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# Paper, Piles, and Computer Files: Folklore of Information Work Environments

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## ABSTRACT

A FOLKLORE OF INFORMATION WORK ENVIRONMENTS adopts the holistic in-depth methods from the folklore of work and applies them to modern information workplaces. Like some other fields, folklore of spaces and artifacts takes the perspective that people's folk practices are a part of the things they interact with, that environment impacts people, and people impact their environment. Thus a folklore of space enfolds many of the research interests of diverse fields that deal with the modern work setting and the elements within that setting, from cubicle design to information systems. This article reviews literature from several bodies of research and attempts to bring them together in a projected folklore of information work space. It emphasizes the importance of studying folklore of information work environments in the context of the current shift toward removing work from any particular place via information systems, e-mail, and the Web. A deep understanding of the folklore of work space can give clues to the impact of this trend and can inform design of information systems and modern work environments.

## INTRODUCTION

I sit in the middle of the room at a round table that barely leaves space to pass around it. According to the sign on the open door, there are four people assigned to this cubicle, each facing one corner. Around the perimeter of this little—maybe 10 foot by 10 foot—room is desk space and counter space. There are drawers underneath the counters and shelves above; computer monitors serve as place markers for the occupants of this workplace.

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The variety and accumulation of things implies that the inhabitants of this cubicle have been here for some time. The shelves are full of mainly books and binders; the counters are piled high with papers, folders, and binders. A box for a chess set is crammed on one shelf where it threatens to fall along with boxes from *Mathematica*, *Office 95*, and other software packaging. There are at least a dozen different coffee mugs and soda cans scattered throughout as well as a small pot for heating water on an upper shelf supporting a row of unlabeled binders. There are four Unix workstations, two personal computers, and a Macintosh computer set at various points on the counters, and all but the PCs are on, humming and drawing line patterns over and over. The walls have calendars, a graph of a three dimensional parabolic curve, and children's watercolors. When I look at the contents of the table before me, I find blank paper and overheads, paperclips, a bus schedule, a German-English dictionary, and a geometry text 1948 copyrighted. Its dog-eared pages have layers of different handwriting, different colors of ink, and its cover is stamped "Property of North High school."<sup>1</sup>

### WHAT IS A FOLKLORE OF SPACE?

There is a great depth, breadth, and diversity of resources in the information work environment described earlier. The information in this environment lies not only on the written pages of books, photocopies, and computer screens, but in how they are organized and piled (either deliberately or accidentally) and placed in relationship to each other and the occupants of this space. An outsider to this space can learn a great deal about the people who work here and the nature of their social relationships to each other and to their larger social group. The space contains information about the organization they work for in the quality and quantity of the things in the room, what is or is not visible, and the range of resources displayed. An investigation of environment and material, verbal and ritual lore that addresses these issues is a folkloric study of space.

Typical folkloric studies emphasize the way individuals carry out or enact folk practices in the material environment with attention to verbal and customary lore. For example, based on the description above, research questions might include: How is information stored and conveyed in this setting? What are the organizational practices at play? What work tasks are carried out here? To what social and cultural groups do these people belong? How are the various materials working together? How is this space personalized and why?

These questions are based on the idea that the practices displayed here are learned behaviors with some individual variation, and that investigating this environment would give some information about how members of the larger folk group(s) involved might also behave. Methods involved in answering these questions range from collection of artifacts to

historiography to ethnography, using folk groups as a central unit of analysis. For the physics researchers described above, folk group memberships would include academia, physics as a field, their particular department, their research group, and so on. As research on information work spaces now stands, there is a large body of literature that deals with the information work environment but not with folkways. In the folklore literature, there is some research on environment but largely not on the information work environment. There are a few areas of research that fall somewhere between these two positions.

This discussion broadly reviews some of the research from a wide variety of fields and what they can tell us about work environments and space, what perspectives have been used to address space, and particularly the dialectic between how people shape and structure their environment, and how people are shaped and structured by their environment. The goal here is to bring these diverse pieces of research together in a way that has not been done before in order to create a starting point for research on the folklore of information work environments similar to the one described at the beginning of and throughout this article.

### WHY A FOLKLORE OF SPACE?

Most studies of work that feed into library and information science (e.g., in terms of creating tools for people; learning about how people communicate, use tools, and share information) do not take the things that surround workers and the material and cultural conditions of work into account (e.g., Barreau, 1995; Kwasnik, 1991; Nardi & Barreau, 1995, 1997). However, the research on more singular elements in the work environment (such as people's reaction to windows or how e-mail is used) can be used as a starting point for research. There are some exceptions in which a holistic picture of work and environment is developed that will be discussed later. The research approach that is best suited to dealing with work space is drawn from folklore, and it brings material, verbal, customary, and ritual lores together under one framework of study; thus this article is about launching a folklore of information work space.

Creating tools for particular work settings is about dealing with the situated nature of work (e.g., Ehn, 1988; Hutchins, 1995; Kyng & Mathiassen, 1997; Suchman, 1987). Part of the situation in which work occurs is that of the material objects that surround, play a part in, and contribute to or hinder, the work that is ongoing in particular places such as the cubicle described earlier. In addition, this single cubicle and all the clutter inside of it are located within a warren of other cubicles, on a larger floor, within an entire building that is spatially located in relation to other buildings at the northernmost apex of a large institution. All of these relations contain multiple layers of social cues and embedded meanings about the culture and social behavior of the people who inhabit them.

As others (Hutchins, 1995; Norman, 1993; Suchman, 1987) have shown, people embed knowledge in their environment. Information is contained in tools, in spatial relationships of objects, and in hands that know where to reach for particular things. Exploring these embedded layers of meaning can contribute to understanding work practices and to better supporting these work practices and building useful information tools.

This discussion will begin with a brief overview of different fields that concern themselves with work space and their research approaches. A discussion of architectural trends in office design sheds light on how information work environments have developed. From there, individual scale resources will be discussed, and the way flexibility in the work place (both in terms of physical malleability and an organization's rules) affects how much, and what kind of, folk practices are enacted. Interaction in the information work environment is always affected by the social structures of the work place, and corporate culture has a strong impact on the material environment in which many people work. I will conclude with a discussion of some of the issues surrounding the newest trend in information work—i.e., removing work from its material and spatial context. The issues discussed here will be illustrated by one extended example of an information workplace that I studied in 1996. This is the setting that sparked my interest in studying environment and how it relates to folk and work practices.

A focus on the materials and environment of work settings is particularly appropriate at this point in time. The de-localizing of work is creating a shift in many aspects of work, particularly in its material conditions. Only through a deep understanding of how people interact with their work space can these changes be fruitfully dealt with. New information systems, such as digital libraries, are being constructed to operate with the idea that they can be used at any place and time. Discussion of these new systems has largely not engaged the issues of space and environment and what dislocation will mean in terms of use and extant social practices.

## LITERATURE ON SPACE AND ENVIRONMENT

However overwhelming this little room full of stuff seemed at first, after some time, I begin to notice it really has its own order. There are at least three obvious work spaces here. To the left, the counters are cleared in a three foot area around one computer. Only two things hang on the fuzzy walls around this space: a calendar (clear of any handwritten marks) and the three-dimensional geometric drawing. On the right, the Mac and a Unix box face the same chair. Several piles of papers are on these counters, along with a box of tea bags and a mug. That hot-pot is just above. A file drawer is open with empty file folders pushed to the back to make room for a large stack of photocopies. These two work areas are on either side of the door to the hallway. It is the third corner (kitty corner from the first)

that gives the room the chaotic air. There are no discernable piles, but more of a nest shape around the computer in the center. Even the keyboard is covered. A "recycle" can sits next to the chair, and it too is overflowing. There are binders, books, and notebooks mixed in with typed and handwritten pages and equations. Photocopied articles are being pulled apart at the staple by the shifting tectonic forces of the piles. Every available bit of wall space above these piles is covered by a child's drawings. This area is an overwhelming presence.

### *Overview*

How people interact with their space is not a new area of research. Several different broad fields of study concern themselves with examining space and environment from different angles and highlight different aspects. The disciplines drawn upon in this overview include architecture, psychology, sociology, managerial science, civil and environmental planning, and computer and information science, as well as folklore. Reviewing these areas provides some starting points and a vocabulary with which to build a study of information work spaces. The underlying idea that all of the researchers from these various fields hold in common is that space and environment contain, both in structures and artifacts, knowledge and social practice:

[T]he environment provides a setting which *elicits* standard behavior according to binding but as yet unverbilized rules which are more compelling and more uniform than such individual variables as personality. Far from being passive, environment actually enters into a transaction with humans. (Hall & Hall, 1975, p. 9, italics in original)

There are as many different ways of discussing this interplay between people and environment—and of analyzing impacts—as there are disciplinary perspectives. Many researchers take a planning and construction perspective. They hope to create and manipulate space and environment in order to encourage or facilitate particular behaviors within that space. They draw on and report on research that can inform these goals. Others are more interested in what ways people work with (or around) their environment without any angle of manipulation. Another important body of research is concerned with how people draw upon the information that is embedded in their environment to accomplish work, and how social order and value structures are a part of the space that they inhabit.

