the surrealists. Modernism thus actually is a mode of knowledge about the archive: it "promotes the idea of an archive that does not so much collect facts as reveal the conditions for their discovery, an archive whose peripheral objects become visible or audible to the extent that they conform to the archive's own protocol."[1] Noise becomes an index of archival logic.

Of course, in Kittler's much more technology-oriented framework, which shares with Spieker's an emphasis on the late nineteenth century and early twentieth century, noise is already evident in the earlier technical media of sound recording. The gramophone picks up not only the meaning inherent in human speech but just as effectively the whispers, the noises of the body, the "extras" of communication, so to speak, that come with every opening of the mouth. Long before John Cage forced spectators to listen to the uneasy noisiness of their bodies as they "listened" to *4′33″*, the technical recording of the trace of the body dispensed, according to Kittler, with meaning and intentionality. Indeed, as Geoffrey Winthrop-Young and Michael Wutz, the translators of *Gramophone, Film, Typewriter,* explain, this is part of the materialist ontology of the Kittlerian cosmology. Technical media are media of the real, recording noise in its singularity as well.[2]

More recently, scholars such as Wolfgang Ernst have been keen to continue the materialist vocation inherent in such realizations.[3] For Ernst, the crucial difference is made to cultural history as a specific human narrative form of writing the history of media. The epistemological settings of narratives and subjectivities are secondary to the primary material constellations imposed on us by media technological formations. Here the nondiscursive offers a novel approach to the past through the agency of the machine. Further, Ernst writes, it is from the ruins of the narrative and the semantic and discursive that the media-archaeological perspective emerges—a perspective on the remainder after meaning. Here the ruin, the noise, becomes a reminder of the remainder of the nondiscursive, with an emphasis similar to that of Kittler's observation about the noise of the body picked up by the phonograph recording.

This chapter is concerned with pursuing further the implications of such characterizations of noise. What the materialist versions of media archaeology are effectively proposing is a nonsignifying take on media history that bypasses not only the hermeneutics of human communication but also the cultural representational approaches of much of cultural studies. In this collection, Ernst's chapter on how machines themselves record the passing of time and act as media archaeographies much before human intervention is a case in point. As Ernst explains, there is a much more fundamental layer of recording reality than that of human communication with symbols. This is not only the layer of involuntary bodily sounds and noises, such as those tracked by the sound artist Cage, but also the layer of nonhuman speeds and slownesses of calculation and translation.

Such a materialist stance has made media archaeologists vulnerable to attacks from cultural studies scholars regarding the nonpolitical nature of their ontologies. However, perhaps we are more accurately dealing with another mode of politics than the politics of representation. For example, since the 1990s Kittler has examined more closely the power formations of global media, computer culture, and the structured hierarchies evident in the combination of technical characteristics with political economy.[4] This has even led some media archaeologists to posit a potential connection between the agenda of Anglo-American cultural studies and that of so-called German media theory.[5]

This chapter does not address the important notions of noise in acoustics, sonic art, and soundscape studies, in which works by Douglas Kahn, Jacques Attali, Paul Hegarty, Emily Thompson, and Jonathan Sterne are exemplary.[6] Tying in with Paul DeMarinis's chapter in this collection, it primarily addresses noise in the context of telecommunications, networks, and digital culture—an area that is still surprisingly uninvestigated in terms of "others" of communication such as spam and noise. By highlighting not only the Shannon and Weaver context of noise in technical signal transmission but also how "noise" is diagrammed through nontechnical practices such as "interception" and "interference" we can actually broaden the materialist-technical focus of German materialist theories to include a diagrammatics of noise in technical media culture. From this perspective, the technicalities of media are part of a wider "abstract machine" of media culture in which noise fills various functions, from an ontological understanding of the a-signifying nature of signals and software to the tactical use of noise in communications—and communication breakdown. This realization is connected to the increasing attention paid, since the 1980s, to the so-called anomalies of network culture: not only spam and bad software, which are often a bit metaphorically described as the "noise" of desired communication, but also cyberwar and the war on cyberterrorism.[7] Networks are increasingly framed as vulnerable, metastable constructions, and the future of the Internet is portrayed as dependent on the "noise question" and various methods and techniques for filtering, managing, and redirecting "noise."

FORMALITIES OF COMMUNICATION

To put it a bit dramatically, around the middle of the twentieth century, noise was born in technical communications. In the 1940s Shannon presented a formal model of technical communication that also involved the formalization of the components of a communication system: sender, receiver, and channel, as well as noise. Although Shannon presented the issue from a purely scientific-engineering perspective, the model diagrammed the problem of deciphering symbolical statements from the supposedly chaotic realm of the Real (to put the diagram in Lacanian terms). The symbolical communication was an engineering task of screening the wanted from the not-wanted. In other words, the problem of how to distinguish the "essential" from the "random" was an engineering version of the Aristotelian division between substance and accident. Communication systems are noisy systems by definition, as demonstrated in a technical context by Shannon in his paper "The Mathematical Theory of Communication" (1948). For Shannon, the new theory of communication had to be designed to take into account "in particular the effect of noise in the channel."[8]

Shannon's well-known diagram of a general communication system is in this sense illustrative. Even though noise is seen as coming from the outside and invading the mediating powers of a communicative act, it still is diagrammed in the same image, as an integral part of the system. Hence it is accorded a position *within* the diagrammatic framework instead of residing as pure noise outside the communication act. In this sense, conceptually, noise is a modality of modern communication systems that is by definition nonsignifying and deals with *signals,* not signs. Measurability of communication was achieved only through this move toward a-signification and the statistics of uncertainty that corresponded with information. In other words, in this particular model a totally predictable message included no information at all, whereas uncertainty equaled increased information.[9]

Technical problems of noise had already been discussed before Shannon and Weaver. Bell Labs, Shannon's alma mater, had since the 1920s been a key site for telecommunications research that shifted the emphasis from psychological and semantic issues to mathematics and physical engineering work in communications. Transmission of intelligence and cultural products (from telegraphy, telephony, and radio to television and cinema) had been since then a question of the physics of signal transmission.[10] From the early experiments with telegraphs to those with vacuum tubes in the early twentieth century, combating weak signals and noise was at the top of the agenda of communications engineering. Walter H. Schottky thematized the existence of shot noise and thermal noise in vacuum tubes, and soon his paper "Über spontane Stromschwankungen in verschiedene elektrizitätsleitern" (1918) was exerting a strong influence on the research agenda. Looking for noise from even atmospheric conditions such as the sun or the weather became a top priority in electrical engineering. As the people at Bell Labs soon noticed, noise was everywhere.[11]

During the early part of the century, communication was gradually perceived as a system event. In the 1920s, Harry Nyquist and R. V. L. Hartley of the Bell Corporation team presented in their respective papers the basis for a general theory of communication. Additionally, Shannon formulated the principle of systems of communication where the received signal-message is formed as a function of transmission *and* noise: E = f(Sn,N).[12] In its practical context, which aimed for system predictability, it fitted in with realizations in mathematics and physics. In 1900 David Hilbert had argued for a system of mathematics that was complete, consistent, and decidable, but the rationality of this calculative system was soon challenged. In mathematics, Kurt Gödel proved in 1931 that every system was by definition incomplete in that it could not be coherent and consistent by its own making. This realization had repercussions far beyond mathematics in the fields of computation and communication systems.[13] Hence, some years later Shannon and Weaver's ideas were part of a larger field of modern thought in which noise and incompleteness were beginning to be included as integral to any functioning system. With this theory of communication, noise was on a mathematical level likened to the actual intended message. This meant that also noise was conceptualized as something programmable.[14]

After the Second World War, cybernetic models of feedback were designed to sequester disturbing anomalies from systems processes. At the same time this task produced a veritable science of noise. Just as someone creating electronic music knows the difference between white noise and pink noise, early pioneers in computing machinery distinguished several different modes of noise. Even though noise was at the time still seen as disorganization, the science of noise proceeded to create regularities: "We may anticipate trouble from white thermal noise, from static crashes, from ignition noise, from selective fading and from interference, both predictable and unpredictable. For each type of signal and for each type of noise, there is an optimum filter or best characteristic of this system. If this transmission circuit is of sufficient importance and if the requisite computers are sufficiently simple, one may reasonably demand that the message and the interference or noise be continuously monitored and that the circuit be adjusted to optimize message intelligibility."[15]

The information scientists tried to battle the stochastic patterns with redundancy. As Warren Weaver proposed in his paper "Recent Contributions to the Mathematical Theory of Communication," which followed and commented on Shannon's formulas, *redundancy* functions as a guarantee that messages will be received relatively intact at the other end. Uncertainty was seen as a basic characteristic of communication that could be countered by strategic repetition:

> Since [the] English [language] is about 50 per cent redundant, it would be possible to save about one-half the time of ordinary telegraphy by a proper encoding process, *provided* one were going to transmit over a noiseless channel. When there is noise on a channel, however, there is some real advantage in not using a coding process that eliminates all of the redundancy. For the remaining redundancy helps combat the noise. This is very easy to see, for just because of the fact that the redundancy of English is high, one has, for example, little or no hesitation about correcting errors in spelling that have arisen during transmission.[16]

Problems of technical media, then, proved to be different from the ones in oral media. Engineering and programming are not situations of conversation. In retrospect, what is interesting is how the forms of redundancy that aimed to combat problems of signal transmission actually turned out to be part of the noise of later technical media in the form of programmatic redundancy, such as mass spamming or viral programs. Redundancy has in itself spurred a problem of distinguishing the proper information from the presumably unwanted flow of messages of dubious origins, and various kinds of filters and scanners are trying to cope with it.

The logic of technical noise has recently teamed up with the issue of recursive and repetitious software. Such software techniques as flooding and trashing (earlier terms for spamming) have been used to overflow BBS, MUD, blogs, and chat rooms, as well as e-mail inboxes. They are not merely noise but actually reveal a logic where *excessive multiple posting* is a potential function of the software code. These kinds of problems with automated executions of code are evidently a crucial part of the digital network culture.[17] They force businesses to invest heavily into security and training of staff and force national governments to increasingly emphasize cybersecurity and new defense measures against online attacks. In addition, these issues connect inherently to the notion of broadband communications, which enables systems to cope with massive amounts of messages. Whereas with older 56-bps modems spamming would easily clog the system, the technical characteristics of modern digital channels allow massive messaging. Interestingly, with filtering programs and semantic Web applications that distinguish "dirt" from proper messages the communicative act is happening increasingly only between programs: the mass-mailing systems that distribute spam messages and the filtering applications that receive and analyze them and potentially forward some of the messages to the user.

In a way, Shannon's model of defining information and noise as quantitative can be seen as characterizing modern communication systems ever since. For example, there is a great temptation to see the Internet on its basic level as a system of signal transmission where the key point is simply that a signal arrives intact from A to B (even though, with Internet protocols, the packets take different routes and a message does not travel intact but is only gathered at the point of arrival).[18] On such a level of engineered communications, no semantics are needed. Norbert Wiener, who emphasized that information was not only this blunt fact of signal transmission but also a choice between options (choosing one option from "noise"), was expressing another core assumption of his brand of cybernetics but also a question of politics of communication. "Noise" was merely a temporary arrangement in a system, not a substance in itself. Everything could be noise, and noise could be a message as well. Of course, the cybernetic view on things was pragmatic: cybernetic feedback systems aimed at homeostasis, a point of minimum energy consumption.[19] In the case of informatic systems, what is being monitored is not so much energy as the ideal ratio between signal and noise.

THE PHYSICS OF NOISE

The fact that noise and redundancy were diagrammed in the 1940s does not mean that themes of unwanted information and "hostile interference" did not exist before the agenda of Bell Labs and the engineering solution to communications noise. As said, if we see Shannon and Weaver's efforts as part of a history of achieving predictability, the realizations in modern physics crucially paved the way for seeing unpredictability as an ontological problem but with practical solutions. However, whereas information systems and noise were diagrammed only in the 1940s, "the preliminary labour started in fields such as statistics, physics and telecommunications at least since the 1920s."[20] This also means that issues of noncommunication, noise, and the dynamics of media systems were being articulated significantly earlier than often thought. Shannon's ideas can be seen as merely a continuation of attempts to find the most efficient way of transmitting statistical, quantitative, and physical messages from transmitter to receiver, a problem that had been the overall encoding problem ever since the optical telegraph.[21] At the same time, the issue of efficient encoding was also on the security agenda, where fast message transmission codes were supposed to be safe from cracking. Here the mathematical problem of efficiency and reliability of signals joined up with security concerns.

Shannon himself drew directly from thermodynamics and the notions of entropy. The second law of thermodynamics, which argues for universal entropy and a gradual increase in disorder, had already been discovered in the mid–nineteenth century by Rudolf Clausius. In a development that was important for Shannon's ideas, the physicist Ludwig Boltzmann conceptualized the problems of closed systems in terms of entropy, meaning the tendency for any system to dissipate with time, to lose its structure. Interestingly, Boltzmann's early conceptualization of information systems took into account the dynamics of such systems: because of the huge number of interactions in a system, a clearly deducible account of a system's functioning cannot be known a priori.[22] Boltzmann's agenda revolved around heat engines, but Shannon was able to use many of the ideas directly in his quest for reliability of digital systems. As John Johnston explains, there is a direct link between the two, and statistical mechanics provided the needed measures of information, choice, and uncertainty.[23] Hence, almost by definition for the early designers of reliability in digital communication, information systems were understood as unstable, nonabsolute, and nondeterminate, and the act of communication as reliant on the dynamics of the whole system.

The etymological relationship of *noise* to *nausea* brings in the idea of irregularity of movement, which emerged as a key theme of physics in the early twentieth century. Stochastic processes and Brownian random motion at the molecular level suggested that the universe consisted primarily of processes of noise. But when the physical realizations were turned into engineering issues, irregularity became a problem. To produce stable systems of communication and automation, one needed to control noise. Hence, for instance, Wiener, who spent his wartime years investigating how to control and shoot down the Brownian movement of enemy airplanes, turned noise into a nearly metaphysical evil. Communication engineering became a branch of statistical mechanics. The question became how to control the amount of entropy in a system, or, in other words, how to ensure that the degree of disorganization of a system did not rise too high.[24] Even though the practical aims might have been similar, this approach differed from Shannon's mathematical formulations, in which information actually *was* noise, and that noise was potentially a source of new information for the receiver—hence providing a sense of its own beyond the sender's intentions. Such ideas were later developed in the contexts of second-order cybernetics and writers such as Heinz von Foerster who saw that new forms of order could actually be born from noise.[25]

In any case, cybernetic feedback, which permeated not only technical systems from the 1940s and 1950s onward but also a whole field from social sciences to economics to psychology, became a model of noise control. In an ironic fashion, the science of steering *(kubernetes)* became one of the chief tenets in combating seasickness (*nausea,* the etymological origin of *noise* in Greek). Yet despite this strategic effort, a very important one to be sure, communication and networks are never frictionless. Whether we are talking in the language of physics (leftover noise, or "three-degree blackbody radiation," indicating how the universe is continuously expanding) or philosophy (e.g., the Serresian agenda of "parasites"), noise is there. In a way, the ontology of physics (and hence digital culture as well as rock music) of the twentieth century is crucially about noise.[26] Similarly, cybernetics, in its attempt to provide solutions for controlling noise, was inherently tied to the existence of noise as disorganization. Wiener's early interest in Brownian movement also suggests how cybernetics can be characterized as an "archival task" of inclusion via exclusion. The whole science of cybernetics was based on the realization that the universe is probabilistic, only metastable. There is no ultimate possibility of getting rid of the intervening effects of noise, as it is a basic feature of the physical world.[27] But there are always ways to examine, map, and constrain that noise.

Whereas Shannon's chief concern was reproduction of the signal, Wiener's was cybernetic homeostasis. The conservative basis of both approaches had already been criticized in the early Macy conferences, which were in a key position to distribute cybernetic models across the social field. As N. Katherine Hayles argues, John Stroud of the U.S. Naval Electronic Laboratory pointed to the problem that dualist models of signal versus noise promoted. In Shannon's model homeostasis was privileged over change. The exact replication of a message over space and time was theoretically defined as the task of communication. Yet alternative models more prone to think of change as positive emerged: for example, Donald MacKay's idea of information as the change that the message achieves.[28]

On a philosophical level, this impossibility of self-identical signal transmission connects with the idea of transmission, *trans-mettre,* the in-between that happens in the media event. *Transmitting intelligence* was a term often used from the end of the eighteenth century onward, but there was a constant danger of transmitting false intelligence as well. This Derridean twist of what happens during the material writing and transmission as *différance* articulated the implicit problems of telecommunications: How could one be sure that the message received was the message sent, and that no one and nothing had "tapped the lines" between the communication's departure and arrival points? The concern was expressed, for example, in 1881 in the British *Blackwood's Magazine* (in an article entitled "Freaks of the Telegraph"): "The telegraph is not always, or to everybody, the unmitigated boon and blessing enthusiastic admirers have represented it to be. . . . There is always more or less uncertainty attaching to a telegram, both in regard to the length of time it may be on its journey, and in regard to the way in which the wording may be reproduced."[29]

Guaranteeing the identity of transmitted information was a crucial requirement of communication in optical and electric telegraph systems. At the same time, however, such a guarantee implied the danger of "nonidentical" communication, of something disturbing the presence between interacting partners. In various cases this was due to either meteorological conditions or insufficient sunlight, as with the optical telegraph. With the electric telegraph, the technical channels provided their own physical noise, but other, nontechnical issues were just as relevant. In other words, the technical archiving of noise on the twentieth-century agenda set forth by information science and physics needed to take into account as well that noise as interference had been an aesthetic-political problem since (at least) the optical telegraph. Conscious interference and production of noise expressed a key tactic of modern technical media.

NOISE AS INTERCEPTION

The nineteenth century experienced a boom in cryptography spurred by the inventions of telegraphy and photography and the "accompanying sense of the general dematerialization of signs."[30] Various systems of encoding were used to enhance the efficiency of transmission in the form of standardized short codes, but also to provide encryption possibilities. Of course, interceptions and noise were already part of the transmission system of letters and the rise of the postal system: the Choderlos de Laclos novel *Les liaisons dangereuses* from 1782 depicts very well an early interest in capturing telecommunication messages—even though dealing with letters of lovers. Some years later, optical telegraph communication encountered related anxieties of interception. A famous case from 1836 told the tale of two dishonest bankers who bribed operators to send falsified information on interest rates and profited from such forging of information. This opportunity to hack communication channels was made possible by the standard routine of decoding and recoding messages at every signpost—a routine designed to decrease transmission errors.[31] The incident represented perhaps the first case in which deliberate errors (as false information) were introduced into communication patterns to achieve financial gain. Some proponents of the semaphore system, however, were convinced that the electric telegraph was more prone to noise in the form of vandalism, as one Dr. Barbay stated in 1846: "No, the electric telegraph is not a sound invention. It will always be at the mercy of the slightest disruption, wild youths, drunkards, bums, etc. . . . The electric telegraph meets those destructive elements with only a few meters of wire over which supervision is impossible. A single man could, without being seen, cut the telegraph wires leading to Paris, and in twenty-four hours cut in ten different places the wires of the same line, without being arrested."[32] In a business context, securing information was an imperative. As Karl Marx notes in his *Grundrisse,* written in the 1850s, capital was keen on creating modes of surpassing spatial boundaries and finding new physical modes of exchange (communication and transport) that were increasingly based on new technologies such as the telegraph.[33] At least from the mid–nineteenth century the stock exchange and commercial communication represented the majority of telegraph traffic in both Europe and the United States. As an 1882 French report on the famous U.S. Gold and Stock Telegraph Company noted, guaranteeing the *identity* of information to all telegraph information subscribers was seen as a key feature in the early business telecommunications sphere.[34]

The issue of hostile noise as interception of messages was intimately tied not only to business but to war. Ever since Claude Chappe's optical telegraph had become functional in the early 1790s, the telegraph was perceived to be a key element of military operations and national security. To underline the importance attributed to this communication system, it was not authorized for civilian use. The codebooks were strictly guarded, and only the senders and receivers were supposed to have knowledge of the code keys.[35] The telegraph allowed a new kind of a communicative overview of the battlefield in which the commanding general moved to a command center behind the soldiers, coordinating movements and wiring battle units together via telegraph. Such a novel communication sphere needed protective measures, and especially the cipher as a cheap and effective solution provided the much-needed secrecy of communication instead of the rigid nomenclator system.[36] But even though military communications became more effective with the telegraph as the binding force, the probability of interception was higher. A commander could merely sit down and "tune his radio to the enemy's wavelength."[37]

Nineteenth-century telegraphy occupied a special place in the quest for noiseless transmission and uninterrupted mediation. Especially the electric telegraph was early on envisioned as a security medium used to prevent train accidents.[38]

Security was also raised as a question relating to the contents of transmission. As David Kahn explains in his extensive history of cryptography, one year after Morse's first messages in 1844 his promotional agent published advice on how to secure secrecy in correspondence. Similarly, a few years later the English *Quarterly Review* emphasized the importance of security in telegraphic communications:

> Means should also be taken to obviate one great objection, at present felt with respect to sending private communications by telegraph—the violation of all secrecy—for in any case half-a-dozen people must be cognizant of every word addressed by one person to another. The clerks of the English Telegraphy Company are sworn to secrecy, but we often write things that it would be intolerable to *see* strangers read before our eyes. This is a grievous fault in the telegraph, and it *must* be remedied by some means or other. . . . At all events, some simple yet secure cipher, easily acquired and easily read, should be introduced, by which means messages might to all intents and purposes be "sealed" to any person except the recipient.[39]

The universal medium—as the optical telegraph was already envisioned to be in full Enlightenment mode—was not supposed to support accidents or accidental signals. From the optical telegraph to the electric, and on to the first ideas about the wireless by Marconi, the telegraph was envisioned as point-to-point communication that was to be protected against outsiders. In the early twentieth century the wireless made the situation even more ambiguous, for it seemed to create novel possibilities for tapping into the transmissions. Point-to-point transmission was hard to secure as radio waves spread throughout the ether; indeed, anyone with sufficient equipment could receive such messages. Whereas governments and the navy in various countries were keen on securing the wireless sphere to themselves, the emergence of radio amateurism raised the urgent problem of how to keep uninvited visitors off the waves. Even if the wireless prepared the way for broadcasting, early pioneers such as Marconi saw the potential intrusion of strangers as a key problem for this medium.[40] The dangers in such "wiretapping" were demonstrated by the *Titanic* incident (1912). The ocean liner's SOS message was transmitted on the wireless, but it was also intercepted by radio amateurs, who were later accused of interfering with the rescue efforts. Soon after the incident the government started to address the "anarchy of the waves" by requiring examinations for wireless operators. The licensing was designed to stop the wasting of airwaves. As the *New York Times,* reported on December 15, 1912, "The effect of all this restriction will be to clear the air of the incessant wireless chatter of the innumerable amateur stations."

