BECOMING DIGITAL

Toward a Post-Internet Society

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BY

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INVESTOR IN PEOPLE

For Noelle

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ABOUT THE AUTHOR

Vincent Mosco is Professor Emeritus, Queen's University, Canada where he held the Canada Research Chair in Communication and Society. He is also Distinguished Professor, New Media Centre, School of Journalism and Communication, Fudan University, Shanghai. Dr. Mosco completed the B.A. at Georgetown (Summa Cum Laude, 1970) and received the Ph.D. in Sociology from Harvard in 1975.

Dr. Mosco is author or editor of 23 books and over 200 articles and book chapters on communication, technology, and society including *The Digital Sublime* and *The Political Economy of Communication*. His *To the Cloud: Big Data in a Turbulent World* was named a 2014 Outstanding Academic Title by Choice: Current Reviews for Academic Libraries.

Dr. Mosco serves on the editorial boards of academic journals throughout the world and has held research positions in the U.S. government with the White House Office of Telecommunication Policy, the National Research Council and the U.S. Congress Office of Technology Assessment and in Canada with the Ministry of Communication. He was a long-time research associate of the Harvard University Program on Information Resources Policy. In 2004 Dr. Mosco received the Dallas W. Smythe Award for outstanding achievement in communication research. *The Digital*

Sublime won the 2005 Olson Award for outstanding book in the field of rhetoric and cultural studies. In 2014, the Association for Education in Journalism and Mass Communication honoured Dr. Mosco and his partner in life and in research, Dr. Catherine McKercher, with the Professional Freedom and Responsibility Award for outstanding achievement in research and activism.

PREFACE

When you write, you illuminate what's hidden, and that's a political act.

— Grace Paley

Grace Paley was a great American storyteller, primarily a short story writer whose work was celebrated by critics and fellow writers alike. The consummate New Yorker, she wrote from her home in 1950s Greenwich Village about the lives of working class women, especially the daughters of immigrant families, who displayed courage and humor as they struggled to build a life of their own. Unlike Virginia Woolf, who sought a room of her own, Paley was most comfortable writing at the kitchen table amid the hubbub of life in a lower Manhattan apartment. While well recognized, her writing did not receive the credit it deserved. She was a woman working in a male-dominated field and she was a political activist who rarely passed up a progressive cause. But mainly, it was because Paley's political sensibility infused the everyday lives of her characters. If only, critics said, she would spend more time honing her craft. By this they meant: spend less time on the picket line and focus more on the transcendent and less political dimensions of life. Paley's response was that all writing is political in the deep sense of uncovering the less visible features of life.

This sensibility provides inspiration for *Becoming Digital*. It too is political in the sense that the book uncovers aspects

of the digital world, which, if not hidden, receive too little public attention. Having grown my own roots in the same Manhattan neighbourhoods that Paley lived in and wrote strengthens my feeling of connection, as does the choice to write every word in the kitchens and other busy spaces that fill my everyday life.

Becoming Digital builds on my 2014 book *To the Cloud*, which identified some of the early steps leading to what *Becoming Digital* calls the Next Internet. Specifically, it provides a brief examination of today's leap into the online world by analyzing the social, political, economic, and cultural consequences of Cloud Computing, Big Data Analytics, and the Internet of Things, which are converging to create global networks of unprecedented power. It does not claim to be an exhaustive treatment. There are many excellent books that provide in-depth treatment of specific pieces of the Next Internet puzzle, several of which are identified at the end of the book. Rather, *Becoming Digital* offers a summary overview for those who want to learn about the digital world and its emerging challenges and potential solutions. Specifically, it is a guide to the central features of the Next Internet, including the technologies that power it, the institutions that shape it, the problems it creates, and the potential steps forward that might enable a genuinely democratic Next Internet. By this I mean a digital world that guarantees open access to all citizens and opportunities to use the network to build a better world.

I am grateful to many people for helping to make this book possible. I would like to single out a few for special thanks. Professor Isaac Serfaty-Nahon kindly invited me to give the opening address at the launch of a new Ph.D. program in Communication at the University of Ottawa. The speech afforded me the opportunity to speak about the central themes of this book and the long period of audience

questions and comments were enormously helpful. Thank you Professor Serfaty-Nahon and all of your colleagues and students.

