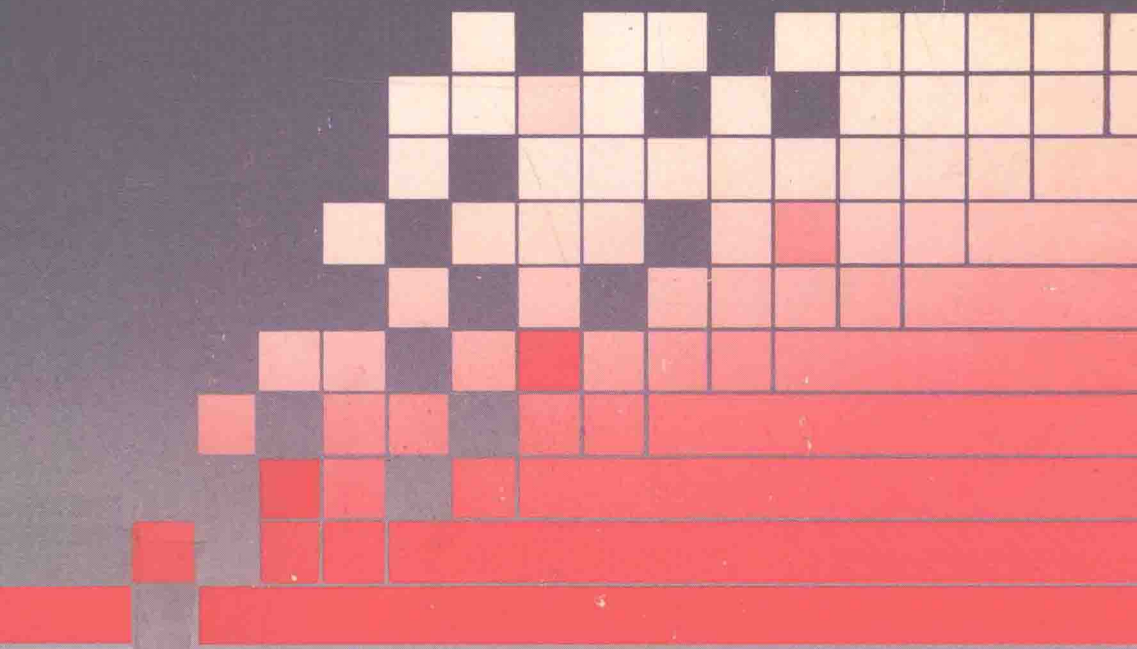
# COMPUTERS AND SOCIAL CHANGE

## INFORMATION, PROPERTY, AND POWER



JUDITH A. PERROLLE

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# COMPUTERS AND SOCIAL CHANGE

*for Jeanette*
*and her generation*

they seize the instruments of harmony; they throw away
The spear, the bow, the gun . . .

—William Blake

# PREFACE

Most texts about the computer and society introduce students to programming or to the way computers work. This book does something different. It provides a framework for understanding the social context and consequences of information technology, including the role of information in human history. Because the computer is a general-purpose tool for communication and control, it affects how people interact with one another, significantly changing what we know and how we behave. By altering the ways we create and use information, computers are contributing to changes in the ways property and power are distributed in society. The effects of computers on individual health and psychology, changing social relationships and workplaces, the protection of electronic information, the preservation of privacy, and the political and military uses of information technology have all become controversial public issues.

This book was "field tested" in university classes attended by a mix of liberal arts, computer science, engineering, and business students. Through their participation in Northeastern University's Cooperative Education Program, most of my students have been actively involved in the computer revolution, and their contributions helped shape what is intended as a text for future classes. Although I assume that the reader is already somewhat familiar with computers (the majority of students entering American colleges in 1985 had already written a computer program), computer terminology has been kept to a minimum. Technical terms that appear without explanation are included in a glossary. Because student backgrounds in the liberal arts are more diverse, introductory-level social science material has been included. Less experienced students have found this material a helpful introduction to the study of society; those with previous coursework have found that it links the humanistic and technological dimensions of their education.

To social scientists, the computer is both a technological product of a society's shared way of life and a source of social change. C. Wright Mills describes the perspective from which many sociologists approach the world as the ability to imagine "the intersection of biography and history" and the ability to see "private troubles" as "public issues." The social significance of the computer lies not only in the personal experiences of the people who interact with it as part of their individual biographies, but also as part of broad historical changes in societies. Problems such as "com-

puter phobia" or "computer illiteracy" are more than the private troubles of some individuals; they are part of public issues of economic transformation and cultural change.

My own biography intersects with the history of computers at several points. In the 1950s I was an enthusiastic young observer of Sputnik and the first UNIVAC computers. Somewhere in my parents' attic is a cardboard "teaching machine" planned for a junior high school science fair project. As a humanities and electrical engineering student at MIT, I was introduced to the challenge of artificial intelligence and to the ethical role of professionals in social change by two excellent professors, Marvin Minsky and Noam Chomsky. In the late 1960s and early 1970s I worked in the computer software industry, first in Boston's Route 128 area and later in Asia, where I was faced with cultural and political issues that dwarfed the technical problems of transferring computers to developing countries. Returning to graduate school in sociology, I have since studied and taught about technology and social change. What began for me as an uncritical enthusiasm for computers became a set of "private troubles" coping with the human factors in computing and eventually a professional specialization.

