BOOK REVIEWS

Cyburgs

The Virtual Community. Homesteading on the Electronic Frontier. HOWARD RHEINGOLD. Addison-Wesley, Reading, MA, 1993. x, 325 pp. $22.95.

Over the past decade, increasing numbers of people have communicated intensively over Internet and other computer networks, developing enduring social relationships with people they may never see in the flesh, thereby creating "virtual communities." Existing only in cyberspace, these cyburgs (as I suggest we call them) might function like small towns, providing a sense of participation in a meaningful human group as well as performing practical functions such as exchange of valuable information, development of new subcultures, and mobilization of collective energies for political action. Traditional sociology has been skeptical of the power of disembodied communication, believing that social structures require frequent face-to-face interactions among members. However, the sheer volume and variety of communications that individuals may transport over the Information Superhighway could be sufficient to build effective cyburgs, so in the absence of really good social-scientific studies this journalistic survey is a good introduction to what may become an important aspect of society.

Today, many scientific collaborations are conducted largely by e-mail, and as frequency and importance of communications increase participants may generate a significant social bond. The potential for real community arises when several people communicate simultaneously, in "real time," and share significant emotional experiences over an extended period. An Internet Relay Chat (IRC) is one variety of written conversation, usually oriented toward a particular topic area of interest. A Multi-User Dungeon (MUD) is a real-time, on-line fantasy game in which players adopt alternate identities and may invest weeks of time exploring, competing, and developing resources in an exotic world with its own peculiar rules and denizens. *Messageries roses*, to use the French term, are sex-chat services in which participants can interact erotically at a distance, with the added dimension that people may misrepresent any of their actual characteristics, and some commercial services have hired men to pretend to be compliant women to attract other men to become customers. Scientific and scholarly systems are generally run as listserves or bulletin boards, on which individuals post messages to be received by others at a later time, thus avoiding the emotional stimulation of quick conversations while increasing the likelihood that participants will think carefully and do serious work.

Rheingold asserts that the technical opportunities for cyburgs were created by unconventional people with rare communal visions, but this is a hypotheses that can be confirmed or disconfirmed only by systematic historical research. His own experience came from a San Francisco conferencing system called the WELL, built by the Whole Earth Catalog with contributions from the Hog Farm commune and Grateful Dead fans, so it is not surprising that he believes the Net was largely created by remnants and successors of the 1960s counterculture. At the same time he recognizes that the chief Internet builders were the Advanced Research Projects Agency and the National Science Foundation, two mainstream government agencies. While suggesting that the creators of the personal computer were members of the counter-culture, chiefly citing the Apple and Lotus corporations, he acknowledges the leading roles of IBM and Microsoft. The role of radicals in new scientific and technological achievements is a social-scientific question of significant interest, but it may be greatly exaggerated by popular reports that emphasize uninhibited excitement.

Another troublesome theory, repeated throughout the book, is the notion that Western society has suffered a dramatic historical loss of community, greatly caused by modern technology. It is one thing to express the value judgment that modern society does not have enough community, but it is quite another to state as fact the proposition that our great-grandparents lived in a world that bound the individual into satisfying and all-encompassing social relationships. Research by historical demographers and sociologists indicates that we have lived for centuries in fluid, constantly changing social environments that bear little resemblance to the romantic villages espoused by Rheingold's communards.

Rheingold believes that the distributed communications of the Net, into which millions of users may contribute their own uncensored messages, may counteract a powerful tendency toward concentration of world culture in the hands of a very few monopolistic mass-media corporations. At the same time, he recognizes three ways in which improper development of the Net could do harm: (i) commercialization could turn all public information into advertisements for commodities; (ii) the new technologies could be used for surveillance and control of individuals; and (iii) the Net could become a web of illusion in which people have lost the capacity to discern the real from the virtual. This book is valuable as a compendium of social questions, and as a general factual introduction to life in cyberspace.

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Actualizing Technologies

What Machines Can't Do. Politics and Technology in the Industrial Enterprise. ROBERT J. THOMAS. University of California Press, Berkeley, 1994. xviii, 314 pp., illus. $45 or £28; paper, $16 or £10.95.

The new microelectronic technologies for production afford U.S. manufacturers the opportunity to improve productivity by decentralizing authority in the workplace. In its May 1994 fact-finding report, the presidential Commission on the Future of Worker-Management Relations (or Dunlop Commission) claimed that interest in participatory employment arrangements will grow as the educational level of the labor force and global economic pressures increase and as "technology creates more opportunities to share information and delegate decisionmaking authority."

Workplace decentralization, however, is not a foregone conclusion of the new technologies. These technologies harbor a potential both for expanding workers' control of production decision-making and for maximizing the capacity of management to monitor and control the activities of workers. *What Machines Can't Do* is an innovative treatment of factors that affect how this potential will be realized.

The author spent three years combing company archives and conducting some 300 interviews with employees of four U.S. manufacturers about technological changes that occurred during the 1980s. The four

manufacturers, three of which are unionized, produce, respectively, commercial aircraft, computers and electronics, aluminum products, and automobile parts.