For more than a decade, it has been my pleasure to work with Professor Cao Jin of Fudan University, Shanghai on numerous research and education projects. Over the years I have come to appreciate her extraordinary skill as a scholar, teacher and creative administrator. I am especially grateful for the opportunity she provided to lecture about the Next Internet in Shanghai and Chengdu in the summer of 2016. As always, you, your students and your colleagues provided a warm welcome, a receptive audience, and valuable insights that were most useful in writing this book.

I would also like to express my deep appreciation to David Flanagan, a fellow member of the Regis High School class of 1966, who kindly invited me to lecture on the Next Internet at the 50th reunion of our class. Regis High School is a Jesuit institution in Manhattan that, thanks to a generous donor, provides an extraordinary free education worth far more than my family, and the families of most of my classmates, could ever afford. Throughout my life, I have appreciated its commitment to a rigorous classical education and to social justice.

Thank you to my dear friend and former student Dr. Ian Nagy for your careful reading of the entire manuscript and to my daughter Rosemary Mosco who took time out from her own writing and activism to offer suggestions that enriched a chapter on what it means to be a citizen in a digital world.

Life is a mystery and no more so than in the deaths that bring great sadness and the births that provide unrestrained joy. Over the course of 12 months from early 2016 to the start of 2017, I lost three former students who had built successful careers as critical communication scholars and teachers. Professor Vanda Rideout was a senior sociologist at

the University of New Brunswick in Canada where she was an accomplished scholar, beloved by her students, and a leader among her colleagues. I supervised Vanda through completion of her M.A. and Ph.D. degrees. She also served as a research assistant for the 1996 edition of my book *The Political Economy of Communication* and we published articles together. In addition to producing excellent work on labour and policy formation in the digital world, she was my dear friend.

Professor Gerald Coulter was a senior sociologist at Bishop's University in Quebec where he was head of the department and a leader in cultural sociology, focusing on the work of Jean Baudrillard. As with Vanda, I had the pleasure of supervising Gerry's M.A. thesis and doctoral dissertation. His sense of humor helped ease my transition from the United States to Canada in the mid-1980s and his commitment to strong scholarship led me to appreciate the excellence of graduate students in my adopted country.

Professor Mahmoud Eid was a senior communication professor at the University of Ottawa. I taught Eid at Carleton University in the 1990s and, from the start, he impressed me with his knowledge of quantitative methodology and his commitment to address the major issues facing Muslim Canadians. The last time I saw Eid was at my University of Ottawa lecture on the Next Internet. He approached me with the dignity and generosity that masked the tensions that Muslim scholars working on issues around radicalization invariably face. He left behind a loving family and a career that ended far too soon.

I am eternally grateful for having students like Professors Rideout, Coulter and Eid. I am also blessed that in a year marked by their passing, I received the wonderful gift of a first grandchild, Noelle Rose Morton. Much of this book was written between hours spent pushing a stroller around the

lakes of Orlando, Florida and doing what I could to live up to the reputation of Goofy Grandpa. Her arrival certainly eased the stresses that typically accompany the writing process. I can only hope that when she is old enough to make full use of the Next Internet, it is an open, democratic and universally accessible network that will help her work on the problems that her generation will undoubtedly face.

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CHAPTER 1

THE NEXT INTERNET

What can really be contributed is not resolution but perhaps, at times, just that extra edge of consciousness.

— Raymond Williams

HAPPY BIRTHDAY INTERNET

On March 12, 2014, Google called on the world to celebrate the twenty-fifth anniversary of the Internet. It was born, in the company's view, when the computer scientist Tim Berners-Lee circulated a paper modestly called "Information Management: A Proposal" to his colleagues at CERN, the European Organization for Nuclear Research, in Geneva. The institution held vast stores of information in numerous locations and the proposal offered a model for making it accessible to any computer by connecting data sets through a series of links. Berners-Lee's paper led to the World Wide Web and eventually the Internet. Although the earliest Internet communication dated back to 1969, only those few with advanced technical skills were able to use it in the first 20 or so years.

Like many others, I did not log on until the early 1990s when universities began providing software to activate the initial rides on what we used to call the Information Highway. As the first image slowly rolled down the screen I felt a sudden surge of pleasure, entirely out of proportion to the banal content beginning to appear on the monitor. Balky at first, the software eventually worked and the first full color image lit up my screen. It was digital magic — positively sublime. With the arrival of graphical browsers, the Internet was opened to all of us, and Google, with help from early government investment in information technology, took off to become, behind Apple, the second richest corporation in the world.