In looking at the literature, one might think that environmental engineers, architects, and interior designers, in consultation with managers, determine the spaces where people live and work. However, while work settings are often purposefully constructed (e.g., cubicle walls are six feet high for a particular reason, windows can or cannot be opened by design, available plug-ins decide how many and where computers will be) nothing is completely determined. On a smaller scale, people adapt and change and organize the space around them every day, in order to make that

space work for them by hanging up calendars or children's pictures, posting reminders, or filing papers alphabetically by author's last name. Much of this shaping is the result of the social groups to which people belong, the actual process of our daily work, and personal preference.

### FOLKLORISTICS OF WORK

There are several fields and schools of research that deal with studies of information work, the materials involved, the social practices around it, and environmental issues. Folklore literature can be generally divided into research on lore about artifacts and materials, verbal lore such as storytelling, and ritual or customary lore. This framework is useful in categorizing literature that goes beyond folkloric studies. Anthropology and sociology of work also contribute to the folklore of the modern office setting. These studies have taken typical modern jobs and office settings as settings for research. They have paid particular attention to the activities of work and work practice, social interaction at many different scales, and ways technology affects work. Finally, work in science studies is important to the development of a folklore of the modern office environment because of its attention to the details of the materials of work, a focus on work as it happens, the social relations that allow work to be accomplished, and the language involved.

First, research that is relevant to the study of artifacts in the modern day office can be drawn from each of the fields mentioned earlier. There are many different approaches that have been taken to studies of artifacts—i.e., description and classification, stylistic analyses, the techniques and technology of production, social uses and cultural meanings, the politics of production and reproduction, and contextualizing objects in terms of performance are just some of the possibilities (Babcock, 1992). Artifacts can be seen as both resources for work and traces of activities (Glassie, 1972, 1983; Roberts, 1972).

Babcock (1992) describes folklore studies of material culture and different approaches that have been taken to studying material lore. Material culture is particularly challenging to analyze due to the multifunctionality of objects, the many frames or contexts that can alter an object's use and meaning (think of the high school geometry book on the table in the physicists' cubicle). Objects have many dimensions that signify different things: a page of handwritten notes on a topic is very different from that same information published in a book. E-mail has different significance from a letter on thick paper with a university letterhead. Materials also can be recycled and re-combined to be used in new and different ways other than those intended. The frame of a monitor can become the resting place for work-related reminders, and a thesis originally used because its content was pertinent may be reused (or simultaneously used) as a model for structure when the content is no longer an

issue. Finally, some aspects of material culture are ephemeral. This is particularly relevant when a topic of focus is the relationship between objects and ways information is organized—piles of resources are regularly taken apart and redistributed to other places (Babcock, 1992; Glassie, 1983).

Analyses of materials and artifacts are also important in sociological and anthropological studies of work. These studies have dealt with a broad spectrum of work, from blacksmithing (Keller & Keller, 1996), to large ship navigation (Hutchins, 1995), to photocopy machine repair (Orr, 1996). Many of these studies take one particular element or technology as their point of focus. For example, Gasser (1986) discusses how computers are integrated into routine office work but does not go into depth about details of work that do not touch on computer use or other materials. Suchman (1987) takes a very careful look at the work that goes on around using a copy machine but does not describe materials or events that do not directly tie to photocopying. Studies such as these, though, are very informative about specific artifacts in the work environment.

In contrast to the research on particular items, there are studies of work that pay careful attention to materials but also to the social practices, activities, and interactions in the work setting. Many of these are studies of scientific work which can also inform studies of information work. For example, Traweek (1988) explores the work and social practices of high energy physicists; Shapin and Shaffer (1985) describe the invention of the air-pump; Latour (1988) details the invention of vaccinations; Orr (1996) focuses on photocopy repair. Star and Griesemer (1989) describe how objects can be used as points of translation between individuals and folkgroups as each group assigns a different meaning to the same object. Many of these studies of science emphasize the social and cultural aspects of the material world, the importance of context for understanding practice, and the role of social interaction.

Verbal lore is an important element of work. One of the most important styles of communication at work is storytelling, as Orr (1996) has demonstrated. Photocopy repair was greatly facilitated by technicians sharing “war stories” about different types of problems that they encountered. Boje (1991) discusses storytelling as a means of “sense making” in office settings. He notes that people use stories to interpret and reinterpret events and to create cohesion. He talks about stories and narratives as being repositories of company history, practice, and lore, and of storytelling as a powerful means of socializing newcomers into an organization. Tenkasi and Boland (1993) argue that storytelling and narrative creation are the “generative process[es] in cognition” (p. 77), that people *think* through talking out loud or to ourselves.

Other researchers who have studied verbal lore have focused on collecting stories tied to work settings. For example, there are many variations

of a man sneaking out of work early, or leaving the workplace during working hours. This man then goes home to find his wife and boss in a compromising situation, and in some stories ends up filling the boss's car with cement (Green, 1993). There are not many collections of verbal lore from the modern information work setting, but other lines of work have been studied in detail. Some examples of well studied work lore include loggers' stories (Dorson, 1972; Toelken, 1996), factory folklore (Nickerson, 1983), coal miners' lore, cowboy verbal lore, railroad lore (Michell, 1983), and so on.

Office lore and storytelling are just beginning to be researched. For example, Dundes and a few others have collected examples of "photocopy lore," cartoons, farces of common paperwork in the business setting such as joke business cards or memos, verses, and other items that are passed around or displayed in modern work settings (Dundes, 1983; Dundes & Pagter, 1987; Dundes & Pagter, 1996). Although the collection of these items is growing, there are few analyses of this material (Roemer, 1994). Storytelling is the focus of some research in managerial studies in which managers are encouraged to use stories to manipulate workers (Armstrong, 1992; Beyer & Trice, 1988; Neuhauser, 1993; Tommerup, 1988). Neuhauser (1993) reports that 90 percent of the stories workers tell about their work are negative—e.g., how people are taken advantage of, exploited, or made to do ridiculous things as a part of their jobs. There is even a Web site devoted to collecting stories about the worst bosses and work horror stories (<http://www.myboss.com>). However, corporations also often have tales about the founder or the early days of the company, stories about various eccentric workers, the ultra-organized or the exceedingly sloppy person. Just as in other situations, folklore functions to create community bonding as well as to pass on skills and workplace culture (Toelken, 1996).

Finally, there are certainly rituals tied to the generic workplace, such as initiation rituals for newcomers, as well as customs from specifically office or information work settings. Work implies a particular type of attire and particular way of looking—e.g., the presentation of the self as "busy," all of which may have little to do with job performance. If these conventions are not followed, although they are often unwritten rules, the employee could be fired (Henson, 1996). Ritual or customary lore in the modern work setting has not been a prominent focus in research on work, although these lores are often subtly present in many analyses. For example, Gasser's (1986) discussion of office work and computing describes "workarounds" that allowed people to accomplish tasks in spite of the "correct" way of doing things. Consulting with local "gurus" is often part of accomplishing work. Other rituals tied to information work settings, such as the power lunch, job interviews, and presentations, remain unexplored in studies of work.

Another topic of research that does not fit neatly into these categories is invisible work. This is the work that needs to be accomplished before any other work can happen, the behind-the-scenes work that keeps organizations running smoothly but that is not overtly or specifically acknowledged as work that goes on (Gerson & Star, 1986; Star & Strauss, 1999; Suchman, 1995; Wichroski, 1994). The organization of materials, the personalization of work space, and the gathering and situating of resources can be included in this category of overlooked or invisible work. Perhaps there are materials that are necessary for doing such work that are not acknowledged or supported. This particular stream of research is also key in pointing to the need for looking below the surface of what is supposed to be happening in the workplace or the ostensible role of material resources.

An examination of folklore in information work environments should take into account the relationship among objects, spaces, and people as well as the larger social system affecting the space (Lawrence & Lowe, 1990). Each of these categories of research is artificially separated from the others; in practice, each is closely linked. Artifacts bring stories to mind, stories are tied to different customs, and customs are tied to particular places.

With the above areas of research in mind, the rest of this article will describe literature from disciplines which do concern themselves with the material environment and space, but which take methodological and theoretical stances that differ from those described above. Beginning with a general review of workplace design, I move through various issues that have been shown to be important in the work place setting. These topics suggest starting points for folklorists (or anthropologists or sociologists) who want to study work spaces. Finally, I will discuss the newest trend of dislocating work from space and what the research literature implies about that.

## MATERIAL LORE IN THE OFFICE ENVIRONMENT

The room is fairly quiet today except for the hum of seven computers and the clacking of two keyboards as Jill and Tim work. Every so often, the muted chime of Eudora's "You've got mail!" is heard from one of the ten other cubicles in this cavernous room. Jill stops typing to stare at her blue computer screen then turns to open the top left drawer next to her and pulls out a blank sheet of paper and a pencil. The bottom drawer is then opened, and her fingers walk across labeled file folders until she opens one and withdraws a journal article. She adjusts her chair to work at the countertop and makes notes and drawings on the blank paper as she reads the photocopy.