The tactic of intended noise, then, was not, then, restricted to military powers; it was also in the reach of (self-)educated operators. Here the figure of "tinkerer boy-heroes" can be seen as a good example of the early moral panic in "tapping the wire." According to Susan J. Douglas, however, these early "hackers" were not regarded as one-sidedly malicious; they could also be seen as positive models of appropriating media technologies to personal use. Whereas communication systems were much characterized by secrecy and the need to guarantee an interference-free channeling of information, the amateur operators were able to tap the secluded lines and the secret world of business and military communications.[41] Such grassroots action used the official lines for the amateurs' own purposes, as a 1907 article in the *New York Times* reported in describing the actions of a young amateur tinkerer, Walter J. Willenborg: "Messages from everywhere to everywhere and back buzzed into our receiving instrument. Only those in cipher escaped." The article further described how Willenborg was able to destroy other messages, as demonstrated by his intercepting and interrupting a message from the Atlantic Highlands: "Willenborg has achieved such high frequency of wave force, or oscillation, that he can, when picking up a message, send shooting into the receiving machine taking it such a clamor that the message is immediately destroyed. . . . The aerial above the shack on the roof began to shoot forth airwaves that crowded each other with great violence. He kept this up for about thirty seconds, and we returned to the receivers."[42]

In nineteenth-century and early twentieth-century predigital networks, it was most often *people* who occupied the position of the "parasite," or intruder in-between of *trans*-mission. Thus J. C. F. Licklider's remark from the 1960s that people were "noisy, narrow-band devices" that represented the stochastic but also creative and unpredictable element in information systems is apt in a wider historical perspective as well.[43] Human beings were often perceived to be a guarantee of functionality and security in man-machine systems, but it seems that they were also a potential source of noise.[44]

Such concerns had already been part and parcel of late nineteenth-century communication discourse. Worries about the transmission of false intelligence and the threat of capture of intelligence included people as elements of distraction. The danger of *parasitizing,* of using telegraph networks for unsolicited goals, was a threat that also was repeatedly raised, as Laura Otis notes in her take on the exchange between physics, media technologies, and fiction of the nineteenth century. Stories of individuals parasitizing public networks were published repeatedly, and this human link was deemed the source of error in networks that aimed at technological, social, and national unity. People were essential but risky. As *Blackwood's Magazine* wrote in 1881, "It is the 'personal equation' which has to be allowed for. The human element plays so considerable a part in matters telegraphic, that the human propensity to err finds proportionately wide scope. . . . It evidently to a great extent depends on the turn of mind of the operator which way [the messages] come out."[45] In the cultural formations of early network media, women especially occupied such a position: the conceptual and material place of in-between in transmission. At the same time they were very ambiguously portrayed. As Carolyn Marvin notes, poems that served as light filler in electrical journals often identified women as technological *objects* under male *control*.[46] Yet the huge number of women working as interconnectors in telegraph offices, as secretaries with typing machines, and later as telephone switchboard operators were uncertain elements, probably because of their imagined cultural status as unreliable and emotional.[47]

UNCANNY COMMUNICATION OBJECTS

What the telegraph age introduced was a novel assemblage of technical communication media constantly susceptible to noise.[48] Of course, this was due not merely to technical reasons but also to political and economic ones. There was a keen interest in the nineteenth century on promoting and securing the emerging technical media networks for capitalist and national interests. Yet at the same time the circuits seemed (at least on symbolical and imaginary levels) to support a variety of unauthorized communication events. Even though the Victorian Internet, a term coined by Tom Standage to refer to the telegraph system of the late nineteenth century, did not include such parasitical entities as worms and viruses, the discursive position of the anomalous was filled with other kinds of near-mythical instances of the uncanny. As Jeffrey Sconce has shown in his book *Haunted Media,* the communication channels of the nineteenth century had already encountered the anomalous.[49]

The electric telegraph system and later also the telephone network advanced stories and concerns of what went in and on the wires. Often these were part of the folk culture of the new media rather than official concerns. Several stories in the collection *Lightning Flashes and Electric Dashes: A Volume of Choice Telegraphic Literature, Humor, Fun, Wit and Wisdom* (1877) deal with issues sometimes neglected in the more formal and official accounts of the networks of telegraphs. Intended for people affiliated with telegraph companies and also as promotional material, the goal of such a volume was to evoke positive emotions concerning the new technology, and accounts of accidents are few. Yet the short story "The Volcanograph" introduces how weird objects of network culture had already spread in the nineteenth century. The short story depicts "hobgoblins" who keep disturbing proper communicative events. The unwanted intruders that keep "breaking in" on the channels are given a lesson with the aid of a telegraphic bomb, a countermeasure of a kind: "Science now comes to our relief in the shape of the volcanograph, a 2,000 cell dynamite battery, worked by a lever and crank in the main office."[50] The pranksters are given a lesson with an explosive electrical bomb, delivered by wire (figure 12.1). The story articulates several interesting themes, from annoying spam prankstering to electrical pulses of warfare moving through the wires.

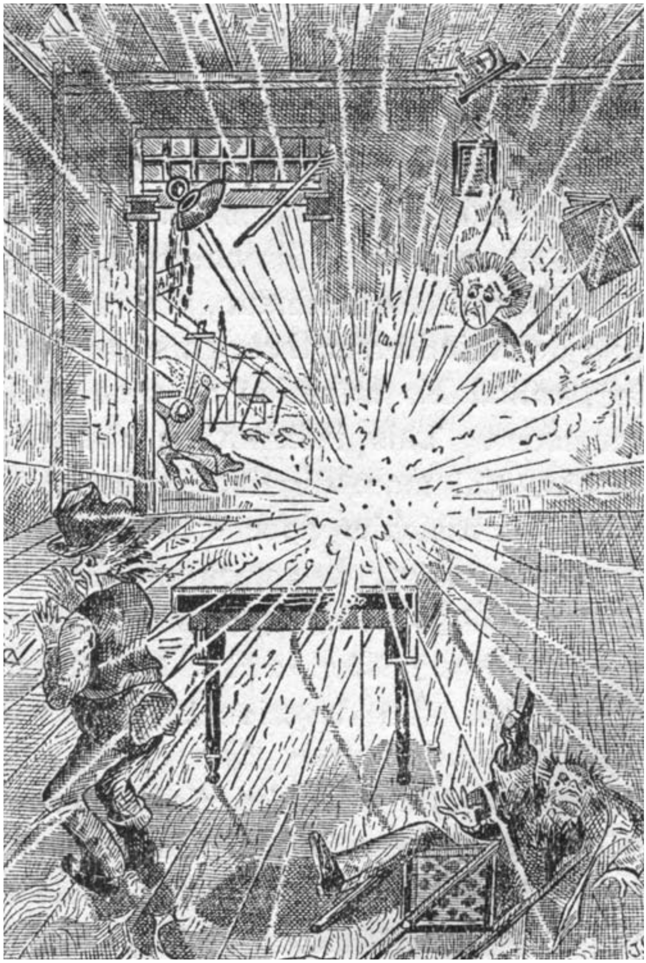

FIGURE 12.1. The volcanograph electric bomb from *Lightning Flashes and Electric Dashes: A Volume of Choice Telegraphic Literature, Humor, Fun, Wit and Wisdom* (New York: W. J. Johnston, 1877).

Later extraterrestrial elements also entered the wires. Such notions of alien signals on the wireless waves were encouraged by Nikola Tesla's early reports from 1899 onward of receiving unexplained signals from Mars, backed up by other similar reports during the early decades of the twentieth century. Hence, for instance, the *New York Times* reported in 1923 "strange radio signals" in Paris, unexplained by experts. The French army had started its regular wireless broadcasting experiments in 1921, but soon the waves were captured by something unexplainable: "The Eiffel Tower, the most powerful station in the vicinity, did not utter the peculiar noises and no other French station emitted them, according to reports. Astronomers say they do not believe another planet was signalling the earth, but they professed ignorance of the origin of the weird wireless noises. Experts agree that it was not static."[51]

As technologies took over and automated functions, they were increasingly imagined as living entities. The technological medium, the literal in-between, was acquiring qualities that portrayed it as uncanny and alive. Perhaps this was a reflection of how the new technologies had been seen since the mid–nineteenth century; the communication systems were constructed as if autonomous, self-sustaining organisms, networks, and the technical principles governing the fast movement of messages were hidden from the human eye. Technical media became a new kind of an example of an uncanny world beyond the human phenomenological field. With electricity and technical media, meaning was not the key unit of the discourse network, and such supernatural phenomena as ghosts and the uncanny became technical matters: "Once memories and dreams, the dead and ghosts, become technically reproducible, readers and writers no longer need the powers of hallucination."[52] It was as if the networks started to hallucinate for us, and hallucinations became automated program functions. With the telegraph, communication functions were for the first time separated from the transportation of goods and people. The optical telegraph was still tied to the human perception of vision, but the electric telegraph relied on the speed of the electric current, surpassing the human senses altogether. As Geoffrey Winthrop-Young explains, the technical network media of the nineteenth century marked a new era of control technologies that "move[d] data in even faster, immaterial fashion" than the old media of carriages and coaches.[53]

Kittler's notion of the history of information media recognizes the history of *technical diagramming* of information, persons, and goods as all formal non-semantic elements in a communication circuit. Messages were seen as commands, persons as addresses, and goods as data that were being exchanged between addresses (persons).[54] The automation and mechanization of "operations of communications systems" were followed by an automatization of processes of interruption and disruption, as well as the myriad "uncanny communication objects" that defy our cognitive coordinates (nowadays evidenced by the folklore surrounding computer viruses and worms).

ARCHIVING THE ACCIDENT

There are several potential approaches to a cartography of noise: it spreads out as an aesthetic, technical, political, acoustic phenomenon. Noise was seen as nearly metaphysical but formally controllable, and even evil by some cyberneticians such as Wiener. Yet it was promoted as an aesthetic revelation by avant-garde artists from Russolo to Cage to composers of glitch music and, according to writers such as Spieker, as an integral part how artists reimagined the order of the archive through the marginal and the contingent.[55] On a diagrammatical level of communication having to do with transmission, noise became formalized in the mid–twentieth century (although physics had been keenly interested in stochastic patterns since the early part of the century). This formalization by Shannon and Weaver can be seen as a key point when the issue of noise entered the archive of technical media culture. Yet as we have seen, noise has been an important, although not clearly defined and articulated, tactic of modern communication media at least since the late eighteenth-century optical telegraph. A longer genealogy reveals the importance of a politics of noise in communication systems and the organization of modern media. Since the optical telegraph noise has been a military issue, and it soon became also an economic issue, playing a role in a vast panorama of phenomena in the United States and Europe.

The I Love You project at the Frankfurt Museum of Applied Art serves as a key example of the diagrammatic and archiving logic of noise in the twentieth century. In 2002 the museum embarked on a novel archival project when it announced that it had started to collect viral code. Whereas the museum was already renowned for its classical collection of ceramics, books, and Islamic and East Asian art, its new mission was an expression of a seemingly novel interest in practices of digital outlaws.

The collecting task was part of the *I Love You* exhibition, which has since then also toured other museums. The exhibition was designed to introduce and analyze the aesthetics and cultural practices of viral programming, a task connected to the cultural status of source code in digital society; it also addressed the meaning of programming as a key cultural technique of the information age. As the curator Franziska Nori noted, the archival function of a museum is not merely to document but also to actively articulate a society's modes of communication and memory.[56]

A parallel example is the projects with viral images and sound created by the American artist Joseph Nechvatal. Nechvatal's project *Contaminations* exposed digital images to viral manipulation, which introduced random (noise) elements on the image surface. This is a perfect example of how the sense of the viral is incorporated into cultural practices, such as image production. The creation of information entropy (disorganization) by such programs is actually turned into a logic of its own kind, where what matters is not only the visual phenomenological surface but even more the micro level of programmed images. Also noise becomes automated as an algorithmic pattern.

Gustav Metzger, in his 1960 Manifesto for Auto-Destructive Art, had already appropriated self-contradictory forms and patterns as part of a logic of creation.[57] Although Metzger's ideas were not directly about virality, he addressed the idea that disorganization was an integral part of any system. Time-based media were constantly vulnerable to the potential disorganization that in the nineteenth century was expressed in terms of the physical notion of "entropy" and in the informatics of twentieth century as "noise" that threatened the clean calculations and communications of cybernetic systems. In recent years we have seen a veritable panorama of viral art, ranging from "biennale.py," the computer virus exhibited at the 2001 Venice Biennale by 0100101110101101.org, to other pieces of Net art, for example by the artist duo Jodi, who use the dysfunctions and the potential breakdowns of network software for their artistic potential.[58] All these examples are continuing the experimental work of earlier avant-garde artists who amplified and discussed the logic of noise not reducible to the unwanted.

Hence, in the context of technical media and, for example, Net art, the archiving noise of is not so peculiar after all. Noise loses its metaphysical characteristics and becomes a mathematical function and an algorithm among others. With technical media, as Kittler notes in reference to Shannon, unsolicited communication is also treated as programmed and hence as having a sense. Thus this archival logic records cultural memory beyond human language. For example, although the above-mentioned I Love You virus (2000) expressed itself on the interface level in a particular phenomenological form, its archival ground lies in program code:

```
rem barok -loveletter(vbe) &lt;i hate go to school&gt;
rem by: spyder / ispyder@mail.com / @GRAMMERSoft Group /
Manila,Philippines
On Error Resume Next
dim fso,dirsystem,dirwin,dirtemp,eq,ctr,file,vbscopy,dow
eq = ""
ctr = 0
Set fso = CreateObject("Scripting.FileSystemObject")
set file = fso.OpenTextFile(WScript.ScriptFullname,1)
vbscopy = file.ReadAll
main()
sub main()
On Error Resume Next
```
[59]

Not merely viral code but also computer programming code in general creates a rupture in the semantic understanding of culture. Of course, it does have a *sense* of its own, but this sense is not reduced to humans' "reading" or "interpretation" of it; computer programming code is also translated to binary machine language and executed. Or more precisely, this is where archival logic turns from human language to informatics. As Ernst notes, cybernetics is what pilots the archival logic of contemporary culture.[60] Its task goes beyond hermeneutics and semantics and into the very concrete existence of a material logic of archiving culture. With this logic of cybernetic archives of 0s and 1s, the question of anomalies is left in brackets on the technical level: from the phenomenological viewpoint of the so-called human being, all technical media are anomalous, that is, they supersede human senses and perception. What such techniques of digital archives as computer forensics reveal is a data-intensive layer that escapes the normal interface visibility and readability that we are accustomed to and often take for granted as the "content" of the computer and digital culture.

Hence the question extends deeply into nonsignifying semiotics and a-semantic assemblages of technical media and the archaeology that maps the thresholds, anomalies, and accidents of network media. In addition, this requires an analysis of the foundations of the technical logic of digital media archives, where noise is not an accidentally occurring topos but a fundamental part of the diagrammatics of communication. The archival state seems to be defined by an entropic tendency of increasing disorder, but the digital archives are curious in this regard, in that their principles do seem to tolerate a certain amount of disorder—or perhaps a more complex order.[61] The Frankfurt museum plan to archive viral code is, then, merely a logical part of this system of inscription, *Aufschreibesystem,* which includes such unwanted information. Of course, it is not only the official Frankfurt museum that is archiving noise, but also the Internet Archive and other sites archiving, for instance, spam e-mails.[62]

Increasingly it seems that noise is our ontology—but also our politics. An understanding of the various tactical and ontological issues surrounding the seasickness inherent in digital culture is necessary for any media theory dealing with transmission and technical media. This is the implicit claim made by various media archaeologists. Such increasingly important issues as noise control or noise used as a weapon in crowd control or in torture characterize contemporary digital cultures and force us to recognize the ever-growing political function of noise, the inherent sickness in the midst of information, as well.

NOTES

1. Sven Spieker, *The Big Archive: Art from Bureaucracy* (Cambridge, MA: MIT Press), 173.

2. Geoffrey Winthrop-Young and Michael Wutz, "Translators' Introduction," in *Gramophone, Film, Typewriter,* by Friedrich A. Kittler (Stanford: Stanford University Press, 1999), xxviii.

3. See Wolfgang Ernst, "Let There Be Irony: Cultural History and Media Archaeology in Parallel Lines," *Art History* 28 (November 2005): 582–603.

4. See, for example, Kittler's essays "There Is No Software" and "Protected Mode," in *Literature, Media, Information Systems,* ed. John Johnston (Amsterdam: G+A Arts, 1997).

5. For an insightful introduction, see Geoffrey Winthrop-Young, "Cultural Studies and German

Media Theory," in *New Cultural Studies: Adventures in Theory,* ed. Gary Hall and Clare Birchall (Edinburgh: Edinburgh University Press, 2006), 88–104.

6. Douglas Kahn, *Noise, Water, Meat: A History of Sound in the Arts* (Cambridge, MA: MIT Press, 1999); Jacques Attali, *Noise: The Political Economy of Music,* trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1985); Paul Hegarty, *Noise/Music* (London: Continuum, 2007); Emily Thompson, *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900–1933* (Cambridge, MA: MIT Press, 2004); Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham: Duke University Press, 2003).

7. See Jussi Parikka, *Digital Contagions: A Media Archaeology of Computer Viruses* (New York: Peter Lang, 2007). See also Jussi Parikka and Tony D. Sampson, eds., *The Spam Book: On Viruses, Porn and Other Anomalous Objects from the Dark Side of Digital Culture* (Cresskill, NJ: Hampton Press, 2009).

8. Claude E. Shannon and Warren Weaver, *The Mathematical Theory of Communication* (Urbana: University of Illinois Press, 1949), 3.

9. John Johnston, *The Allure of Machinic Life: Cybernetics, Artificial Life, and the New AI* (Cambridge, MA: MIT Press, 2008), 136–37.

10. See Lily E. Kay, *Who Wrote the Book of Life? A History of the Genetic Code* (Stanford: Stanford University Press, 2000), 94–102.

11. Leon Cohen, "The History of Noise on the 100th Anniversary of Its Birth," *IEEE Signal Processing Magazine,* November 2005, 33–35.

12. Harry Nyquist, "Certain Factors Affecting Telegraph Speed," *Bell System Technical Journal* 3 (July 1924): 324–46; R. V. L. Hartley, "Transmission of Information," *Bell System Technical Journal* 7 (July 1928): 535–63; Shannon and Weaver, *Mathematical Theory of Communication*, 34.

13. Charlie Gere, *Digital Culture* (London: Reaktion Books, 2002), 17–18.

14. Geoffrey Winthrop-Young, *Friedrich Kittler zur Einführung* (Hamburg: Junius, 2005), 140–41. Friedrich Kittler, *Draculas Vermächtnis: Technische Schriften* (Leipzig: Reclam, 1993), 165.

15. W. G. Tuller, "Use of Computing Machinery in Applications of Information Theory," in *Proceedings of the 1952 ACM National Meeting (Pittsburgh)* (New York: ACM Press, 1952), 111.

16. Warren Weaver, "Recent Contributions to the Mathematical Theory of Communication," in Shannon and Weaver, *Mathematical Theory of Communication,* 112.

17. See Tony Sampson, "Senders, Receivers and Deceivers: How Liar Codes Put Noise Back on the Diagram of Transmission," M/C Journal 9, no. 1 (2006), http://journal.media-culture.org.au/0603/03-sampson.php.

18. Eugene Thacker, *Biomedia* (Cambridge, MA: MIT Press, 2004), 145.

19. Norbert Wiener, *Cybernetics or Control and Communication in the Animal and the Machine* (Cambridge, MA: MIT Press, 1948), 75; Thacker, *Biomedia,* 145–46. Only some years later feedback was transformed from an unwanted systems anomaly into a new music aesthetics. Positive feedback created noise as a physico-acoustic phenomenon, which was used not only in the new aesthetics of rock music but also to the benefit of the recording and distribution companies for decades. Also stochastic patterns became a form of serializing noise into aesthetics. The early avant-garde influences continued in the 1940s with John Cage's 1942 piece *Credo in Us,* which connects music from gramophone records in random patterns, and in the 1950s and the 1960s with, for example, the cybernetic aesthetics of Max Bense and his collaborators like Theo Lutz and his "Stochastic Texts" and the stochastic computer graphics of Georg Nees and Manfred Mohr. See Florian Cramer, *Words Made Flesh: Code, Culture, Imagination,* 2005, online PDF-book, http://pzwart.wdka.hro.nl/mdr/research/fcramer/wordsmadeflesh/.

20. Tiziana Terranova, *Network Culture* (London: Pluto, 2004), 28.

21. Armand Mattelart, *The Information Society: An Introduction,* trans. Susan G. Taponier and James A. Cohen (Thousand Oaks, CA: Sage Publications, 2001), 56–57.

22. See Terranova, *Network Culture,* 21.

23. Johnston, *Allure of Machinic Life,* 27, 136–39.

24. Wiener, *Cybernetics,* 17–18.

25. See Johnston, *Allure of Machinic Life,* 138, 189.

26. See Cohen, "History of Noise," for a general introduction to the theme. Michel Serres's philosophical view on communication as parasitical by definition rests on such a thorough understanding of physics. A communication relation from A to B can emerge only if it "agrees" on a third excluded, the mediator of media. This is the parasite, the noise: "Rigorously speaking, there is never silence. The white noise is always there. If health is defined by silence, health does not exist. Health remains the couple message-noise. Systems work because they do not work. Nonfunctioning remains essential for functioning. And that can be formalized. Given, two stations and a channel. They exchange messages. If the relation succeeds, if it is perfect, optimum, and immediate; it disappears as a relation. If it is there, if it exists, that means that it failed. It is only mediation. Relation is nonrelation. And that is what the parasite is. The channel carries the flow, but it cannot disappear as a channel, and it brakes (breaks) the flow, more or less. But perfect, successful, optimum communication no longer includes any mediation. And the canal disappears into immediacy. There would be no spaces of transformation anywhere. There are channels, and thus there must be noise." Michel Serres, *The Parasite,* trans. Lawrence R. Schehr (Baltimore: Johns Hopkins University Press, 1982), 78–79.