By 1993 the Internet was so widespread that the *New Yorker* magazine could publish a cartoon that remains its most viewed. It features a dog sitting in front of a computer screen and telling a fellow canine, "On the Internet, nobody knows you're a dog." For much of the world, especially in developed countries, the Internet is nothing short of the dominant means of electronic communication. This makes it vitally important to understand how it is changing and what that means for the billions who rely on Internet communication every day. Even as Silicon Valley celebrated the Internet's adulthood, the Next Internet was emerging from infancy, hastening the arrival of what might reasonably be called the post-Internet world. Google acknowledged as much when in a revealing 2015 interview, the company's head of search declared that the search engine, which helped to define the original Internet, was now a "legacy" system (a euphemism for "still useful but soon destined for the trash heap"). Now Google, along with other large firms and small startups, is working on new forms of mobile-friendly search engines appropriate to the Next Internet.

THE WEB: DEEP AND DARK

The Internet is not the entirety of the digital world. In fact, it contains a fraction of what is located in what is called the Deep Web and the Dark Web. The Internet that most of us know is a vast store of data accessible through a web browser like Firefox, Safari, or Chrome and a search engine, most likely Google's, though some still look things up on Microsoft's Bing, or Verizon's Yahoo. The Deep Web contains databases that standard search engines are not able to reach but which require software provided by their managers. The Deep Web includes the private files of corporations, which permit, for example, employees of Apple to access the company's sales records and legal documents, and those of governments, such as the medical files of health care recipients and the locations of drone targets kept by the United States Cyber Command. Then there is the Dark Web, which is available to those who know how to use specialized software and need anonymity. Developed by the U.S. Navy, the Dark Web provides some cover for investigative journalists as well as for those needing to mask criminal activity. So in addition to helping reporters evade government scrutiny, it makes possible a marketplace for banned goods, including illegal drugs like opioids. Indeed, the Dark Web has been identified as a key instrument for fentanyl distribution in the United States. While this book will reference these less well-known corners of the digital world, most of it concentrates on those digital quadrants we visit the most, using tools like Google search, the Safari browser, and the software that makes possible one-click shopping with Amazon, Gmail or Apple's iCloud, and social media sites run by Facebook, Instagram, Snapchat, and Twitter.

There is also a web outside the formal orbit of the Internet that I would be remiss not to mention. The eminent

philosopher Willard Van Orman Quine advised us to consider the web inside our minds. We contain, he argued, a "web of belief" that includes the ideas we cherish, which occupy the center, and those connected to this core to form a network of powerful ideological forces. Rather than hosting a discrete collection of beliefs, our minds tie these together in a more or less connected system that assesses new ideas and beliefs in terms of how well they can fit into the "web of belief." Well before cognitive psychology verified this view, Quine understood the power and resilience of belief systems, something especially important for those who scratch their heads in disbelief over how supporters of Brexit and Donald Trump remained enthusiastic in the face of so much evidence challenging their views. We bring this web to all that we encounter, including the webs of Internet social media that are so influential today. There is no denying social media's influence, but it is important to recognize that this influence is tempered and often limited by our internal web of information and beliefs.

GRAND CONVERGENCES

This book is about how societies are becoming digital in a post-Internet world. It focuses on the significance of major transformations resulting from the convergence of Cloud Computing, Big Data Analytics, and the Internet of Things, the primary technological systems that make up the Next Internet. Put simply, the Cloud stores and processes information in data centers; Big Data Analytics provides the tools to analyze and make us of it; and the Internet of Things connects sensor-equipped devices to electronic communication networks. Building on my 2014 book, *To the Cloud*, I describe the essential elements of these three key

technological forces in the digital world and assess their social significance. Its central argument is that the Cloud, Big Data, and the Internet of Things comprise an increasingly integrated system that is accelerating the decline of a democratic, decentralized, and open-source Internet. There is nothing inevitable about this outcome. The Next Internet can be a tool to expand democracy, empower people worldwide, provide for more of life's necessities, and advance social equality. Instead, it is now primarily used to enlarge the commodification and militarization of the world. This trend is not inevitable, but concerted political and policy interventions are required to reverse it.

