

TOWARDS A WORKING PERSPECTIVE OF TECHNOLOGY: A BIBLIOGRAPHIC ESSAY

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FOR MANY AMERICANS, TECHNOLOGY IS MYSTERIOUS. Despite the fact that technologies of all sorts impact almost every aspect of our daily lives, we continue to function with relatively uninformed conceptions of technology. We usually don't know or understand the technical mechanics of the technologies that we enjoy. When we purchase technologies such as computers, we have a vague sense that the computer may affect our family life, our friendships, the ways we work, and the development of our children, but we don't know much beyond that.

In the past two to three decades, there has been a proliferation of works concerning technology and its effects on various spheres of society. It is now common to find books and conferences on technology and democracy, technology and gender, technology and the workplace, technology and religion, technology and education, technology and community, technology and literature, just to name a few. While this growing literature is extremely helpful in examining the ways that existing social institutions and cultural practices are challenged and reshaped by new technological developments, these texts are often thinly veiled normative arguments about how democracy, education, or communities ought

to be, rather than works that clarify the nature of technology and how it “works” in society. These texts are crucial to the development of a robust public discourse about our technologies, but they often fail to provide a broader framework from which individuals can engage and assess technologies. Many questions that need to be addressed remain unanswered: What is technology? How does it relate to individual action and social order? Is technology an autonomous force that determines history? Or can it be resisted? How does a new technology shift from being the stuff of science fiction to becoming a part of our everyday worlds, even shaping our sense of reality? Is our society prone to develop or use particular kinds of technologies over others? Are there certain types of technologies that are better than others for living the “good life”? Do technologies tend to reinforce or break down power structures?

The need for a more sophisticated and constructive understanding of technology is apparent as contemporary developments in biotechnology, nanotechnology, psychopharmacology, and computer technology seem to outpace our legal, social, and cultural institutions’ abilities to guide and manage these developments. With each new technological advance, it becomes clearer that the existing public discourse on technology is lacking a language for discussing and engaging our technologies in meaningful ways.

Despite the fact that the amount of thoughtful and creative scholarship on technology has been growing in the traditional disciplines of history, sociology, and philosophy (and in newer fields such as communications, media ecology, cultural studies, and science and technology studies), it is an area of literature that continues to be surprisingly unrecognized and underutilized in America. The works cited in this bibliographic essay contribute to the important task of moving beyond either an uncritical acceptance of technologies or vague feelings of helplessness. They are also useful for challenging the common notion that technology is merely a tool, having no social or cultural significance, by revealing the ways that technology is integrally bound up in social institutions, morality, power structures, cultural practices, and the creativity of its users. While the literature on technology is vast, this bibliographic essay aims to provide a basic typology of the technology literature, highlighting the dominant approaches and main areas of study, that will help

readers move towards constructing a language or framework that is capable of meaningfully engaging the technologies of our times.

Early Perspectives on Technology

Fascination and enthusiasm are what usually greet new technologies in American society. Much like the faith that Western civilization has had in modern science, the optimism and excitement that is commonly expressed for technologies can be traced back to the belief in Progress that characterized eighteenth-century Enlightenment thinking. Thinkers like Voltaire and Condorcet believed that science and technology were ultimately the keys to achieving the perfection of the human race, empowering people with the fruits of rational knowledge and the development of means to fulfill material needs. Technologies often played a large role in utopian visions, eliminating social inequality and ensuring political freedom for all.

While the notion that technology both symbolized and guaranteed progress sprung from the Enlightenment in Europe, it quickly became integrally bound up in the fledgling culture of the newly established United States of America. With prolific inventors such as Benjamin Franklin and Thomas Jefferson among the nation's leaders, technology was truly regarded as a means to humanity's steady moral, social, political, and material betterment. Progress was considered inevitable, and technology would be the means of achieving it. In the nineteenth century, not only did Americans celebrate technologies such as railroads, steamboats, and industrial machinery, for the unprecedented prosperity that they brought to the American economy, but Americans also were awed by and even revered the sheer power and grandeur of technologies, dazzled by what historians have come to call the "technological sublime." This unwavering faith in technologies characterized the popular American sentiment, leading many to believe that American success was as inevitable as the progress that technology would bring.

Because this conception of technology as progress has so dominated the American perspective, much of the contemporary scholarship on technology sees this idea as a point of departure. Many of the following

books offer the necessary historical context for understanding present-day technological utopianism. Merritt Roe Smith and Leo Marx's *Does Technology Drive History?*, Howard Segal's *Technological Utopianism in American Culture*, and Daniel Czitrom's *Media and the American Mind* provide especially excellent historical and theoretical overviews of America's love for technology.