27. See N. Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago: University of Chicago Press, 1999), 88–89.

28. Ibid., 63–64. Interestingly, nonlinear systems theory has recently analyzed noise as a positive phenomenon with which to enhance weak signals. See Kurt Wiesenfeld and Frank Moss, "Stochastic Resonance and the Benefits of Noise: From Ice Ages to Crayfish and SQUIDs," *Nature* 373 (January 1995): 33–36.

29. Quoted in Laura Otis, *Networking: Communicating with Bodies and Machines in the Nineteenth Century* (Ann Arbor: University of Michigan Press., 2001), 138.

30. Gere, *Digital Culture,* 34. The detective story is part of the same discursive field, dealing with a world of signs waiting to be intercepted and decoded as well as "an anxiety, or even despair, about the ability to uncover the true nature of things" (35).

31. Patrice Flichy, *Une histoire de la communication moderne: Espace public et vie privée* (Paris: La Découverte, 1997), 37–38.

32. Quoted in Bruce Sterling, *The Hacker Crackdown: Law and Disorder on the Electronic Frontier* (London: Penguin Books, 1994), 12.

33. Jonathan Crary, *Suspensions of Perception: Attention, Spectacle, and Modern Culture* (Cambridge, MA: MIT Press, 1999), 140–42.

34. "Le Telegraph de Bourse," *La Nature,* September 23, 1882, quoted in Flichy, *Une histoire,* 69.

35. Mattelart, *Information Society,* 23.

36. David Kahn, *The Codebreakers: The Story of Secret Writing* (New York: Macmillan, 1967), 191. Especially France was occupied with the new paradigm of code writing, *cryptography,* after its defeat in the 1870 war with Prussia. The urge to find new patterns of computated communication methodology spurred novel inventions that were also automatized into special cipher devices (230–65). An apt example is the "superphone" from 1922, which was to make possible uninterruptible communications for military use. See "'Superphone' to Assure Secrecy in Talking," *New York Times,* January 25, 1922. The Second World War saw cipher devices as key devices of communication; exemplary were the German Enigma machines for crypting and the decrypting machines of inter-

ception at Bletchley Park codebreaking center (where Alan Turing worked as well). See Gere, *Digital Culture,* 40–43. In the First World War, the Germans had their own *Abhorchdienst* (Interception Service), which consisted of human computers, that is, mathematicians. Kahn, *Codebreakers,* 313–14. Regarding ciphers, the history of code and computation spans, of course, much further time than the history of technical media.

37. Kahn, *Codebreakers,* 298.

38. Brian Winston, *Media Technology and Society: A History: From the Telegraph to the Internet* (London: Routledge, 1998), 23.

39. Quoted in Kahn, *Codebreakers,* 189. A good example is Henry James's short story from 1898 about a young female telegraph operator who has access to the coded messages passing through the ether. Henry James, "In The Cage," in *In the Cage and Other Stories* (1898; repr., London: Penguin Books, 1974).

40. Erkki Huhtamo, "Ennen broadcastingia," *Lähikuva* 1 (1992): 8–10.

41. See Susan J. Douglas, *Inventing American Broadcasting, 1899–1922* (Baltimore: Johns Hopkins University Press, 1989), 187–216. See also Huhtamo, "Ennen broadcastingia."

42. "New Wonders with 'Wireless,'" *New York Times,* November 3, 1907.

43. J. C. R. Licklider, "Man-Computer Symbiosis" [1960], in *In Memoriam: J. C. R. Licklider, 1915–1990* (Palo Alto, CA: Digital Equipment Corporation, Systems Research Center, 1990), http://memex.org/licklider.pdf.

44. On the history of interactivity, see Erkki Huhtamo, "From Cybernation to Interaction: A Contribution to an Archaeology of Interactivity," in *The Digital Dialectic: New Essays on New Media,* ed. Peter Lunenfeld (Cambridge, MA: MIT Press, 1999), 96–110.

45. Quoted in Otis, *Networking,* 142–43.

46. Carolyn Marvin, *When Old Technologies Were New: Thinking about Electric Communication in the Late Nineteenth Century* (Oxford: Oxford University Press, 1990), 30.

47. Ibid., 26, 31.

48. Of course, a lot of the attention went to natural phenomena that threatened communications. With the telegraph, the wires were to be protected from storms and other physical dangers. See, e.g., "Protection of Telegraph Wires," *New York Times,* August 30, 1893. Such accounts do, however, articulate well the importance attributed to such networks. To quote the *New York Times* article: "If there should be a time of serious national or international trouble it might be a matter of the utmost consequence to the Government that the connections of the capital with other important cities should not be liable to be broken by a mere windstorm. It might be a matter of great moment to business, and the interruption of telegraphic communication at a critical time might involve immense losses. The transmission of general news is sometimes not only a matter of overpowering interest to the people, but it may be a matter that deeply concerns their welfare for the time being. The civilized world has come to be largely dependent upon the uninterrupted working of the great system of electrical communication that has been built up with such marvelous rapidity. The working of its affairs has become adjusted with reference to this factor, and it is important that it should be constant in operation."

49. Jeffrey Sconce, *Haunted Media: Electronic Presence from Telegraphy to Television* (Durham: Duke University Press, 2000), 57.

50. *Lightning Flashes and Electric Dashes: A Volume of Choice Telegraphic Literature, Humor, Fun, Wit and Wisdom* (New York: W. J. Johnston, 1877), 7. Warm thanks to Ned Brooks for providing this piece of source material.

51. "Get Strange Radio Signals," *New York Times,* March 21, 1923; cf. Sconce, *Haunted Media,* 96–97.

52. Friedrich Kittler, *Gramophone, Film, Typewriter,* trans. Geoffrey Winthrop-Young and Michael Wutz (Stanford: Stanford University Press, 1999), 10.

53. Geoffrey Winthrop-Young, "Silicon Sociology, or, Two Kings on Hegel's Throne? Kittler, Luhmann, and the Posthuman Merger of German Media Theory," *Yale Journal of Criticism* 13, no. 2 (2000): 407.

54. Friedrich Kittler, "The History of Communication Media," *Ctheory,* July 30, 1996, www.ctheory.net/.

55. Spieker, *Big Archive.*

56. Franziska Nori, "I Love You," in *I Love You,* exh. cat., 2002, www.digitalcraft.org/iloveyou/catalogue.htm.

57. See part of the manifesto at "Manifesto Auto-Destructive Art," 1960, www.luftgangster.de/audeart3.html.

58. On Net art viruses, see Jussi Parikka, "Archives of Software: Computer Viruses and the Aesthesis of Media Accidents," in *The Spam Book,* ed. Jussi Parikka and Tony D. Sampson (Cresskill: Hampton Press, 2009), 105–24.

59. This particular piece of source code was copied from "'I Love You' Virus Source Code," n.d., www.elfqrin.com/docs/hakref/virus_iluvu_src.html (accessed July 7, 2009).

60. Ernst, "Let There Be Irony," 16, 34.

61. Ibid., 124–29.

62. See, for example, Paul Wouter's spam page at www.xtdnet.nl/paul/spam/ (accessed July 7, 2009). Viral source code (often for antivirus purposes) is available on various Web sites that distribute program code. See, for example, http://en.pudn.com/ (accessed July 20, 2010).

13

Objects of Our Affection

How Object Orientation Made Computers a Medium

Casey Alt

In the beginning there was the Calculating Machine. Whether that of Pascal, Leibniz, or Babbage, the Calculating Machine represented the ultimate Enlightenment dream. It was the fullest material expression of humanity's most rarified process of rationality: an independent, mechanical device that could automatically compute mathematical solutions. It was the promise of an engineering miracle that would liberate our creative minds and active bodies from the sedentary tedium of complicated numerical tasks. Perhaps no one despaired of this problem more than Charles Babbage, who, in considering the mathematical labor required in compiling and verifying various astronomical tables in the early nineteenth century, uttered his legendary lamentation: "I wish to God these calculations had been executed by steam!"

The dream of the universal calculator is the early forebear of what we know today as the digital computer, and it is a vision that exclusively dominated the field for decades after its inception. During this era, the sole measure of progress in computer engineering was speed of calculations. Even as late as the early 1960s, the entire destiny of computers was tightly bound to the desire to creep ever closer to the asymptote of infinitely fast calculating engines.

Yet our contemporary notions of computers are dramatically different from these earlier characterizations. Today, few people would ever use the term *calculator* to describe what we now know as personal computers. Rather, computers have become such a ubiquitous and powerful presence that their specific digital logic is reordering culture on a global level. More than anything, people describe today's computers not as calculators but as *media*. Over the past forty years, much academic energy has been expended attempting to characterize the exact significance and effects of this digital media revolution. While the majority of such scholarship has brought us a long way toward better understanding many of the specific downstream uses and, to a lesser extent, upstream production practices of digital media, few accounts, if any, have posed the much larger underlying question: How did computers and computation come to be viewed as media in the first place? When and, more interestingly, how did the dominant metaphor of computer as calculating machine begin to be displaced by that of computer as medium? How did the tightly packed, internally consistent, lockstep logic of ever-faster calculations get pried apart to create a medium—a malleable material stratum for accommodating an incredibly diverse array of communications, expressions, and affects?

These questions are the subject of this chapter. My central thesis is that computation became a medium when the concepts of medium and interface were implicitly embedded in computation at the material level of the programming language itself, an event I locate in the emergence of object-oriented programming. In doing so, I will argue the strong case: object orientation is not merely a way of thinking about computation that just happens to lend itself to viewing computation as a medium; rather, it is the medialization of computation. That is, it is both historically and conceptually impossible to conceive object orientation and computational mediality apart from each other, as they are in fact only different perspectives on the same phenomenon.

In exploring this question, I will employ a media-archeological approach that is heavily informed by the philosophical methods and concepts of Gilles Deleuze, particularly as formulated in his two-volume treatise on cinema, *Cinema 1: The Movement-Image* and *Cinema 2: The Time-Image*. In applying the methodologies of Deleuze's cinema project, my objective is not to read digital media as cinema but to employ a similar mode of analysis to articulate the ways in which object orientation performs computational mediality. Finally, it is not my intent to essentialize or create a definitive theoretical rubric for delimiting which media types qualify as computational media; rather, I seek to problematize traditionally oversimplistic notions of digital media as "end-products" by focusing on the specific conceptual and material conditions of production that made it possible for practitioners to consider computation a medium in the first place.

. . .

A CULTURE OF OBJECT ORIENTATION

> *And we believe moreover that there are always machines that precede tools, always phyla that determine at a given moment which tools, which men will enter as machine components in the social system being considered.*
>
> —GILLES DELEUZE AND FÉLIX GUATTARI

At its most general level, object orientation is a design strategy for modeling highly complex systems as smaller interacting elements that are finitely computable. As opposed to previous top-down approaches that sought to describe complex systems at the macro level of the complexity itself, an object-oriented approach reverse-engineers complexity by accurately defining the specific algorithmic behaviors and properties of each of the discrete elements in the system such that an accurate simulation of complex behavior emerges, bottom-up, from the sum of individual interactions. As such, object orientation constitutes a radical inversion of previous methods of computer science. Object-oriented programming languages and their accompanying development environments are the technical means for translating this distributed, emergence-based approach to problem solving into computable instructions for digital computers.

As with most major sociotechnical transformations, the conceptual framework for what we now know as the appropriately named object-oriented paradigm did not emerge in a cultural vacuum but was rather just one expression of epistemic cultural changes that characterized the decade of the 1960s. It is perhaps no surprise that such a significant subversion of the established methodologies of computer science occurred during a period in which all kinds of traditional Western power structures were shaken by a barrage of antiestablishment sentiment. However, despite object orientation's eventual revolutionary implications for computer science, the ideological preconditions that gave rise to object orientation were in no way limited to countercultural influences. Rather, they reflected a much broader discursive shift that permeated all intellectual communities: an approach to understanding complex systems that is often described under the general category of *systems theory*.

Many historians trace the origins of systems theory to the Austrian-born biologist Karl Ludwig von Bertalanffy, who in the 1940s proposed his general systems theory as a transdisciplinary science for mathematically modeling complex systems. Intended as both a reaction against reductionism and a shared discipline for reunifying the sciences, systems theory sought the development of a rigorous formalized science for describing the generalizable organizational principles for all complex systems, whether sociological, economic, psychological, ecological, biological, chemical, or mechanical. Though from ostensibly different historical genealogies, systems theory has often heavily overlapped—frequently to the point of indistinguishability—with the related and similarly transdisciplinary field of cybernetics, which studies processes of organization, communication, and control in human-machine systems by mathematically describing their feedback mechanisms. Taken together, both disciplines were hailed as a Kuhnian shift in the sciences and won proponents across a wide spectrum of academic disciplines. Given their implicitly mathematical foundations for modeling complex systems, it is no surprise that both systems theory and cybernetics were deeply imbricated in the computer science communities of the time.

Yet systems theory and cybernetics were not confined to the walls of the academy. In many ways, they enjoyed their fullest expression within wider popular culture, often surfacing in unexpected contexts. The methodology found as much resonance in the corporate boardroom of Ford Motor Company and the White House via the "systems analysis" of Robert S. McNamara as it did with Stewart Brand, a charismatic artist and editor who circulated fluidly across the 1960s counterculture, spreading his ecology-infused flavor of techno-evangelism. As detailed in Fred Turner's historical account of Brand and his cultural legacy, systems theory had even permeated the art worlds of New York and San Francisco: "For the artists of these communities, . . . cybernetics offered a new way to model the world. Even at the height of the cold war, many of the most important artists of this period, figures such as John Cage and Robert Rauschenberg, embraced the systems orientation and even the engineers of the military-industrial research establishment. Together they read Norbert Wiener and, later Marshall McLuhan and Buckminster Fuller; across the late 1950s and well into the 1960s, they made those writings models for their work."[1] Such "systems art," as most fully theorized by the influential art critic Jack Burnham, would come to dominate much of the artistic sensibility of the 1960s, playing itself out in the works of artists such as Hans Haacke, Merce Cunningham, and Allan Kaprow.

MOVING TOWARD MEDIUM

Given the degree to which systems theory, cybernetics, and their necessary complement, computer science, had diffused so diversely across the intellectual cultures of the 1960s, it is surprising how long computation managed to resist becoming media. Not until the late 1960s did computer scientists really begin to think of computers, processes of computation, or even computer languages as media. Before then, the term *medium* was employed only in relation to an external material substrate for storing data and was almost exclusively preceded by the terms *input, output,* or *storage.* As one of the most succinct encapsulations of this denotation, Robert J. Rossheim's "Report on Proposed American Standard Flowchart Symbols for Information Processing," published in 1962 in the journal *Communications of the ACM [Association for Computer Machinery],* defined *medium* as "the material on which data is recorded, e.g., tape, cards, paper, etc."[2]

Never were the processes of computation, programming languages, or even the computer itself understood as media.

Ironically, in the exact same year as Rossheim's report, the first in a series of new technological developments began to puncture traditional barriers between computers and media. It is extremely relevant that all three of these advances, which prefigured three of the primary manifestations of what we now know as digital media—computer games, graphics, and simulations—were also the first prototypical experiments in object orientation, early indications that from their very inception object orientation and digital media were inextricably linked.

Though often excluded from more "serious" histories of digital media and object orientation, the first such breakthrough occurred in 1962 with the creation of the game *Spacewar!* by Stephen "Slug" Russell and others for Digital Equipment Corporation's PDP-1 computer. Regarded by many as the first widely popularized interactive, graphics-based computer game, *Spacewar!* soon turned up on every PDP-1 on the embryonic ARPAnet and even became an official sales demonstration for the full capabilities of the PDP-1. While the history of *Spacewar!* has been chronicled in numerous locations, including a sensationalist 1972 article by Stewart Brand for *Rolling Stone* entitled "Spacewar: Fanatic Life and Symbolic Death among the Computer Bums," few commentators have recognized that the program employed a style that would later be considered object oriented.[3] In a public discussion of *Spacewar!* in 2002, Russell recognized this fact by stating, "I didn't know it at the time because the vocabulary hadn't been invented, but it was an object-oriented design."[4]

The second major advance in both digital media and object orientation was the release of Ivan Sutherland's Sketchpad application for computer graphics in 1963. As the first interactive computer graphics application, Sketchpad allowed its users to create complicated geometric drawings via a graphical interface consisting of a light pen and an x-y point plotter display. Perhaps more amazing than Sutherland's entirely graphical interface, however, was Sketchpad's ability to create "instance" copies from both "master" drawings and transformation behaviors (or "constraints") that had already been created. Sutherland accomplished this remarkable innovation by designing an unusual data structure that separated "general" structures from "specific" structures, each of which shared the functions and property types of the general structure via a network of bidirectional pointers, a solution that prefigured similar class-instance relationships in later object-oriented languages.[5] Upon graduating from MIT in 1963, Sutherland eventually landed at the University of Utah from 1968 to 1974, where he and his fellow professor David Evans founded Evans and Sutherland, the company most responsible for the early advancement of computer graphics and interactive simulation technologies.

A third development that preceded the formal origination of object orientation was the creation of the simulation programming language Simula-67 by the Norwegians Kristen Nygaard and Ole-Johan Dahl in 1967. Simula-67 was a modified version of the popular ALGOL-60 language, which was designed as a simplified language for describing algorithms. Expanding on the concept of a record set proposal for ALGOL-60 by its creator Charles Antony Richard, Nygaard and Dahl modified a copy of ALGOL-60 by recoding the traditional storage allocator to allow the creation of separate processing "activities," each of which could create multiple copies of itself called "processes" that behaved as individual entities containing their own data states and separate program counters and that conducted most of their processes intrinsically.[6] This powerful new feature, which anticipated more formalized class-object conventions for object orientation, allowed for behavior and data inheritance chains among related activities and processes.

Yet despite the significant innovations presented by these three initial harbingers of object orientation, each of them faced systemic sociotechnical drawbacks that prevented them from becoming models for a new computational paradigm. In the case of *Spacewar!,* attention was so focused on playing the application that its implementation style was never seriously studied as a model for programming. As for Sketchpad, Tim Rentsch, a computer science professor who wrote a wonderfully lucid and concise appraisal of object orientation in 1982, noted that since it was "a graphical interaction system and not a programming system," "its application to programming was not widely appreciated, perhaps because the object oriented philosophy was not explicit enough." Rentsch also argued that "Simula falls short of realizing object oriented programming for several reasons," many of which had to do with the fact that its object-oriented behavior was essentially a secondary graft onto ALGOL with "traditional ALGOL style programming taking up the slack," which "ran contrary to the object-oriented philosophy." More importantly, Rentsch noted that the primary drawback of Simula's object-oriented features was that most users failed to grasp how they worked, leading Rentsch to conclude: "If Sketchpad is an object oriented system without the language, Simula is an object oriented language which is rarely used in an object oriented fashion."[7]

The major limiting factor in each of these early systems was more philosophical than technical in that none of their creators began with the self-conscious intent to design an entirely new paradigm for computation. Rather, each system was conceived and implemented as an ad hoc solution to a very specific application domain without any concern for more holistic relevance or applicability. Instead, the role of designing a new paradigm would serendipitously fall to the young computer scientist Alan Kay during the period of 1968–72.

A NEWER, BETTER THING

According to Kay's own remarkably readable account, "The Early History of Smalltalk," he found himself "through a series of flukes . . . in graduate school at the University of Utah in the Fall of 1966, 'knowing nothing.'"[8] Kay had come to the University of Utah to work with Dave Evans and, upon arriving, was assigned to read Sutherland's Sketchpad dissertation and to tackle a recent version of "Algol" that "doesn't work."[9] Kay would eventually discover that the troublesome language was actually Simula and, in comparing it to his study of Sketchpad, understood that the two systems were essentially doing the same thing: "What Sketchpad called masters and instances, Simula called activities and processes. Moreover, Simula was a procedural language for controlling Sketchpad-like objects, thus having considerably more flexibility than constraints."[10] Kay later described this important realization as "an epiphany" that "rotated my point of view through a different dimension and nothing has been the same since."[11]

What Kay's new perspective inspired him to see was a model for computation in which data and instructions are bundled into discrete objects that behave like individual computers themselves and communicate with one another to carry out complex computational tasks in parallel, a conceptual model Kay called object orientation. Kay later realized this vision in Smalltalk, the first language based on his idea of object orientation: "In computer terms, Smalltalk is a recursion on the notion of computer itself. Instead of dividing 'computer stuff' into things each less strong than the whole—such as data structures, procedures, and functions that are the usual paraphernalia of programming languages—each Smalltalk object is a recursion of the entire possibilities of the computer. Thus its semantics are a bit like having thousands and thousands of computers all hooked together by a very fast network."[12] Kay realized that the real power of such an approach lay in its ability to simulate complex situations by creating individual programming objects that mapped onto real-world objects. By assigning each object specific behavioral interactions with other objects, one could generate highly complex behaviors from relatively simple and minimal programming components, an idea Kay summarized as "the insight that everything we can describe can be represented by the recursive composition of a single kind of behavioral building block that hides its combination of state and process inside itself and can be dealt with only through the exchange of messages."[13]

In 1967 Kay's vision was further expanded when the computer science department at Utah was visited by Douglas Engelbart, a computer scientist at the Stanford Research Institute whom Kay described as a "prophet of Biblical dimensions." During his visit, Engelbart demonstrated his team's research on his "oNLine System (NLS)," a computer-based environment for "augmenting human intellect" and enabling collaborative work via a number of remarkable early innovations, including word processing, hypertext/hyperlinking, the first computer mouse, and remote videoconferencing. To a large extent, Kay was among Engelbart's early converts; however, given his increasing aversion to large, centralized mainframe computing models, he was not completely sold on Engelbart's design, arguing that "there was a monstrous bug in this approach" since "one would have to backtrack to a master state in order to go somewhere else" and that "a much 'flatter' interface seemed called for."[14]

Kay's initial misgivings about the closed, hierarchical model of the NLS were amplified a year later in 1968 when he visited Seymour Papert's research lab at MIT, where Kay witnessed Papert's program for teaching elementary school children programming via the specially designed LOGO programming environment. The experience profoundly influenced Kay, reinforcing the line of thought begun by his earlier epiphany of object orientation: "As with Simula leading to OOP, this encounter finally hit me with what the destiny of personal computing really was going to be. Not a personal dynamic vehicle, as in Engelbart's metaphor opposed to the IBM 'railroads,' but something much more profound: a personal dynamic *medium.* With a vehicle one could wait until high school and give 'drivers ed,' but if it was a medium, it had to extend into the world of childhood."[15] It was at this moment that Kay became the first computer scientist to vocally promote computation as a medium, and Kay's notion of such a medium was irrevocably bound to his developing notion of object orientation. In 1968 Kay gave material form to his vision in a cardboard mock-up of what he called the "Dynabook," a very small personal "notebook" computer that would allow object-oriented computation to become a universally accessible medium.