Understanding the digital world, and especially the transition to the Next Internet, requires more than explaining technologies. It also needs perspectives or ways to think about today's social upheavals. Specific details matter but so too do ways of seeing them. In addition to providing essential information on the Next Internet, I hope to improve on the capacity to understand today's communication technology by offering tools for reflection that, in the words of the great cultural theorist Raymond Williams, offer an "extra edge of consciousness" to understand the modern world. For this I primarily turn to *political economy*, which helps comprehend the power relations that shape the digital world, and *cultural studies*, which contributes to understanding how we make sense of it. The former leads us to carefully examine the power of today's technology leaders, primarily Apple, Google, Microsoft, Facebook, and Amazon, as well as governments whose intelligence agencies and armies depend on digital to project power. Cultural Studies explain how we make meaning in the world. Specifically, it explores how we invest technology with the desire for community, for emotional attachments, for guides to our place in the world, for a wisp of magic, and for a sense of the sublime that lifts us out

of the banality of everyday life. Taken together, these converging ways of seeing digital technology provide more than a collection of facts about the post-Internet world, they offer powerful visions to understand it, and imagine solutions to its challenges.

A WEB OF PROBLEMS

We need these visions because the Next Internet will pose significant social problems including the concentrated power of a few global companies and the governments they work with, growing militarization, environmental devastation, the widespread commodification of personal information, unprecedented surveillance, and near universal automation. As a result, we need citizens who are not only familiar with these problems and can distinguish the old from the new Internet, the Cloud from the Internet of Things, and Google from Amazon. Our times require a keen sense of how to think critically, using the conceptual tools that political-economic and cultural approaches provide. Moreover, *Becoming Digital* recognizes that, even as the analog world remains important, there is no turning back from digital. Rather, we urgently need to advance citizen control over the core technologies, the data we generate, and how they are used. To that end, the book argues for making new use of an old concept, the public utility, which has historically been applied to the allocation of water, electricity, and other essential resources. The public utility concept has also appeared as a key focus of debate throughout the history of computing and, with the rise of centralized data storage and processing, made possible by Cloud Computing, it figures prominently in current debates about how to govern information resources.

THE ROAD AHEAD

Becoming Digital begins by describing how we arrived at today's Internet by focusing on the conflicting tendencies that marked its earliest days as a research communication network linking a handful of institutions. The combination of corporate and government funding, particularly by the Department of Defense, and loosely organized, collaborative projects bringing together university, corporate, and government research labs, delivered a complex mix. This included a tendency to hierarchy and regimentation, growing out of a Cold War mentality favoring centralized planning against what was perceived to be a unified Communist foe in possession of the most advanced technologies. But it also featured decentralized elements emerging from the experimental culture of the Internet's inventors, as well as the military objective that called for a fully distributed and robust network able to survive a major war, including a nuclear conflagration. Over the years, corporations realized the financial value of the Internet, especially the potential to deliver customized advertising to users whose every click could easily be monitored and recorded. In short order, the network grew to become a massively successful commercial instrument, even as it retained some of its original, decentralized, elements. The result is a global system of communication that is complex, contradictory, and contested by individual users, governments, businesses, and social movement organizations throughout the world.

Becoming Digital proceeds to describe how the fundamental structure and guiding values of the Internet are changing with the growth of Cloud Computing, Big Data Analytics, and the Internet of Things. It defines and describes the key characteristics of each with particular attention to how they are converging and becoming embedded in everyday life.

Cloud Computing is a system that provides data storage, software applications, and information technology services to fee-paying customers. These range from individuals who pay Amazon Web Services to store and process data that used to be kept on their laptop hard drive to the world's largest banks, which rely, for example, on Salesforce.com to manage their workforce and marketing divisions. Cloud Computing is transforming data storage, software and service delivery by shifting these functions from personal and corporate data centers to the Cloud.

