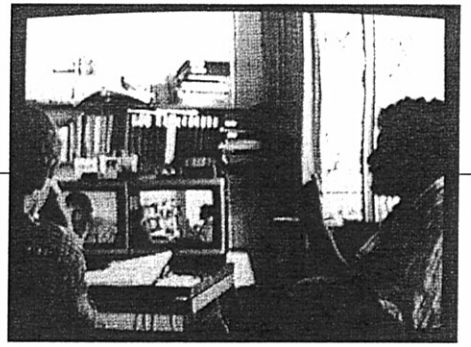
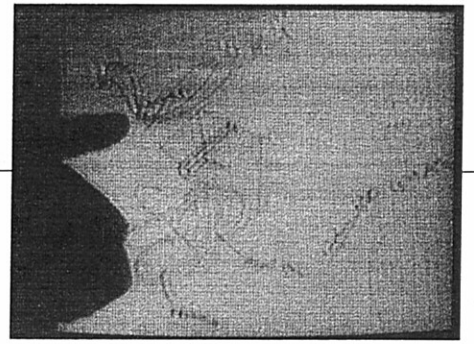
media space





Xerox PARC

System Concepts Lab

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I consider that we are enslaved by knowledge, that there is a servility fundamental to all knowledge, an acceptance of a mode of life such that each moment has meaning only in terms of another, or of others to follow...my thought has but one object, play, in which my thinking, the working of my thought, dissolves.

George Bataille, Un-Knowing and Rebellion

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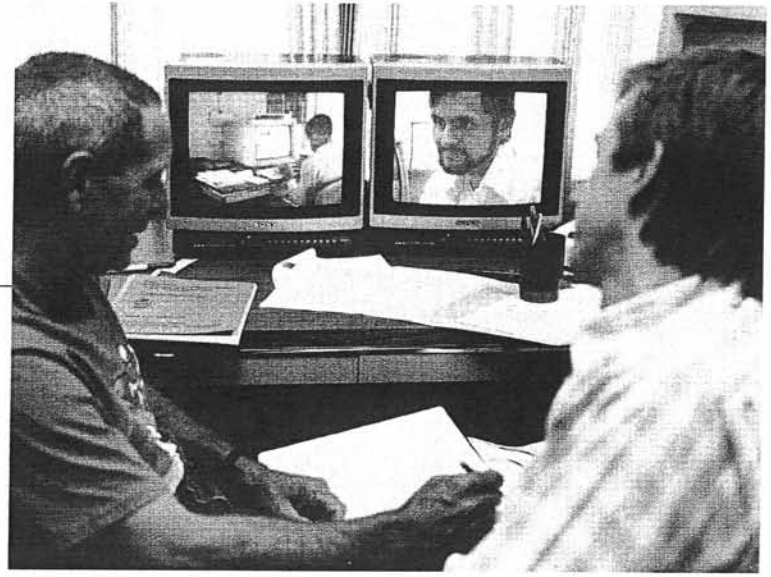


Four of us working together in the media space. The two of us in the foreground and the third shown in the right-hand monitor are working actively together in a joint activity. The fourth, shown in the left-hand monitor, is working privately, but is maintaining a background presence in and awareness of the joint activity.

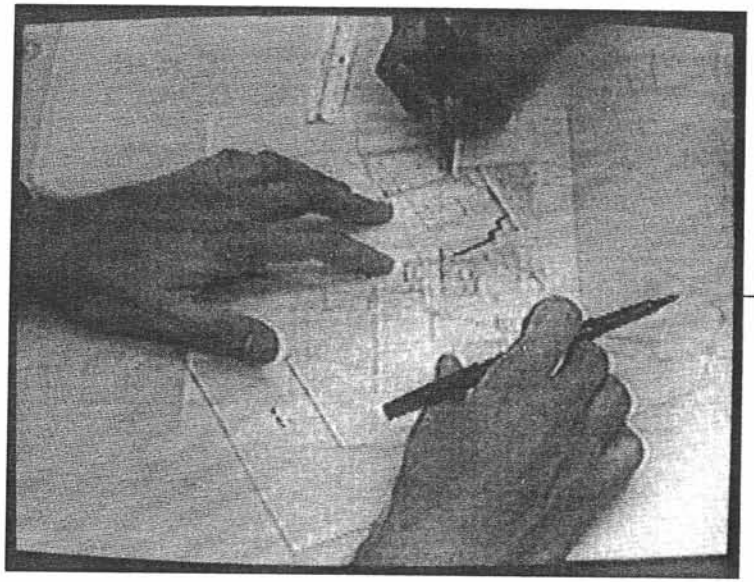
introduction

I am reporting here on my experience as a member of a group that is building and working within an electronic setting, a "media space". The experience that I am reporting is simple: for about two weeks, four of us worked in a media space that spanned our separate offices. We experienced connection among ourselves through the media space; we did not have to leave the media space and revert to traditional means of connection (face-to-face, paper-based notes, whiteboards, etc.) to keep in touch and to work together. Our experience confirmed our belief in the central role of communication among the members of a design group, and of the possibilities of supporting communication with electronic media.

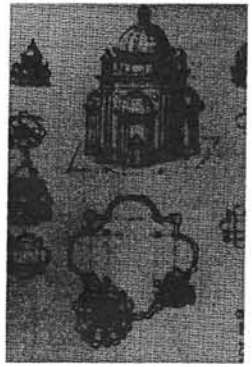
we are work in an electronic media space,
exploring connection over distance,
exploring connection across time

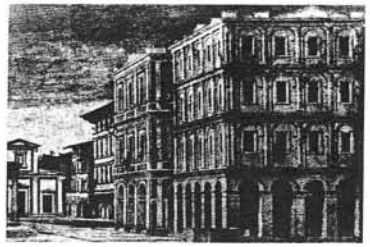
My involvement with media space grew out of research in design practice that I have been pursuing for fifteen years. In that research, my associates and I have been identifying technologies and methods to aid design groups in keeping their practice vital. We approach design as a social activity, and look particularly at the internal communications of closely knit design groups. We contend that computing, video and electronic communications together, but not separately, can extend physical space as the medium in which designers work. The new electronic medium will extend the group's ability to communicate across time and space, and will open possibilities for controlling and creating their own design processes.