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Theoretical Perspectives on Technology and Society

Understanding technological change in contemporary society is one of the dominant areas of research and theoretical work being done in the historical and sociological scholarship on technology. The primary

questions being asked are: What is the relationship between technology and society? Does technology drive history and social change? Or, does society determine the technology that it produces? While earlier accounts of technology focused primarily on recording the nuts-and-bolts development or engineering of technology, what dominates analyses now is the effect that technology and society have on each other. Two perspectives, technological determinism and social constructivism, are the main points of departure for the majority of the literature.

Technological Determinism: Technology's Effect on Society

The approach of technological determinism views technology as a powerful and autonomous force that changes history and social order. This perspective is present in most histories that argue that technologies were responsible for such enormous historical shifts in human history as the Industrial Revolution, the Protestant Reformation, and the period of Post-Industrialism. According to technological determinists, the realms of technology and society are understood to be distinct spheres—the active sphere of technology and the passive sphere of society. This passivity was perhaps best summed up in the motto for the 1933 Chicago “Century of Progress” World Fair: “Science Finds. Industry Applies. Man Conforms.” While technology is understood as a natural by-product of the quest for scientific knowledge, it is understood to be autonomous. Once created, it seems to have a “life of its own” with consequences that its inventor or engineer could never have foreseen.

Another characteristic of the technological determinist perspective is that technology itself—its medium, the technical form and features—is the source of social change. An outgrowth of this view is commonly found in media analysis, such as that of Neil Postman, Harold Innis, and Marshall McLuhan. Their accounts argue that different media have different “biases,” which determine not only different ways of thinking and perceiving the world, but also different types of civilizations. Strong forms of technological determinism will point to the use of papyrus to explain the fall of the Roman Empire or to the printing press to explain the rise of rational thinking and reason. An example of weaker forms of technological determinism, Joshua Meyrowitz's book, *No Sense of Place*, shows how the medium of television altered the boundaries of private

and public life in American society by bringing political culture and public life into the living rooms of Americans.

Present in both optimistic and pessimistic evaluations of technology, tendencies towards technological determinism can be found equally in McLuhan's vision of the global village made possible by electronic technologies and in Jacques Ellul's concern for the technologizing (and, thus, rationalizing) of all domains of life. Despite the implicit characterization of human beings and institutions as passive, technological determinism accurately captures the idea of unintended consequences, and how deeply they can affect the most fundamental aspects of our lived reality.

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Social Constructivism: Society over Technology

In response to the tendencies of scholarship towards technological determinism, the social construction of technology approach was begun

in the mid-eighties by sociologists Wiebe Bijker and Trevor Pinch. Drawing from the theoretical work done in the sociology of science, where assumed notions of postivism and scientific inevitability were sufficiently challenged, the social constructivist perspective sought similarly to reveal the levels of contingency and human agency involved in the innovation process of technology. By showing the ways that the design and use of technologies are very much products of particular social and cultural contexts, embedded with pre-existing cultural assumptions and meanings from their inception to their institutionalization, agency is restored to society as the producer of technology. No longer is technology “autonomous”; rather it is shown to be the natural outcome of our socio-cultural realities.

While social constructivism adequately addresses an important blindspot of technological determinism, it still persists in analytically separating technology from society, theoretically implying a dichotomy that does not substantively exist. Alternative models have emerged out of the social constructivist project to address this problem, one of which is Thomas Hughes’ systems approach, viewing technologies not as individual artifacts, but as entire constellations or systems in which social and technical aspects interact together. Similarly, Bruno Latour’s actor-network theory works with the metaphor of technology as interconnecting networks that link human beings and non-human entities together, conveying the mutually constitutive nature of technology and society. Historian Ruth Schwartz Cowan’s essay in *Social Construction of Technological Systems* suggests that much can be gained from examining a technology at the point at which it is being considered by a consumer making choices between competing technologies. She argues that by analyzing technological change from the user’s perspective, there is theoretical room for a dialectical relationship between the constructivist view of technology and the deterministic one.

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Philosophy of Technology

While historical and sociological debates between technological determinism and social constructivism concern the relationship between technology and society, questions about the actual nature of technology and the resulting lifeworld that is shaped by it motivate a distinctly philosophical literature on technology. Drawing from a rich European tradition of exploring technological issues, many philosophers of technology explore the logic and nature of technology itself and consider its significance and meaning in our experience of life. The works of Heidegger, Gehlen, and Berger best reflect the German philosophical tradition that rejects the instrumental notion of technology (as being merely a means to an end) and conceptualizes technology as a way of viewing the world and its objects. As a result, the socio-psychological consequences of the technologized life are primary areas of focus. How are our "technologically textured" lives different from the lives of previ-

ous generations? What is the role of technology in our pursuit of the good life, individually and communally? According to Albert Borgmann's theory of technology, while there are particular goals and needs that technology can be expected to fulfill, our lives include particular practices and things that are better off being directly engaged without technological mediation. Similarly, Erik Parens' edited volume, *Enhancing Human Traits*, problematizes the common notion that technology enhances our lives. What constitutes enhancement? And what are the ethics for using technologies to enhance our lives? While the European line of philosophical inquiry dominates much of the field, Carl Mitcham's *Thinking through Technology* offers a thorough survey and discussion of the various philosophical perspectives on technology. Lesser known traditions include the philosophy of technology that stems from American philosopher John Dewey's critique of technology. Larry Hickman's and Hans Joas' works are representative of pragmatist inquiries into the role of public life and values in the construction and use of technologies.