Tim is moving between the Mac and the Unix box as he works. The Mac is running Netscape, and he moves through pages of a site of another research group. He stops to read a bit of text there, then turns back to the other computer and types, back and forth between the two. At one point he pauses on a Web page and jots what appears

to be an e-mail address on a post-it note, which he then sticks to the frame of the Unix monitor. He then clicks on an icon that launches Mathematica.

Mike walks into the room with a paper in his hands and sits down. "Hey," he says to the other two, "do either of you know where that one thesis with all the graphs has gone? I think it is from 1992, and it has a blue cover." "No," they both answer him. Mike begins to rifle through his heaps of paper and, after a moment, stops. "Hey!" he speaks a little louder, "who knows what happened to that blue thesis with all the graphs in it that I was using?" A voice from the next cubicle answers. "Not here," it says. Another disembodied voice chimes in "I'll ask Professor Smith." A knock on a real wooden door sounds; as the door opens, classical music is heard and a shaft of sunlight shines across the top of the cubicle area. Then the door closes and the music is gone. Mike turns back to his piles. "What will you do now?" I ask. "I'll do what I always do when I lose something I *really* need. . . clean." He begins picking up groups of papers and goes through them one by one. The first few handfuls get sorted through and neatly stacked but, the further down he moves in the pile, the more items that go into the recycle bin. Nothing ends up in drawers. It strikes me that his piles of paperwork are just like the organization of an archeological dig site—i.e., stratigraphic layers can be used to age and order the material.

## STUDIES OF ELEMENTS IN INFORMATION WORK ENVIRONMENTS

Workplaces are highly designed structures that oftentimes are deliberately set up by builders, designers, planners, and management to reflect or instill a particular corporate culture; symbolism and metaphor are overtly and covertly imbedded in built forms. However, the careful planning of work space extends far beyond building structure—e.g., there are years of ergonomic research on singular topics such as lighting. Most studies, whether they focus on a single element or an entire environment, are oriented toward maximizing worker output and minimizing cost and how this plays out in the interaction between personnel and the work setting. There are schools of workplace design that are opposed to this top-down corporation-oriented approach, but in the United States, England, and France, workplace design continues to be oriented toward the bottom line and management's needs.

"Productivity" is thus a key motivating force in much research on work environment from architecture, managerial studies, environmental psychology, and other related areas. These studies aim toward finding the optimal combination of high worker satisfaction, low levels of stress, and high levels of contentment—all of which result in all-important gains in productivity.

Research on the work environment from this literature takes a social-psychological perspective on work space and people's relationship to their environment (Fischer, 1997; Lawrence & Lowe, 1990). The focus is on

the individual worker and his or her reactions and perceptions to a small number of environmental variables. Some central issues in this research include studies of territoriality, such as the need for personal space and privacy. These studies relate much of human behavior in space to the basic needs for control over a place of which one feels ownership. Environmental cognition is another frequently encountered topic of study. This refers to how people find their way through and remember space. A large component of environmental cognition is how people perceive their environment and the symbolic nature of the artifacts and buildings encountered. Spaces are most commonly differentiated on the basis of function—i.e., what activity occurs within that space (Fischer, 1997).

Although work spaces are generally designed to maximize workers' psychological comfort and memory (after all, when these are thwarted, productivity will fall), there is a great deal of variation in the form that the work environment takes. This is true for several reasons. On a macro scale, there have been different schools of thought in office building design. Each of these trends has been intermingled as work spaces have changed over time, and each floor plan is implemented according to a company's policy and funds.

Corporate policies and funds also affect the more micro forms and varieties of materials found in the work setting. Many firms have rules about how visible each person's decoration of her or his space may be, what types of plants are allowed, or how computer resources can be used. However, individuals in the workplace are a dynamic force. At the same time that their work practices and behaviors are being shaped by their environment, they shape and change the spaces around them. Instructions about how not to jam the copier get taped up, family photos are often displayed in individual work areas, and the organization of computer and paper files varies according to personal preferences.

There are several aspects of folkways in this mix. First, there are conventions of design that are a part of the folk practices of architects, interior designers, building planners, and others. Second, there are aspects of folklore at play in both the general corporate culture and the specific organization. Finally, individuals enact and maintain folk practices of the groups to which they belong as they set out their vacation memorabilia or build several versions of "to do" piles. The folklore of work space should be given attention by anyone looking at aspects of the workplace environment, whether they are interested in such things as building information systems or studying information flows and uses.

#### TRENDS IN WORKPLACE DESIGN: CLOSED OFFICES TO OPEN OFFICES TO NO OFFICES

The two most common models for office floor plans in use today are the corridor office and the open-plan office (Duffy, 1992). The corridor

office has a hallway running down the length of the building, with doors that open to offices on either side. These offices usually have windows to the outside, permanent floor to ceiling walls, and traditional furniture such as a free standing desk and chair. The result is often long skinny buildings with several wings. This type of building configuration allows for privacy and more personal control over space (each office has its own light switches, window, heating adjustments). At the same time, it encourages a small range of interaction between office dwellers.

The open-plan office, on the other hand, has few enclosed offices for managers, and the rest of the floor is completely open with desks arranged in tight rows. These buildings are usually large squares. No space is "wasted" on corridors, workers are easily supervised, the layout of desks can be easily changed, and communication is very open. There are some hybrids of these two models—e.g., buildings with closed offices around the perimeter of the building and open office space in the middle.

The most widespread philosophy in office design today was invented in Germany in the mid 1950s. It is called "bürolandschaft" or "office landscape" (Duffy, 1992). The idea was to combine the advantages of both types of office plans by using large open spaces, but creating groupings of furniture and desks for people who need to communicate, along with some enclosures created using large plants and movable partitions. Desks are not arranged in rows but in groups in a flowing pattern. Ideally, the open spaces provide necessary privacy and quiet. This design has been widely adopted but, as businesses expand, desks are usually forced closer and closer together; mobile partitions are used more frequently than open space. The now common arrangement of closed offices around the building perimeter and cubicles in the center is a descendent of this concept (Duffy, 1992).

Recently, there has been a new wave of discussion about the design of office space that calls for flexibility and the need for team work space. It is based on the idea that the nature of work and organizations has shifted from being functionally differentiated and fixed to focusing on teams of people with different specialties that dissolve and reconfigure as needed. Researchers argue that this openness to change creates the "high performance workplace." They advocate creating all offices of the same size out of modular panels. In this way, when work groups are reconfigured or when people move, there is simply the matter of moving people from one generic space to another. They note that this requires the average office to move up in size so that it serves more functions, but also that there should be no (or few) large offices for senior management. In addition, services such as electricity, network cables, and air ducts can be run through central "spines" in the middle of the floors, and offices can be located on either side of the spine. In this way, everyone has access to needed facilities.

The modular panels are useful in that open spaces can be created easily or partitions taken down when open communication is called for.

There is a shift in attitude toward the amount of interpersonal interaction, which is now viewed as a necessary asset. Creating proximity for interaction is now a major part of new designs (Becker & Steele, 1995; Duffy, 1992; Duffy, Laing, & Crisp, 1993). The need for general purpose gathering areas for informal interaction is emphasized. "Functional inconvenience" of making people walk to a common work space such as a photocopier room has become an element of design because increased interpersonal interaction is supposed to be good for business (Becker & Steele, 1995; Laing, 1993).

The work setting that Jill, Tim, and Mike inhabit clearly fits into the open office landscape that got too full; offices with real walls and doors and windows encircle the large open room in the center of each floor. The open room is filled with multi-dweller cubicles, a concession to the high number of people crushed into this space. The cubicles allow limited privacy but do encourage fellow cubicle dwellers to get to know each other and their neighbors. The missing ceilings allow for a special variety of interaction—i.e., calling out questions or comments into space and often getting the answer needed. Although many cubicle dwellers wish for real offices, this kind of information richness would no longer be "in the air if they had them."

On the same floor as Jill, Tim, and Mike are three conference rooms, a kitchen, and lounge chairs near the elevator, perhaps constructed as concessions to the newer philosophy of workplace design. The conference rooms are seldom used casually, and the kitchen can only hold a person or perhaps two at a time. The more interactive group location is the tiny room that contains a photocopier and a large printer.

A few researchers follow a more social-action oriented approach. They emphasize that these newer, more flexible offices are required by market demand for more creative teamwork and by shifting cooperation between specialists from previously segregated departments—e.g., accounting, design, engineering, customer relations. They also discuss the need for employee participation in design decisions (Hodgkinson, 1993; Laing, 1993). Research links the participatory approach to more traditional concerns with productivity—participation in design is closely related to employee satisfaction and a higher sense of community which in turn relates to increased productivity and quality of work (Spreckelmeyer, 1993). However, participatory design of buildings and post-occupancy evaluation are still the exception rather than the rule for building construction (Brand, 1994; Duffy, 1992; Duffy et al., 1993; Leaman & Borden, 1993). In Jill, Tim, and Mike's building, there is a long waiting list for space, so it is unlikely that general use areas will open up or that any major changes will be made.