We guide our research through design examples, using them to test technologies and methods that we develop, but in fact we spend most of our time and effort in developing the technologies. In the Spring and Summer of 1985 we used the design of an addition to a single family house as an example. Our intent was to provide a system, which we call the *design journal*, for recording on video the process of design and for accessing the recordings in a way that is meaningful to the project's participants. We initially focused on making the recordings accessible--creating catalogs, mastering video disks, controlling disk playing--but we increasingly found ourselves focussing on connection--from cameras to recorders, from recorders to monitors, from one designer's work area to another's. In working on the technology to support the addition example, we shifted from record keeping for a project to connection among the sources for and users of images. With that shift, we started to speak of the *media space*.



A stillframe from a video record that shows designers' hands working together as the form of a building emerges. The stillframe is from our video records of the design of an addition to a house, and is part of our investigation into recording, accessing and replaying records of design situations. We built the media space when we shifted our emphasis from recording, accessing and replaying to real-time connection.





Three examples of pictorial space from pre-Renaissance and Renaissance Italy. First (bottom, left), the pictorial space of the wall painting interacts closely with the physical space of its architectural setting, with the painted angels behind and the painted arcade above the physical arcade. Second (bottom, right), an ideal town square in a pictorial space that is self-contained and isolated from physical space. Third (upper, right and left), a sketch of a church made in pictorial space is realized in physical space as a building. The relationship of pictorial and physical space in these examples helped us to see the possibilities for media space within the physical space of our laboratory.

The "space" of media space is a metaphor for the physical space in which we both participate in and experience human activities. The Acropolis is exemplary of non-metaphorical, literal, physical space. At some distant time in the past, the settlement that would become Athens emerged with the Acropolis at its center. Athenians built on the Acropolis and experienced it at the center of their life, and in the Fifth Century used it for the site of the Parthenon. Found, created, experienced--the Acropolis is an archetype for space.

Our metaphorical use of "space" proceeds from our interpretation of the pictorial space of the Italian Renaissance. Pictorial space appeared first within the craft of making paintings that fit well into their architectural settings, it became a codified system of illusion, and then a medium for architects to flexibly handle the appearance of buildings (i.e., to work in two dimensions while thinking in three). While the space of perspective-based pictures is not physical as the space of the Acropolis is, when used as a design medium by architects, it serves as a surrogate for the physical space of buildings. Thus architects enter the pictorial space of their design media, by means of their eyes, and see and experience space, in the mind's eye.

The space of theater has a physical existence, but like Renaissance pictorial space, it is metaphorical -- as in *Hamlet.* Likewise the spaces of the silver screen and of tv, where the imaginary actions in imaginary spaces become real -- as in *8 1/2* or *The Purple Rose of Cairo.* From here, it is only a step to the media space.

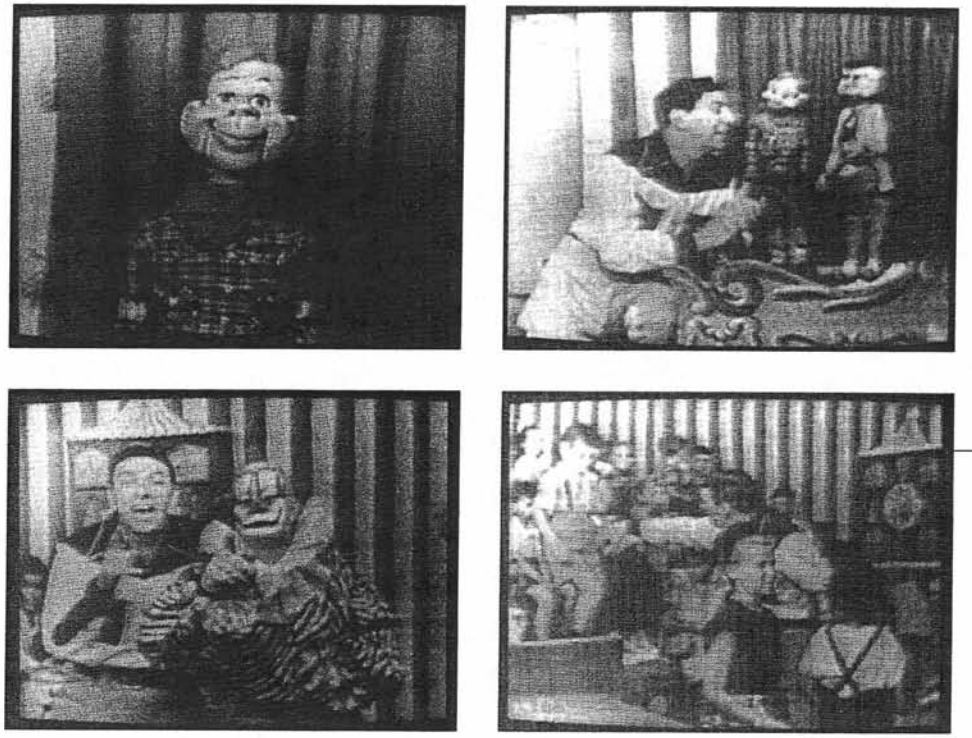
The step from entertainment media to media space is suggested by McCluhan. From him we know that the world of electronic media, for example an ad campaign or a national

election, is not adequately contained within Cartesian space and linear time, and is not consistent with our thinking, institutions and activities. From these observations we have proceeded to explore the possibilities that electronic media offer as a setting for human activities.

