is that of individualism, in the sense not simply that people are important but that the individual is seen as the ultimate source of value and meaning. In America, a person's career, religion, politics, spouse, children, and life-style are supposed to reflect his or her own purposes, motives, and desires and be valuable because they raise the person's sense of self-worth through furthering personal growth.

Habits of the Heart (the phrase is de Tocqueville's term for the mores and traditions of a nation) argues that the original individualism for which the United States was celebrated did provide meaning for people's lives, because individual fulfillment was seen as tied to the creation of a valued religious and political community. Economic careerism and independent political activity were viewed as important parts of the evolving society, and commitment to self was thus also commitment to collective goals. But these biblical and republican traditions of individualism have eroded into instrumental and expressive individualism that takes the form of a never-ending search for a self-activated self. Now "the individual can only rarely and with difficulty understand himself and his activities as interrelated in morally meaningful ways with those of other, different Americans" (p. 50).

This analysis is structured around conversations with 200 white middle-class Americans in which the authors talked with them about their careers, families, life-styles, and understanding of their own lives. Much of the analysis centers on work as the core of the crisis. The authors find, as have many before them, that people tend to work for success in accumulating power, money, and position but not for the substance or end of work itself. There is no sense of "calling" for people in their work, and so work provides no sense of meaning or commitment to a community of others. Other studies in this tradition that have reached this conclusion have argued that individuals can compensate for the lack of meaning provided by work through emphasis on family, religion, politics, or life-style. *Habits of the Heart* finds that the problem is not so simply solved.

The book analyzes these other activities to show how instrumental and expressive individualism dominates them too. Rich and insightful analyses of love and marriage, life-style enclaves, modern therapy, religion, and political movements are developed from the interviews to show how these enterprises have been organized to preclude the development of the kind of community commitments that give meaning to people's personal lives. Marriage and family reflect instrumental and expressive calculations where commitments are only as strong as the cost-benefit balance sheet. The social relationships considered healthy in therapy are those based on a calculus of what feels good and is personally fulfilling. Life-style enclaves, touted as communities of self-expression, separate private lives from public ones and so segregate their members rather than integrate them into a larger moral community. And religion and politics are too much organized as communities of support for the individual rather than as collectivities with purposes of their own.

For models of cultural renewal the authors look to "those who have defined their lives by their relationships and commitments to larger wholes, those who have attempted to articulate a socially responsible individualism; as opposed to a self based on the notion of pure, undetermined choice, free of tradition, obligation, or commitment" (p. 155).

How good an analysis is presented in *Habits of the Heart*? The authors' self-conscious claims about the importance of the work rest to a large extent on their wanting to create a dialogue in which social science transcends its academic bounds and becomes part of public philosophy. Its methodology of using conversations and the engaging style of its writing could further that goal.

But if *Habits of the Heart* is to succeed as public philosophy it needs also to succeed as sociology. Here it fails, for its argument has been developed in disregard of major contributions made in the analysis of culture. Cultural resources derive from a society's particular material basis and from the organization of its politics. Since the work of Karl Polanyi, sociologists have understood well how the culture of individualism derives from a market economy and how the absence of a strong political center intensifies such individualism. But the analysis in *Habits of the Heart* proceeds as if our society's culture of individualism develops independently of its economic and political organization.

Consequently, the authors' program for cultural renewal has a naive ring: We must change the climate in which business operates to encourage new initiatives in economic democracy and social responsibility; we must return to the idea of work as a calling and as a contribution to the good of all; we must reduce the extrinsic rewards and punishments of work to make vocational choices more in terms of intrinsic satisfactions; we should use our accumulated wealth to revive craft production; and we should heal the split between public and private, work and family, by making the ethos of work less brutally competitive and more ecologically harmonious (pp. 275–296).

But our society is built on an economic system in which production occurs for profit, not for social responsibility. Work is brutally competitive because the mechanism of a market is competition. Work is organized by extrinsic and not intrinsic rewards because in a market system price determines value, and people are forced to judge their worth by their income. This culture of instrumental and expressive individualism, which the authors of *Habits of the Heart* argue has become self-destructive, reflects the material reality in which we live, the logical working out of what Polanyi termed the market mentality. Analysis of this culture as if it is divorced from our market system itself cannot advance the cause of a public philosophy.

RICHARD RUBINSON
Department of Sociology, Florida State Univerity, Tallahassee 32306-2011

History of Technology Contextualized

Technology's Storytellers. Reweaving the Human Fabric. JOHN M. STAUDENMAIER. Society for the History of Technology and MIT Press, Cambridge, MA, 1985. xxx, 282 pp. $35.

This book is based on an unlikely recipe. Take all the articles published in a single academic journal, *Technology and Culture*, during its first 20 years, 1959–1980. Sort through these pieces noticing the key themes and controversies that have engaged the contributing scholars during that period. Analyze the whole collection as a single body of work. See what this tells you about the proper way to study the history of technology.

If the same method were applied to most scholarly journals, each book would have to be sold with a box of extra-strength pain reliever. Fortunately, John Staudenmaier's efforts have produced entirely palatable results. *Technology's Storytellers* is a lucid, richly detailed review of attempts to establish the history of technology as a fully respectable research field.

Well into the 1950's much of the historical literature on technology lacked methodological and intellectual depth. Many books were simply laudatory tales of ingenious men and their wonderful inventions leading humanity ever forward along the path of "progress." The dominant style was that of "Whig history," in which past developments were shown to lead inevitably to a glorious present. Attempts at more careful study erred by being too narrowly focused, anti-

quarian, and internalist, looking at the intricacies of technological development without linking those changes to any broader social circumstances. With the founding of *Technology and Culture* under the energetic editorship of Melvin Kranzberg, historians were given a forum to explore the topic with new care and rigor.