Shortly after receiving his doctoral degree from the University of Utah in 1969, Kay was hired by Bob Taylor to create and direct the Learning Research Group at Xerox's Palo Alto Research Center (PARC). Kay's first order of business was to begin realizing the Dynabook, and his team quickly dove into the development of both its hardware and software components. During their work, they invented several technologies that have become the foundations of all contemporary computer interfaces, including the now-ubiquitous windowed interface system; high-resolution displays with bitmapped workspaces and icons; a graphical desktop, folders, and files; an improved digital version of Engelbart's mouse; and bitmapped fonts and font editors. Unfortunately, Kay was never able to fully realize the hardware of the Dynabook during his time at PARC, though his team created the full software and programming environment, which operated on an early version of the Xerox Alto computer they had optimistically dubbed "the interim Dynabook."

For the purposes of this chapter, however, the most significant contribution to emerge from the Learning Research Group was the Dynabook's intended object-oriented programming environment, called Smalltalk. Kay designed Smalltalk in 1972, and Dan Ingalls surprised him by implementing it a few days later as proof of its feasibility.[16] As the first purely and intentionally object-oriented language, Smalltalk-72 and its subsequent revisions are in many ways the single most significant legacy of Kay's tenure at PARC. At the same time, however, it is practically impossible to conceive of "Smalltalk the language" as a single discrete entity, since it was indissociably enmeshed with its larger software development environment and user interface. As the Learning Research Group member Adele Goldberg once described it, "Smalltalk is not a language, but rather a system in which to define systems. Smalltalk, as both a language and a development environment, provides a solution for software developers aiming to create customizable information systems, because the Smalltalk development environment is itself extensible."[17] In his external appraisal of object orientation, Rentsch similarly emphasized the degree to which "Smalltalk as a language" was often indistinguishable from its larger interface and software environment:

> More than a programming language, Smalltalk is a complete programming environment, all of which reflects the object oriented philosophy. . . . Smalltalk may be thought of as comprised of four pieces, viz., a programming language kernel, a programming paradigm, a programming system, and a user interface model. . . . Thus the user interface is built on the programming system, which is built following the programming paradigm and using the programming language kernel. . . . Although I have represented the pieces as separate and independent, they are not, really. In fact, they are inseparable and very interdependent. Not only could each piece itself not exist in a vacuum, the design for each piece influenced the design for all the other pieces, i.e., each design could not exist in a vacuum.[18]

This difficulty in disentangling the language from the rest of the medium underscores the deeper fact that, from its very outset, object orientation was imagined not just as a language but as a complete medium or interface between humans and computation. Even more strongly, the members of Kay's Learning Research Group considered Smalltalk and object orientation not just as *a* medium for computer-human interface but rather as *the* medium for bridging the gap between the digital machine language of computers and the embodied thought processes of humans. Dan Ingalls has professed such a view in his comment that Smalltalk is "a language of description (programming language) that serves as an interface between the models in the human mind and those in computing hardware, and a language of interaction (user interface) that matches the human communication system to that of the computer."[19] Similarly, Kay commented in one of his earliest published essays on Smalltalk that "In SMALLTALK, parallel models are dealt with from the start, and the children seem to have little difficulty in handling them. Actually parallel processing is remarkably similar to the way people think."[20]

This expanded notion of object orientation as fully embodied medium continued to inform the team's work throughout their time at PARC and followed their concept of object orientation into the wider computer science community. As an avid student of philosophy and contemporary theories of media, particularly the writings of Marshall McLuhan, Kay became the most articulate and energetic spokesperson for this new approach to computation. Despite all of his notorious candor, attention to historical rigor, and philosophical self-reflexivity throughout multiple personal histories and interviews, Kay never actually mentions why it was such a natural conclusion that object orientation and computational mediality should be so inexorably conflated. Yet Kay's omission is perhaps far more telling than any elaborate answer might be. Kay neglects to provide such an explanation of this connection not because the two concepts have no meaningful relationship but rather because they are so tightly coupled that they are in fact the same thing. Thus, for Kay, who understands object orientation at such a deep and intimate material level, the question of the relationship between object orientation and mediality is so obvious as to be tautological and, therefore, a nonquestion.

OBJECTS OF OUR AFFECTION

To know the world one must construct it.

—CESARE PAVESE

In his 1985 discussion of the cultural importance of the computational advances of the 1960s and 1970s, Howard Rheingold offers an insightful assessment of the importance of Smalltalk and object orientation: "Starting from concepts set forth in LOGO and in Simula, Kay began to devise a new metaphor in which the string of one-at-a-time instructions is replaced by a multidimensional environment occupied by objects that communicate by sending one another messages. In effect, he started out to build a computer language that would enable the programmer to look at the host computer not as a serial instruction follower, but as thousands of independent computers, each one able to command the power of the whole machine."[21] What is particularly noteworthy in Rheingold's analysis of Smalltalk is his description of a radical conceptual transition in the ways a "programmer" is expected "to look at the host computer" in moving from a linear string of instructions to "a multidimensional environment" that is "occupied" by spatialized "objects" acting like "thousands of independent computers." Considering that all forms of computer programming are composed solely of lines of textual instructions, what is it about object orientation that transforms lines of text into a dynamic "multidimensional environment"? What can it possibly mean for code to "occupy" space?

Rheingold's descriptive language for object orientation is by no means unique to his particular journalistic style. On the contrary, discussions of object-oriented programming are so riddled with terms such as *space, environment, interface, movement, topology, architecture, inside, outside,* and *parallel* that their ubiquity effectively renders them invisible. In fact, it is nearly impossible to write about object orientation without employing such spatializing metaphors, a tendency that Nigel Thrift has similarly observed in the closely related field of complexity theory.[22] One particularly salient example is the landmark 1995 book *Design Patterns: Elements of Reusable Object-Oriented Software,* by Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides. Considered the first comprehensive guide for software developers to identify and solve common object-oriented design problems, *Design Patterns* is explicitly intended as an application of the book *A Pattern Language,* Christopher Alexander's extensive exploration of patterns of historically recurring solutions to common problems in architecture. As stated by the authors in the introduction to *Design Patterns,* "Even though Alexander was talking about patterns in buildings and towns, what he says is true about object-oriented design patterns."[23] Again, as with Rheingold's account of the new attitude to object orientation, what do such statements even mean? What can programming possibly gain from architectural analyses?

Given the historical discussion of object orientation and mediality thus far, it is perhaps no surprise that object-oriented programming is described in such spatially embodied terms. Yet it is not enough that this relationship be considered coincidental. Rather, this spatialized and embodied attitude toward programming is a necessary conceptual precondition of object orientation. One conceives of object orientation in spatially embodied terms because the language itself demands it, or, at the very least, its proper and optimal use demands it. The act of learning to express oneself effectively through object-oriented code is a process of internalizing and adopting its specific philosophical approach to the world. To fully understand how object orientation constitutes computational mediality, one must isolate the precise philosophical concepts required by the logic of object orientation in the same way that Deleuze charted the philosophical concepts created by cinema. Thus the remainder of this section maps the conceptual openings created by object orientation that have allowed it to become such a predominant medium of contemporary life.

Openings 0–1: Delineation

Before discussing the specific conceptual affordances created by object orientation, it is important to understand the approaches that preceded it. At the most basic level of digital computer programming are machine languages, which consist of sequential lines of processor-specific binary instructions for performing a task. Each line of machine code usually contains three elements. The first is a processor-specific binary operation code, or opcode, which describes a mathematical or memory operation, such as the addition of two numbers. Every processor responds to a number of binary opcodes that compose its processor-specific instruction set. The other elements in each instruction line are the operands, which are binary representations of the numbers or memory addresses on which the opcode's operation is to be performed.

Given the extremely tedious and unintuitive nature of machine language programming, "second-generation" assembly languages were developed in the 1950s to increase coding efficiency. As with machine languages, assembly language programs consist of lines of single processor-specific instructions; however, assembly languages replace the binary opcode designations with textual mnemonics that more closely resemble human language. For example, the three-letter mnemonic "mov" might represent the 10110000 machine language opcode to move an operand to a specific memory address. Additionally, assembly languages allow for memory addresses to be assigned short variable names instead of binary numbers as a means for more easily denoting what value is stored at each memory location. Prior to executing an assembly language program, an external assembler application performs a one-to-one conversion of all the assembly mnemonics to their corresponding binary machine opcodes and similarly translates all symbolic variable names to their actual binary memory addresses so that the processor can execute the machine code.

Within the realm of machine languages and assembly languages, the act of programming is therefore a process of delineation in which the job of the programmer is to deconstruct the steps necessary to achieve some computational task, then order these operations into a linear, flat, stepwise list of instructions for the processor to execute. Delineation literally requires the programmer to think through the processor, to anticipate its logic at the most granular level. That is, the only logic of the program is the logic of the processor, and the conceptual task of assembly programming is that of translating a macro-level task into a linear list of every single processor operation required to achieve the desired result. Given that machine language and assembly language programs are as minimal as possible and therefore exceptionally fast to execute, the only notion of time in the program is the speed of the processor itself. As a result, time exists as a secondary function of the number of instructions without any irreducible identity of its own. Delineation therefore opens a linear extension in space, as a string of instructions for the processor to traverse, and forces the mind of the programmer into the austere logic of the forever unbending line.

Opening 1.5: Nonlinearity

While assembly languages represent a slight improvement in programming efficiency over machine code, a much larger leap was made in the late 1950s with the development of several "third-generation" languages. Third-generation languages brought programming syntax much closer to human languages and standard mathematical notation while also allowing a single program to run on many different processor architectures. Early third-generation languages, such as FORTRAN (FORmula TRANslator), ALGOL (ALGOrithmic Language), and COBOL (COmmon Business Oriented Language), provided significantly more readable code by extending the use of named variables and added the notion of abstract data types and algebraic expression syntaxes, which allowed multiple processor instructions to be expressed using algebraic notation in a single line of code such as "x = y + 5 * 2." Prior to execution, compiler programs translate the more flexible and readable instructions of third-generation languages into the specific machine or assembly language opcodes for each processor on which the program will run. Thus, rather than needing to create separate versions of the same program for each specific processing platform, one can run the same code on any processor that has a corresponding compiler program for that language.

In addition to the above improvements, third-generation languages introduced several capabilities for structuring the code so as to improve readability and decrease the need for redundant code. The first of these developments was the advent of procedural programming, in which commonly repeated and functionally related lines of programming instructions are grouped together as a single block of code or procedure (also called functions or subroutines) and assigned a name so that the programmer can repeat the entire block of instructions by simply calling the procedure name at any point within the code. Additionally, during the late 1960s and early 1970s, third-generation languages increasingly adopted structured programming approaches, which sought to eliminate the often convoluted "spaghetti code" produced by GOTO statements by establishing standardized control structures for common processing tasks, such as sequencing, selection, and iteration. Given that all of the code produced by both procedural and structural programming in third-generation languages is ultimately compiled into either machine or assembly languages for the specific processor on which it is intended to run, it is important to note that the advances introduced by both procedural and structural programming are more about creating conceptual aids for the human programmer than fundamentally changing how the computation actually executes.

The new structural innovations of third-generation languages resulted in the first movements away from the strict reproduction of calculator instructions of machine and assembly languages. The advent of procedural programming approaches shifted the conception of programming from a process of delineation toward a process of organization. Whereas delineation consists of creating linear sequences of instructions for the processor, organization privileges human readability and an economy of instructions over linear literalness. Organization occurs via two conceptual activities: factoring and control. Factoring is the reduction of code redundancy in a strictly linear program by grouping repeated instructions into named procedures that represent the least number of necessary elements. Control is a process of calling the procedures in the correct order so as to achieve the proper computational result. Control is located primarily in the main program of the program, which is a sort of "master procedure" that temporarily passes control to each of the other procedures by calling them to perform their specific task as necessary. Additionally, a procedure can call and pass control to any other procedure other than the main program to execute some subtask. The entire program terminates when the last instruction of the main program has completed.

As a result of this new way of conceiving programming, the design process becomes more complicated than a single line of instructions progressing serially through the processor. Though the form of a procedural program is still a line, the line is actually more compact than its machine or assembly program equivalent since redundancies have been eliminated from the code. However, the full time of execution of the program remains the same, since control jumps back and forth to different points in the line as different procedures and control statement loops are executed in order to reproduce the original list of linear instructions. Thus one could describe the motion of the execution as oscillating between continuous linear movement in one direction and saltation as it jumps between different segments of instructions within the line. As a result of these saltations, time is no longer reducible to the sum of the individual lines of code. While time is still tied to the code, it is larger than the code and must therefore exist outside it such that it becomes more accurate to think of the code as being within time instead of vice versa. In procedural programming, time is what grounds the compacted code, with each saltation opening onto an extension in time. Even though compilers for third-generation languages ultimately reduce these conceptual saltations and repetitions to the original linear line of instructions of machine or assembly code, procedural programming requires the programmer to think much more flexibly and abstractly in terms of writing the code so as to reduce space (lines of code), yet imagine the execution of the program as existing solely in abstract time.

Object Orientation, Opening 2: Encapsulation

If there is any single concept that is most emblematic of object orientation, it is encapsulation. Encapsulation is the process of completely bundling data elements and all processes that operate on them within a discretely contained coding structure or object. While such a movement may sound like a difference of degree in terms of the concept of local variables and early attempts at "information hiding" in procedures, the creation of the closed object as a self-contained unit of computation resulted in a conceptual shift that was both radical and absolute.

The biggest conceptual transformation implicit in encapsulation is the complete deconstruction of previous notions of a program. In machine, assembly, and procedural programming, a program is often viewed as one continuous linear entity with a single point of control passing through each of its instructions one by one. Encapsulation completely reverses this notion by sundering the cohesiveness of the program into a number of independent entities whose interactions dynamically emerge to approximate the end goals of the application. Whereas data were previously reducible either to time or to space of process and were open to any operations, data now become a primary structural element, as collections of data properties are enclosed along with all of the processes that operate on their states. Thus, instead of a factoring and economy of process, there is a factoring and economy of the necessary relationships between related data properties and their operation methods, even at the risk of replication and redundancy of processes or data across different objects.[24] Kay himself described the initial difficulty in understanding this shift by stating, "It took me a remarkably long time to see this, partly I think because one has to invert the traditional notion of operators and functions, and the like, to see that objects need to privately own all of their behaviors: *that objects are a kind of mapping whose values are its behaviors.*"[25] Encapsulation is therefore an act of differentiation that breaks the unified linear representation of the program into a diversity of several autonomous, parallel, and entirely self-sufficient computational entities, each of which is separately compiled as its own distinct object.

An extremely important result of disassembling the linearity of the program is the simultaneous opening of multidimensional space within the conceptual act of programming. This opening is accomplished through two distinct but concurrent movements. First, if one considers this process of deconstruction as the splitting of a single computational thread into several distinct objects operating in parallel, the conceptual space of the program expands from the single line to multiple parallel lines, thereby opening up space from a one-dimensional line to a two-dimensional plane. Yet there is also a second movement in that the very notion of object encapsulation and differentiation simultaneously opens up concepts of both exteriority and interiority, which necessarily imply a conceptual opening of three-dimensional volume within the code. And it is possible to go even one step further. Since encapsulation also enables the internal hiding of different and dynamically changing properties and methods from other objects, there is also the opening of an internal subjectivity for each individual object. It is thus through a single act of conceptual closing that encapsulation requires the programmer to conceive the space of the program as embodied, three-dimensional space containing multiple individual subjectivities.

Opening 3: Messaging

With the opening of embodied space and individual subjectivities, the question of coordination among these objects comes to the fore. Whereas previous programming models managed control by carefully passing it in a stepwise manner from each instruction in the linear sequence of the program, the distributed and closed nature of objects preempts any notion of such straightforward control. As linearity was deconstructed by encapsulation, so was control itself as objects broke free of the rigid sequential ordering. Thus, within object orientation, coordination among the various objects is accomplished through messaging, which is the sending of processing requests among objects. For example, a simple object that keeps track of the numerical value for the high score of a game might be sent the message "+ 3" by another object in the game. The score object would receive the message, determine whether the message request matched one of its internal methods, then execute the method by adding three points to the total score and returning the new score. As such, any message's request is a request to execute a method within the object.

While messaging may initially seem similar to the notion of calling procedures, they are qualitatively different activities. As Rentsch observed, "In a typical procedural programming language it is hard to give up the notion that the caller of a procedure is somehow 'in control,'" explaining that "in Smalltalk, on the other hand, a message is a request of what the sender wants with no hint or concern as to what the receiver should do to accommodate the sender's wishes. The sender, presuming all objects to be quite intelligent, trusts the receiver to do 'the right thing' without worrying about exactly what the right thing is. Thus assured, the sender relinquishes control philosophically as well as actually, so that the interpretation of the message is left entirely up to its recipient. This notion, a sort of call by desire, is central to the object oriented philosophy."[26] Messaging thus opens up the concept of medium in that the external "space" between different objects becomes a substrate for communication.

The concept of medium also implies a sense of propagation and traveling between, such that messaging also opens the possibility of movement within the code. This movement is not imagined as the sort of linear movement of instructions through the processor, as was the case in the previous linear systems of programming; rather, as multiple messages trigger parallel events across disparate objects, these distributed state changes effect a continuous qualitative transformation across the entire set of objects. This emerging and perpetually unfolding topological whole is what would be called the program in object orientation, and it is the summation of the multiple contingent object actions in response to various messages. Additionally, movement and the transformation of the whole must take place within some sense of time, for, according to Deleuze, "Movement is a mobile section of duration." Thus, in opening up medium and movement, messaging also opens up the possibility for Henri Bergson's concept of duration, in which time is experienced directly as a continuous global change within the relations and states of an entire field of objects. As Deleuze stated in *Cinema 1,* "Relation is not a property of objects, it is always external to its terms. . . . Relations do not belong to objects, but to the whole. . . . But, through relations, the whole is transformed or changes qualitatively. We can say of duration itself or of time, that it is the whole of relations." This duration of object orientation is categorically different from the abstract time of procedural programming. Whereas time exists as a series of linear atomic elements in the earlier models of programming and computation, duration is the irreducible continuous unfolding and emergent web of interactions as a whole.[27]

Yet how does such an openness to duration emerge when each object is ultimately just a collection of different self-contained precompiled programs? The concept that allows objects to maintain openness to the whole and duration is a special feature known as *late binding*. Whereas machine, assembly, and procedural programming operate according to early binding, in which all of the variable name linkages are determined during compiling before the program is ever executed, most object-oriented languages, such as Smalltalk, function according to late binding, in which reference linkages are left open at compile-time to be resolved dynamically at the last possible moment during the actual execution of the program, or at *run-time*. As a result, each object does not contain any prescribed plan for which objects will make requests of it while the program is unfolding because late binding allows the object to remain open and "wait" for messages by dynamically resolving any messages as they occur. This required process of waiting creates not only a universal duration among the whole set of objects but also an internal, subjective duration specific to each individual object. It also implicitly opens up yet another dimension that is crucial to how object orientation functions as medium: real-time interactivity. It is thus through messaging and the auxiliary concept of late binding that object orientation requires programmers to think in terms of embodied movement, duration, and interactivity.

Opening 4: Polymorphism

Late binding does not only produce the possibilities for duration and interactivity; it also allows for another key component of object orientation known as polymorphism. Polymorphism is the ability for different objects to evaluate the same message differently according to each object's individual context. Thus the message "+ 3" sent to a numerical object such as the score of a game might be interpreted as "Add 3 to the current score and return the numerical value of the new score in a message back to the sender," whereas the same "+ 3" message to a text string object might be interpreted as "Concatenate the text character for the number 3 to the end of a current text string and return the resulting string to the sender." Thus polymorphism helps to fill the subjectivity opened up by encapsulation by itself opening up the possibility for active evaluation according to the internal context and current state of each object. Kay describes the process of evaluation via polymorphism by stating: "The grammar of SMALLTALK is simple and fixed. Each phrase is a message to an activity. A description of the desired activity is followed by a message that selects a trait of the activity to be performed. The designated activity will decide whether it wants to accept the message (it usually does) and at some later time will act on the message."[28] Such a capacity for contingent evaluation and deferred decision making imbues objects with yet another important quality. According to Deleuze's Bergsonian ontology, the universe consists exclusively of images. Yet the term *image* has a special meaning for Deleuze and Bergson: an image must be understood, not as a static visual representation of an object, but rather as a virtual summation of all possible states of an object, a dynamic unfolding of its material presence in time that Bergson called a *movement-image*. Like Bergson before him, Deleuze thus considered the material universe to be a vast, vibrating assemblage of all material movement-images acting and reacting to one another in a jittery field of unfolding relationality. Deleuze called this field "a plane *[plan]* of immanence," a concept that is wholly consistent with the kind of emergent unfolding that occurs in object-oriented programs.