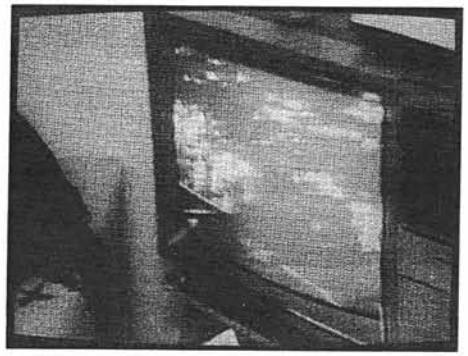
McCluhan's observations and vision gave form to the experiences of my childhood. One day in 1953, in second grade, our mothers rounded us up, and in a station wagon drove us to New York, where we were shepherded through hallways, around corners, over cables, under bright lights, looking up at the puppeteers in dark glasses, and then,"...What time is it?...It's Howdy Doody time!"

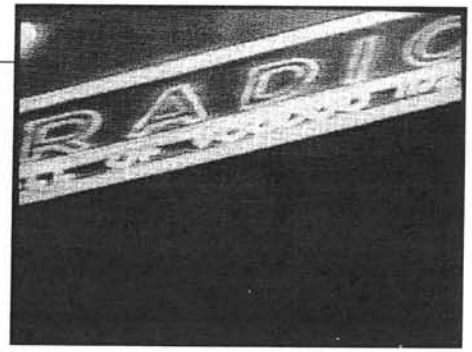
Fifteen years later, reading McCluhan I saw that in my family's den, watching *Howdy Doody*, I had been personally present in the peanut gallery, in a space created by the networks and the technology of television. Because I was young, because I hadn't yet learned to read, because I had once been in the peanut gallery in person, my experience was so involved that even now, despite my intellectual knowledge that I was only watching a show, I remember that I was there, in the peanut gallery, participating. In this way *Howdy Doody* is a precursor to the media space.

My childhood experiences with *Howdy Doody* blurred the distinction between my being in the peanut gallery in person and my being there in my family's den. My child's mind and the suggestiveness of the show gave me an illusion that my participation in it and my experience of it were tightly coupled. However, the coupling really was loose, created for example through the device of representative viewers, the peanut gallery. For me, now, it is not a question of deviousness or fraud by the show's producers and staff, but of creation of a show that fulfilled my desires to participate in fantasy. The pros (adults) who put *Howdy Doody* together



Stillframes from Howdy Doody, showing the puppets Howdy Doody and Mr. Bluster, the show's host Buffalo Bob, the clown Clarabell, and children in the peanut gallery. Buffalo Bob acted as an intermediary between the audience, whether at home (lower, left) or in the peanut gallery (lower, right), and the puppet world of Howdy and his friends (upper, right). With the help of Buffalo Bob, every afternoon I was drawn from my house into Howdy's imaginary puppet world, just as I was during my one, live visit in the peanut gallery.





Stillframes from *Late Night with David Letterman* of November 20, 1985. On a monitor in the show's offices we see the studio audience that was to have seen this show; we look out the fourteenth floor window of the offices to the sidewalk outside Radio City Music Hall; and, we see the show's director, at his desk, with video and audio paraphernalia. The space of *Late Night with David Letterman* is normally constructed according to theatrical conventions, with the show's cameras and microphones providing sights and sounds that approximate those available to the studio audience. The video and audio are composed into a single view and transmitted to countless tv's, where they appear in the little glass stages in our houses. This show, however, abandoned the theatrical conventions, turned its eyes and ears on itself, and blurred the boundaries of the show's visual and acoustic space.

gave me a new world to enter that I couldn't create for myself.

Skipping thirty years to adult tv, *Late Night with David Letterman*, I see and feel much the same way that I felt with *Howdy Doody*. *Letterman* is more refined, its good humor often directed at itself, ironically, most notably on the show of November 20, 1985. That show was about itself, revealing how the show is orchestrated and packaged for distribution to our bedrooms.

In both *Howdy Doody* and *Letterman*, the show gives us an experience that includes the illusion of participation. *Letterman* looks as real to me now as *Howdy Doody* did when I was a kid. But the participation is just as much an illusion. Physically I'm not there; I'm in my bedroom, looking into a tube that is receiving a produced package of sight and sound that is flowing out of the network. And more important, the "there" of the show is a very particular sort of reality, a production in a more or less theatrical space. That reality provides possibilities for fantasy, but also limits the experience that we can have of it.

Fantasy in the spaces of *Howdy Doody* and *Letterman* provides the bridge to design, for design, in its search of the new and its construction of the future, is never far from fantasy. The difference comes because design includes delivery of something, an artifact, that is different from the process of the designers. The space in which designers work is not a theatrical space, and design is generally not about presentation of its own process. A space for design is a setting for the designers to work together, being there both in the sense of participating and experiencing.

Physical space naturally couples participation and experience. If we're there, we're there. This isn't completely true, of course; the Acropolis can be seen by people from below who

are excluded from the site. But our presence in physical space usually is bound up with our own and with other's experience of it. We might project ourselves in time, and enter either of the churches (see illustration, p3) during their initial period of use. In one, with the saints and angels, and in the other, under the dome, we participate in a ritual, creating for a moment an earthly heaven. The physical space, with its pictorial space, is a setting in which we (still projected back in time) can together, through our participation conjure an experience.

Our intention with the media space is to provide a setting as appropriate for the social activities of a closely knit design group as the churches in our examples are to the creation of an earthly heaven. The media space is similar to those physical spaces not just because it is a visual and acoustic environment, but it is a setting in which we both participate in and experience human activities. In doing so we might be working against the nature of video as a medium, and we certainly are running against most current use, whether the *Letterman* show or the security camera outside my office window. But we expect to maintain as inseparable the pairs of participation and experience.

It's both viewing and producing;
you see and are seen,
you show and are shown

Our working together preceded organization;
our process of designing and building preceded a project.
We worked together directly, from motivation and intent,
without organization and without project.
If we had stopped to form an organization and a project,
we might be starting something now...

organization

The laboratory in which we work, and its organizational antecedents, developed and used the sequence of Smalltalk computing systems, and with them demonstrated an innovative and important approach to personal computing. The laboratory's work process combined exploratory implementation with exploratory use of its systems, and the laboratory culture continues to support that exploratory process in our work on the media space.

