FIG. 5 Dew Harrison, from *4-D Duchamp.* Caiiamind website, 1996.
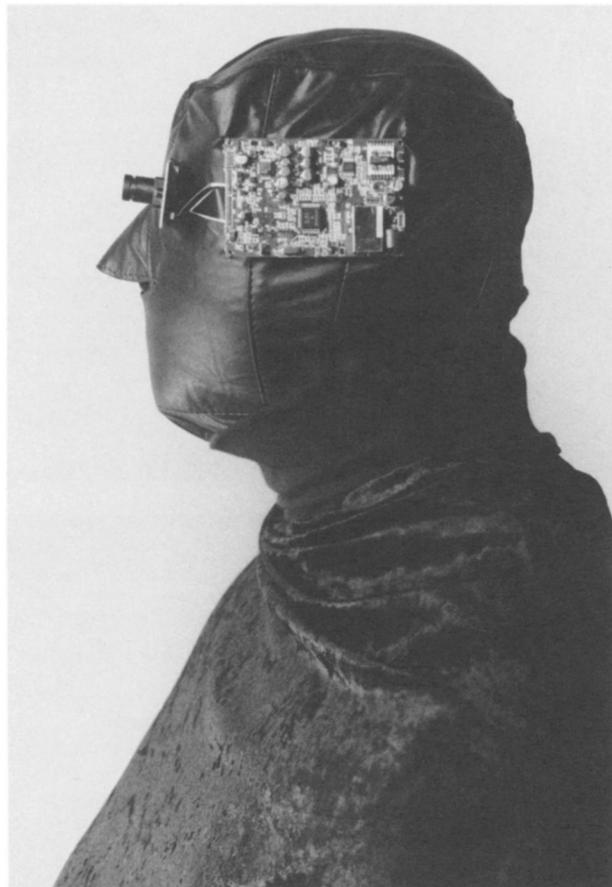

FIG. 6 Eduardo Kac, *Telepresence Garment,* 1995–96.

given that there are no fixed boundaries to the artwork, that it is a collective project mutating through the input from geographically and temporally dispersed locations.

Eduardo Kac

Eduardo Kac first integrated electronic media into his work as a writer and artist through holopoetry, which he pioneered in the early 1980s, but his other emphasis has been in the fields of telematic and telepresence art. He also began working with robotics in the 1980s, with a dialogic performance between a radio-controlled robot and a human performer wearing a wireless video monitor as if it were a head. He has subsequently produced a series of robotic-telepresence works such as his series of Ornitorrinco pieces, developed with Ed Bennett since 1989. These works take their name from the robot Ornitorrinco, which means "platypus" in Portuguese, emphasizing the hybrid qualities ascribed to that animal that are manifest in the telerobotic creature. Ornitorrinco has "journeyed" to various real and mythic places while being controlled by

viewers from around the globe accessing the work through the Internet and the telephone network.

Working extensively with these telematic pieces—in which participants in widely separated geographical sites are linked through electronic media—Kac has placed particular emphasis on the possibilities of real-time dialogic exchange. In a 1994 piece titled *Essay Concerning Human Understanding,* he created (with Ikuo Nakamura) a "live, bi-directional, interactive, telematic, inter-species sonic installation." The premise of the piece is that two different species of living organism—a philodendron and a canary—exchange acoustic signals in a telephonic conversation. To facilitate this, Kac and Nakamura attached a sensory electrode to one leaf of the plant in a site in New York. Fluctuations in the electric field of the plant were processed through a Macintosh computer running a brain-wave analysis program. Meanwhile, the song of a yellow canary was picked up by equipment installed in its cage at the Center for Contemporary Art at the University of Kentucky and transmitted to the plant in New York. Thus the bird and the plant engaged in a real-time telematic exchange, a process that questioned the very idea of communication. The proximity of human observers affected

both ends of this conversation—changing the canary's song and the plant's electric response and reply.

In various recent pieces, Kac has been exploring the possibilities of having human subjects project their wills and enact their desires as they interact through wireless and fully mobile robotic objects. In the St. Petersburg Biennale in 1996, in Russia, Kac donned a Telepresence Garment *(fig. 6)* through which he transformed himself into a zombie-cyborg (which he terms a *zomborg*), allowing his dispossessed body to be manipulated electronically by an operator—in this case the art historian Simone Osthoff—in a remote location. His work can be seen at ⟨http://www.uky.edu/FineArts/Art/kac/kachome.html⟩. He can be contacted at ⟨ekac1@pop.uky.edu⟩.