Yet for Bergson not all movement-images are created equal. Some possess an interval that slows the immediacy of their actions and reactions. Bergson designates such images as living images: "For Bergson, the gap, the interval, will be sufficient to define one type of image among others, but a very special type—living images or matters *[matières]*. Whereas the other images act and react on all their facets and in all their parts, here we have images which only receive actions on one facet or in certain parts and only execute reactions by and in other parts."[29] These two facets are respectively synonymous with sensory and motor systems of living things, which Deleuze calls the first two "material aspects of subjectivity." Deleuze refers to the gap between the sensory and motor systems in living things as a "centre of indetermination" that can be filled by the "third material aspect of subjectivity" called *affect:* "Affection is what occupies the interval, what occupies it without filling it in or filling it up. It surges in the centre of indetermination, that is to say in the subject, between a perception which is troubling in certain respects and a hesitant action. It is a coincidence of subject and object, or the way in which the subject perceives itself, or rather experiences itself or feels itself 'from the inside' (third material aspect of subjectivity)."[30]

Given Deleuze's concise description of the concept of affect, it is relatively easy to apply an identical reading to the possibilities created by late binding and polymorphism in objects. Since each computational object is its own movement-image as a virtualized representation of all the possible permutations of its execution and interactions with other objects, message receipt can be understood as perception, and the corresponding method of execution can be considered an action. Yet late binding opens up an interval in the duration of the object, an interval that is filled by the indetermination and evaluation of polymorphism. It is through this movement that polymorphism opens up the ability for programmers to infuse their programming objects with affect.

Opening 5: Interface

Within this multidimensional space of perpetually unfolding, interacting, and affective objects, the program feels more like an embodied community and less like a linear script. Yet the community exists for a purpose, and this purpose requires a degree of coordination. While the hidden interiority of encapsulation is entirely necessary to the very notion of object orientation, it poses an interesting paradox: If one is to think of objects as self-contained, closed entities whose internal subjectivities are protected from any external visibility, how do objects even know what requests other objects are capable of executing?

To some extent, this question may seem a bit contrived, given that a programmer may ultimately have a view into all the different objects' internals, but in practice such transparency is not usually the case. Most complex software applications are not produced by a single programmer; rather, they involve teams of programmers, with each individual person tackling separate objects that interact to form the larger application. It therefore becomes exponentially inefficient for each programmer to read the internal code of every other programmer's objects for the same project when all one really needs to know is what kinds of actions the object can perform and the message format needed to request each action. Anticipating the Internet, Kay remarked, "Again, the whole point of OOP is not to have to worry about what is inside an object. Objects made on different machines and with different languages should be able to talk to each other—and will have to in the future."[31] Even the solitary programmer will work much more efficiently if he or she follows the same principles of object-oriented design, since needing to remember and review the internal specifics of one's own objects is equally tedious and time-consuming.

Object orientation solves this problem of both hiding internals but presenting functionality through the concept of an *interface*, or *protocol*. Viewed as a separate component from the actual code itself, which is often called the *implementation*, an object's interface is a public face for the object that describes which of the object's internal methods may be requested by another object, the necessary format for making each request, and the sort of message (if any) the requesting object should expect in response to its request. It is important that not all of an object's internal methods need be included in the interface. In fact, good object-oriented design dictates that, except for methods that must be declared as public to enable outside interaction, all other methods should be declared as private and only accessible to the object itself. As Gamma, Helm, Johnson, and Vlissides summarize it in *Design Patterns:* "An object's interface characterizes the complete set of requests that can be sent to the object. . . . Objects are known only through their interfaces. There is no way to know anything about an object or to ask it to do anything without going through its interface. An object's interface says nothing about its implementation—different objects are free to implement requests differently. That means objects having completely different implementations can have identical interfaces."[32] As a standardized best practice of object-oriented software development, all object-oriented programming languages and environments strongly encourage programmers to develop a clear and carefully delineated interface for every object implementation.

It is through these mechanisms that object orientation inserts the concept of interface at the level of the code itself. One of the terms most frequently used to describe the interface is that of a public contract between every object within the community of objects, and such a rules-based community structure injects a kind of sociality into the space of the code. However, this society of objects is not limited just to computational objects, for interface is also the means by which the concept of the human user enters the program. Just as interfaces dictate possible interactions among objects, they proscribe possible interactions between objects and human users. As a result, users are made to inhabit the space and medium of the other objects and are treated as objects themselves. Dan Ingalls has addressed this point by commenting that "in Smalltalk especially, the interaction between the most primitive objects is viewed in the same way as the highest-level interaction between the computer and its user."[33] Kay has expressed a similar perspective by arguing that "the notion of multiple control paths allows the separate notions of 'files,' 'operating system,' 'monitor,' etc., to be replaced by the single idea that the user is also a process (and thus has *state* which consists of variables and bindings, etc.)."[34]

Thus, through the concept of interface, users are themselves subsumed within the fully embodied medium of object orientation. Whereas the majority of this section has focused on how object orientation necessitates an extremely rich and robust conception of mediality from the perspective of the programmer, interface pulls end-users into the loop as well by positioning them within the larger logic of object orientation. This positioning is also a disciplining of the users, in the Foucauldian sense, in which users experiment with the medium so as to inductively come to understand the logic of the particular system into which they are "thrown." Kay has described this same phenomenon in his own eloquent terms: "I read McLuhan's *Understanding Media* and understood that the most important thing about any communications medium is that message receipt is really message recovery: anyone who wishes to receive a message embedded in a medium must first have internalized the medium so it can be 'subtracted' out to leave the message behind. When he said 'the medium is the message,' he meant that you have to *become* the medium if you use it."[35] While object orientation opens the capacity for computation to become a medium capable of encompassing virtually every aspect of contemporary lived reality, it can do so only by reordering culture according to its own specific logic and enforcing this logic upon anyone wishing to access it. Thus the culture that exists in object-oriented media is a recoded culture that is not restricted to computational spaces. Rather, as computation grows increasingly pervasive in all areas of culture, object orientation recodes all aspects of the noncomputational world in very real ways.

END-USER AGREEMENT

> *The object is no longer to compare man and the machine in order to evaluate the correspondences, the extensions, the possible or impossible substitutions of one for the other, but to bring them into communication in order to show how man is a component part of the machine, or combines with something else to constitute a machine.*
>
> —DELEUZE AND GUATTARI

If there is a Deleuzean abstract machine for our contemporary culture, it is object orientation. Whether manifested as the wildly popular online video game communities *World of Warcraft* or *Second Life,* massively trafficked social networking Web sites such as Facebook and MySpace, or even just the incessant daily information-processing workflow of most modern occupations, object orientation increasingly mediates how we work, play, fight, and love. It has become so ubiquitous and naturalized as to elude visibility. In creating the ability for computation to become such a rich and engaging medium, object orientation has made itself a completely indispensable part of what we now know as computation. In producing and consuming object-oriented digital media, we, the users, are positioned as just another set of objects within object orientation's distributed field of operations.

For in the end, object orientation is not so much a revolutionary computational breakthrough as it is the social imposition of a very specific set of power relations and practices onto code. Object orientation is systems theory made material at the most microphysical level of its language kernel, and it is further evidence that ideologically etched material practices often continue to discipline bodies and shape discourse far beyond the life spans of their originating ideologies. In creating the possibility for computational mediality, object orientation opens the rigid, linear logic of serial computation onto the brute messiness of the world, inviting the entire breadth of lived experiences to be incorporated into a self-fulfilling, self-reinforcing feedback loop. The more our culture is reordered as object oriented, the more the beliefs of systems theory and its ideological offspring—complexity theory, complex adaptive systems, the New Economy—become empirically reified. After all, object orientation was never about computing a solution to a problem; rather, it is about creating a believable simulation. Its validity flows more from affect and belief than from mathematical correctness, and the only way to increase the validity of an object-oriented simulation is to model more and more of the world as object oriented. As such, object orientation is as much about recasting our entire view of the universe as exclusively object oriented as it is about using object orientation to "solve" certain problems in the lived world.

For Kay, object orientation was just an early point on a much longer trajectory rather than a destination in itself. Perhaps this is why he often speaks of Smalltalk and object orientation as though they are half-born progeny that have enjoyed far more productive lives than they deserve. Kay's ultimate dream of a world in which multiple generations of children are as fluent in computer programming as they are in reading and writing is far from being realized. He has continued to repeatedly make this point throughout the years and has gained a reputation as a staunch provocateur and critic of his own field, frequently speaking about how "the computer 'revolution' hasn't happened yet" and attacking "most undergraduate degrees in computer science these days" as "basically Java vocational training" or "Java certification."[36]

In the end, the greatest irony of object orientation may be that no one was more disturbed by its voracious, all-consuming logic than Alan Kay himself, who, only a few years after creating Smalltalk, actively lobbied for its destruction:

> The reason I wanted to "burn the disk packs" [at the end of 1975] is that I had a very McLuhanish feeling about media and environments: that once we have shaped tools, in his words, they turn around and "reshape us." Of course this is a great idea if the tools are *really* good and aimed squarely at the issues in question. But the other edge of the sword cuts as deep—that inadequate tools and environments still reshape our thinking in spite of their problems, in part, because we *want* paradigms to guide our goals. Strong paradigms such as LISP and Smalltalk are so compelling that they *eat their young:* when you look at an application in either of these two systems, they resemble the systems themselves, not a new idea.[37]

The ultimate effect of the object-oriented turn is difficult to predict, precisely because we are so actively immersed in it. How does one even begin to ask the question of outcomes when almost every tool of representation is itself increasingly object oriented? Perhaps the first step is an honest assessment of how we got to where we are in the first place, as a means for beginning to recode the system from within.

NOTES

The section epigraphs are from Gilles Deleuze and Félix Guattari, "Balance Sheet—Program for Desiring Machines," *Semiotext(e)* 2, no. 3 (1977): 119; Cesare Pavese, epigraph to Alan Kay's "A Personal Computer for Children of All Ages," paper presented at the ACM National Conference, Boston, August 1972; and Deleuze and Guattari, "Balance Sheet," 118.

1. Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago: University of Chicago Press, 2006), 43.

2. Robert J. Rossheim, "Report on Proposed American Standard Flowchart Symbols for Information Processing," *Communications of the ACM* 6, no. 10 (October 1963): 602.

3. Stewart Brand, "Spacewar: Fanatic Life and Symbolic Death among the Computer Bums," *Rolling Stone,* December 7, 1972.

4. Steve Russell, Nolan Bushnell, and Stewart Brand, "Shall We Play a Game? The Early Years of Computer Gaming," video recording of panel discussion, May 7, 2002, Computer History Museum, Mountain View, CA, accession no. 102695272, Computer History Museum.

5. Ivan Sutherland, "Sketchpad: A Man-Machine Graphical Communication System" (PhD diss., Massachusetts Institute of Technology, 1963), 23.

6. Alan Kay, "The Early History of Smalltalk," in *History of Programming Languages,* vol. 2, ed. Thomas J. Bergin Jr. and Richard G. Gibson Jr. (New York: ACM Press, 1996), 516, 571; Jan Rune Holmevik, "Compiling Simula: A Historical Study of Technological Genesis," *IEEE Annals of the History of Computing* 16, no. 4 (1994), www.idi.ntnu.no/grupper/su/publ/simula/holmevik-simula-ieeeannals94.pdf.

7. Tim Rentsch, "Object Oriented Programming," *ACM SIGPLAN Notices* 17 (September 1982): 55–56.

8. Kay, "Early History of Smalltalk," 515.

9. Ibid., 516.

10. Ibid.

11. Alan Kay, "Alan Kay's Magical Mystery Tour," interview by Michael Shrage, *TWA Ambassador,* January 1984, 36, quoted in Howard Rheingold's *Tools for Thought: The History and Future of Mind-Expanding Technology* (Cambridge, MA: MIT Press, 1985), 238.

12. Kay, "Early History of Smalltalk," 513.

13. Ibid., 512.

14. Ibid., 518, 519.

15. Ibid., 523, emphasis in original.

16. Ibid., 533.

17. Adele Goldberg, "Why Smalltalk?" *Communications of the ACM* 38 (October 1995): 106.

18. Rentsch, "Object Oriented Programming," 52.

19. Daniel H. H. Ingalls, "Design Principles behind Smalltalk," *BYTE Magazine,* August 1981, 1, www.cs.virginia.edu/~evans/cs655/readings/smalltalk.html.

20. Alan Kay, "Microelectronics and the Personal Computer," *Scientific American,* September 1977, 9.

21. Howard Rheingold, *Tools for Thought: The History and Future of Mind-Expanding Technology* (Cambridge, MA: MIT Press, 2000), 245–46.

22. Nigel Thrift, "The Place of Complexity," in *Knowing Capitalism* (Thousand Oaks, CA: Sage Publications, 2005), originally published in *Theory, Culture and Society* 16, no. 3 (1999): 31–70.

23. Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides, *Design Patterns: Elements of Reusable Object-Oriented Software* (Singapore: Pearson Education, 1995), 2–3.

24. This redundancy is dealt with through a new kind of factoring in object orientation known

as inheritance, which allows for classes of objects to inherit both methods and properties from other superclasses of objects, thereby eliminating the need for redundantly defining properties and methods for similar objects. I have chosen not to include a discussion of inheritance in my argument because it has little impact on the relationship of object orientation to mediality.

25. Kay, "Early History of Smalltalk," 520, emphasis in original.

26. Rentsch, "Object Oriented Programming," 52.

27. Gilles Deleuze, *Cinema 1: The Movement-Image,* trans. Hugh Tomlinson and Barbara Habberjam (Minneapolis: University of Minnesota Press, 1986), 8, 10.

28. Kay, "Microelectronics," 124.

29. Deleuze, *Cinema 1,* 61.

30. Ibid., 65.

31. Kay, "Early History of Smalltalk," 562.

32. Gamma et al., *Design Patterns,* 13.

33. Ingalls, "Design Principles behind Smalltalk," 4.

34. Kay, "Personal Computer for Children," 9, underlining in original.

35. Alan Kay, "User Interface: A Personal View" [1989], in *Multimedia from Wagner to Virtual Reality* ed. Randall Packer and Ken Jordan (New York: W. W. Norton, 2001), 124, emphasis in original.

36. Alan Kay, "A Conversation with Alan Kay," interview by Stuart Feldman, *ACM Queue* 2 (December 2004): 26.

37. Kay, "Early History of Smalltalk," 549, emphasis in original.

14

Digital Media Archaeology

Interpreting Computational Processes

Noah Wardrip-Fruin

The media archaeology approach has often unearthed forgotten moments from predigital media and, bringing them into the present media context, has both seen them anew and used them to illuminate the media culture of today. This chapter, instead, attempts a media archaeology of the more recent past—unearthing forgotten moments from the early history of digital media.

In particular, this chapter is a prototype of an archaeology of specific digital works and systems. Such an investigation cannot limit itself to published accounts of the system outputs, or even to stored interaction transcripts. It is important to understand how the digital artifact and the systems that supported it actually functioned—the operations, the processes.

The example discussed here is Christopher Strachey's 1952 love letter generator for the Manchester Mark I. This work, likely the first experiment with digital literature and digital art of any kind, is fully documented in notes and program listings found in Strachey's papers at the Oxford Bodleian Library. Fully engaging this work turns one not just to an explication of its operations but to their interpretation.

This, in turn, points toward a central issue both for the development of a digital media archaeology and for the future study of digital media generally: How do we engage a work's processes? Digital media are not simply representations but machines for generating representations. Like model solar systems (which might embody a Copernican or geocentric perspective while still placing the sun and planets in similar locations), the operational and ideological commitments of digital media works and platforms are visible more in the structures that determine their movements than in the tracing of any particular series of states or outputs. As a step in such a direction, this chapter concludes by drawing on some of the analysis of Strachey's generator in considering a much more recent work: Marc Böhlen's Amy and Klara.

STRACHEY'S LOVE LETTER GENERATOR

People must have wondered if Christopher Strachey's father would amount to anything. Born to one of England's prominent families, Oliver Strachey was addicted to puzzles, expert at chess and bridge, a lover of crosswords, a trained pianist, and apparently ill suited to anything that mattered. He was not a good enough pianist to play professionally, he took an administrative job with the East India Railway Company and hated it, he was unhappily married and divorced. Then, at the outset of World War I, he took a post as a cryptographer with the War Office Code and Cypher School—and came into his own. His love of puzzles, and skill at them, made him a gifted codebreaker. He spent the rest of his career in cryptography and was honored as a Commander of the British Empire (CBE) in 1943.

In the mid-1940s there was reason to wonder if Christopher Strachey would ever share his father's experience of bringing the special shape of his mind to bear on a suitable task. He had been a bright child, playing imaginary three-dimensional tic-tac-toe on his mother's bed in the early morning and explaining mathematical concepts to his nurse at five. According to Strachey's biographer Martin Campbell-Kelly, his academic accomplishments were not a match for his intellect—though they did manage to get him into Cambridge University. At the university he continued to pay more attention to his social and intellectual life than to his academic performance. He graduated without much distinction in 1939, spent World War II working as a physicist, and in 1945 left that work to become a schoolmaster.

There was nothing to indicate that seven years later Christopher Strachey would find himself—through happenstance, through interests slightly askew from those around him—one of the people to do something "first." However, though it is not yet widely known, in the summer of 1952 he undertook the first known experiment in digital literature, and perhaps created the first digital art of any kind, when he completed his love letter generator for the Manchester Mark I computer.

THE GENERATOR'S GENESIS

Strachey came to this almost out of nowhere. In 1950, just two years earlier, he had no official connection to research communities of any sort—not mathematics, not engineering, and certainly not computation. He had developed an interest in modern computers through scattered articles, books, and radio addresses on the topic. He had never seen one.[1] And he had not shown a particularly keen interest in creating literature or art. But two things in his background can be seen as setting the stage.

First, certain circumstances of his upbringing may have made it more likely that a playful, creative experiment would occur to him as a possible use for a computer. Strachey was born in 1916, five years after his father married Ray Costelloe—an active suffragist and a trained mathematician and electrical engineer who came from an American Quaker background. In 1919 the family moved to Gordon Square, where Christopher's grandparents also lived. Gordon Square was then the center of the Bloomsbury group of artists and intellectuals, and Christopher's uncle Giles Lytton Strachey—a prominent member of the group—had just shocked the country with the 1918 publication of Eminent Victorians (a skewering of Cardinal Manning, Florence Nightingale, Thomas Arnold, and General Gordon). The family's neighbors included Virginia and Leonard Woolf, Clive and Vanessa Bell, and John Maynard Keynes.

Second, there was the happenstance of his choice of university. Strachey attended King's College, Cambridge, which was then quite small (about two hundred undergraduates). While there he met a junior research fellow named Alan Turing, who was, at just that time, undertaking perhaps the most fundamental work ever performed for the discipline of computer science (a discipline still some years from being founded). According to Campbell-Kelly, it is unlikely that Strachey spoke with Turing about computing at King's, but he did get to know him.[2] And as the Manchester Mark I computer was built, it was Turing who wrote the programming manual. Though Strachey was officially only a teacher at Harrow School, his personal connection with Turing was enough to allow him, in 1951, to ask for and receive a copy of the manual. And it was this that enabled Strachey's sudden appearance in the world of computing.

Strachey had first seen a modern computer earlier that year. He had been introduced to Mike Woodger of the National Physical Laboratory (NPL) by a mutual friend and had spent a full January day learning about the Pilot ACE computer then under construction at NPL (based on a design of Turing's). When he returned to school after winter break he began working on a program to make the ACE play checkers. Then he learned of the Mark I that had just been installed at Manchester, which Woodger informed him had a significantly larger "store" than the ACE—making it better suited to Strachey's programming interests. After receiving a copy of the programming manual from Turing, Strachey visited for the first time in July and discussed his ideas for a checkers-playing program with Turing. These ideas impressed Turing, and he suggested that the problem of making the machine simulate itself using interpretive trace routines would also be interesting.[3] Strachey, taken with this suggestion, went away and wrote such a program. As Campbell-Kelly writes:

> The final trace program was some 1000 instructions long—by far the longest program that had yet been written for the machine, although Strachey was unaware of this. Some weeks later he visited Manchester for a second time to try out the program. He arrived in the evening, and after a "typical high-speed high-pitched" introduction from Turing, he was left to it. By the morning, the program was mostly working, and it finished with a characteristic flourish by playing the national anthem on the "hooter." This was a considerable tour-de-force: an unknown amateur, he had got the longest program yet written for the machine working in a single session; his reputation was established overnight.[4]

The attempts to recruit Strachey began immediately, and by November Lord Halsbury of the National Research and Development Corporation (NRDC) had convinced him to take a position as a technical officer. Strachey, of course, was still teaching at Harrow School—but in 1951 and 1952 he spent long sessions during his school breaks at Manchester, working on his checkers program and two assignments already given him by the NRDC. He also attended computing colloquia at Cambridge University and even gave a two-part BBC radio address about computers that spring. In his second BBC talk he described the multimodal interaction (image on a cathode ray tube, text on teleprinter) and unusual proto-personality of his checkers program:[5]

> In addition to showing a picture of the board with the men on it on a cathode ray tube, and to printing out the moves on a teleprinter, the machine makes a sort of running commentary on the game. For instance it starts by printing "Shall we toss for the first move? Will you spin a coin." It then calls, in a random manner, and asks "Have I won?" There's no cheating in this, at any rate as far as the machine is concerned. The player has then to feed his moves into the machine according to certain rules. If he makes a mistake the machine will point it out and ask him to repeat the move. If he makes too many mistakes of this kind, the remarks printed by the machine will get increasingly uncomplimentary, and finally it will refuse to waste any more time with him.[6]

By June 1952 Strachey had wound up his responsibilities as a schoolmaster and officially began full-time computing work as an employee of the NRDC. That summer he developed—probably with some input from others—a Mark I program that created combinatory love letters.[7]

It is unlikely that Strachey had digital art, of the sort we create today, in mind.[8] For one thing, there would have been little thought of an audience. As with his checkers-playing program, the love letter generator could be reported to a wider public but experienced directly only by a small audience of his fellow computing researchers. At the same time, it certainly was not an official assignment from the NRDC; rather, like many creative computing projects, it was undertaken for enjoyment and to see what could be learned.

Not everyone in Strachey's small audience enjoyed it equally. Turing's biographer Andrew Hodges reports that "those doing real men's jobs on the computer, concerned with optics or aerodynamics, thought this silly, but . . . it greatly amused Alan and Christopher."[9] Looking at the program's output today, we can understand why Turing and Strachey's colleagues thought the project silly. Here are two examples that Strachey published in an article in the art journal *Encounter* (immediately following texts by William Faulkner and P. G. Wodehouse):

> Darling Sweetheart
>
> You are my avid fellow feeling. My affection curiously clings to your passionate wish. My liking yearns for your heart. You are my wistful sympathy: my tender liking.
>
> Yours beautifully
> *M. U. C.*

and

> Honey Dear
>
> My sympathetic affection beautifully attracts your affectionate enthusiasm. You are my loving adoration: my breathless adoration. My fellow feeling breathlessly hopes for your dear eagerness. My lovesick adoration cherishes your avid ardour.
>
> Yours wistfully
> *M. U. C.*[10]

There could be a variety of reasons why, reading these, we might not share Turing and Strachey's great amusement. Perhaps we are further removed from a certain type of purple prose, or from that early computing culture focused on "real men's jobs."[11] But another reason seems more likely—that it is not simply the output that amuses; that the resulting letters are not really the interesting part of the project.