Buildings that are based on some of these principles of flexibility in spatial configurations are already in existence. Hall and Hall (1975) conducted a five-year study of the John Deere headquarters in Moline, Illinois, beginning when construction was almost complete and then five years into occupancy. They wanted to see how the building affected the people who worked there and what they thought of their work space. This building was based on the landscape office model but also tried to draw on the advantages of having uniformly sized work spaces so that employees could be moved around easily. At the time this study was conducted, people were grouped in departments by specialty or function, but there was also space for multi-specialty teams to be co-located. Reactions to the new building were generally very positive, and the corporation took advantage of such things as movable walls to alter the work space. The two greatest complaints of employees were, first, that in the open areas they felt "on display" and "exposed" and, second, that the company had a "clear desk" policy so they could not leave any personal or work items out overnight.

While there have been some trials of these newer theories of office design, as Hall and Hall (1975) found, along with others studying more recent buildings (Becker & Steele, 1995), there are still issues to be resolved. However, while these problems remain unsolved, corporations are moving on to yet another largely untested strategy for managing their space—i.e., removing workers from any place to call their own.

This up-and-coming trend in office design involves eliminating the office from "office work" (Becker & Steele, 1995; Bleeker, 1991, 1994; Duffy et al., 1993; Gray, Hodson, & Gordon, 1993; Gunn & Burroughs, 1996; Lipnack & Stamps, 1997; Vischer, 1996). The reasons behind removing the tie between work and a particular locality range from the high cost of real estate and building maintenance, to the advantage of increased interaction with customers, to the greater environmental benefits of fewer workers commuting, and so on. There are multiple ways in which this idea is being implemented. In some cases, workers no longer have a space to call their own. This is often called "hotelling." Workers spend a portion of their time traveling, and overall office space is reduced by removing a significant number of office spaces and creating ones where none (but the boss's, of course) are private. If a worker will be at the office, he or she should either call ahead to reserve a space, or spaces will be granted on a first come, first served, basis. The "satellite office" is also a part of this trend—smaller branch offices are placed in convenient locations so that employees do not have to travel as far from the customer to get to work every day. Visits to the main office are more rare. "Telecommuting" (also known as "telework" or "virtual work space") is, of course, at the root of both of these ideas; the theory is that, through new computer technologies, workers can perform their tasks anywhere they can plug in their laptop and modem cord. Everywhere is a "workplace"—airports, dining room

tables, customer sites, etc. Jill, Tim, and Mike all frequently work from home or other locations. This de-localizing of work will be discussed in detail later.

Although the rhetoric behind these new workplace strategies includes discussion of their advantages for individual workers, it is too soon to assess the effects of de-localizing work. Do folk practices change in nature? How? Only a few corporations have implemented these programs, often on a small scale or trial basis, because of concern over the loss of individuals' presence and interaction with their peers. A review of the literature on individual work environment gives clues to how the de-localizing of work might play out.

### INDIVIDUAL RESOURCES

Corporations generally provide employees with "basics," such as a desk, a chair, computer equipment, and a phone. Beyond this, there is enormous variety in the quality of these items, what else the company provides for workers, and what workers are allowed to do to their work space.

The amount of flexibility or malleability built into a work environment by the environment is crucial. This allows for the workplace to change over time, according to the demands of the marketplace, new theories of



Figure 1. A Variety of Personal Resources Organized in an Individualistic Manner (a Corner of Tim's Space After the Cleaning).

management, group practices, and personal taste. There is a continuum of what can be made changeable, and by whom, in the workplace. At the large and formal end of the scale, buildings can be designed so that, for example, the interior physical infrastructure is mobile. At the small and informal end of the scale, individual employees can make changes to their own work environment such as adjusting the chair height. This flexibility (and there is always some) is what allows folkways to emerge in the workplace setting in different ways. Over time, a space can be modified drastically to reflect the work practices, culture, and personality of the people that spend time there (Brand, 1994).

In terms of the work environment, all of the research points to the importance of people being able to make changes to their work space and of allowing personal storage space and some privacy. In the sample workplace described here, resources such as post-its, white boards, and file organizers are important in managing work flow. Spatial arrangements of such things as desktop piles are key in personal work systems. Obviously, Jill, Tim, or Mike could not use each others' systems of storage.

Additionally, artifacts may be used in ways that they are not designed or intended for. Just as people plant flowers in old tires on the lawn or make art out of found objects like tin cans and plastic (Toelken, 1996), Tim uses a drawer meant for hanging file folders to store piles of papers. His hot pot serves as a bookend. Monitor frames act as message centers. In Figure 5 an envelope is used as a storage pocket on a bulletin board.

Allowing individuals to control some elements of their work environment has often been found to be important to employee morale, productivity, satisfaction, and stress levels. Not surprisingly, researchers have found that it is important that people first have a permanent space that they feel they "own," and second, that they be allowed to control who enters their work area and when (Wollman, Kelly, & Bordens, 1994). Other studies discuss the importance of people being able to store personal items in their work space as well as being able to adjust furniture and equipment (Hall & Hall, 1975; O'Neill, 1994). It is well documented that workers do not like to be out in the open (Block & Stokes, 1989; Oldham, 1988), but there are several theories about this. Most of these have to do with openness and crowding creating too many distractions, too much noise, and a feeling of being on display (Hall & Hall, 1975). O'Neill (1994) found that, although people generally like higher partitions that provide more privacy, they are less disturbed by noise if they can see the source (like a nearby photocopier). Of course, there is a strong relationship between a higher general noise level in the work environment and lower feelings of satisfaction about the job (Sundstrom, Town, Rice, Osborn, & Brill, 1994). The sense of ownership and control over the work environment has been traced to the territorial instinct, but how people establish this control and ownership and how it is played out in specific settings is a matter of folk practice.



Figure 2. Many Levels of Reminding Items are Visible in Post-it Notes, Colors, and Placement of Items.

If people are allowed to modify or adjust their personal work space (assuming that they have one), what are they doing with it? Scheiberg (1990) describes two very different units at a university. One, "book cataloging," is hidden away from the public in the basement of the main library. In this space, workers have covered nearly every surface and even have hung things from the ceiling—e.g., posters, pictures, slogans, comics, and other items. In the second work setting, a part of the financial management, there is much interaction with the public. Workers there are not allowed to decorate with anything that could be seen above cubicle partitions. Decoration in this area is much more subdued, limited mainly to pictures standing on desks or counter spaces. Scheiberg (1990) argues that personal decorations provide an outlet for emotions that must otherwise be suppressed. The work of book cataloging requires concentration and quiet, but the financial office allows more talking. Visibility to the public also plays a large role—for instance, the people in the cataloging department recognize that most people do not even know they exist, while people in the financial office are very careful about the image they present to outsiders.

Other researchers have found similar decor protocols when they examined whether or not people substituted pictures for a lack of windows (Biner, Butler, Lovegrove, & Burns, 1993; Hall & Hall, 1975). What they

found was that people decorate their spaces with items that they enjoy looking at because they want to make their work space look more personal, and they put up items they want their co-workers to see. In situations where the organization's rules limit personal items, researchers have found that people want to put out similar items but are not allowed to (Hall & Hall, 1975; Scheiberg, 1990). When folklorist Alan Dundes and others collected photocopy lore, they also found cartoons, jokes, and drawings that people kept in their personal spaces either publicly visible or hidden away (Dundes, 1983; Dundes & Pagter, 1987; Dundes & Pagter, 1996). It appears that, while rules limit what is visible, personal modifications still find their way into the work setting.

These findings also appear to be true in Jill, Tim, and Mike's cubicle. They are allowed to set out or hang up personal items, and their work setting is filled with such things—posters, children's pictures, calendars, etc. A "clean desk" policy is obviously not enforced by the management. If a clean desk policy was implemented, Mike and Tim would need to make some changes to their work habits. How would these play out? Personalization of work space is important for the actual activities that people perform. Both Mike and Tim seem to use their desktops to contribute to information organization and retrieval of their personal stores of resources. Literature from library and information science emphasizes the importance of having and accessing personal collections.

Personal collections of information are the most drawn upon and used of all information resources (Barreau, 1995; Kwasnik, 1991; Nardi & Barreau, 1995; Nardi & Barreau, 1997; Schneider & Rice, n.d.; Soper, 1976), so it is important that people be able to create and store a personalized collection of materials such as photocopies of documents, books, journals, notes, manuals, departmental or organizational policy handbooks, phone/address books, etc., in addition to the "decorative" type items mentioned earlier. Access to a personal collection is yet another issue as workers are packed into smaller spaces, and spaces that they must share with others. Sufficient and convenient storage space that is always available, accessible, and undisturbed by others is an important issue (O'Neill, 1994). Having a space that will not be disturbed is not simply a matter of satisfying some territorial instinct. Researchers have found that people organize their desks and set out items to help themselves find important items and also to remind them of things that they need to do (Malone, 1983; Nardi & Barreau, 1995; Nardi & Barreau, 1997). The two main units of organization are files or piles, each of which can be either purposefully arranged and labeled or not (Malone, 1983). As Malone (1983) found, the largest challenge in organizing information is the difficulty of filing, classifying, or grouping it in terms of content, context, and media. Most office or information work now takes place in a variety of media and across many levels of formality. People must shift between paper and com-

puter screens, written reports, and electronic memos. In addition, there are shifting timelines of work and deadlines that must be met or ignored.