At the time of the initial media space experience, our group had four members out of a laboratory of about twenty-five. We did not exist officially as a media space group, but found that our work on several, different projects overlapped at media space. Each of us, therefore, worked on media space and on other things, and worked with each other as well as with other members of the lab. In this way, the media space connects with the lab as a whole, both its projects and its members.

Since the initial experience, we have organized our work--described our concerns, outlined technical issues and objectives, articulated relationships with other projects. A project has now been born and we are pursuing it. Here, however, I will report only on our initial experience.

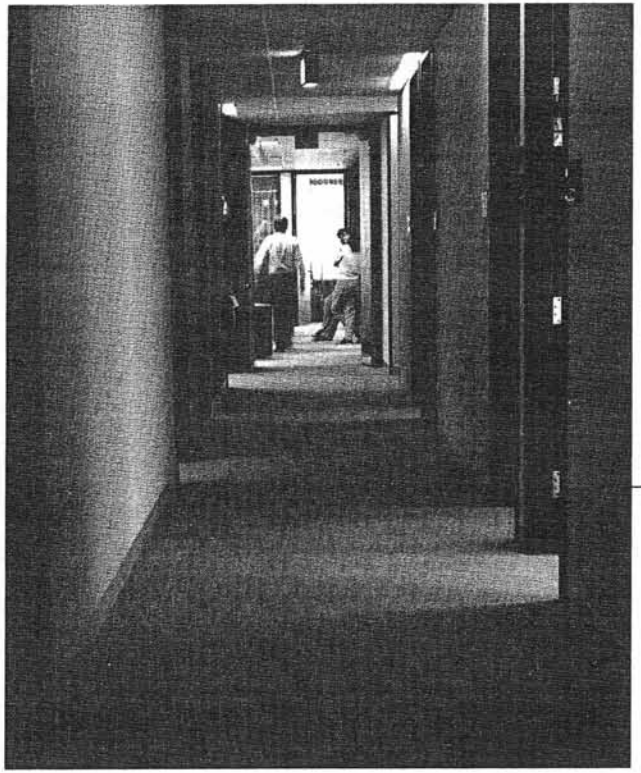
physical setting

Our laboratory provided a nurturing home to start the media space work--to form the group and to do the work without having to declare in advance what we were doing. Our physical setting played a different role--it got in the way of our work, but in doing so prompted us to action.

The laboratory is physically located at two facilities, one in Palo Alto, California, and the other in Portland, Oregon. The four members of the media space group all worked in Palo Alto, but Portland played an important part, because of researchers there who were closely involved with the media space and because of the possibilities offered by the laboratory's having two sites.

In Palo Alto, the laboratory occupies a contiguous area of about 8,000 square feet, and within that area, each researcher has a separate office of about 120 square feet. The laboratory includes an entry corridor, which passes several offices, and then leads into an open, common area. The common area is about fifty feet square, and it contains a seating area for thirty people, a large-screen tv (often connected with Portland), tables for eating, and two equipment areas. Individual offices line three of the common area's sides, separated from it by glass partitions.

My office faced the common area, and from it I participated easily in many laboratory activities--seeing a meeting form in the seating area, greeting my boss with a wave as she walked by, hanging pictures in my window, overhearing occassional words from a conversation in a nearby doorway, having my computer and tv screens visible to others. Beacuse my office opened directly onto the common area, I knew what was going on, I could easily participate in group activities, and I was visible.



The entry corridor to the laboratory leads past offices (on the right) a reception area (end of the corridor, on the left) and into the common area. The offices of two of the media space participants face this corridor. The media space partially replaces their separation from the visual and acoustic space of the common area.

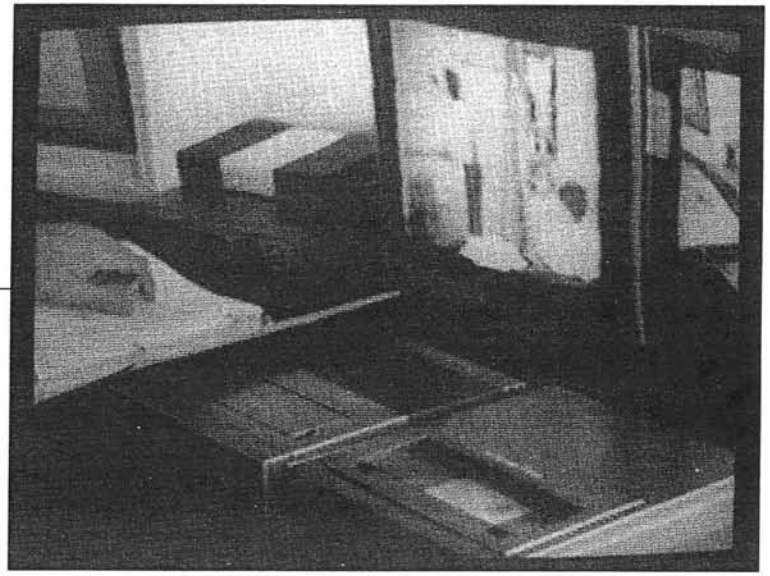
The laboratory's common area. At the right middle- and background, two researchers converse at the edge of the common area, while a third participates from a few steps away and a fourth listens from an adjacent office. At the left middleground, a researcher works in one of the equipment areas. The offices of two media space participants face the common area (one is in the middle of the background, the other faces another side of the common area and is not visible).

Several of the laboratory's offices do not open onto the common area, but onto the corridor, as noted above. Three of my close associates on our deisgn studies project were located on the corridor, and I saw that they were more separated from me than researchers located adjacent to the common area, and moreover, that the corridor did not provide a space for their particpation in the way that the common area did for others. With these observations, we started to build an electronic space to serve much of the role that the common area serves. We did this with two researchers from the corridor and two from the common area.