When we read an example of output from the love letter generator, we are seeing the surface manifestation of two other elements that remain hidden from us: the generator's data and processes. These two elements were what Strachey worked on, and any one of the vast number of possible output texts is only an unpredictable manifestation of them. It is likely that this unpredictability is part of what amused Strachey and Turing, but we will only partially understand it, or any other aspect of the system, if output texts are all we consider. Yet we are unfortunately likely to do so. In fact, most reports of the generator (including those in the excellent texts of Campbell-Kelly and Hodges) provide only sample outputs. The two exceptions to this that I have found are David Link's "There Must Be an Angel" and Strachey's own article in *Encounter,* both of which detail the entire set of processes (at a relatively high level of abstraction) and a portion of the data.[12]

The views of the generator that include its data and processes, as well as its output, are views that consider the work as a system. This chapter takes such a view as its starting point for interpretation—finding a richness in the work unavailable to interpretations that focus only on the surface. This sort of interpretation is nearly demanded by early digital artworks, for which there was little or no consideration of an audience. But, as this chapter will argue, from a media-archaeological perspective it is an approach we can fruitfully bring into contact with digital art today.

UNDERSTANDING THE GENERATOR

If we are to view the generator as a system, we must consider its surface output, the data it employs, and the processes it executes.

We can begin with the surface. The generator's outputs have been used in discussions of queer identity, but the generator has rarely been considered carefully as a literary project. Certainly there are reasons for this—Turing and Strachey were both gay, and at least Turing openly so, at a time when homosexuality was illegal in England. It might also seem from widely reproduced outputs of the generator (e.g., that found in Hodges) that it was a love letter generator that "could not speak its name"—the word *love* being conspicuously absent.

But this does not explain the almost complete lack (with the exception of Jeremy Douglass's contribution) of attempts to read the generator's output in literary terms—to give it close consideration.[13] Surely our existing tools for literary work are sufficient to perform a reading of surface text. No, a lack of means for approaching the generator's output does not seem the likely cause of this silence. Rather, it seems more likely that scholars have not approached the generator's output from a literary perspective because it simply does not feel human. The letters preserved by Strachey are not texts that anyone would write—yet, unlike certain modernist and postmodern texts, they do not achieve a paradoxical interest value based on the knowledge that they were written by a person. These inhuman texts were, in fact, produced by a machinic process.

In part the inhuman feeling comes from the mismatched awkwardness of declarations such as "You are my avid fellow feeling" in the first letter reproduced above. But it may be even more dramatic in the patterns of permutational word repetition in the second example. In the first sentence we have "sympathetic affection" followed by "affectionate enthusiasm." In the next sentence, "loving adoration" followed by "breathless adoration." The following two sentences echo previous phrasing with "breathlessly hopes" and "lovesick adoration"—after which the "letter" is abruptly over.

The generator's texts do not seem like a fumbling attempt to express love, but like something other than expression, something that is not working toward the pleasures traditionally found in reading. How, then, can we read the love letter generator? If we are going to find more that interests us, in this project that "greatly amused" Strachey and Turing, we're going to have to look beneath the surface.

An entry can be found in the name of the hopeless romantic of the above letters. "M. U. C." is the Manchester University Computer, or Mark I. M. U. C. played the part of a love letter author by carrying out the following process, as outlined in the same article in the *Encounter:*

> Apart from the beginning and the ending of the letters, there are only two basic types of sentence. The first is "My—(adj.)—(noun)—(adv.)—(verb) your—(adj.)—(noun)." There are lists of appropriate adjectives, nouns, adverbs, and verbs from which the blanks are filled in at random. There is also a further random choice as to whether or not the adjectives and adverb are included at all. The second type is simply "You are my—(adj.)—(noun)," and in this case the adjective is always present. There is a random choice of which type of sentence is to be used, but if there are two consecutive sentences of the second type, the first ends with a colon (unfortunately the teleprinter of the computer had no comma) and the initial "You are" of the second is omitted. The letter starts with two words chosen from the special lists; there are then five sentences of one of the two basic types, and the letter ends "Yours—(adv.) M. U. C."[14]

With this entry, we will now examine the generator's data and processes.

The Generator's Data

What can be read in the generator's data—its sentence templates and, especially, the "lists of appropriate adjectives, nouns, adverbs, and verbs" available to the sentence-assembling process?[15] These are not a traditional text; rather, they represent the spectrum of possibilities for each open slot in the generator's structure, for each run of the program.

One thing we can do with the data is compare it against the ideas we have developed while reading examples of surface text. By looking at the complete list of available words (table 14.1), we can see, for example, that the absence of the word *love* from certain printed examples of the generator's output was simply an accident of randomness rather than a deliberate, telling lack built into the system. The generator's complete vocabulary contains *love, loves, loving, lovingly, lovesick,* and *lovable.* But, given the nature of randomness, we might not have realized this—even after reading many examples of the generator's surface output—without examining the system's data.

Another thing we can do with data is look for patterns in it. Data may be carefully authored or selected to work with processes in particular ways. It may have telltale absences or conspicuous repetitions. In this case, however, what seems

TABLE 14.1 The Love Letter Generator's Data

Category	Words
Adjectives	anxious, wistful, curious, craving, covetous, avid, unsatisfied, eager, keen, burning, fervent, ardent, breathless, impatient, loving, lovesick, affectionate, tender, sweet, sympathetic, fond, amorous, erotic, passionate, devoted, dear, precious, darling, little, lovable, adorable
Nouns	desire, wish, fancy, liking, love, fondness, longing, yearning, ambition, eagerness, ardour, appetite, hunger, thirst, lust, passion, affection, sympathy, fellow feeling, tenderness, heart, devotion, fervour, enthusiasm, rapture, enchantment, infatuation, adoration, charm
Adverbs	anxiously, wistfully, curiously, covetously, eagerly, avidly, keenly, burningly, fervently, ardently, breathlessly, impatiently, lovingly, affectionately, tenderly, fondly, passionately, devotedly, seductively, winningly, beautifully
Verbs	desires, wishes, longs for, hopes for, likes, clings to, wants, hungers for, thirsts for, yearns for, lusts after, sighs for, pines for, pants for, woos, attracts, tempts, loves, cares for, is wedded to, holds dear, prizes, treasures, cherishes, adores
Letter Start	dear, darling, honey, jewel, love, duck, moppet, sweetheart

apparent is a lack of careful shaping. Strachey wrote, in his *Encounter* article, that "the vocabulary is largely based on *Roget's Thesaurus*." Here we can see that the data looks like a verbatim transcription from that source. From this we can begin to ask ourselves questions, but only preliminary ones. For what sort of processes would one choose to copy the data from a thesaurus, rather than carefully select each element? Is this data a determining factor for the work? What would happen if it was replaced by thesaurus entries associated with different interpersonal relationships, or with an entirely different topic?

As these preliminary questions reveal, most of what it might be interesting to interpret about this data can be considered only in the context of the generator's processes. In general, in process-intensive work, data is interesting primarily when considered for how it will be employed in processes. And so it is to this challenge, of interpreting the generator's processes, that we must turn.

The Generator's Processes

My approach—of interpreting systems—now comes down to a crucial question: How can we begin to read processes? That is to say, how can we begin to interpret what a work does, what it can do, instead of only what it says?

First we need to identify some features of the work's processes from which to begin our interpretation. One approach to this is comparison—considering two or more processes together, and seeing which shared and differing features emerge.

This is the approach taken here. I begin by comparing Strachey's love letter generator with two other works in which processes play a significant role: one is an influential literary work, and the other is the contemporaneously developed version of Strachey's checkers-playing program.[16] The features that emerge through this comparison, when considered in context, will form the starting point for interpretation.

One Hundred Thousand Billion Poems The Oulipo (Ouvroir de Littérature Potentielle, or Workshop for Potential Literature) was founded in 1960 by Raymond Queneau and François Le Lionnais. It was founded after Queneau ran into Le Lionnais, a friend of his, while at work on a difficult and unusual project that he did not feel he had the strength to continue.[17] Queneau reports, "He suggested that we start a sort of research group in experimental literature. That encouraged me to continue working."[18] The project was Queneau's *Cent mille milliards de poèmes,* or *One Hundred Thousand Billion Poems* (1961).

This work consists of ten sonnets, each having fourteen lines. While one might expect, then, that this work would be more suitably titled Ten Poems, something in the construction of each poem causes the number of potential poems to be much larger than ten. To wit: a reader can construct alternate poems by reading the first line of any of the original sonnets, followed by the second line of any sonnet, followed by the third line of any sonnet—and find that the whole work is artfully constructed so that any reading of this sort produces a sonnet that functions syntactically, metrically, and in its rhyme scheme. This is made easier by the way the poem is printed, with each poem on a page cut into fourteen strips that can be turned individually. Each line of poetry rests on an individual strip of paper, so that new poems can be composed by turning strips to reveal lines originally used for one sonnet or another.

This process, carried out by the reader, creates a dizzying number of possibilities. When one chooses which of the first lines to read, there are ten possibilities. Next, having read one of the ten first lines, one can choose any of the ten second lines—meaning that there are one hundred (10 × 10) possibilities for reading the first two lines. After reading a second line, one can choose any of the ten third lines—meaning that there are a thousand (100 × 10) possibilities for reading the first three lines, and so on. This type of work is called "combinatorial literature," and Oulipo member Harry Mathews, while incorporating a quotation from earlier writing by a fellow Oulipian, Claude Berge, writes of combinatorics that

> [its object is] the domain of configurations, a configuration being the preset arrangement of a finite number of objects, whether it concerns "finite geometries, the placement of packages of various sizes in a drawer of limited space, or the order of predetermined words or sentences."

> Arrangement, placement, order: because these are the materials of Oulipian combinatorial research, what generally results can be called rearrangement, replacement, reordering, subsumed by the generic term permutation.[19]

While combinatorial literature is concerned with the arrangement of fixed elements, it is important to note that not all the elements have to be employed in each result—not all the packages have to fit in the drawer. Certainly a major feature of Queneau's *One Hundred Thousand Billion Poems* is that only 14 of its 140 lines are used in the production of any of its potential sonnets. And from this we can see that Strachey's love letter generator is a work of combinatorial literature—one of those that preceded the first work of the Oulipo, a historical circumstance the Oulipo came to call "anticipatory plagiary."

What can we say about the love letter generator's processes, in comparison with those of *One Hundred Thousand Billion Poems?* To begin, we can observe that its processes are random and carried out by a computer, whereas Queneau's Poems are always the product of reader selection. The generator's processes are also quite a bit more combinatorial than those of the Poems. The generator carries out a combinatory process in the selection of nearly every word when creating sentences that follow the pattern of "My—(adj.)—(noun)—(adv.)—(verb) your—(adj.)—(noun)." In each of these word selections, the number of potential choices is also not small. For example, there are 31 possible adjectives that could occupy the open space after the sentence's initial "My" and 29 possible nouns for the slot following that, creating 899 possibilities for just the first three words of each sentence of this form (424,305,525 for a complete sentence).[20] *One Hundred Thousand Billion Poems*, on the other hand, is combinatory only on a line-by-line basis, and there are only ten options for each line.

But at least as important as the degree of combinatorial operation in these works is the nature of what is being permuted—the data that is being arranged by these processes. In Queneau's piece, the chunks of data are quite large: full lines of the sonnet. Because the chunks of data are large it is possible, though it requires a high-wire act of writing, for Queneau to enforce structure through the artful construction of each line. *One Hundred Thousand Billion Poems* not only maintains scansion and rhyme in all its permutations (which simply requires constructing only ten sonnets with identical schemes in these dimensions) but also syntactic sense, which requires artful parallel constructions across the sonnets. Further, the different original sonnets have different topics but evocative, potentially related imagery that enriches the possible reader experiences. As Stephen Ramsay characterizes reading One Hundred Thousand Billion Poems*:* "Though one might create a poem using random selections, there is nothing inherently aleatory about the process. . . . Rather, one consciously and deliberately looks for interesting combinations of lines and poetic effects. In building my sonnet, I found myself unable to resist the urge to make the wild horses of the Elgin marbles seize 'the thumb- and finger-prints of Al Capone.' . . . One has the clear sense of having discovered something with these combinations—of having liberated certain energies in the work—while at the same time having beat Queneau at his own game."[21]

Once again, we see the potential power of data-intensive approaches. In contrast, the love letter generator achieves greater combinatorial possibility by working with smaller units of data. It carries out more operations on smaller units—it is, in Chris Crawford's terminology, "process intensive."[22] Because the data units are small (individual words), and because the selection included in the work is not carefully shaped in any obvious way (e.g., only rhyming nouns), the love letter generator does not seem to achieve shape through data the way that *One Hundred Thousand Billion Poems* does.

It might be possible for the generator to, instead, achieve shape through process. For example, the processes could be elaborated to avoid particularly poor results (e.g., excessive repetition) or to enforce particularly pleasing patterns of some sort (e.g., linked imagery between sentences, alliteration, or even rhyme). Though some of these might require slightly more elaborated data, this does not seem the most important facet of the fact that more complex processes were not used to give more structure to the generator's output texts, to make them better love letters. So let us remember this fact and return to it after comparing the generator with another example process.

Strachey's Checkers-Playing Program Strachey completed the first version of his checkers-playing program for the Mark I before he began work on the love letter generator. His original design for the program focused on an approach from game theory that is now relatively well known as a "game tree search" or "minimax" algorithm. Strachey describes it as follows in his *Encounter* article:

> In the scheme actually used the machine "looks ahead" for a few moves on each side. That is to say that it selects one of its own possible moves, discovers all the legal replies for its opponent, and tries them out one by one. For each combination of its own move and its opponent's reply, it then finds all its own possible second moves and so on. As there are, on an average, about ten legal moves at each stage of the game, the number of moves it has to consider gets very large indeed if it is to look ahead more than a very few steps. After a certain number of these stages (the number being determined by the time taken) the machine evaluates the resulting position using a very simple scheme. It notes the value of this position and ultimately chooses the move which leads to the best possible position, always assuming that its opponent makes the best of the possible moves open to him.[23]

With this much description we can begin to draw some basic distinctions between the love letter generator and the checkers-playing program. Some distinctions, such as that one set of processes selects words while the other selects game moves, are so straightforward that they will be passed over. More important is a comparison, for example, of how these selections are made.

Let's start at the beginning. When the checkers-playing program begins the process of selecting a move, it starts by looking at the current state of the board and then projects forward. This means that the program must constantly keep track of what is often called "state information"—it must "maintain state" over the course of the game—in order to know where to begin. And in selecting each move it projects forward many possible states, with the choice based on the best possible outcome of a series of moves.

By contrast, what kind of state does the love letter generator maintain? It must know what stage in the generation process is taking place—beginning, ending, or main body. It must also know when two sentences of the form "You are my—(adj.)—(noun)" appear consecutively in the main body, so that it can follow the rule requiring that "the first ends with a colon . . . and the initial 'You are' of the second is omitted." But the determination of which sentence types will be used is random, and so is the selection of the word that will fill each open slot for an adjective, noun, adverb, or verb. None of what has already been decided plays into the current decision, and certainly no forward projection of future possibilities is carried out.

Why is this? Certainly it is not because the computer was incapable of it, or Strachey was incapable of it—the checkers-playing program, after all, was written before the love letter generator. In part it may have been that the mathematical operations of playing a zero-sum game were more amenable to an approach that made complicated decisions based on state information. But more important than speculation, for our purposes, is the simple fact that a state-free design was chosen for the generator's processes.

Before discussing this issue further, however, let's look at another facet of the checkers-playing program. While the game tree search algorithm it used was not unknown at the time of Strachey's work, in the context of real-world computer checkers (in which speed issues required a limited number of projected future moves) it produced an unexpected behavior. Strachey reported this unexpected result to computer scientists at the Association for Computing Machinery's national meeting in 1952 and then put it in layman's terms for his Encounter article:

> There is, however, one feature of the machine's game which was quite unexpected and rather interesting. The way in which the machine values the positions it reaches when looking ahead is extremely crude. It counts each man as one point and each king (being obviously worth more than an ordinary man) as three points; the value of any position is the difference between its own points and its opponent's points. A large number of the positions it examines will, of course, have the same value, and it chooses between these at random.

> Suppose now its opponent has a man in the seventh rank so that he is about to make a king in his next move, and the machine is unable to stop him. The machine will effectively lose two points at its opponent's next move, and a human being would realise that this was inevitable and accept this fact. The machine, however, will notice that if it can sacrifice a single piece its opponent must take this at once. This leads to an immediate loss of only one point and, as it is not looking far enough ahead, the machine cannot see that it has not prevented its opponent from kinging but only postponed the evil day. At its next move it will be faced with the same difficulty, which it will try to solve in the same way, so that it will make every possible sacrifice of a single man before it accepts as inevitable the creation of an opponent's king.[24]

This type of behavior, in which there are complex (and likely some unexpected) results from the interactions of simple rules, is often in the digital arts called "emergent behavior." In this case, the behavior that emerges is not desirable (it leads to bad checkers playing) but it is notable for being both a completely logical outcome of the design of the system and an outcome that even the system's author did not foresee. Part of what sparks interest in process-intensive digital art is the possibility it seems to hold out for more positive forms of emergence—which will be able to surprise not only the system authors but also the audience.

Encounter readers were not given an explanation of how Strachey sought to address this problematic result, but he did give more information to the audience at the ACM meeting:

> In order to avoid this difficulty, the second strategy was devised. In this the machine continues to investigate the moves ahead until it has found two consecutive moves without captures. This means that it will be able to recognise the futility of its sacrifice to prevent Kinging. It is still necessary to impose an over-riding limit on the number of stages it can consider, and once more, considerations of time limit this. However, as no more *[sic]* is continued for more than two stages unless it leads to a capture, it is possible to allow the machine to consider up to four stages ahead without it becoming intolerably slow. This would mean that it would consider the sacrifice of two men to be of equal value to the creation of an opponent's King, and as there is a random choice between moves of equal value, it might still make this useless sacrifice. This has been prevented by reducing the value of a King from 3 to 2⅞.[25]

What Is the Generator's Game?

The above gives some indication of the level of complexity that Strachey's curiosity-driven (rather than NRDC-assigned) Mark I programs were able to achieve. Given this and our previous discussion, a series of observations present themselves for our interpretation. It is a potentially puzzling combination of facts. How should we consider the love letter generator's deliberate simplicity, its statelessness and randomness, and the fact that its vocabulary is a transcription from a thesaurus? This may not seem a puzzling set of facts on their own, but it seems more puzzling once we are reminded of the fact that this was not a project tossed off and then forgotten. In addition to Strachey and Turing's amusement at the time, Strachey also wrote of the love letter generator for Encounter two years later, and the project made enough of an impression that it has appeared in many accounts of his work, Turing's work, and early work with the Mark I.

David Link argues that the love letter generator is based on a "reductionist position vis à vis love and its expression. Like the draughts game that Strachey had attempted to implement the previous year, love is regarded as a recombinatory procedure with recurring elements."[26] Given the discussion above, I believe we should go further. The love letter generator is not just any recombinatory procedure with recurring elements but specifically a process designed to fail. Just as, when Polonius enters the stage, the audience waits for the next spectacularly vapid truism to escape his lips, I picture Strachey and Turing watching the teleprinter, knowing the processes that were going on within the Mark I, and waiting for the next formulaic jumble of those words most socially marked as sincere in mainstream English society. To put it another way, the love letter generator—in the way it operated—was a blunt parody of normative expressions of desire. It played the role of the lover as an inept spouter of barely meaningful, barely literate sentences, composed with repetitive randomness while one finger still rested in the thesaurus. Further, the examples chosen for preservation by Strachey appear to be those with particularly strong surface markers of mindless permutational patterns.

As a linguistic process designed to fail spectacularly and humorously, through randomness, the love letter generator is certainly not alone. Perhaps the best-known examples are the *Mad Libs* books, first published later the same decade (1958) by Roger Price and Leonard Stern.[27] Like the love letter generator, *Mad Libs* are defined by a process that fills in adjectives, adverbs, nouns, and verbs within given sentence structures. But *Mad Libs* can also request exclamations, geographical locations, numbers, colors, parts of the body, and so on. Further, most of the words in any given *Mad Libs* text are not blank but instead form a skeleton of a traditional text on a particular subject, with only strategic words left open. In addition, *Mad Libs* are not combinatorial. Rather than making all the possible words of each open sort part of the work, *Mad Libs* fills in their blanks by drawing on the suggestions of players who do not know the subject matter of the text for which they're providing material. For example, rather than choosing among verbs on a provided list, players of *Mad Libs* are free to use any verb they can recall.

The result is a process that everyone knows will fail. One player, who has seen the terms needed for the *Mad Libs* text, asks the others for the necessary types of words. The players then joyfully call out the most potentially inappropriate suggestions they can imagine. There is some humor in this, but much more in the anticipation—in waiting to see how this gathering of data will, when combined with the given data through the *Mad Libs* process, result in a ridiculous text. The anticipation is released as the final text is read, often to great laughter. But no one keeps the resulting texts around afterward. They are funny only as the anticipated, yet unpredictable, result of the *Mad Libs* process. And certainly, in this way, the love letter generator's products are more like *Mad Libs* than like the carefully crafted linguistic foolishness of characters like Polonius. However, it is important to note that Polonius is meant to represent a certain type of fool, while *Mad Libs* are not meant to represent any type of previously recognizable processes. *Mad Libs* are a humorous process, but not a representation—while I interpret the love letter generator as a representation.