The difficulty of classifying all these diverse items is an important mediating factor as to where they are physically located in the work space—e.g., the most pressing work is put front and center on the desk, with piles moving outward in descending order of importance (Malone, 1983; Soper, 1976). People routinely use location as a reminder in the same way one might put the dry-cleaning receipt next to one's lunch in order to remember to pick it up. This is just one means of distributing knowledge in the work environment—the dry cleaning is “remembered” by the lunch (Hutchins, 1995). Computer files are organized along exactly the same lines (Nardi & Barreau, 1995, 1997). Research has shown that co-locating files that are related, such as grouping items according to a project, is the most common way to organize computer files. Recall then operates in terms of remembering what was being done at the time that the file was used or seen. Several researchers who study the use of personal collections of physical items note the importance of context both in terms of finding and using items. Kwasnik (1991) found that the context of an item is the single most important factor (that is not a document attribute). Context is important for accessing items; recalling the circumstances of their creation and use; and showing ownership, source, and purpose as well as how the items are related to the individual. Barreau (1995) followed up Kwasnik's research in the electronic environment and found the same issues to be important. Context is an important factor in interpreting and re-using documents, which is especially pertinent given the fact that computers can be used to help re-combine and alter bits of documents more easily than paper documents (Paepcke, 1996). However, not all of the affordances of computers are useful.

While the ability to make “shortcuts” or “aliases” for files helps with putting one item in multiple categories, other computer capabilities are used less than one might guess. Certainly, the strategy that Mike uses—creating a sea of resources that constantly shift according to the last time they were accessed, their importance, and their associated content—could not be electronically replicated. On computers, the “find file” function is hardly ever used; visually scanning folders and lists of files is the preferred method for finding things (Barreau, 1995; Nardi & Barreau, 1995). In addition, some tasks are simply more easily done in the physical world, such as using post-its and taking advantage of visibility and co-location as reminders. On a computer desktop, the space is limited in such a way that items are easily covered up by other windows, and it is difficult, if not impossible, to have multiple items visible at the same time. Putting “odd” items together (such as URLs and file names) is virtually impossible without creating new documents (think of attaching comments received via e-mail about a paper written in MS Word and a relevant Web site). A mix of

paper and electronic resources seems to be the most common way to deal with a wide variety of information, such as sticking post-it notes onto computers (Schneider & Rice, n. d.). Tim uses this tactic, as do others in the pictures of work spaces included (see Figures 1, 2, & 3). Finally, a great deal of information work involves dealing with “ephemeral” items—e.g., things that require action immediately and then are thrown away or a business card with an e-mail address that will be needed at some point in the future. While dealing with this ephemeral information seems to be problematic in both the electronic and physical realms, physically most people use designated spots—often piles on the desk or lists of things (Barreau, 1995; Nardi & Barreau, 1995, 1997). Again, Tim’s post-it notes, Jill’s handwritten notes, or the white board seen in Figure 3 are examples of these practices in action.

Another dimension of the multi-functionality of items in the work setting involves the use of artifacts and space as symbols. Corporations use artifacts in a highly complex system to signal rank in the hierarchy, corporate image, and managerial presence.

#### HIERARCHY AND CONTROL: SPACE AND MATERIALS AS SYMBOLS

Many elements of our environment serve as symbols (Fischer, 1997; Lawrence & Lowe, 1990). Lawrence and Lowe break symbolic analyses into two types: those that take a psycho-symbolic approach and those that

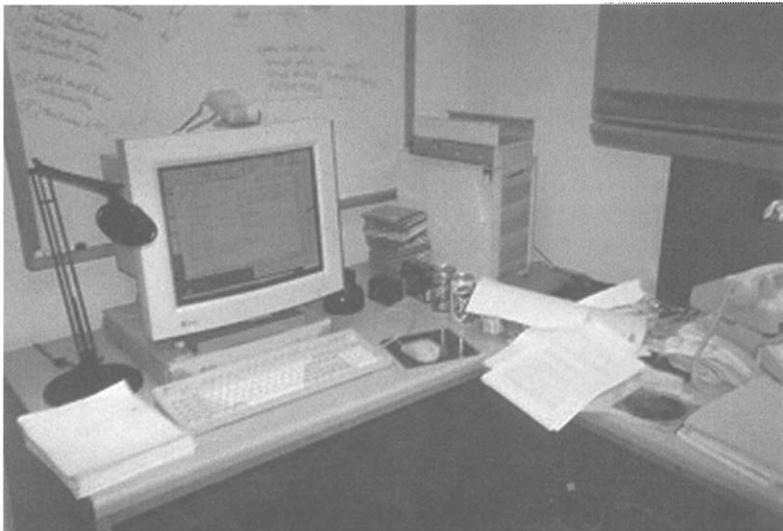


Figure 3. White Boards and Tack Boards are Common Means of Putting up Ephemeral Reminders, as is the Post-it on the CPU Case, or Notes on the White Board.

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focus on social symbolic and metaphoric accounts. Obviously, corporations and office spaces are ripe areas for these types of explorations; both of these dimensions of symbolism are present in Tim, Jill, and Mike's office. The fact that they are three people in a cubicle tells them and their colleagues that they do not rank single occupancy or one of the "real" offices around the perimeter of the building. They share important equipment such as the printer and photocopier with many other people, but each of them has at least one high power computer with a large monitor. They must have some status to warrant such expensive machines. Status symbols are also presented by employees (Roemer, 1994)—Mike hangs pictures by his children and Jill displays a geometric graphic of a difficult problem that she solved. None of them need to worry about censure for having clutter or even nonwork related items—such as a chess game lying around. These people exist in an academic research setting. Other studies show that work spaces in the private business world are more rigid in the symbolic nature of artifacts.

### CORPORATE CULTURE

Although it is easy to see that people should be given resources as needed to do their work, and that environment is a part of social practice, corporate culture often operates on a different plane. Office space and furnishings are commonly used as a part of the hierarchy, symbolically noting an individual's importance in the structure (Becker & Steele, 1995; Duffy, 1992; Fischer, 1997). Warren (1997) argues that "your workspace is the biggest clue to your rung on the corporate ladder." There are all sorts of environmental indicators of status: not only whether or not plants are provided but also what size and variety; whether or not "art" is provided, what kind, how many mats, and how fancy the frame; whether the chair has armrests, an adjustable seat, how much padding; and many other items. There were no plants, no "art," and only plastic trash cans in Jill, Tim, and Mike's cubicle, although their chairs were padded and had adjustable arms and seats. Many corporations and the federal government have entire books that spell out the size and quality of the items in each office (for up to sixteen categories of employees for the federal government). Not surprisingly, researchers have found that environmental satisfaction and job satisfaction both have a strong positive correlation with rank (Sundstrom et al., 1994). This linking of desirable physical amenities to rank is what new office design theories are arguing against.

Personal control of workspace, flexibility, and personalization are often regulated by management, even at the level of the individual's work space (Becker & Steele, 1995; Duffy et al., 1993; Fischer, 1997). The question becomes not whether something is possible but whether it is allowed. Hall and Hall (1975) noted complaints about this at the Deere headquarters. Others have also described regulations that did not allow any

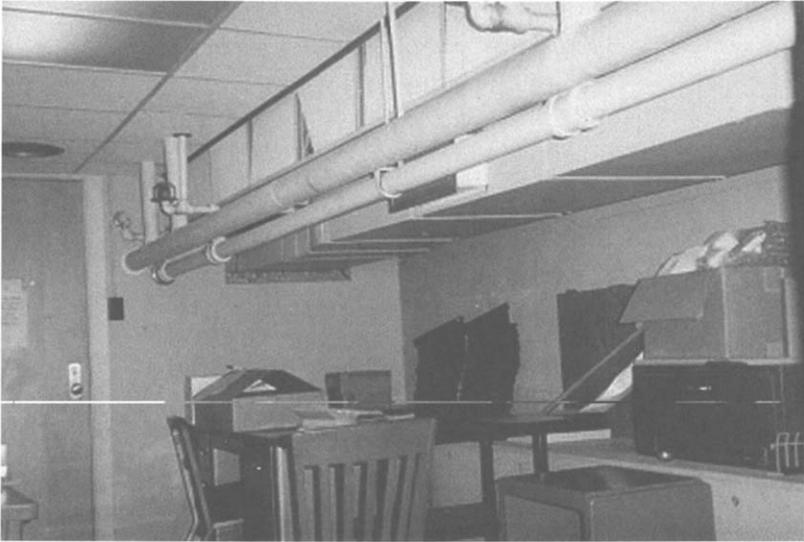


Figure 4. The Symbolic Message of Exposed Plumbing and Few Resources in an Underground Office is Very Different Than. . .