We had been approaching the design journal for the house addition example with heavyweight system technology, but with the media space, we stepped to relatively simple technology. Our work on the design journal started with our rich computing environment and extended to the gear and systems for recording and playing back video scenes. This is truly a complex world: using a computing system both to model the content of video and to control recording and playback of the video. Likewise the computing technology of our laoratory is complex. Our computing systems that support research in human-computer interaction (user interface), data bases and data sharing, and computer languages and systems. Each member of the laboratory uses a personal work station, writes programs regularly, and relies on computer-based systems for mail, for creating textual/graphical documents, and for storing and retrieving information. Our computing systems are expensive, both in captial cost and in system maintenance, and we have to be skillful in order to use them.

In contrast to the complex computing technology of our laboratory and to the complexities of the design journal, we primarily used video equipment that is relatively cheap and easy to use: cameras, monitors, cabling, audio pickups and amplifiers. Complexity and relatively high cost only entered with the video cross-bar (matrix) switch that provides flexible connection. We wired up our offices to the video switch, placed cameras, microphones and monitors in our offices, and we had a video (including audio) network. That network, together with the computing network that we already used, constitute the technology of the media space.

I returned to town from a trip
and caught up by watching video recordings...
some hours of watching, a lot of fast forward,
and in a blur, I saw somthing,
as form had emerged...
I knew to ask what had happened



Media space equipment in one of our offices, including a vcr and receiver (foreground), a pair of tv monitors, a second vcr and receiver, a corner of a computer display (background), and a notebook (with hand). With the two vcr's we could record both the video/audio feed from the office to the switch and the feed from the switch to the office. We logged the recordings in the notebook, and used the notebook as an index into the recordings.

equipment

The media space emerged when we added a video network to our computing network. The video network provided for direct connection among the members of our group, it provided for connection with other researchers in the laboratory, and it provided for use of video recording devices. The first of these, direct connection, falls completely within the internal relations of our group and dominated our initial experience with the media space. The second of these, connection with lab members not in our immediate group, we provided by means of the shared laboratory areas in Portland and Palo Alto, not offices of other individual researchers. The third of these, recording of video, we continued to use for journalizing our work, but we did not systematically include in the media space.

The video network was first of all a video switch, with ten input channels and ten output channels. We assigned these to the three kinds of connection: one each to our offices; five to shared laboratory areas, four in Palo Alto and one in Portland; one each to vcr and disk player.

We placed the video switch in the laboratory common area, where it was visible from two of our offices. We controlled it with a manual panel, and so we had to walk to it in order to change connections.

We ran video and audio cabling between the switch and each office, and in each office we placed: 1 color camera, with power supply, mounted on a tripod; 1 omni-directional microphone with amplifier; 2 color monitors.

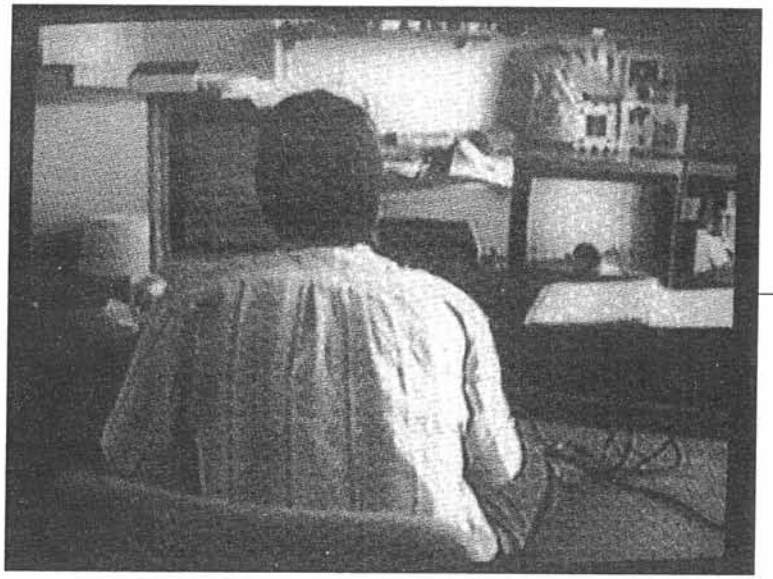
The video and audio signal from the switch to the office was connected to one monitor, and the video and audio signals from the camera and microphone were sent to the switch. The second monitor showed the video from the camera.

We built the media space over a period of several weeks, pulling cables, installing equipment and learning to work with it. Then for a relatively short period, two or three weeks, we worked in the media space, discovering that it provided most of the connection among our group. By the end of those weeks, we had discovered the power of connection, but we also increasingly felt limitations of this, initial media space and saw how to proceed, so we did not prolong its use.

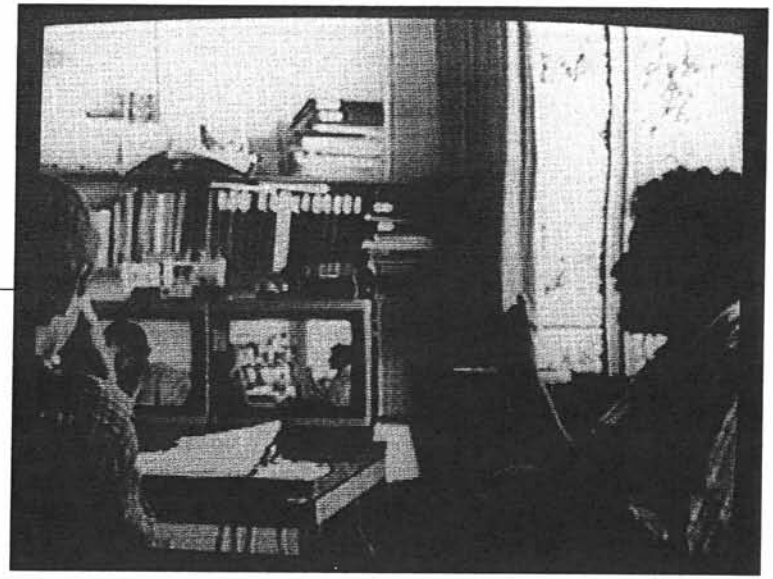
We used the media space as we worked individually in each of our offices, concentrating on this or that solitary task, as a way to keep background contact with the other members of the group. We also used it for discussions that spanned two offices. Most significantly, the space allowed us to move fluidly from one use to the other--as I'm programming by myself, I overhear part of a telephone conversation, comment on it, enter into a discussion, and eventually, as the discussion wanes, find myself programming again, all without leaving my office.