Jon Ippolito

Although Jon Ippolito's work includes computer- and Internet-based projects, it takes inspiration less from the history of electronic media than from conceptual and process art of the 1960s and 1970s, whose dematerialized objects and decentralized practices prefigured many of the innovations of the "digital revolution." Accordingly, the focus for Ippolito's artworks has been a process rather than a medium: since 1992 he and fellow artists Janet Cohen and Keith Frank have engaged in a series of "adversarial collaborations" that investigate the conflicts inherent in the collaborative process. This preoccupation has led them to experiment in materials ranging from cement to photographs to words, and in scales from individual Polaroids to room-sized installations to events that span the mid-Manhattan subway system.

With this range of techniques and formats, it was not hard for Cohen, Frank, and Ippolito to adapt their work to a virtual form suitable to the World Wide Web, especially since their emphasis on the collision between different ideas and intents has an obvious parallel in the Internet's own flame wars and communication breakdowns. Their Web project *Agree to Disagree* **Online** *(fig. 7a, b,* which can be seen at [http://www.three.org]) aims to capture the shape of a conversation among the three artist-collaborators. The conversation begins with a single inflammatory assertion—"In the future, books will be replaced by maps"—and progresses statement by statement as each participant responds in turn. The viewer can follow animated arrows that trace the shifting positions and alliances of the three collaborators or zoom out to navigate digressions that branch to such topics as Watergate, computer-operating systems, and the efficacy of the Evelyn Wood speed-reading course. Ippolito and his colleagues are particularly interested in the computer's ability to alter the perception of time. Whereas a computer allows the viewer of
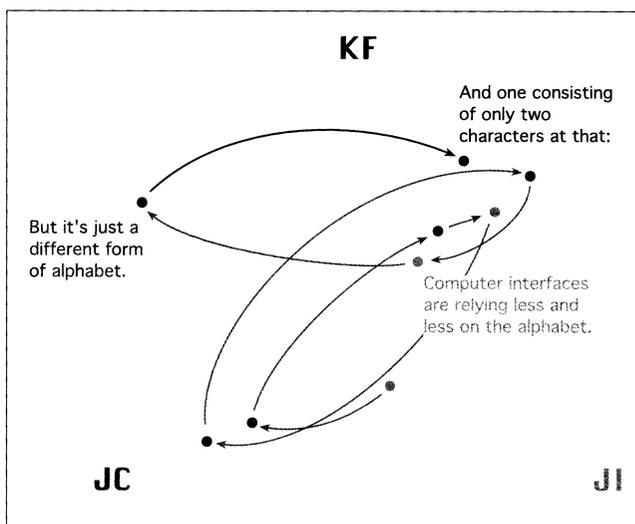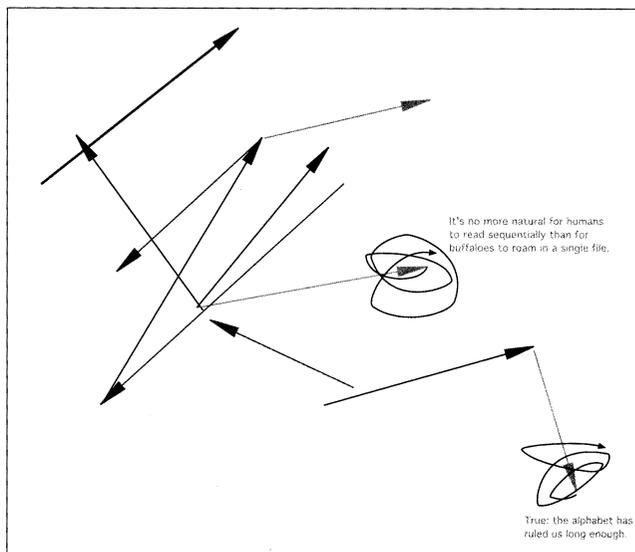

FIG. 7a, b Detail of Cohen/Frank/Ippolito, *Agree to Disagree Online,* 1997, interactive World Wide Web site at (http://www.three.org). Technical assistance by Joline Blais. Courtesy the artist.

Agree to Disagree **Online** to reduce the conversation to one statement at a time, the algorithms driving the *Self-Curating Exhibition,* an individual work by Ippolito on a theme similar to that of his collaborative projects, allow the viewer to observe several years' worth of decisions in a matter of minutes. This program simulates the hanging of a group show in a virtual gallery. Each "artist" is a computer program designed to propose a particular kind of work (e.g., modest-sized paintings or grandiose sculpture) with a particular attitude (e.g., leaving plenty of room for others or dominating the space). Once installation has begun, those "artists" whose works garner attention are given more chances to install pieces; artworks that are ignored are removed. The viewer can thus let loose a selection of artist-programs in the space and then "fast forward" to an arbitrary time in the future to view the installation resulting from any number of iterations of this competitive process.   ▄