Cloud data centers are more than giant warehouses that store data. They are closer to information factories that take data fed to their tens of thousands of servers by telecommunications cables and satellites and then process it to produce results that add value to the original data. Weather data becomes weather forecasts, medical data becomes a flu outbreak prediction, population data becomes a plan to build or close schools, crime data becomes police deployment, and so on. We increasingly hear references to Big Data or analytics to describe the application of statistical tools to very large data sets to develop predictive algorithms. For big data enthusiasts, these techniques eliminate the need for traditional approaches that rely on historical, theoretical, or qualitative understandings because what amounts to digital positivism enables the numbers to speak for themselves. The Cloud and Big Data are intimately connected to the singular reliance on quantitative analysis that allows companies to profit from packaging and selling enormous stores of data and also makes it possible for governments to extend their ability to monitor, manage, and control citizens. Moreover, when married to artificial intelligence systems, they can be used to determine whether we qualify for a mortgage, whether we are likely to commit a crime, and whether we qualify for an organ transplant.

The incentive to invest in the Cloud and Big Data expands exponentially with the Internet of Things, a system that embeds sensors and processors in everyday objects as well as in people. These are used to scan, monitor, record, and communicate online about the operation of things (Does my living room need more heat?) and the behavior of people (What is my blood pressure?). What the original Internet did for people, the Internet of Things does for objects and devices. No longer limited to building networks of human communication, the Internet of Things makes use of the Cloud and Big Data to create a global, centralized, and commodified system of communication among objects, as well as people. It promises to revolutionize industrial and informational practices, rationalize global supply chains, create so-called smart cities and homes, reconstitute offices and factories, and vastly expand the ability to monitor the body. Our Wi-Fi-enabled thermostats and step-counting smart phones represent the early days of Internet-based devices. However, given the commercial potential to measure and monitor everything and everybody, development is proceeding rapidly.

The convergence of Cloud Computing, Big Data Analytics, and the Internet of Things marks a new stage in digital development, a genuine ontological shift in the emerging post-Internet world. It not only deepens the tendency to experience others primarily through technological mediation. It also fundamentally shifts the relationship between humans and digital machines. The original Internet required an external device, such as a computer, tablet, or smart phone, to which one logged on to connect and communicate. Less an external means of communication, the Next Internet's digital networks are embedded everywhere, including inside us. They are enabling constant and ubiquitous connections to sensor-equipped objects, and to the scanners worn on, and placed in, our bodies. As with electricity, but far more

powerfully, digital technology greatly expands its influence even as it withdraws into the woodwork of life. The human−computer divide is increasingly becoming an anachronism. For now, it means a steady integration of humans and machines. But it promises a future that raises fundamental questions for all of our institutions as we proceed to what some expect will be the trans-human world ahead.

Following a chapter on the technologies that comprise the immediate post-Internet world, *Becoming Digital* describes the significance of these developments with chapters on their political-economic and then on their bodily and cultural significance. I begin with political economy not to suggest any special privileging but simply as an appropriate starting point. Using the formal term, political economy is *mutually constituted* with culture at every level of their development. Both embody power and culture. The personal, the politicized body, is political, and the political, the body politic, is personal. I follow the chapter on technologies with one on political economy because it maps key corporate and government participants that reappear throughout the remainder of the book. These include the tech industry led by a handful of mainly U.S. companies that, on August 1, 2016, became the five most valuable corporations in the world. From first to fifth, they are Apple, Google, Microsoft, Amazon, and Facebook. Market caps change from time to time, but when assessing the power of Big Tech, it is important to acknowledge that it was the first time that five companies in the same industry led the list of the most valuable in the world. This was no fluke. On June 1, 2017, all five in their same respective positions, topped the market cap list. As if to add an exclamation point to this statement, on June 6, 2017 the annual list of the top 100 brands reported that these same companies led the way as the most valuable brands in the

world. The only difference is that Google heads the brand list with Apple in second place.

The ability of these companies to dominate the digital world and fend off competitors has benefited enormously from close ties to the U.S. government, especially its military and intelligence agencies. Indeed, despite the occasional spat, there is an increasingly close connection between Silicon Valley and the military, which aims to apply the Valley's technologies to substantially expand remote warfare, especially through the global deployment of weaponized drones. With the decline of industry competitors from the United Kingdom and Europe, the United States faces only China for control over digital systems. Led by the giant Alibaba along with Baidu, Tencent, Huawei, and Wanda, and also with considerable government support, China is now a significant force in the emerging world of ubiquitous digital technology. The chapter concludes by situating the clash between the United States and China in the context of wider struggles about the global political economy, especially trade, culture, and military expansion.