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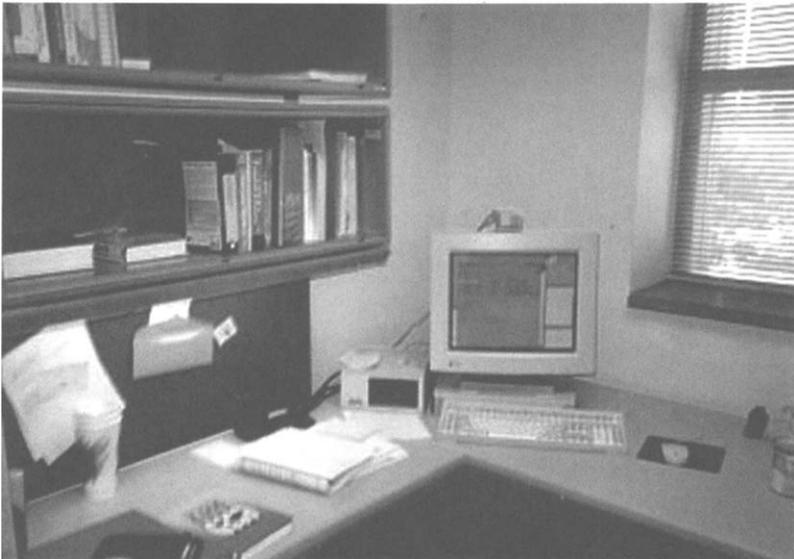


Figure 5. The "Messages" of State-of-the-Art Computer Equipment, Shelving, and Desk Space.

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personalization to be visible to the public. However, employees in some offices did not mind minimizing personal effects that they felt would damage the public image of the office (Scheiberg, 1990).

Issues of control are not only important aspects of material culture, but they tie into verbal and ritual lore as well. Many stories in work settings focus on attempts by institutions to try to exert control over members and on hero stories and trickster tales about how people have overcome or dealt with these pressures. Perhaps just telling the story to others is a coping mechanism. For example, one anonymous contributor to the Web site dedicated to boss horror stories (<http://www.myboss.com>) describes an encounter with her or his boss: "My Boss encouraged me to do something that was clearly illegal. When I resisted, he said, 'Don't be a sissy. There's no need to worry unless there's an investigation'" (anonymous, 1998). Similarly, people share rituals about how to "really" get work done in ways that are not part of the official process of doing things.

Managerial control often reaches beyond formal rules that employees are asked to follow into the spaces they occupy. Cubicles are a "perfect example of a structure designed to assure the invariable control of its occupier" (Gordon, 1998, p. 18). Gordon cites Michel Foucault's theories discussing the structuring of buildings and space to discipline or control the people within them. He examined the development of the modern-day prison, which is designed so that there are points of control where all prisoners can be viewed, but prisoners in turn do not have an all-encompassing view. Cubicles fit into Foucault's panopticon in that they are mostly open, any conversation can be overheard, and many walls are low so they can be looked over. As Gordon (1998) points out:

What is most intriguing and insidious about the cubicle is that there is no identifiable site of control: no boss stands at the door to secure compliance, no executive continually inspects one's work. No monitor is needed. The mere *possibility* that a person from a higher echelon or even a co-worker will overhear a discussion or notice an employee resting, is sufficient to ensure that the corporation's standards, customs, restrictions and prohibitions are observed. (p. 19, italics in the original)

Management often prefers this means of control despite studies that show autonomy, flexibility, and privacy to be linked to higher performance and satisfaction (Becker & Steele, 1995; Duffy, 1992). There are examples of management installing technology to monitor employees movements and work, which is actually at the expense of efficiency (Sachs, 1995).

The partitioning of space can be seen as making ideological distinctions in domains of control, centers of activity, and ownership and belonging. One study indicates the connections between gender and space in a discussion of women's employment patterns in Worcester, Massachusetts (Hanson & Pratt, 1995). What is particularly relevant about this work is

that the authors bring post-modern, critical theory, feminist, post-structuralist discussions of locality, exile, ownership of space, geography, and nationality back down to a concrete study of how space and distance affect women's employment opportunities. They consider how spheres of action are embedded in space with the women's sphere being in the home. The abstract "embodied" or "situated" knowledge becomes very concrete in mapping the radius where women traditionally find jobs. This research stands as a reminder that any representation of space necessarily implies a vantage point, and that concerns about mapping, territories, mobility, and containment must be brought to any research of the folk practices in a particular environment (Wood, 1992). Spaces can devalue the experiences of some members of society.

Simply walking onto the floor that Jill, Tim, and Mike work on is enough to testify to the way even six foot high cubicles contribute to surveillance and control. All sounds, even the clack of keyboards, permeate the walls. I witnessed a discussion over cubicle walls about who had what illness based on who had been heard sneezing or coughing across the entire floor of some thirty people. This kind of interaction can be useful—e.g., Mike took advantage of the fact that everyone could hear him ask his question at the same time and could immediately answer him about the whereabouts of the blue-covered thesis he wanted. In addition, there is some anonymity in the fact that everyone and his or her actions are always audible. While office gossip is probably a dangerous indulgence in this setting, it is difficult to tell precisely which exact person is making what sounds. For example, with the door closed, the sounds of typing could indicate that any or all members of the cubicle are hard at work. Hero and trickster tales circulate about the range of activities that employees are able to get away with in this setting, from playing computer games all day to sleeping.

Recent recommendations in architecture and business management literature emphasize backing off from constant control and rigid symbolism of space and artifacts. There are frequent calls for multiple spaces for work of different sorts to take place (Bleeker, 1991, 1994; Duffy, 1992; Fischer, 1997; Gunn & Burroughs, 1996). For example, Becker and Steele (1995) suggest providing lounges for informal conversations, rooms with large tables for group work, and quiet spaces for reading, as well as cubicles for computer work. They describe a building in Sweden in which all levels of employees participated in the design and building process. It has many different sorts of spaces for people to work, and employees are free to move about from lounge chairs for reading or making calls, to an open cafeteria with computer terminals. The appearance of business in the United States will need to be renegotiated in order for spaces such as lounge chairs to be occupied without fear of reprisal (Becker & Steele, 1995; Henson, 1996). Researchers argue, continuing a debate of decades,

that it is in a business's best interests to encourage and support employees' personalizing their space, and to find ways to make potentially alienating general areas more friendly.

As others have testified, the appearance of "busy-ness" (sitting at a desk and writing, typing, reading, or shuffling papers) is sometimes more important than getting anything done at all (Henson, 1996). Duffy, Laing, and Crisp (1993) note that, although Scandinavia has a long tradition of participatory design (so the exemplary building in Sweden is not surprising), this kind of design is not feasible for other parts of the world and for large-scale businesses. However, the marketplace is pushing for more flexible space that will accommodate rapidly reconfigured teams, more mobile workers, and fewer resources spent on buildings. The result is the same: a space where many of the hierarchical trappings of office space are removed to be replaced by uniformly sized offices with mobile walls and multi-use informal spaces (Becker & Steele, 1995; Bleeker, 1991, 1994; Duffy et al., 1993). This philosophy of work and thus workplace design is beginning to catch on, while at the same time there is a call to be rid of the workplace as the main setting of work altogether.

## CONCLUSION

New ideas about de-localizing work have taken on a trendy aura. The theory is that you can work anywhere, at your, or your customer's, convenience. The underlying assumption is that the place where you are working is unimportant; a table in your kitchen or a seat on an airplane is as good as an office, and all the necessary resources move easily with the individual worker.

This trend of removing people from an environment usually associated with working and into a sort of "anyspace" that individual workers create is disturbing given all the research and literature about the numerous ways that environment *does* matter. Environments are more than just backdrops; these are embodiments of culture, social practices, and knowledge. The implications of removing people from particular locales of work have not been deeply explored, nor is there much known about how this might change the way work is done and how folk practices change as well—e.g., those associated with workplace community and with information storing, finding, and reminding.

Studies reviewed here show that many elements important to accomplishing work, including changes in managerial structure (Griffith, 1995), will be altered or missing when work is removed from the office. Telecommuting is heralded as the answer for mothers who need or want to stay home with children but who also want to work. But what happens to the important issue of control over work space? How many homes are equipped with a room devoted exclusively to office space? When a different space is co-opted, work cannot be left out, nor can the "office landscape"

that Schneider and Rice (1996) and Kwasnik (1991) described be established. Knowledge that is a part of the piles and files that Soper (1976) and Barreau (1995) discuss cannot be built up. Parts of people's lives, home, and work which have been kept separate for this particular type of work for the last fifty years come together, sometimes with jarring results (Hanson & Pratt, 1995). Multiple work and home identities are intermingled; time and work spent on otherwise separate tasks overlap with the result of overwhelming and literally dislocating people. But some workers, such as traveling salespeople, have always had to juggle work and home identities, and perhaps the telecommuting option could be extended to those whose work makes it appropriate (Griffith, 1995). Allowing people who do isolated work to join their peers via the Internet can be a positive change.

The work group that Jill, Tim, and Mike belong to has an extensive Web site and tools for online collaboration, such as a Web board for discussion of work, and a specific protocol for posting draft papers which other group members can then read and comment on electronically. Each of them noted that e-mail was probably the most common means of communication among their fellow workers, even though they all occupy the same cubicle warren. They noted that this was because many people worked at home at least part of the time, and that group members worked at radically different times of the day. The Web and e-mail are also used for collaboration with another group on the other side of the country, although, for privacy issues, there is a parallel site for "outsiders" to use. "Teleworking" is a large part of their work practices, yet they are obviously not even close to being completely a "virtual organization."