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Technology and Power

Coming to grips with how technological change is integrally wrapped up in issues of power and politics was a major area of concern for scholars and thinkers of the twentieth century. In literature, George Orwell's *1984* and Aldous Huxley's *Brave New World* are perhaps the most well known explorations into the ways that technology can be used coercively by totalitarian governments to enforce social control. Herbert Marcuse's seminal work, *One Dimensional Man*, has been a point of departure for more recent scholarship by critical theorists Douglas Kellner and Andrew Feenberg, who grapple with the ways that particular understandings of technology mask political powers that are in fact being exercised. Other scholars such as Langdon Winner have sought to show the inadequacy of the idea of scientific or technological inevitability commonly expressed in our culture and to argue for a conception of technology as a *political* artifact that implicitly leads to distinct types of social orders, benefiting particular institutions and groups of people. Concerns about who will decide how technologies are implemented and distributed are raised in the respective works of Lawrence Lessig and Lori Andrews, as they document the extent to which market forces and tendencies of commodification increasingly shape the development of Internet technologies and biotechnologies. As a whole, these works play an important role in examining how technologies are institutionalized

in ways that maintain or exacerbate existing power structures, raising difficult questions about what resources are available in our social institutions to protect the vulnerable and the weak from exploitation.

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Technology and Feminism

Feminist scholarship on technology generally falls into two stages. Early gender and technology issues frequently concerned the impact of technology on the everyday lives of women, whether focusing on computer technology in the workplace, technology in the domestic setting, or reproductive technology. In analyzing the trends towards deskilling, cheapened labor, increased domestic work, or the re-conceptualizations of women's reproduction and sexuality, these early approaches to technology and women focused on the ways that technologies were designed and produced by men, thus shaped by patriarchal values and interests in maintaining inequality and in exploiting women's bodies.

These essentialist assertions have since received much criticism by those feminists who argue that technologies cannot be inherently gendered and that they are ultimately socially constructed artifacts that can be redirected to serve women's ends. Reflective of these broader shifts in the feminist movement, technologies are now often explored as a means of deconstructing gender, identity, and even human being, as seen in the works of Donna Haraway, Allucquere Rosanne Stone, and others who examine the social and political implications of cyberculture for women. In conjunction with these explorations into technology's impact on gender, an emerging literature is developing on how women are appropriating technologies to fight against institutional discrimination by networking on-line to improve the conditions of women worldwide.

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Technology and Its Discourse

The task of understanding and assessing technology is often complicated by the fact that so much hype and debate often surround the technologies that we use. Deciphering whether scholars and pundits are reacting to technology or the surrounding rhetoric is not always an easy task, for the discursive aspects of technology in our culture play a significant role in making technologies what they are. Separating out the myths and rhetoric that shape the ways that technologies are used and understood from the technology itself is a crucial task that has been taken up by various scholars in different areas ranging from the Internet to genetics. Understanding the effects of marketing, the use of metaphors of technology, and the roles that the scientific community plays in shaping our understanding of technology sheds light on the fundamental characteristics and values of contemporary American culture. Each of the following works explore and reveal the ways that technologies are mythologized, their capacities exaggerated and ultimately made sacred by language and discourse.

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Technology and Postmodernism

While science and technology may be rightly identified with the project of modernity, it might be just as fair to view contemporary technologies as the very tools that are, ironically, dismantling the assumptions of modernism and ushering in the realities of postmodernism. While the claims of postmodernism may seem abstract and distant to the person on the street, Kenneth Gergen's and Sherry Turkle's works show that the experiences of constructing multiple identities or gender-bending in cyberspace directly challenge the essentialist notions of identity and gender. As the technology of virtual reality poses serious questions about the ontological status of reality, and cutting-edge biotechnologies and artificial intelligence hint at the possibilities of a "posthuman era," it becomes clear that many of the borrowed premises of our social and political order are increasingly fragile and perhaps even meaningless. George Landow's and Richard Lanham's explorations into the implications of computer hypertext (that is, blocks of text linked electronically in an open-ended network) for our conceptualization of knowledge throw into question long-held assumptions about reason and rationality. Whether these technologies actually represent the start of a new reality and new age remains to be seen. However, considering the fact that technology has always been the symbol of progress, it should come as no surprise then that technologies today are regarded as liberatory agents from modernist frameworks of meaning and reality.

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