Here, I believe, we come to a point at which we can understand the love letter generator, the first experiment in digital literature. It is a process designed to fail that employs a thesaurus-based set of word data and that can result in particularly inhuman surface texts (as seen in those selected for preservation by Strachey). We understand this combination in context—or, perhaps it is better to say two contexts: the technical context of the early stored-program computer on which Strachey worked as well as the social context of 1950s computing culture and the increasingly homophobic larger English society. Taking all this together, we can see the generator as a parody, through its operations, of one of the activities seen as most sincere by the mainstream culture: the declaration of love through words.

That is, I see the love letter generator, not as a process for producing parodies, but as itself a parody of a process. The letters themselves are not parodies of human-authored letters; rather, the letter production process is a parodic representation of a human letter-writing process. It is not a subtle parody, driven by a complex structures that circuitously but inevitably lead, for example, to the same small set of vapid sentiments stored as data. Rather, it is a brutally simple process, representing the authoring of traditional society's love letters as requiring no memory, driven by utterly simple sentence structures, and filled out from a thesaurus. The love letter generator, in other words, was as complex as it needed to be in order to act out a broad parody.

PLANS FOR ANOTHER GENERATOR

Coming to an interpretation of the love letter generator, however, does not bring us to the end of its story. Strachey's papers in the Oxford Bodleian Library also reveal his plans for a second version of the love letter generator. Here the parody would have been somewhat less broad. Also, while the sheer number of possible

$$\textit{There is no} \begin{pmatrix} \textit{girl} \\ \textit{woman} \\ \textit{one} \end{pmatrix} \textit{in} \begin{pmatrix} \textit{the universe} \\ \textit{the world} \\ \textit{existence} \\ \textit{England} \end{pmatrix}$$

$$\textit{who is nearly as} \begin{pmatrix} \textit{beautiful} \\ \textit{lovely} \\ \textit{delicious} \\ \textit{exquisite} \\ \textit{wonderful} \\ \textit{exciting} \\ \textit{attractive} \\ \textit{charming} \\ \textit{lovable} \\ \textit{nice} \\ \textit{inspiring} \end{pmatrix} \textit{as you.}$$

FIGURE 14.1. An example of a simple sentence grammar from Strachey's plans for a second love letter generator.

letters might not have been greater, the feeling of diversity would have been increased. Rather than each letter being an expression of inarticulate desire, the second version of the generator would have operated according to themes such as "Write to me," "Answer my letter," "Marry me," "Stop seeing that man," and "Tell your mother." Further, each output would have had a general style, such as "reproachful," "yearning," "impatient," "grateful," or "reminiscent." Strachey's notes contain many sample sentences for different permutations, such as:

> I can't imagine why you are always seeing that man
> How can you be so cruel as not to stop seeing that man?
> Do I dare to ask you to stop seeing that man?
> Don't go on seeing that man or I shall never speak to you again

His notes also provide many grammars for producing sentences along these lines. Figure 14.1 shows a simple one, and Figure 14.2 the ending of a more complicated sentence structure.

Strachey's plans are a pleasure to read through—with clever turns of phrase, amusingly structured processes and grammars, and occasional surprising nods (like the "among my wires" in figure 14.2) to the conceit that it is M. U. C. who declares love in these letters. But the project was abandoned, and Strachey's papers give no indication of the cause. Personally, my thoughts turn to the context of Strachey's work. I cannot help but wonder if it all began to seem less funny in the face of what had happened to the man with whom Strachey had stood and laughed while the first generator went about its foolishness.

When Strachey and Turing stood together in the summer of 1952, waiting for M. U. C.'s next pronouncement of love, Turing was on a forced program of hor-

$$\textit{...is} \begin{pmatrix} \textit{beastly} \\ \textit{wretched} \\ \textit{miserable} \end{pmatrix} \textit{without} \begin{cases} \textit{you} & \begin{pmatrix} \textit{in my arms} \\ \textit{sitting beside me} \\ \textit{among my wires} \end{pmatrix} \\ \textit{your} & \begin{pmatrix} \textit{beautiful} \\ \textit{lovely} \\ \textit{delicious} \\ \textit{exquisite} \\ \textit{wonderful} \\ \textit{exciting} \\ \textit{attractive} \\ \textit{charming} \\ \textit{lovable} \end{pmatrix} \begin{pmatrix} \textit{tip tilted nose} \\ \textit{curly hair} \\ \textit{slender waist} \\ \textit{tapering fingers} \\ \textit{dimpled chin} \\ \textit{sparkling eyes} \end{pmatrix} \end{cases}$$

FIGURE 14.2. The conclusion of a more complex sentence grammar from Strachey's notes.

mone injections. Intended to render him impotent, they were also causing him to grow breasts and perhaps impairing his thinking. The injections were part of Turing's sentence—following his conviction, on March 31 of that year, for "gross indecency." Turing and Strachey may have laughed at the half-witted pronouncers of heterosexual love so roughly parodied by the love letter generator, but that meant laughing at a society all too willing to reject, incarcerate, and hormonally alter them for the simple fact of their homosexuality.

Two years after that summer, on the evening of June 7, 1954, Alan Turing took his own life.

LEARNING FROM THE GENERATOR

We might say that Lytton Strachey's *Eminent Victorians* and Christopher Strachey's love letter generator are both humorous critiques of conservative elements in English culture and those who held them in overly high esteem—one work operating through what it says, the other through what it does. The mode of the love letter generator, of expression through operation, is far more uncommon. But is it unique? Now, more than half a century later, we might turn to the question of whether what we have learned through an examination of Strachey's generator could help illuminate the contemporary landscape of digital media.

Consider Marc Böhlen's Amy and Klara.[28] At first it seems like a work far removed from Strachey's generator. Instead of reaching the audience as plain text on a teleprinter, Amy and Klara takes the form of two pink boxes from which large robotic eye–like speakers emerge. Then synthesized speech begins, with one robot commenting on an article from Salon.com. This quickly devolves into an uninteresting fight. For example:

Leave me alone.
What is wrong with you?
Leave me alone, please.
Weirdo.
Aha.
You are such a dork.[29]

Like the love letter generator's letters, the fights of Amy and Klara are not as well written as those produced by an average human writer. Further, like the teletype printing of Strachey's generator, the text-to-speech technologies that produce Amy and Klara's voices are flat, mechanical, and without nuance. If the goal were simply to create a compelling audience experience, it would be more effective to have the robots simply play a prerecorded fight between human voice actors.

But Amy and Klara uses text to speech for the same reason that the love letter generator uses a teletype rather than human handwriting. Each performance of Amy and Klara is an unpredictable expression of a much more complex underlying system, and the output must be able to vary widely for that expression to be possible.

When we begin to look at Amy and Klara as a system, we notice two things that may not be noticed by audience members. First, through slots in Amy and Klara*'s* boxes, two cameras look at each other. Second, each robot also houses noise-reducing microphones. In other words, the robots of Amy and Klara not only "speak"—they also "see" and "listen."

In addition, the robots of Amy and Klara also "read." Each performs a statistical evaluation of the contents of Salon.com. This is the starting point for their dialogues, as the Amy robot chooses a topic identified by her reading of Salon.com on which to offer a comment. A text-to-speech system turns Amy's comment (assembled by an agent architecture in part based on AIML) into sounds sent through her speaker. Because the robots do not share data, the Klara robot only "hears" Amy's comment through her microphone—and must use automatic speech recognition technology to turn it into text. Given the limitations of software systems for text-to-speech conversion and automatic speech recognition, misunderstandings begin almost immediately. This is compounded by the fact that Böhlen has designed the Klara robot with a simulated thick German accent. As the robots find that they disagree, or that they believe they disagree, the exchange becomes unfriendly and, in time, simply an exchange of unpleasantries. Like the German accent, nasty exchanges are something for which text-to-speech systems (and agent architectures) are not generally designed. This required significant custom system work on Böhlen's part.

Here we can see that, just as Strachey's goal was not to reproduce the most effective human love letter, Böhlen's goal is not to reproduce the most engaging human fight. Rather, Böhlen assembles a system that, through its performance, expresses something about recognition and misrecognition, communication and miscommunication, mechanism and emotion. To interpret the work further as a system would require a careful examination of its surface, data, and processes. For our purposes it is sufficient to note that this system-oriented method of interpretation, strongly suggested by Strachey's early work in the digital arts, can offer an important perspective on digital works much closer to the present. This has implications both for future work in digital media archaeology and for the digital media field broadly.

Because processes are so central to digital media, an archaeology of digital media must move beyond what is done in most of the field's existing historical discussions. We can applaud the fact that historical work in digital media is already accustomed to studying technological systems and proposals other than those that achieve dominance—as media-archaeological approaches suggest. For example, digital media histories generally engage the ideas about hypertext in the writings of early pioneers such as Theodor Holm Nelson, Andries van Dam, and Douglas C. Engelbart, rather than only those of World Wide Web developer Tim Berners-Lee. On the other hand, the ideas expressed by the specific designs of the processes in nondominant systems are very rarely investigated. For example, I am aware of no critical work that investigates the processes in the "Green" and "Gold" Xanadu source code released from Nelson's project or the version of van Dam's still-functioning FRESS project demonstrated by David Durand and Steven J. DeRose.[30]

More generally, the digital media field must begin to grapple with the ideas embedded in its systems. Those working in the digital arts are often working in terms of processes (with inspirations ranging from John Cage to contemporary computer science) in ways that are invisible on the surface of their projects. Similarly, those working in commercial areas of digital media, such as computer games, construct systems that operationalize ideas of narrative structure, character behavior, linguistic interaction, and so on. Each of these is something that, in other domains, we are accustomed to scrutinizing closely, often seeking to understanding something of their underlying logic. But in the area of software, in which the underlying logic exists in an explicit encoding that can be examined, this takes place very rarely. As work continues in areas such as media archaeology and software studies, I hope we will develop a set of approaches and body of examples that will render this long-running lack a historical curiosity.

NOTES

1. Though he had used a differential analyzer, a kind of analogue computing machine, when working with differential equations during World War II.

2. Most of this account of Strachey's life and family is adapted from Martin Campbell-Kelly's

"Christopher Strachey, 1916–1975: A Biographical Note," *Annals of the History of Computing* 7, no. 1 (1985): 19–42, while the following material on Strachey, Turing, and the love letter generator also draws on Andrew Hodges's biography of Turing, *Alan Turing: The Enigma* (New York: Walker, 2000); Christopher Strachey's article "The 'Thinking' Machine," *Encounter* 3, no. 4 (1954): 25–31; Strachey's papers in the Bodleian Library (University of Oxford); and material from the British Broadcasting Corporation (BBC) archives. I am indebted to Oliver House and David Durand for archival work with Strachey's papers, and for the transcript of Strachey's second BBC address I am indebted to Allan Jones.

3. As David Durand points out (pers. comm.), having a machine simulate itself, as in the problem that Turing suggested to Strachey for his first Mark I program, is also the basic outline of Turing's demonstration of the halting problem—a lynchpin of Turing's argument in his essay providing the foundation for modern computation. See Alan M. Turing, "On Computable Numbers with an Application to the Entscheidungsproblem," *Proceedings of the London Mathematical Society* 2, no. 42 (1936): 230–65.

4. Campbell-Kelly, "Christopher Strachey," 24–25.

5. More significant than its questionable status as the first computer personality, Strachey's checkers program troubles the claim of A. S. (Sandy) Douglas's OXO to the title of "first graphical computer game." Douglas's program, which showed a game of tic-tac-toe on a CRT, was developed in 1952 for the University of Cambridge EDSAC.

6. Christopher Strachey, "Science Survey," transcript of radio address, BBC Home Service, 1952, sent to me in 2005 by Allan Jones, who has published on early BBC broadcasts on computing.

7. Campbell-Kelly, in "Christopher Strachey," notes some aesthetic advice from Strachey's sister Barbara, while Hodges, in *Alan Turing,* mentions collaboration with Turing, but neither source confirms the other's account on these points. In Strachey's writings he often fails to even credit himself (preferring to say that there is such a program and leaving aside who created it).

8. At the time of Strachey's projects, when the first stored program computers were just coming into existence, artistic applications of computers were essentially unheard of. According to Jasia Reichardt, the prominent curator of the 1968 computer art exhibition *Cybernetic Serendipity,* computer art's "first tentative steps date back to 1956." Jasia Reichardt, *The Computer in Art* (London: Studio Vista, 1971), 7. The earliest examples cited in current surveys of digital art, such as Christiane Paul's *Digital Art,* are from more than a decade after Strachey's generator. Christiane Paul, *Digital Art* (London: Thames and Hudson, 2003). It is, of course, quite possible that further research will reveal even earlier digital artworks than Strachey's generator. For example, C. T. Funkhouser has written of a 1959 digital poem created by Theo Lutz using one of Zuse's electronic digital computers—which may lead us to imagine that an earlier work of digital literature/art, using one of Zuse's earlier systems, might be uncovered through further research. But whatever happens, we do know that the field of digital literature has more than a half century of history, almost as long as that of the digital computer itself and perhaps the longest of any of the digital arts. See C. T. Funkhouser, *Prehistoric Digital Poetry: An Archaeology of Forms, 1959–1995* (Tuscaloosa: University of Alabama Press, 2007).

9. Hodges, *Alan Turing*, 478.

10. Strachey, "'Thinking' Machine."

11. Regarding the prose, Strachey, in his *Encounter* article, characterizes the generator's output as giving a "Victorian" impression (ibid., 26). But as George Landow (pers. comm.) points out, this seems the same view of Victorian culture found in Giles Lytton Strachey's *Eminent Victorians*, which is probably more amusing than accurate.

12. David Link, "There Must Be an Angel: On the Beginnings of the Arithmetics of Rays," in *Variantology 2: On Deep Time Relations of Arts, Sciences and Technologies,* ed. Siegfried Zielinski and David Link (Cologne: König, 2006), 15–42.

13. Jeremy Douglass, "Machine Writing and the Turing Test," presentation in Alan Liu's Hyperliterature seminar, University of California, Santa Barbara, 2000, www.english.ucsb.edu/grad/student-pages/jdouglass/coursework/hyperliterature/turing/.

14. Strachey, "'Thinking' Machine."

15. Of course, for many works of digital literature it is a challenge to get access to the data. While Strachey, like most computer scientists, published an account of his project's processes, it is rare to publish a project's complete data. In this case, the relevant papers of Strachey's at the Oxford Bodleian Library were consulted. These contain a complete program listing for the generator, from which its data were extracted (folders C 34 and C 35, box MS. Eng. misc. b. 259). Unfortunately, most early work in the digital arts was not so scrupulously preserved. The importance of preservation issues for digital literature, combined with some practical suggestions for current authors, is the subject of Nick Montfort and Noah Wardrip-Fruin's *Acid-Free Bits: Recommendations for Long-Lasting Electronic Literature,* 2004, Electronic Literature Organization, www.eliterature.org/pad/afb.html.

16. This chapter is not alone in making these comparisons: both Link and I made them in 2006. Noah Wardrip-Fruin, "Expressive Processing: On Process-Intensive Literature and Digital Media" (PhD diss., Brown University, 2006); Link, "There Must Be an Angel."

17. Raymond Queneau, *Cent mille milliards de poèmes* (Paris: Gallimard, 1961).

18. Quoted in Jean Lescure, "A Brief History of the Oulipo," in *Oulipo: A Primer of Potential Literature,* ed. Warren F. Motte (Lincoln: University of Nebraska Press, 1986), 32.

19. Harry Mathews and Alastair Brotchie, eds., *Oulipo Compendium* (London: Atlas Press, 1998), 129.

20. Given that each love letter contains five sentences, each of one of the two types, one can add together the number of possibilities for each of the two sentence types and then take the resulting number to the fifth power in order to determine the number of possibilities for the main body of the letter (leaving aside the letter's opening and closing words). I calculate this to be 753,018,753,081, 800,000,000,000,000,000,000,000,000,000—a number much greater than one hundred thousand billion.

21. Stephen J. Ramsay, "Algorithmic Criticism" (PhD diss., University of Virginia, 2003), 54.

22. Chris Crawford, "Process Intensity," *Journal of Computer Game Design* 1, no. 5 (1987), www.erasmatazz.com/page78/page31/page229/page241/ProcessIntensity.html.

23. Strachey, "'Thinking' Machine," 27.

24. Ibid., 28.

25. Christopher Strachey, "Logical or Non-mathematical Programmes," in *ACM '52: Proceedings of the 1952 ACM National Meeting* (Toronto) (New York: ACM Press, 1952), 49.

26. Link, "There Must Be an Angel," 25.

27. Leonard Stern, "A Brief History of Mad Libs," 2001, www.penguinputnam.com/static/packages/us/yreaders/madlibs/history.html.

28. Marc Böhlen, "Amy and Klara," in *Proceedings of ISEA 2006 Symposium / Zero One San Jose*, ed. Steve Deitz (2006), http://isea2006.sjsu.edu/content/view/261/49/.

29. Marc Böhlen, "Amy and Klara: Towards Machinic Male-dicta and Synthetic Hissy Fits," 2006, www.realtechsupport.org/new_works/male-dicta.html.

30. Udanax.com and Project Xanadu, "Xanadu Secrets Become Udanax Open-Source," 1999, www.udanax.com/; Steven J. DeRose, "Fress: The File Retrieval and Editing System," 2003, www.derose.net/steve/writings/whitepapers/fress.html.

15

Afterword

Media Archaeology and Re-presencing the Past

Vivian Sobchack

> *What may be called "presence" ("the unrepresented way the past is present in the present") is at least as important as "meaning."*
>
> —EELCO RUNIA, "PRESENCE"

> *Archaeologists should unite in a defense of things, a defense of those subaltern members of the collective that have been silenced and "othered" by . . . imperialist social and humanist discourse. . . . This story is not narrated . . . , but comes to us as silent, tangible, visible and brute material remains.*
>
> —BJØRNAR OLSEN, "MATERIAL CULTURE AFTER TEXT: RE-MEMBERING THINGS"

Both of these epigraphs, the first taken from a groundbreaking theoretical essay by a Dutch philosopher of history and the second from a "manifesto" by a Norwegian archaeologist, strike me as particularly relevant to the task of making sense of "media archaeology," however heterogeneous and literally unruly this undisciplined discipline might be. Much like the far-ranging essays in this volume, both epigraphs are dramatic articulations of a fairly recent, decidedly materialist, and generally antinarrative and antihermeneutic discourse focused on the conditions under which the absent past can be said to have "presence" in the present.[1] Thus this discourse is also concerned with the conditions for—and effects of—both "immediacy" and "mediation," even as it has not directly addressed the various entities and forms specifically designated as "media." As I will argue, this discourse of presence (a "presence in absence") and its particular concern with the past and the conditions under which it can be re-presenced (as well as historiographically communicated) are central to media archaeology. What, however, in the context of this discourse is meant by the term *presence?*

At one extreme, *presence* is defined as the *literal* transhistorical (yet not ahistorical) transference or relay of metonymic and material fragments or traces of the past through time to the "here and now"—where and when these can be activated and thus realized once again in our practical, operative, and sensual engagement with them.[2] Not to be confused with a "naïve realism," this sense of presence emerges from the epistemological and sensual specifics (both material and structural) that are entailed not in theoretical or interpretive discourse but in operative (and necessarily corporeal) *practice* and *knowledge*—that is, in "performative act[s] of knowing, which [focus] on 'what is done' rather than on what is represented."[3] This view of presence certainly informs much of media archaeology. Indeed, many of the essays in this volume are concerned not only with the recovery and description of previously neglected or marginalized media-historical artifacts but also with the "techno-historical event" (the epistemic and sensual conditions called into being) that each of these artifacts inaugurates through a transhistorical *operative practice.* This view also grounds the importance to most media archaeologists of handling, measuring, collecting, and focusing on these historical remainders primarily in the Heideggerian terms of *techne,* which in its own right, is a "revealing" that not only "brings forth" but also *makes present.*[4] Indeed, this literal as well as philosophical view of the presence of the past in the here and now connects what appear as quite disparate media-archaeological projects: for example, delineating the practical domestic use of a Japanese "Baby Talkie" optical toy or describing the deep physical and structural operations that reveal an old phonograph (or modern computer) as itself archaeologist and *archon*—insofar as the specific technology "exercis[es] the power of . . . procedure and precedence" and thus establishes the epistemic conditions "for the operation of a system," for seeing and knowing.[5]

At the other extreme, *presence* is defined as a consequential but *illusory* (and elusive) *effect.*[6] Reminiscent in function of Roland Barthes's *punctum,* the fragment or trace pierces an *uncanny* hole in quotidian temporality (and comprehension) not only by suddenly "being there" by virtue of being noticed but also, upon inspection, by radically and retrospectively challenging and changing the accepted order of things.[7] In the case of media archaeology, an overlooked media artifact (whether realized or only imagined and/or schematized) seems, at once, both familiar and strange. Thus its suddenly "being here" (and, all along, having "been there") produces a "presence effect" that is capable of overturning the premises (and comprehension) of established media hierarchies and media histories. Indeed, many of the essays in this volume are inaugurated by some uncanny—and punctual—experience of re-cognition. This is not only recognition of some marginalized or unrealized technical device that ruptures the continuities and teleologies of media history but also re-cognition of the transhistorical and topical presence "all along" of, for example, the discursive conjunction of media with the literal figuration of tiny people, or the sudden re-cognition that what was previously dismissed as machinic "noise" or computer "artifact" (a startling term in this context) and once regarded as disruptive of media is actually a systemic element of it.

It is precisely this awareness of a different and disruptive kind of presence in the present—a metonymic "presence in absence" whether considered "real" or an "effect"—that has generated increasing dissatisfaction with what the philosopher of history Eelco Runia sees as the smothering *metaphoricity* or substitutive function of interpretive and explanatory historical narrative (or, as he puts it, historical "representationalism"). Indeed, though to varying degrees, this dissatisfaction with "representationalism" is where media archaeology and the essays in this volume part ways from the dominant philosophy and interpretive methodologies of film, television, and media studies; cultural studies; and new historicism. Thus, although it shares certain family features and foci with these disciplinary areas, and although it cannot avoid entering the "hermeneutic circle" (at the very least to even entertain an initially surprising object as related to media), media archaeology, like the discourse of presence, is generally *antihermeneutic* in orientation. It prefers to avoid or defer interpretive analyses and explanations as well as the kind of teleological emplotments demanded by realist historical representation, which attempts to fill in the absences of the past with coherent—and metaphorical—narratives that substitute for their loss.