Computer technology is sometimes viewed as a phenomenon to be promoted or opposed. A positive or optimistic approach to the benefits of computers is contrasted with the "other side"—a negative or pessimistic view. However, this perspective is often fatalistic, based on the belief that social change just "happens" to people and that nothing can be done about it. In this view, the only choice is whether the inevitable future is "good" or "bad." However, the purpose of the social sciences is not to judge the goodness or badness of phenomena but to describe them in ways that add to our understanding of the world and our ability to predict and influence change. Social science can also provide a basis for democratic policy, by clarifying the consequences of technological choices.

When the computer is viewed as part of large-scale social change, some of its effects may seem beyond our influence. Yet people's choices do make a difference. Studying the social impact of the computer can have practical consequences for our decisions about how computers will be used. As individuals, computer specialists and other professionals are often in a position to choose the direction of technological development. For example, a programmer coding a piece of medical records software may make a minor modification to improve accuracy and reduce human misery. An office manager may choose between two data display screens and save employees from eyestrain. Organized groups of people can affect larger public issues. Parents, through their local PTA and school board, may have a direct say about computer use in their children's schools. Voters, through their elected representatives, can influence local, state, and national legislation. Business and employee organizations can negotiate issues of computers in the workplace.

Considering the current popular enthusiasm for computers, much of this book may seem critical. Yet, if we allow our enthusiasm for technology to obscure our judgment of its consequences, we will restrict our capacity to

make informed choices about the use of that technology. If we look only at social benefits, we will fail to assess social costs.

## THE PLAN OF THE BOOK

The book is organized into four parts. The first examines the social context of information technology, providing a conceptual framework for understanding the computer as an information-processing tool capable of producing enormous changes in human life far beyond the immediate purposes for which it was designed. Chapter 1 introduces the basic concepts of information, society, and technology. A theoretical background to the study of social change is provided in Chapter 2. In Chapter 3, the role of information, property, and power in human history furnishes a perspective from which to assess the significance of the new information age.

The second part of the book considers immediate effects of computers by examining the subject of ergonomics—the human/technology interface. The individual's experience with computers is the subject of Chapter 4. The physiology of computer use is presented as a discussion of ergonomic research aimed at improving both health and productivity. Design criteria for computer equipment and systems that improve human well-being are considered, with a focus on aids for the handicapped. The topic of the psychology of the human/computer interaction is organized around the issue of self-esteem and includes computer phobia, the fascinations and hazards of hacking, sex differences in computer use, and the question of what "user-friendly" actually means in terms of human satisfaction. In Chapter 5, a review of recent research on social interaction among computer users connects the individual's experiences to broader public issues of family change, education, and new forms of recreation.

The third part of the book analyzes the computer transformation of work. Chapter 6 presents the computer's impact on work as part of a major industrial transformation of the economy accompanied by job dislocations as well as enhanced productivity. Chapter 7 considers microlevel issues of computers in the workplace, with emphasis on changing conditions of work in blue-collar, clerical, and professional occupations.

The fourth section of the book deals with the computer's effects on information, property, and power in democratic institutions. In Chapter 8, legal consequences of information as a form of property are examined. The transformation of legal institutions involves changes in copyright and patent protection for computer software and data bases. It also affects law enforcement and the definition of white-collar crime. The tension among legal guarantees of individual privacy, public "right to know," and emerging property rights in information are analyzed in terms of information's role in social control. Chapter 9 looks at the role of computers in society's decision-making processes. Ethical and professional issues are examined in a discussion of computer use in business, government, and military decisions.

# ACKNOWLEDGMENTS

As participant observers in workplaces undergoing rapid technological change, my students informed and educated me. I gratefully acknowledge their contribution to this work, though any errors of interpretation and synthesis are my own. I thank them for their patience with experimental electronic manuscript drafts and with ideas in progress. Special thanks to Mike Gunderloy, Margery Rossi, William Swanson, and Cathy Swindlehurst for help with the tedious chores of proofreading and typing.

I am indebted to many colleagues for comments and criticisms at all stages of the work. Conversations with Joseph Weizenbaum clarified the moral and ethical framework of the project. The late Lila Leibowitz contributed to the anthropological perspective in Part One. For Part Two I am grateful for Sherry Turkle's psychological insights. Journal and conference panel reviewers' suggestions improved the theoretical argument about computers and capitalism, especially as it was applied to the transformation of work in Part Three. Members of the Harvard/MIT faculty study group on technology and civil liberties provided useful advice for Chapter 8; material prepared by the Computer Professionals for Social Responsibility was invaluable for completing Chapter 9. I am also indebted to the following reviewers for their valuable suggestions: Professors Harold Borko, U.C.L.A.; Gary Marx, M.I.T.; Bernard Phillips, Boston University; Charles Van Loan, Cornell University; John Williamson, Boston College; and Vance Wisenbaker, Eastern Kentucky University.

The people at Wadsworth Publishing have been enormously helpful, from the initial encouragement of John Moroney through the capable editorship of Sheryl Fullerton. The fact that I have never met face-to-face with Leland Moss or the other members of the production staff confirms my belief that cooperative projects with geographically dispersed participants can be an effective way to organize work in the information age.

Finally, to Gwendolyn Bikis, whose assistance with research, rough draft editing, word processing, and proofreading kept the manuscript going through hectic schedules and numerous revision, thanks are insufficient. She was a partner in producing the book and will be a partner in sharing the royalties.

Judith A. Perrolle
Boston, Massachusetts
August, 1986

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ONE

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