Our cabling, cameras and switch limited us to one signal into and one signal out of each office, so we treated a one-way connection from one office to another as our basic unit. Thus I sometimes looked into a different person's office from the one who was looking into mine, and sometimes I found myself paired with someone else, each of us visible to the other.

Most of our connections included one corridor office and one common area office. Connections between the two corridor offices and the two common area offices were relatively infrequent. In addition to connections between offices, we connected offices with the laboratory areas. Only seldom did we record through the switch, choosing instead to place recorders directly on the feeds in/out of the offices.



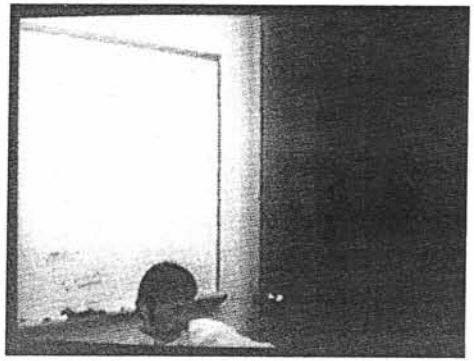
A stillframe from the video journal of May 30, 1986, showing one of us in his office, a computer workstation at the left, monitors at the right, and a vcr between. We installed the media space next to our network of computers, which allowed us to work in both computing and video environments simultaneously, even though they were electronically separate.

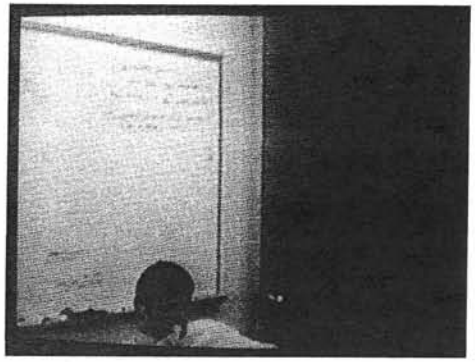


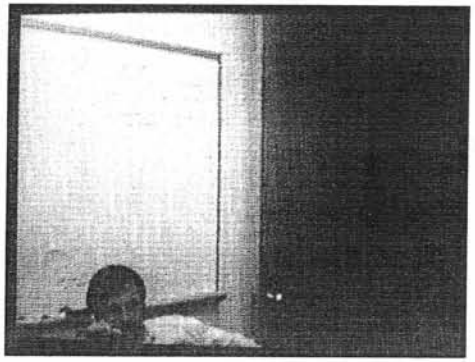
A stillframe from the video journal of June 2, 1986, showing three of us in a discussion, two in one office and the third in his own office, shown in the left monitor. The right monitor shows the view that is being sent to the other office (and the view shown in the stillframe). The camera here is looking over our shoulders toward the monitor screens, and is one of the two principal camera placements that we used (see also the illustration, p1). In the other principal placement, the camera looks over the top of the monitor, as in the stillframe from May 30 (illustration, p12).

We changed connection by walking to the switch and pushing the buttons on its panel. We changed connection sometimes for reasons, sometimes for whim, never according to a schedule. We made changes many times in a day, and we rarely went even for half a day without changes. We typically created a connection, lived with it for several hours, and then replaced it with another. Thus we moved irregularly through all the dyadic relationships in the group.

We dealt with privacy directly, mostly by turning off the microphone in the office, perhaps once or twice turning off a camera. Conversely we dealt with disturbance just as directly, controlling the volume on the tv monitor.

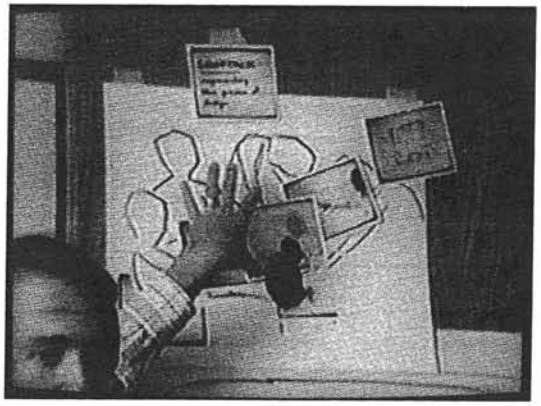


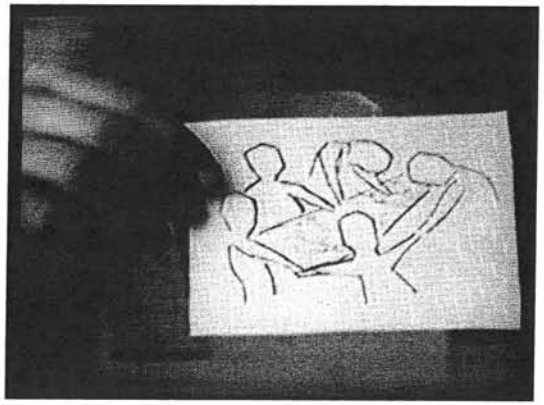


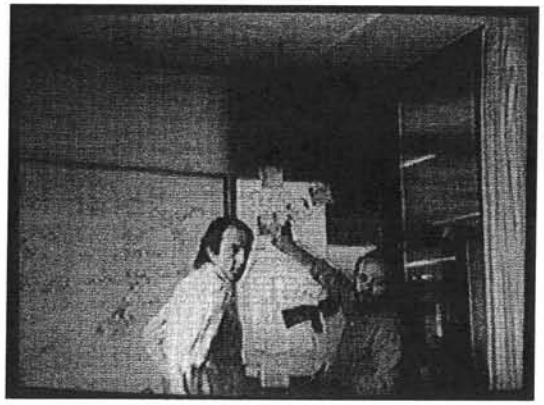


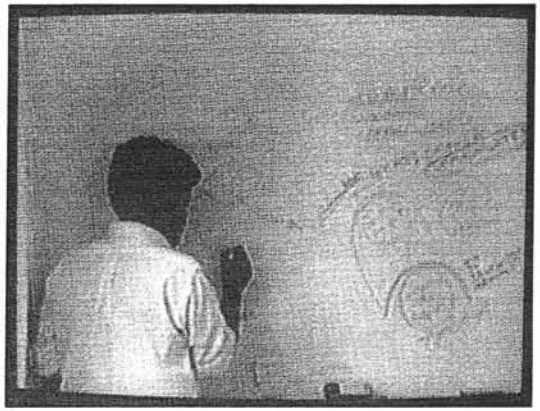
Stillframes from two locations in the media space, taken at three moments of a discussion. The discussion started in one of our offices when our photogrpaher arrived to discuss a poster. A second member of our group became involved in the dicussion through the media space, remaining physically in his office but taking an active part in the discussion.