The four case studies show that technological choice and change were partly influenced by politics within the corporations. As different occupational groups jockeyed for status, recognition from superiors, and career advancement opportunities, their actions determined the course of technological change. In the case of the aircraft manufacturer, for example, the operations manager faced a choice between a proposal from the shop superintendents for a computer-controlled, multishop system for storing and retrieving parts and a proposal from the engineers in the research-and-development department for a flexible machining system (FMS). The system proposed by the shop superintendents would have increased their control over scheduling and improved their ability to cope with unpredictable demands from the engineering department. The R&D engineers preferred the FMS because it would reduce costs and production personnel as well as allow them to distinguish themselves in the company by doing "real engineering" or creative work. Distinguishing themselves in this way, they felt, would raise their status to the level of the higher-paid product designers. The operations manager, who was subsequently promoted to a higher position in the company, opted for the FMS not only because of its efficiencies but because he "wanted to be the guy who did it first" (p. 55) in order to advance his career in the company.

The case of the computer and electronics firm also illustrates how organizational politics drives technological innovation. The manufacturing engineers, envious of the higher status enjoyed by the product engineers in the firm, attempted to enhance their own status by developing a new surface-mount technology (SMT) to replace the old through-hole assembly of printed circuit boards. Developing SMT would allow the manufacturing engineers "to be real engineers and to gain currency or value in the [firm's] status system dominated by products and invention" (p. 101). Resistance by corporate management to innovations in production technology, however, hindered SMT development, which also competed with new computer-integrated manufacturing systems in the firm. Undaunted, and utilizing preexisting social networks of manufacturing engineers in the several geographically dispersed product divisions of the company, the manufacturing engineers surreptitiously mounted an effort to develop SMT in defiance of corporate management orders. The idea of SMT eventually percolated upward in the company but was coopted by corporate management, whose long-standing desire to centralize and standardize production processes in the product divisions was served by the deployment of SMT. The manufacturing engineers failed to achieve a higher status because "the design labs moved quickly to absorb the new technology and to reassert their authority in the determination of manufacturing procedures" (p. 132).

Thomas extracts a new "power-process perspective" of organizational change from the four case studies. This perspective, rather than constituting a theory with testable hypotheses, sensitizes researchers to the dynamic relationship between technology and organizational change. According to the power-process perspective, the "political hand" of interoccupational rivalry can shape technological and organizational changes and choices "when sufficient desire, opportunity, and resources are available" (p. 234). The new perspective is a synthesis of the leading technological-determinism and social-choice perspectives on organizational change. Technological determinism views technology as an external force with a known, uniform impact on the organization; according to the social-choice perspective, in contrast, technological and organizational changes result from choices made by organizational leaders whose interpretations of the external organizational environment guide their decisions. In the power-process perspective, the fact that a given technology has known production capabilities enables occupational rivals within a corporation to use it to advance their interests, and the indeterminacy of the effects of new production technologies on organizations stems from the constraints imposed on their selection, implementation, and configuration by the history of interoccupational politics within firms.

The power-process perspective as exemplified in these case studies neglects the origins of occupational interests and the conditions that cause them to vary and to be expressed. The interests of engineers, for example, may stem as much from the professional socialization they experienced in engineering school as from the web of bureaucratic rules spun within the firms that employ them. Further research on the origins of occupational interests and how they vary across corporations will enhance the predictive power of the power-process perspective.

What Machines Can't Do is a welcome documentation of the human side of technological innovation. Greater sensitivity to the politics of technological change will help corporations innovate more effectively and humanely.

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Vignettes: Medical Wisdom

Benjamin Rush, writing on diseases of the mind in 1812, referred to cases of excessive sexual appetite and their treatment. He believed that one remote cause was "excessive eating, more especially of highly seasoned animal food," and that treatment should include "a diet, consisting simply of vegetables, without any of the condiments that are taken with them." He added that Dr. Stark, who had reported the results of his own dietary experiments, "found his venereal desires almost extinguished by living upon bread and water." This was perhaps not surprising, since he died as a result of this self-experimentation, probably of scurvy.

—*Kenneth J. Carpenter*, in *Protein and Energy: A Study of Changing Ideas in Nutrition* (Cambridge University Press)

In 1939, when I was a medical student, my professor of pharmacology showed the class a bottle of Prontosil (the German sulfonamide drug just coming into wide use in the United States). "Gentlemen," he said, "this will work. And do you know why it will work?" [*dramatic pause*] "Because it's red!" These skeptical words about the hope for anything more than a placebo effect of this first of the modern antibacterial drugs and, in fact, all the lectures in pharmacology I attended, reflected an attitude of "therapeutic nihilism." The usual teaching in American medical schools more than 50 years ago was, in essence, "Don't just do something, stand there!"

—*William A. Silverman*, in *Doing More Good Than Harm: The Evaluation of Health Care Interventions* (New York Academy of Sciences)