Chapter four demonstrates that with the promise to transform and individuate the scanning and tracking of personal and interpersonal life, digital technologies are more than instruments in political-economic and geopolitical conflicts. They are also a force for control over individual bodies and social relationships. Indeed, the expectation of unprecedented commodification and control at the micro level, as Next Internet technologies are inserted into everyday life, fuels much of the feverish competition at the macro level. The chapter begins by addressing the creation of a quantified and commodified self through the development and promotion of sensor-equipped products that track the performance of bodily organs and their functions, gather and store data in the Cloud, and apply analytics to draw conclusions, develop

algorithms, and make predictions. Interest in measuring and monitoring all aspects of human functioning extends beyond the tech companies that design and manufacture devices. Advertisers are tapping into the vast market potential; insurers are eager to sharpen their predictive models; employers are using these devices to closely monitor workers; and governments deploy them to better manage and control citizens.

Such major leaps in technical capacity are accompanied by supporting cultural myths, understood not as false visions of reality, but as stories we tell each other to help us cope with the inexplicable, with accelerating change, and, ultimately, with the knowledge of our own mortality. It has been said that we make myths whenever we make technologies and the transition to the Next Internet is no exception. The new digital world is supported by two prominent stories, including first the *singularity* or the promise of fully integrating human bodies and machines. Believers expect that the resulting meta-humans will vastly expand productive capabilities, overcome the conflicts that have historically divided people and societies, and perhaps even achieve immortality. The chapter also takes up a primary myth propelling the Internet of Things, the centuries-old promise of bringing *things* to life. Today's conjurers embed intelligence in everyday devices and, whether or not we call it "artificial," this imagined power feeds utopian visions that ease the fears of radical technological change.

Chapter five addresses emerging problems, including the vulnerabilities unleashed by reliance on a digital world primarily led by a handful of private corporations and driven by commercialization. Problems also include expansion in militarization as weaponized drones and robotic warriors take to the battlefield. Additionally it takes up the serious issue of environmental degradation from the massive growth in the

power requirements for Next Internet systems and in electronic or e-waste produced by discarded hardware; surveillance by corporations, governments, and hackers; and, finally, the challenge of a transformed global division of labor which, along with automation and artificial intelligence, threatens workers and their jobs.

The final chapter considers the prospects for solving these problems. There is no guarantee that the convergence of the Cloud, Big Data, and the Internet of Things will meet the goals of its corporate and government supporters. The Internet of Things in particular has proven to be highly vulnerable to hackers and data thieves who have already used Wi-Fi-enabled devices to attack and take down networks. The difficult task of securing networks may lead to market failures for many promising applications. Indeed, some look at the growing popularity of music on vinyl (now surpassing in value digital downloads), print books, and in-person meetups, particularly among young people, as signs of a tilt back to analog. We may very well be increasingly digital, but analog communication is far from consigned to the dustbin of history.

Chapter six also examines the work of those who believe another world, including another Internet, is possible by pressing for greater citizen control over communication and information resources. It considers the importance of structural and transactional social movements that are fighting to address major problems, including struggles to oppose concentrated corporate control over the digital world; opposition to militarism; the creation of environmentally sustainable information systems; resistance to the growth of a surveillance society by fighting for the human right to, and the human necessity of, privacy; and the global movement for a guaranteed living income. Increasing interest is focusing on the public utility model that provided the foundation for

widespread access to essential resources like water and power. The utility model also has deep roots in the history of computing. Although the recent growth of massive, centralized data systems expands corporate and government control over information, it is also creating conditions that support genuine citizen control. The convergence of Cloud Computing, Big Data Analytics, and the Internet of Things is often described as laying the groundwork for a utility model of communication. It increasingly resembles a utility in all but ownership and control. These remain primarily in the hands of private corporations that act like monopolies that dominate producer markets and monopsonies that control purchaser markets. Establishing public control over these markets would not only expand public access to the rich resource of the Next Internet. It would also better enable citizens to address problems arising from the new digital world. Specifically, more people would have the opportunity to make socially beneficial uses of the information now routinely given up to private corporations and governments with no compensation. *Becoming Digital* concludes with a discussion of how an electronic communication system based on the public information utility model could help realize the powerful democratic visions that inspired so much of the original Internet.