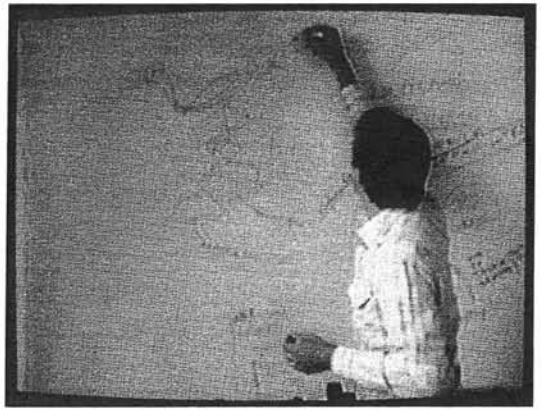
The framing of the top sequence is typical of much of our media space usage--fixed in a single and somewhat arbitrary framing for long periods of time. The top sequence also shows a hand-held microphone. The lower sequence shows active use of the camera, both adjustment of its framing and changing the contents of its field-of-view.



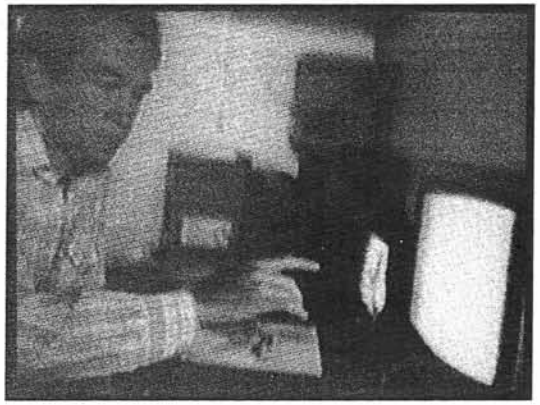


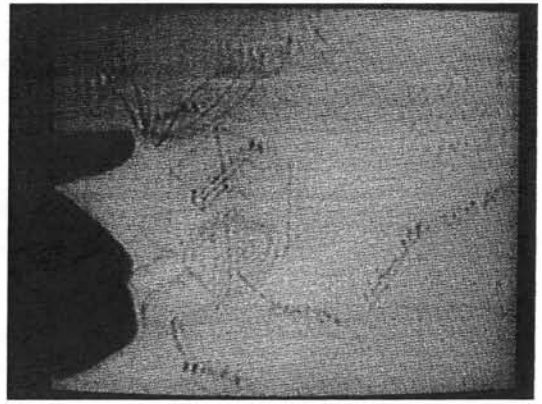




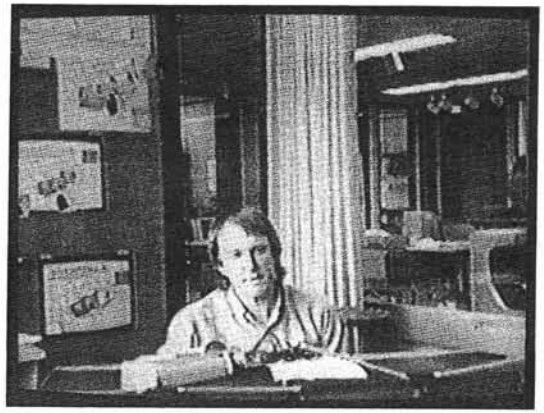


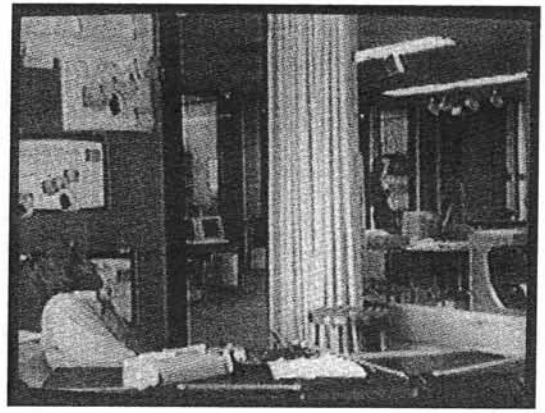
Stillframes illustrating a discussion that we started in one office and continued in another. We started the discussion by diagramming the conceptual structure of the media space (top, left) and the physical layout of our office and equipment (top, right). Subsequently we continued the discussion in another office, using the media space video simply to show the whiteboard in the first office.

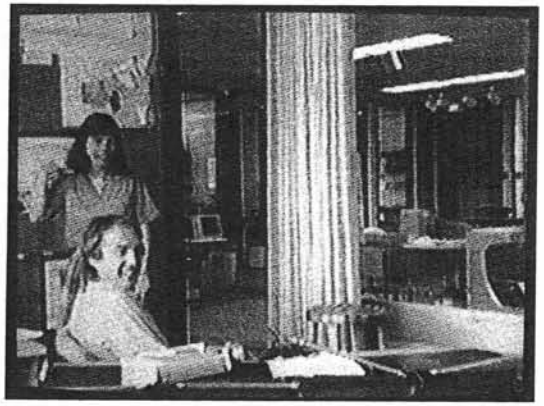




A sequence of four stillframes from May 30, 1986, showing the arrival of a fellow researcher in the media space. In the first frame, the visitor is visible at the right border, talking at the other side of the common area, while the media space participant works in his office. The next three frames show establishment of eye and voice contact across the common area, recognition by the visitor of the media space link, and then connection within the media space to a third person, not visible in the stillframe (the hand at the ear indicates the poor quality of audio).







what we learned

We created the media space more as myth than as problem solving. As I reported previously, we did have a problem--two of us were located on a corridor and were separated from much of the action in the laboratory--and the media space provided a solution to it--it acted as a replacement for the visual/acoustic space of the common area. But this problem and solution were not really at the center. Rather, we moved from our strengths in order to explore possibility. We felt sure about working together (four is a good size for a group, and besides, we had good experiences working with each other), we felt sure about computing technology and our abilities to use it, and we saw a possibility of using video and computing together, to create a space that is different from the physcial space that we know, or even from the information space within computing networks.