To show what the journal has accomplished, Staudenmaier begins with a little counting and classifying. He clusters the 272 articles according to the time period, geographical location, variety of technology, and methodological style with which they deal. From there he identifies the issues most prominent in the array. As one might expect, the topic of leading concern has been that of "emerging technology," how new inventions and innovations arise when they do. Another important theme involves the distinctive character of technological knowledge. By and large, historians have rejected the notion that technology is merely "applied science." "Technological knowledge is unique," Staudenmaier writes, "because its design concepts are radically incomplete when they remain on the abstract level. By their very nature they must be continually restructured by the demands of available materials, which are themselves governed by further constraints of cost and time pressure and the abilities of available personnel" (p. 104).

During the 1960's, the book argues, there eventually emerged a rough consensus about the most fruitful method for studying technology's past. "Contextual history" (p. 13) takes what is best from detailed, internalist studies of technological design and combines them with research into significant economic, social, and cultural influences upon technological change. Indeed, the fact that the periodical was named *Technology and Culture* rather than, for instance, "History of Technology," reveals this intention to examine technology within a broad range of contexts. As reflected in this journal and in other publications as well, the contextual approach—in its various manifestations—is now the one historians generally prefer.

Though Staudenmaier praises the advances his colleagues have made, he is also aware of some shortcomings. The journal has not paid much attention to such topics as the worker's role in technological change, non-Western contributions, cultural conflicts involved in technology transfer, criticisms of capitalism, and women's perspectives. In some cases these oversights are obviously crucial ones, as for example in the "nearly complete avoidance of the question of labor-management tension in the journal" (p. 177). This leads Staudenmaier to wonder openly whether the attempt to overcome "Whig history" and "progress talk" has been successful. Have the historians merely buried this threadbare ideology in a more subtle array of concepts and methods?

Staudenmaier has a talent for dissecting complicated issues—gnarly disputes about technological determinism, for example—and occasionally suggests possible strategies for resolving them. Along the way he summarizes a wide range of empirical findings about specific devices, techniques, and systems. For humanists, engineers, and scientists interested in the relationship of technology to broader currents of social thought, this book will be a useful and enduring resource.

Despite the book's many strengths, I found myself wishing Staudenmaier had found a way to reveal his own views more directly, rather than continually filter them through the writings of others. In the introduction he comments that he was first attracted to the study of technology by observing the powerful and often destructive effects the coming of modern technics has had upon the American Indians. Although he seems troubled by what technology has done in "reweaving the human fabric," he never tackles that issue directly. It is one thing to make great strides developing the intellectual apparatus of an academic subdiscipline, quite another to confront the social, political, and spiritual challenges posed by the presence of technology in our world.

LANGDON WINNER
Department of Science and Technology Studies, Rensselaer Polytechnic Institute, Troy, NY 12180

Crustal Geochemistry

Archaean Geochemistry. The Origin and Evolution of the Archaean Continental Crust. A. KRÖNER, G. N. HANSON, and A. M. GOODWIN, Eds. Springer-Verlag, New York, 1984. x, 286 pp., illus. $30.50. Final Report of IGCP Project no. 92.

The Continental Crust. Its Composition and Evolution. An Examination of the Geochemical Record Preserved in Sedimentary Rocks. STUART ROSS TAYLOR and SCOTT M. MCLENNAN. Blackwell Scientific, Palo Alto, CA, 1985. xvi, 312 pp., illus. Paper, $23. Geoscience Texts.

In the last decade there has been considerable progress in understanding the early geochemical evolution of Earth's crust-mantle system. These two books are excellent summaries of the current state of knowledge about this system. *Archaean Geochemistry* was prepared as the final report of an International Geological Correlation Programme project. It is a collection of papers by several authors and covers many aspects of the geochemistry of the crust-mantle system during Archean times, from the formation of Earth to about 2500 million years ago. *The Continental Crust* is a summary by Taylor and McLennan of their views of continental crustal evolution and of their extensive studies of the geochemistry of ancient sedimentary rocks. These books complement one another, and either one, or both, would be valuable to geoscientists interested in recent developments in this branch of geochemistry; the books would also be good references for a graduate-level seminar on the geochemical evolution of the crust-mantle system.

The papers in *Archaean Geochemistry* cover a wide spectrum. The book begins with a paper by Wänke and co-workers that deals with mantle geochemistry and with the authors' model of the accretion history and bulk composition of Earth. The model the authors favor postulates an inhomogeneous accretion from two basic components, and thus it is a variant of current common ideas. I like their general approach, although I was disappointed that they did not clearly identify their two components or give their composition in tabular form; presumably interested readers will have to obtain that information from previous papers. A second paper, by Sun, is also primarily concerned with mantle geochemistry, but more from the viewpoint of interpretation of data from Archean mafic and ultra-mafic rocks. Sun concludes that core-mantle fractionation was complete by 3.8 billion years ago and that much of the crust-mantle fractionation observed today had also occurred by then; he also concludes that there were significant heterogeneities present in the Archean mantle.

Two of the chapters deal with the genesis of Archean greenstone belts. One (Groves and Batt) concludes that greenstones in Australia were ensialic whereas the other (Smith *et al.*) concludes from oxygen isotope data that greenstones in South Africa were ensimatic. Although two different greenstone belts are involved, these papers clearly indicate that the important question of what geologic setting leads to formation of Archean greenstone belts is far from resolved and that different types of data, or different examples, lead to different conclusions.

Several papers of more local interest deal with the geochemistry of igneous or metamorphic rocks in the Archean. Two of these (Hansen *et al.*; Condie and Allen) are of particular interest because they deal with the granulitic rocks of southern India, including a particularly well-documented transition from amphibolite facies to granulite facies.