Being part of an electronic community has been more extensively studied and discussed. The metaphor for an online environment is, of course, "cyberspace." Electronic communities have become commonplace as more and more people participate and interact on the net. Some elements of physical space and face-to-face interaction are reproduced with interesting transformations, while other new environmental factors are created (Rheingold, 1993).

For example, one study (Correll, 1995) described a chatroom called the "lesbian cafe." It was designed as a place for lesbians to chat and meet, especially for people who would not otherwise get to meet because of physical distance, a common element to communities on the Net. However, in this particular group, members began to incorporate in their "chatting" (literally typing) physical elements such as a bar, drinks, a fireplace, and chairs. When someone familiar with the group would log on, she would begin the session by typing something like "I am sitting at the bar and have ordered a martini." In the same vein, Baym (1995a, 1995b) described a newsgroup devoted to the discussion of daytime soap operas. She described how, through their interaction, these aficionados have de-

veloped a strong sense of community and membership. There is a definite distinction between insiders and outsiders in this group and a structure to the community. Both of these "electronic communities" are examples of people who came together over the Net when physical space actually separated them. This interaction is supported in electronic space but not physical space, and these are just two of many examples of similar interactions. System designers have been increasingly interested in addressing social aspects of interaction that are taken for granted in the real world but prove to be a stumbling block in the electronic realm, and the roles of physical conventions are debated (Ackerman, 1994, 1995; Erickson, 1997; Fertig, Freeman, & Gelernter, 1996; Twidale & Nichols, 1996). Supporters of this new communication technology say the beauty of the Internet is that space no longer creates a barrier.

On the other hand, one interesting element of the lesbian cafe example is how physical objects are invoked in order to help create a social order. People naturally "gather" around the "fireplace." The sensibilities of the physical world play a large part in mediating how people interact in many of these online spaces. MOOs and MUDs are also spatially organized, they are room-based, which has consequently extended to buildings and cities and even to a complete copy of the Starship Enterprise. "Navigation" is the metaphor for "moving" through cyberspace, although along with the sea-faring language, there is a mixed bag of other images linked to space and movement—"superhighway," "surfing," "paths," and "sites."

In all of this talk and use of the Internet, there is also a literature that discusses how communication "bandwidth" is diminished. The "reduced cues" school of computer mediated communication has studied how communication via computer removes the tacit and intangible interactions in face-to-face communications. Some of these elements are re-encoded in other parts of the media (for example, looking at someone's e-mail address to note where they are from). There are many studies of the use of new electronic systems, or the needs of particular user communities of information resources and what happens when some of these resources or systems are implemented electronically (see Bishop & Star, 1996, for an overview). However, there is not much research or discussion on how spatial elements are lost in the computer environment. As Nardi and Barreau (1997) point out, the computer is limited in how well it deals with particular mixes of documents that are not a problem in real life. Yet, "reduced cues" in the spatial sense have not been picked up as a topic of research. People just don't know what the implications are of trying to create a sense of place online, especially in the sense of actually replacing physical spaces with virtual spaces.

If space is seen as embedding ideological distinctions about control, ownership, and belonging, the movement of work out of particular

locations should also be analyzed in these terms. Having a space to call one's own becomes a matter of survival, affirmation, and bonding for people who are often overlooked or pushed aside by society. It is not clear whether old hierarchical patterns will continue as work moves into an online environment, whether the experience of new groups will be ignored, or which groups will benefit from the use of technology. This is an important question that is exacerbated by the absence of physical space because the lack of representation may be even more indiscernible.

#### *Toward a Folklore of Information Work Space*

A folkloristic study of space includes such elements as studying how people delineate space, how they create boundaries, how the space that they occupy affects interaction as well as how interaction and individuals modify space. It includes how people organize their things, how people spatially orient themselves in terms of accessing things and accomplishing tasks, how people manage their environmental resources, and how people personalize their spaces. It is important to understand how folk groups organize themselves and their things in the environment because it reveals their values and the logic of their system of beliefs. Analysis of artifacts may reveal certain aspects of the culture of a folk group that would not be available to a researcher in any other way. Finally, with an eye toward the future, researchers should examine what, if any, of these practices carry over in an online environment, what new spatial practices and speech conventions are emerging, and how these will affect the folk groups and communities involved.

#### NOTES

- <sup>1</sup> All such anecdotes are drawn from fieldwork I did in 1996 while studying the work practices and the use of information resources of physicists. That work was supported by the NSF/ARPA/NASA Digital Library Initiative under contract number NSF 93-141 DLI.

#### REFERENCES

- Ackerman, M. S. (1994). Augmenting the organizational memory: A field study of Answer Garden. In *Proceedings of the ACM conference on computer supported cooperative work (CSCW'94)* (pp. 243-252). New York: ACM Press.
- Ackerman, M. S., & Starr, B. (1995). Social activity indicators: Interface components for CSCW systems. In *Proceedings of the ACM symposium on user interface software and technology (UIST'95)* (pp. 159-168). New York: ACM Press
- Anonymous. (1998). Crazy quotes, entry number 2. Retrieved October 25, 1998 from the World Wide Web: <http://www.myboss.com>.
- Armstrong, D. M. (1992). *Managing by storying around*. New York: Doubleday Dell Publishing.
- Babcock, B. (1992). Artifact. In R. Bauman (Ed.), *Folklore, cultural performances, and popular entertainments: A communications-centered handbook* (pp. 204-216). New York: Oxford University Press.
- Barreau, D. K. (1995). Context as a factor in personal information management systems. *Journal of the American Society for Information Science*, 46(5), 327-339.
- Baym, N. K. (1995a). The emergence of community in computer-mediated communication. In S. G. Jones (Ed.), *CyberSociety: Computer mediated communication and community*. Thousand Oaks, CA: Sage.

- Baym, N. K. (1995b). From practice to culture on usenet. In S. L. Star (Ed.), *Cultures of computing*. Oxford, England: Basil Blackwell.
- Becker, F., & Steele, F. (1995). *Workplace by design*. San Francisco, CA: Jossey-Bass.
- Beyer, J. M., & Trice, H. M. (1988). The communication of power relations in organizations through cultural rites. In M. Jones, M. Moore, & R. Snyder (Eds.), *Inside organizations: Understanding the human dimension* (pp. 141-157). Beverly Hills, CA: Sage.
- Biner, P. M.; Butler, D. L.; Lovegrove, T. E.; & Burns, R. L. (1993). Windowlessness in the workplace: A reexamination of the compensation hypothesis. *Environment and Behavior*, 25(2), 205-227.
- Bishop, A. P., & Star, S. L. (1996). Social informatics for digital library infrastructure and use. In M. E. Williams (Ed.), *Annual review of information science and technology*, 30, 301-401.
- Bleeker, S. E. (1991). The information age office. *The Futurist*, January-February, 18-20.
- Bleeker, S. E. (1994). The virtual organization. *The Futurist*, March-April, 9-13.
- Block, L., & Stokes, G. (1989). Performance and satisfaction in private versus nonprivate work settings. *Environment and Behavior*, 21, 277-297.
- Boje, D. M. (1991). The storytelling organization: A study of story performance in an office-supply firm. *Administrative Science Quarterly*, March, 106-127.
- Brand, S. (1994). *How buildings learn: What happens after they're built*. New York: Penguin Books.
- Correll, S. (1995). The ethnography of an electronic bar: The lesbian cafe. *Journal of Contemporary Ethnography*, 24(3), 270-298.
- Dorson, R. M. (Ed.). (1972). *Folklore and folklife: An introduction*. Chicago, IL: University of Chicago Press.
- Duffy, F. (1992). *The changing workplace*. London: Phaidon Press Ltd.
- Duffy, F.; Laing, A.; & Crisp, V. (Eds.). (1993). *The responsible work-place: The redesign of work and offices*. Oxford, England: Butterworth Architecture.
- Dundes, A. (1983). Office folklore. In R. M. Dorson (Ed.), *Handbook of American folklore* (pp. 115-120). Bloomington: Indiana University Press.
- Dundes, A., & Pagter, C. R. (1987). *When you are up to your ass in alligators... More urban folklore from the paperwork empire*. Detroit, MI: Wayne State University Press.
- Dundes, A., & Pagter, C. R. (1996). *Sometimes the dragon wins: Yet more urban folklore from the paperwork empire*. Syracuse, NY: Syracuse University Press.
- Ehn, P. (1988). *Work oriented design of computer artifacts*. Stockholm, Sweden: Arbetslivcentrum.
- Erickson, T. (1997). Supporting interdisciplinary design: Towards pattern languages for workplaces, Retrieved February 11, 1999 from the World Wide Web: [http://www.pliant.org/personal/Tom\\_Erickson/Patterns.Chapter.html](http://www.pliant.org/personal/Tom_Erickson/Patterns.Chapter.html).
- Fertig, S.; Freeman, E.; & Gelernter, D. (1996). "Finding and reminding": Reconsidered. *SIGCHI Bulletin*, 28(1). Retrieved April 24, 1998 from the World Wide Web: <http://www.acm.org/sigchi/bulletin/1996.1/fertig.html>.
- Fischer, G. (1997). *Individuals and environment: A psychosocial approach to workspace*. New York: Walter de Gruyter.
- Gasser, L. (1986). The integration of computing and routine work. *ACM Transactions on Office Information Systems*, 4(3), 205-225.
- Glassie, H. (1983). Folkloristic study of the American artifact: Objects and objectives. In R. M. Dorson (Ed.), *Handbook of American folklore* (pp. 376-383). Bloomington: Indiana University Press.
- Glassie, H. (1972). Folk art. In R. M. Dorson (Ed.), *Folklore and folklife: An introduction* (pp. 253-280). Chicago, IL: University of Chicago Press.
- Gordon, N. (1998). The cubicle-ization of the workforce. *Chicago Tribune*, 29 January, Section I, p. 13.
- Gray, M.; Hodson, N.; & Gordon, G. (1993). *Teleworking explained*. New York: John Wiley and Sons.
- Green, A. (1993). Boss, workman, wife: Sneaking-home tales. *Journal of American Folklore*, 106(420), 156-170.
- Griffith, C. (1995). What's wrong with telecommuting? *Information Today*, December, 20-21.
- Gunn, R. A., & Burroughs, M. S. (1996). Work spaces that work: Designing high-performance offices. *The Futurist*, March-April, 19-24.