In approaching the media space, we didn't act deliberately, thinking out the ramifications of juxtaposing and then integrating video and computing. Both of these technologies are mature, have their own signatures, their own "message", and the messages are different. Our approach to building a composite medium was to bring them in simple form into use, together; then to experience something new.

Keeping the technologies simple meant limiting our initial ambitions. Most broadly, we suspended our design journal interests, but we also accepted limitations with:

- equipment (we always felt short of cameras, the quality of our audio was marginal)
- physical setting (the separation of our offices, lack of shared working space, and the clutter of equipment and cables in our offices were all problems)
- the gap between our computing and video environments (we could not control the switch from our computer work stations but had to do so manually at the switch, we did not use technology available in our laboratory for remotely pointing cameras, we manually maintained our log of recorded video)
- connection with others (we were not yet able to use the video link with our Portland site to include someone there as a group member)

We chose to suspend our design journal interests and to accept the limitations, so that we could arrive at real experience, even though the experience was with an incomplete media space, so that we could have experience, rather than just our thinking, to guide us.

For me, the important experience of the media space is the connection established among the group, even though we were physically separated. The ease with which we could maintain background contact, flow into comments, create and dissolve a conversation remind me of the times I have worked in architectural studios, but of course with the important difference of spatial separation. Our experience allowed us to work together more closely, while pursuing our separate interests.

Our experience with the media space changed my initial intuition about video and computing into conviction. I had started to work with video as much from rebellion against the neatness, exactitude, correctness and factuality of computational information as from a pull to video. I have suspected for some time that the social processes internal to a design group rarely take symbolic form. Rather, most of our communication is intimate, direct, pre-verbal. From this perspective, the beautiful computational properties of this or

symbolic representation we have already removed the life of the process, just as surely as we do by recording its appearance as a video signal. What helps is to have two representations, each capable of capturing its own sort of shadow. Perhaps those credible shadows that we create in our computing systems have their match in the mindless, hypnotic presence of video.

Our experience bore out the parity of video and computing, more than I had imagined. Even as I sat in my office, deep in the ant's labor of my brain (to use Bataille's phrase) as I wrestled with the intricacies of programs for managing color maps (or some such problem), I was also continuously aware of Steve, then Enrique, then Bob, also engaged in their ant's labors, as luminescent figures and intermittent noises coming from my monitor. That bright and flat space of video connects us as powerfully as that dark maze of computing leaves us in our special, little worlds.

addicted, we focus on our computations;
video insistently keeps you present with me,
and so our group flourishes

subsequent work

With completion of our experience with the initial media space, we achieved a quality of space that we wanted--participation and experience were in balance; connection was under our control. We experienced the power of connection through the media space, encountered its limitations, and saw how to proceed. So we dismantled the media space and began again.

We intend our second media space to overcome many of the limitations that we identified--by increasing channels to and from each office, by expanding the video switch, by providing for control of switching from our computer workstations, by physical renovations to the laboratory and rearrangement of offices, by including a member from Portland in the group, by creating a second media space in Portland, and so on. The list of these improvements is quite long, and represents both additional capabilities for the media space and additional users.

At some point we will consolidate the improvements, declare the second media space to be operational and become introspective about its use, as I have done here with the first. Perhaps we will do so with a third, or even more.

Throughout this research, however exploratory we feel and however seductive we find the technology, we treat the media space as an extension of physical space, not as a replacement for it. Whatever aspects of human connection that we can convey through our media, there will always be other aspects--ones that we already recognize and others that we haven't yet recognized--that we cannot account for. Because of these, we can never properly contain human relations in our media; in trying to do so, we'll always miss something important.

But of course I wouldn't be calling the media space an "extension" unless it also added something. For just as any medium will fail to carry something important that physical space carries, so, conversely, it introduces something. Plato's written dialogs are different from the oral dialogs of Socrates--the immediacy and live involvement is lost, but the precision and clarity of writing is gained. And so we can step back further and see physical space as one medium--and a special one, where, as human beings, using our hands and eyes and ears and tongues, we learned to act together. Our vision is to extend the physical medium with a new medium provided by audio and video technologies.

For the extension to serve us, it must permit us to move fluidly between the physical space of our laboratory and the acoustic/visual space that it provides--just as the dome of the Renaissance church permits us to move between earthly and heavenly space. We then can act according to our slogan, "you don't have to be there to be there." Audio/video convey sound/sight from place to place and between times, and can act as stand-ins for physical presence. The fluidity between the media makes it easy--I make an audio/video stand-in for myself that is available to you, in your office, five minutes from now. But ultimately, to be there, you have to be there, at least as long as you think that our physical existence in physical space makes any sense at all.

acknowledgements

This is the first report of our media space work. I am writing it alone because I provided the initial vision for this work within our laboratory, and because I carried most of the organizational responsibility. But the work really was a collective enterprise involving most of the people in the System Concepts Laboratory, including the unwavering support of my boss, Adele Goldberg, and of the laboratory's other managers, Dave Robson, Glenn Krasner and Tom Merrow. From the laboratory, four of us participated directly in the media space, Steve Harrison, Bob Flegal and Enrique Godreau and me. Steve's role was central: without him, we would not have a media space and without any of the rest of us, the story would probably be pretty much the same.