In this regard, aligning metaphor and metonymy with representation and presence, Runia writes: "Presence is not the result of metaphorically stuffing up absences with everything you can lay your hands on. It can best be kindled by metonymically presenting absences."[8] And he continues: "The things that stick do so because they do not connect to something already in the mind. . . . Metaphors provide intellectual entertainment on the level of logos, but . . . metonymies strike home at the level of pathos."[9] This is pathos, however, not as some naive form of affect; rather, it is akin to what Giuliana Bruno has called "e-motion"—through her hyphenation emphasizing a form of dynamic transport and historical transitivity that enables something of the real to touch and move us.[10]

Indeed, it is only through confrontation with a historical metonymy, Runia argues, that we may get a "glimpse of the numinosity of history" that "ultimately throw[s] us back on ourselves."[11] This "numinosity"—as presence or presence effect—is thus experienced (and written) as a revelation, not of the transcendental, but of the transcendent: that is, of a *historicality* that spans the division of past, present, and future, not only revealing the past as in some way always present but also revealing the present and future as in some way already past.[12] Hence media archaeologists who focus on such historical metonymies as an extremely rare and custom-made British Grand Bi-Unial Magic Lantern from the 1890s and those who focus on such historical metonymies as current computer code (or the currents that make up computer code) are not so different as they might first appear. Indeed, the experience of presence or presence effect—the numinosity or "aura" of historicality, of presence in absence and absence in presence—is valued by both.

For those media archaeologists to whom the presence of the past emerges (in part) in the here and now through actual engagement with a historical "original" (if never with an "origin"), presence is numinous or auratic much in the manner of Walter Benjamin's description of "aura" as the numinosity attached to one's *existential encounter* with the *singularity* of a work of art (here, the odd or rare historical artifact, fragment, or trace).[13] Presence, however, is also numinous for those media archaeologists who regard it only as an effect—much in the manner of Samuel Weber's elaboration of "aura" as "*the singular leave-taking of the singular,* whose singularity is no longer that of an original moment but of its *posthumous aftershock.*"[14] Although the metonymic fragments and traces of the past do not transport the past directly to the present, in their presence they do numinously reverberate with its absence. Thus, at both ends of the discourse of presence—real, if partial, presence or illusory presence effect, existential encounter or its posthumous aftershock—the previously overlooked and unthought metonymic fragment or trace provokes intense awareness not only of an irrecoverable larger absence (conceived as "the past") but also of an existentially present "otherness" (recognized as a difference located in, yet distinguishable and distant from, the order of things that constitutes the everyday world we live intimately as "the present").

For Runia, then, as well as for media archaeologists, "Presence—being in touch with reality—is . . . just as basic as meaning. Whereas meaning may be said to be the *connotative* side of . . . consciousness, of life, presence is the *denotative* side."[15] Thus, in relation to historiography, "presence resides in the denotative region of language, . . . in the things a story has to present in order to present a story," rather than in the story itself. Nonetheless, connotation and meaning tend to dominate most historical and historiographic practice: that is, although "the denotative level of historiography is sometimes *mentioned,* . . . it is the level of what historians do with what they present that always steals the show."[16] Presence, then, emerges not at the level of narrative and meaning but in meticulous *description,* which is, as potentially endless, always metonymically partial and open—and prior to the summary comprehension accomplished first by naming and then by interpretation.

Practically, of course, communicating presence through language will always entail some degree of connotation and interpretation. Thus, historiographically speaking, the best one can hope for is, as Hans Ulrich Gumbrecht suggests, "an oscillation between presence effects and meaning effects."[17] Philosophically and methodologically, however, the desire for presence (as well as its actual upsurge in the process of research) calls forth a new kind of methodology—and a new kind of historiography. Empirical and materialist, emphasizing qualitative and often quantitative description, this new methodology emphasizes the "thinginess" of things and entails not interpretive "reading" or cultural "analysis" but closely looking at and, when possible, touching, operating, and performing the object of study. Historiography is also transformed—conceived and written (to use Hayden White's useful distinction) not in *narrativized* acts of *interpretation* that impose a comprehensive vision on the world but rather in *narrated* acts of discovery and description that open up our senses as well as our intellect to the world—and, particularly, to its constant discontinuities, its always marvelous "otherness" from the way we would think it.[18] In sum, the desire for presence and the historiographic strategies (both methodological and discursive) that accompany it account in great part not only for the emergence of certain kinds of counterhistories (here I think of the quantitative work of *Annalistes* such as Fernand Braudel or of the antihermeneutic and hypertextual, albeit not textualist, work on the year 1926 by Hans Ulrich Gumbrecht) but also for the increase of more recent denotative rather than connotative histories: material histories, structural histories, what we might call forensic histories—and, indeed, the histories and transhistories wrought (and writ) by media archaeology.[19]

As I have already argued, the metalevel grounding of media archaeology in all its diversity is located in a desire for, and belief in, the possibility of historical presence as summarized above. I have also pointed to several consequences (both philosophical and methodological) entailed in this grounding principle. Indeed, I have suggested that media archaeology and the essays in this volume, being informed by the desire for presence share certain "family" features that bring them together into a heterogeneous coherence that is as spatialized as it is ideational, a coherence that, in its literal relation of "co" and "here," constitutes a commonly shared philosophical *habitus* that can also accommodate a certain amount of internal difference. These family features, most of them already mentioned, include a valorization of media in their concrete particularity rather than as a set of abstractions; media as material and structures (in their broadest and most dynamic sense) rather than as subaltern "stuff" subject (and subjected) to theory or metaphysics; media practice and performance as a corporeal, instrumental, and epistemic method productively equal to methods of distanced analysis; description of media's materials, forms, structures, and operations rather than the interpretation of media content or social effects; media's formal and epistemic variety rather than their remedial similitudes; and, finally (at least in this litany), media, in their multiplicity, rupturing historical continuity and teleologies rather than supporting them.

So what does media archaeology "add up to"? What might be said of its "deep structure" in toto and in the end? Perhaps these questions should not be asked at all, given media archaeology's value as an undisciplined discipline that assiduously avoids any kind of comprehensive interpretation or totalizing theory. Nonetheless, the editors of this volume have requested not only that I ask them but also that I attempt to answer them. So, in conclusion (and with a great sense of irony), I want to turn to Hayden White's *Metahistory* to look at the "historical Imagination" of media archaeology (and the essays in this volume) as a synoptic whole.[20] As such, media archaeology narrates itself as a particular kind of history that, despite its surface avoidance of narrativization, nonetheless is—at a deep-structural level—emplotted and formally argued and has ideological implications.

Emplotment, or what *kind* of overall history is being told (whether diachronic or synchronic, whether narrating structural transformation or continuity) results, for White, in varying "explanatory affects": the history as a whole, and in its deep structure, as Romantic, Satiric, Comic, or Tragic (with some, but not all, of these potentially functioning adjectivally in relation to the others). Although I am certain that many media archaeologists, given their empiricism and materialism, will bristle at the thought, it seems to me the archetypal emplotment of media archaeology is decidedly *Romantic.* Romance is fundamentally a drama of resurrection, recuperation, and redemption (in this context, it seems not coincidental that White mentions the legend of the search for the Holy Grail—a mediating religious artifact that, like historical media artifacts, embodies the virtual in the substantial and a "presence in absence"). The Romance is also a drama, to quote White, "of the ultimate transcendence of man over the world in which he was imprisoned by the Fall . . . and the dark force of death."[21] To a certain degree, then, we might see all historians and historiography as Romantic insofar as their primary aim is to transcend human mortality through resurrecting, recuperating, and redeeming "the past" by either, like Jules Michelet, breathing in the dust of the dead or, like E. P. Thompson, resurrecting and writing the voices of the English poor.

In its historical materialism, its antihermeneutic bent, its insistence on media variety, specificity, and difference, and its primary grounding in the possibility of the "presence" of the past in the present, media archaeology's emplotment seems to me particularly Romantic—although, as Seinfeld might say in ironic recuperation, "Not that there's anything wrong with that." Indeed, given our age of skepticism and irony, a Romantic worldview is generally regarded as not only naive but potentially dangerous—hence those media archaeologists who qualify the "reality" of historical presence in the present as a presence "effect." Nonetheless, these media archaeologists are still Romantics—albeit also self-satirists. Indeed, White writes that although he cannot imagine a Romantic Satire, he can "legitimately imagine a Satirical Romance," meaning by that term "a form of representation intended to expose from an Ironic standpoint, the fatuity of a Romantic conception of the world"—in this case, the fatuity of a Romantic conception of "real" presence still held, at least in part, yet also in part disavowed. That is, even those media archaeologists who qualify "presence" as merely an "effect" are having their cake, if not eating it too.

The second deep-structural element of the historical imagination that White considers is that of *formal argument*—the principles of discursive combination that explicitly or implicitly express different notions of historical reality and its appropriate historiographic form. Here White differentiates "four paradigms of the form a historical explanation, considered as a discursive argument, may be conceived to take: Formist, Organicist, Mechanistic, and Contextualist."[22] The formal argument of media archaeology is primarily *Formist*—that is, its primary aim is "the identification of the unique characteristics of objects inhabiting the historical field."[23] As Formist, media archaeology can thus be differentiated from the related contemporary discourses of film and media studies and cultural studies, whose formal arguments are primarily Contextualist—that is, focused on synchronic and structural relations among elements of the "spectacle" that constitutes the historical field. (While, at one time, film and media studies also privileged a Formist mode of argument in its discrete and close formal studies of specific films and/or the work of film authors, this mode has been overtaken by and subordinated to Contextualism.)

Like Contextualism, media archaeology avoids the integrative and synthetic principles of Organicism (here Erich Auerbach's *Mimesis* with its microcosmic-macrocosmic relations comes to mind) and the integrative and reductive overarching laws of Mechanism (certainly, here, Marx's *Das Kapital* comes to mind, with its "laws" regarding the relations between economics and social structure). Also like Contextualism, media archaeology is essentially wide and dispersive in scope. That is, all media (broadly conceived as well as "old," "new," and imagined) are grist for their archaeological mill. However, unlike Contextualism, media archaeology's aim is to *dispel* what are seen as similarities among media objects and to also see these objects as potentially *transhistorical*—that is, not necessarily context dependent. Finally, and perhaps most important, rather than generalizing (as I am doing here), and while not completely ignoring context, media archaeology's primary Formist aim (and appeal) is "a depiction of the variety, color, and vividness of the historical field"—this depiction (or denotative description) metonymically bent on evoking what has been emphasized here as a sense of "presence" or, for the reader, "presence effect."

The last of the deep-structural elements of the historical imagination White considers is that of *ideological implication*. He argues that every work of history's "claim to have discerned some kind of formal coherence in the historical record brings with it theories of the nature of the historical world and of historical knowledge itself which have ideological implications for attempts to understand 'the present,' however this 'present' is defined." Thus the choice of—and relations between—a particular mode of emplotment and a particular formal argument have ideological and ethical implications for how "one can legitimately conceive [of] changing that present or . . . maintaining it in its present form indefinitely."[24] At its deep-structural level, then—and irrespective of explicit ideological discourse or the consciously held political beliefs of the historian—each historiographic project is implicated in one of what White identifies as the four basic "metapolitical" positions: Anarchism, Conservatism, Radicalism, and Liberalism. Occupation of these positions entails different conceptions of the need for (and pace of) social change and of the value of present social establishments.

If we understand that, today, history, historical research, and historiography are all entailed and "disciplined" in the social (and sometimes antisocial) professional establishment known as "academia," then it is certainly relevant to ask, What, in this context, is the deep ideological (and ethical) orientation of media archaeology? Here media archaeology is particularly dialectical in its current undisciplined status. That is, on the one hand, it narrates an Anarchism that cares little for the "historical establishment" and, against the latter's structural systemiticity, privileges a heterogeneous "community" of individuals who occupy a common *habitus* by virtue of some shared yet diverse historical interests, beliefs, and practices. On the other hand, it also narrates a Liberalism that is relatively at ease with the historical establishment, and optimistic that it will respond to media archaeology's "adjustments" and "fine-tuning" of that establishment's epistemic premises and practical methods. For White, Anarchism is "inclined toward the essentially empathetic techniques of Romanticism in [its] historical accounts"—whereas Liberalism is inclined to a "rational" view of social change as "most effective when particular parts, rather than *structural relationships,* of the totality are changed."[25] However, whereas White finds there are affinities among Romantic historical emplotment, Formist historical argument, and an Anarchist mode of ideological implication, Liberalism, for him, is most often aligned with Satire and Contextualism. These, however, are just dominant affinities and not necessary combinations that result in a given kind of history. Indeed, White concludes that the most interesting and productive histories are characterized by "a dialectical tension [that] usually arises from an effort to wed a mode of emplotment with a mode of argument or of ideological implication which is inconsonant with it."[26] In closing, then, I would argue that media archaeology—ideologically, and in terms of its liberal alliances and differences from the disciplined disciplines of history, film and media studies, and cultural studies—retains its anarchic status as undisciplined: committed, that is, to a discourse of presence (whether Romantic or Satiric) that poses a major challenge to these disciplines' epistemic norms and established values.

NOTES

The epigraphs for this chapter are taken from Eelco Runia, “Presence,” *History and Theory* 45 (February 2006): 1, and Bjørnar Olsen, “Material Culture after Text: Re-membering Things,” *Norwegian Archaeological Review* 36 (2003): 100, quoted in Ewa Domanska, “The Material Presence of the Past,” *History and Theory* 45 (October 2000): 34.

1. Although perhaps most associated with historiography, the issue of “presence” spans disciplines. See, for example, the literary theorist and philosopher Hans Ulrich Gumbrecht’s two (quite different) yet prescient volumes, the hypertextual and “immersive” *In 1926: Living on the Edge of Time* (Cambridge, MA: Harvard University Press, 1997) and the more conventionally written *Production of Presence: What Meaning Cannot Convey* (Stanford: Stanford University Press, 2004). After its publication of Runia’s “Presence” in early 2006, *History and Theory*’s next issue focused on the topic; see *History and Theory* 45 (October 2006). Stanford University’s Critical Studies in New Media workshop also focused on “presence” during 2006–7, and in May 2007, in association with the Stanford Humanities Center and Lab and the Archaeology Center), it held an interdisciplinary colloquium, “The Politics of Presence.” See the homepage of Critical Studies in New Media at http://humanitieslab.stanford.edu/44/Home (accessed July 15, 2009).

2. Although the allotted space for this “Afterword” does not allow me to address directly the essays that make up this anthology, in the context of this particular definition of *presence* I would point out that, opposed as they may superficially appear, Huhtamo’s essay on discursive topoi and Ernst’s essay on technology as itself archaeological and archival share the premise of a *concrete* transhistorical transference of “presence.” Both Ernst’s technological artifacts and Huhtamo’s topoi are privileged as *sites* of *storage and retrieval.* Indeed, Runia notes that the rhetorical idea of topoi traditionally included both storage and retrieval. As he writes: “For Vico indeed, ‘topics’ is at least as much about ‘finding’ as about ‘shelving.’” Further, “Vico defines topics as ‘the art of finding in anything all that is in it.’” Runia, “Presence,” 13.

3. Domanska, “Material Presence,” 348.

4. See Martin Heidegger, “The Question Concerning Technology,” in *Martin Heidegger: Basic Writings,* ed. David Farrell Krell, trans. William Lovitt (New York: Harper and Row, 1977), 287–317. Heidegger writes, “Technology is . . . no mere means. Technology is a way of revealing” (294). And he also connects this revealing power of *techne* with art and *poiesis,* ending with: “Thus questioning, we bear witness to the crisis that in our sheer preoccupation with technology we do not yet experience the coming to presence of technology. . . . Yet the more questioningly we ponder the essence of technology, the more mysterious the essence of art becomes” (317).

5. Carolyn Steedman, “In the Archon’s House,” in *Dust: The Archive and Cultural History* (New Brunswick: Rutgers University Press, 2002), 1. In the discussion from which this quotation is drawn, Steedman refers to both Derrida and Foucault and their “intermittent dialogue” on “the archive as a way of seeing, or a way of knowing; the archive as a symbol or form of power” (2).

6. Hayden White says in an interview: “The idea that you could have an experience of a past phenomenon—an experience of the presence of the past—can only be an illusion. It’s a contradiction in terms. But you could get the illusion of presence, and this is what [Frank] Ankersmit, I think, has in mind. Ankersmit no longer speaks about having an experience *of* history, but has an experience *about* history, of *historicality* . . . . A museum display [as] an attempt to give an experience *of* history . . . left him kind of cold. A memorial to dead children, he says, was an experience *about* history.” Note here the casual yet telling criterion of the illusion’s *affect* (it doesn’t leave you “cold”) as an element of the “presence effect.” Hayden White quoted in Erlend Rogne, “The Aim of Interpretation Is to Create Perplexity in the Face of the Real: Hayden White in Conversation with Erlend Rogne,” *History and Theory* 48 (February 2009): 73.

7. See Roland Barthes, *Camera Lucida: Reflections on Photography,* trans. Richard Howard (New York: Hill and Wang, 1981), 42–59. Barthes writes: "However lightning-like it may be, the *punctum* has, more or less potentially, the power of expansion. This power is often metonymic" (45).

8. Eelco Runia, "Spots of Time," *History and Theory* 45 (October 2006): 309. Metonymy is of central importance to the discourse of "presence," particularly as developed by Runia ("Presence") to counter what he argues are the *metaphoric substitutions* effected by realist historical narrative to achieve "meaning." That is, realist historical narrative substitutes *as a whole* for the past and proceeds on an underlying claim of *analogy* or *similitude* to it (i.e., this is the same as and/or equal to that by virtue of a metaphysical idea of resemblance). The relational logic of metonymy, however, insofar as it is based on *partiality* (i.e., this is related to that by virtue of existential contiguity, association, or shared attribute rather than resemblance), preserves *difference:* the container is not of the same "stuff" as the contained; the part is not of the same "stuff" as the whole. To further the link between metonymy and "presence," it is also worth emphasizing (as Runia doesn't) the difference between *metonymy* and *synecdoche.* Both are often confused because the relational logic of each is based on partiality. Metonymy differs from synecdoche, however, in that its relation of part to whole is not based, as is synecdoche, on the *abstraction* of the part from an *organic ensemble* or whole (i.e., the acorn for the oak). Rather, metonymy (to quote Paul Ricoeur) "brings together two objects each of which constitutes *'an absolutely separate whole'*" (i.e., the crown for the king). See Paul Ricoeur, *The Rule of Metaphor: Multi-disciplinary Studies of the Creation of Meaning in Language,* trans. Robert Czerny, Kathleen McLaughlin, and John Costello (Toronto: University of Toronto Press, 1977), 56; for discussion of distinctions among metaphor, metonymy, and synecdoche, see 56–58.

9. Runia, "Spots of Time," 313.

10. Giuliana Bruno, *Atlas of Emotion: Journeys in Art, Architecture, and Film* (London: Verso, 2002).

11. Runia, "Spots of Time," 309.

12. An example of what I mean here is an essay I published in 1999 (and written earlier) on a then relatively *new form* of media—QuickTime "movies" made on and for the computer—constituted and constrained by limited computer memory. In the piece, if ironically, I regard both the form and the constraints of these little QuickTime artifacts as *already relegated to the past* insofar as the present was then fixed on achieving the computer memory and speed to allow for "streaming." I was prescient insofar as few (if any) of the works made in this mode remain. See Vivian Sobchack, "Nostalgia for a Digital Object: Regrets on the Quickening of QuickTime," *Millennium Film Journal* 34 (Fall 1999): 4–23, later abridged under the same title in *Future Cinema: The Cinematic Imaginary after Film,* ed. Jeffrey Shaw and Peter Weibel (Cambridge, MA: MIT Press, 2003), 66–73.

13. See Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction," in *Illuminations,* ed. Hannah Arendt, trans. Harry Zohn (New York: Schocken Books, 1968), 217–51. Of particular relevance to media archaeology and its historical objects (which here can be substituted for "the work of art" in the following quote), Benjamin writes: "The uniqueness of a work of art is inseparable from its being embedded in the fabric of tradition. This tradition itself is thoroughly alive and extremely changeable" (223).

14. Samuel Weber, "Mass Mediauras, or: Art, Aura and Media in the Work of Walter Benjamin," in *Mass Mediauras: Form, Technics, Media,* ed. Alan Cholodenko (Stanford: Stanford University Press, 1996), 104–5, second instance of emphasis mine.

15. Runia, "Presence," 5, emphasis mine.

16. Runia, "Spots of Time," 315, emphasis mine.

17. Gumbrecht, *Production of Presence,* xv.

18. Hayden White productively distinguishes between "narrativization" and "narrating": "When you impose a narrativized vision of the world on the world, I call it narrativization. . . . Narration

is the act of speaking. Any time you speak in the first person about a thing in the world as a third-person mode of existence, you're narrating." Quoted in Rogne, "Aim of Interpretation," 68.

19. The other major academic contributions to the emergence of these new approaches to historiography can be attributed to both cultural studies and the "new historicism." Nonetheless, insofar as both these approaches tend to regard the "world as a text" (i.e., a coherent if complex *symbolic* system) that can be "read" and interpreted, they become precisely what the discourse of "presence" challenges, both epistemologically and for "equal time." Just as important to the emergence of this new discourse has been our increasing relations with the "virtual" and, hence, an increased longing for the "real."

20. Hayden White, *Metahistory: The Historical Imagination in Nineteenth-Century Europe* (Baltimore: Johns Hopkins University Press, 1973). See, particularly, "Introduction: The Poetics of History," 1–31. Although White is dealing with nineteenth-century European historians, he makes the case that the taxonomic method he employs for the "deep structural analysis of the historical imagination" might well be relevant to other periods; furthermore, he limits his taxonomy's relevance to historical narratives only, pointing out that these are particularly constrained—not only by the external constraints dictated by their object of study (past historical events) but also by their purportedly realist representation of these objects (these events happened and in this specific way). See 8 n.

21. Ibid., 9.

22. Ibid., 13.

23. Ibid., 13–14.

24. Ibid., 21.

25. Ibid., 26, 24.

26. Ibid., 29. Given my gloss on the affinities of media archaeology, it is apt in this context that White uses, as a major example in his book, the "inconsonance" of Jules Michelet, "who tried to combine a Romantic emplotment and a Formist argument with an ideology that is explicitly Liberal" (29).

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