- Hall, M. R., & Hall, E. T. (1975). *The fourth dimension in architecture: The impact of building on behavior*. Santa Fe, NM: Sunstone Press.
- Hanson, S., & Pratt, G. (1995). *Gender, work and space*. New York: Routledge.
- Henson, K. D. (1996). *Just a temp*. Philadelphia, PA: Temple University Press.
- Hodgkinson, S. (1993). Environmental issues and the workplace. In F. Duffy, A. Laing, & V. Crisp (Eds.), *The responsible workplace: The redesign of work and offices* (pp. 98-111). Oxford, England: Butterworth Architecture.
- Hutchins, E. (1995). *Cognition in the wild*. Cambridge, MA: MIT Press.
- Keller, C. M., & Keller, J. D. (1996). *Cognition and tool use: The blacksmith at work*. New York: Cambridge University Press.
- Kwasnik, B. H. (1991). The importance of factors that are not document attributes in the organization of personal documents. *Journal of Documentation*, 47(4), 389-398.
- Kyng, M., & Mathiassen, L. (Eds.). (1997). *Computers and design in context*. Cambridge, MA: MIT Press.
- Laing, A. (1993). Changing business: Post-Fordism and the workplace. In F. Duffy, A. Laing, & V. Crisp (Eds.), *The responsible workplace: The redesign of work and offices* (pp. 33-43). Oxford, England: Butterworth Architecture.
- Lawrence, D. L., & Low, S. M. (1990). The built environment and spatial form. *Annual Review of Anthropology*, 19, 453-505.
- Leaman A., & Borden, I. (1993). The responsible workplace: User expectations. In F. Duffy, A. Laing, & V. Crisp (Eds.), *The responsible workplace: The redesign of work and offices* (pp. 16-32). Oxford, England: Butterworth Architecture.
- Lipnack, J., & Stamps, J. (1997). *Virtual teams: Reaching across space, time and organizations with technology*. New York: John Wiley and Sons.
- Latour, B. (1988). *The Pasteurization of France*. Cambridge, MA: Harvard University Press.
- Malone, T. W. (1983). How do people organize their desks? Implications for the design of office information systems. *ACM Transactions on Office Information Systems*, 1, 99-112.
- Mitchell, R. (1983). Occupational folklore: The outdoor industries. In R. M. Dorson (Ed.), *Handbook of American folklore* (pp. 128-135). Bloomington: Indiana University Press.
- Nardi, B., & Barreau, D. (1995). Finding and reminding: File organization from the desktop. *SIGCHI Bulletin*, 27(3). Retrieved April 24, 1998 from the World Wide Web: <http://www.acm.org/bulletin/1995.3/barreau.html>.
- Nardi, B., & Barreau, D. (1997). "Finding and reminding" revisited: Appropriate metaphors for file organization at the desktop. *SIGCHI Bulletin*, 29(1). Retrieved February 12, 1999 from the World Wide Web: <http://www.acm.org/sigchi/bulletin/1997.1/nardi.html>.
- Neuhauser, P. C. (1993). *Corporate legends and lore: The power of storytelling as a management tool*. New York: McGraw-Hill, Inc.
- Nickerson, B. E. (1983). Factory folklore. In R. M. Dorson (Ed.), *Handbook of American folklore* (pp. 121-127). Bloomington: Indiana University Press.
- Norman, D. (1993). *Things that make us smart: Defending human attributes in the age of the machine*. Reading, MA: Addison-Wesley Publishing Co.
- Oldham, G. (1988). Effects of changes in work space partitions and spatial density on employee reactions: A quasi-experiment. *Journal of Applied Psychology*, 73(2), 253-258.
- O'Neill, M. J. (1994). Work space adjustability, storage, and enclosure as predictors of employee reactions and performance. *Environment and Behavior*, 26(4), 504-526.
- Orr, J. E. (1996). *Talking about machines: An ethnography of a modern job*. Ithaca, NY: Cornell University Press.
- Paepcke, A. (1996). Information needs in technical work settings and their implications for the design of computer tools. *Computer Supported Cooperative Work: The Journal of Collaborative Computing*, 5, 63-92.
- Rheingold, H. (1993). *The virtual community: Homesteading on the electronic frontier*. New York: Addison-Wesley.
- Roberts, W. E. (1972). Folk architecture. In R. M. Dorson (Ed.), *Folklore and folklife: An introduction* (pp. 281-294). Chicago, IL: University of Chicago Press.

- Roemer, D. M. (1994). Photocopy lore and the naturalization of the corporate body. *Journal of American Folklore*, 107(423), 121-138.
- Sachs, P. (1995). Transforming work: Collaboration, learning, and design. *Communications of the ACM*, 38(9), 36-44.
- Scheiberg, S. L. (1990). Emotions on display: The personal decoration of work space. *American Behavioral Scientist*, 33(3), 330-338.
- Schneider, S., & Rice, R. E. (1996). *Desktop and electronic landscapes: Individual adjustment to new information systems*. Unpublished manuscript. SCILS, Rutgers University.
- Shapin, S., & Schaffer, S. (1985). *Leviathan and the air-pump: Hobbes, Boyle, and the experimental life*. Princeton, NJ: Princeton University Press.
- Soper, M. E. (1976). Characteristics and use of personal collections. *Library Quarterly*, 46(4), 397-415.
- Spreckelmeyer, K. F. (1993). Office relocation and environmental change: A case study. *Environment and Behavior*, 25(2), 181-204.
- Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, "translations" and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science*, 19(3), 387-420.
- Star, S. L., & Strauss, A. (1999). Layers of silence, arenas of voice: The ecology of visible and invisible work. *Computer-Supported Cooperative Work: An International Journal*, 8(1/2), 1-30.
- Suchman, L. (1995). Making work visible. *Communications of the ACM*, 38(9), 56-65.
- Suchman, L. (1987). *Plans and situated action: The problem of human machine communication*. Cambridge, MA: Cambridge University Press.
- Sundstrom, E.; Town, J. P.; Rice, R. W.; Osborn, D. P.; & Brill, M. (1994). Office noise, satisfaction, and performance. *Environment and Behavior*, 26(2), 195-222.
- Tenkasi, R. V., & Boland, R. J. (1993). Locating meaning making in organizational learning: The narrative basis of cognition. *Research in Organizational Change and Development*, 7, 77-103.
- Toelken, B. (1996). *The dynamics of folklore*. Logan: Utah State University Press.
- Tommerup, P. (1988). From trickster to father figure: Learning from the mythologization of top management. In M. Jones, M. Moore & R. Snyder (Eds.), *Inside organizations: Understanding the human dimension* (pp. 319-331). Beverly Hills, CA: Sage.
- Traweek, S. (1988). Beam times and life times: The world of high energy physicists. Cambridge, MA: Harvard University Press.
- Twidale, M., & Nichols, D. M. (1996). Collaborative browsing and visualisation of the search process. *Aslib Proceedings*, 48(7-8), 177-182.
- Vischer, J. C. (1996). *Workspace strategies: Environment as a tool for work*. New York: Chapman and Hall.
- Warren, E. (1997). Where do you stand? *Chicago Tribune*, section 2, July 1, pp. 1, 4-5.
- Wichroski, M. R. (1994). The secretary: Invisible labor in the workworld of women. *Human Organization*, 53(1), 33-41.
- Wollman, N.; Kelly, B.; & Bordens, K. (1994). Environmental and interpersonal predictors of reactions to potential territorial intrusions in the workplace. *Environment and Behavior*, 26(2), 179-194.
- Wood, D. (1992). *The power of maps*. New York: The Guilford Press.