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Religion of Technology: The Divinity of Man and the Spirit of Invention and The Invisible Computer: Why Good Products Can Fail, the Personal Computer is So Complex, and Information Appliances are the Solution (Book Reviews)

Charles C. Adams
Dordt College

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Book Reviews

The Religion of Technology: The Divinity of Man and the Spirit of Invention, by David F. Noble (New York: Alfred A. Knopf, Inc., 1997). 273 pages. $27.50. ISBN 0-679-42564-0.

The Invisible Computer: Why Good Products Can Fail, the Personal Computer Is So Complex, and Information Appliances Are the Solution, by Donald A. Norman (Cambridge, MA: The MIT Press, 1998). 302 pages. $25.00. ISBN 0-262-14065 9. Reviewed by Charles C. Adams, Professor of Engineering, Dordt College.

Technology has played a seminal role in the development of Western culture during the second millennium. Now that we have entered the third millennium, its ubiquitous influence is manifest in the hopes, the fears, and the everyday lives of the majority of the world's citizens. The two books reviewed here complement each other by examining how our humanness — particularly that aspect of our being we call faith — has shaped technology, and by examining how technology is shaping the character of our humanness.

In his book, David F. Noble uses the phrase "the religion of technology" in a dual sense. On the one hand, he claims that followers of millenarian Christianity have had the primary, direction-giving responsibility for developing Western science and technology. By "millenarianism," he means "the expectation that the end of the world is near and that, accordingly, a new earthly paradise is at hand" (23). The "religion of technology" in that sense refers to those tenets of millenarianism that provided the faith environment in which modern Western technology could appear and grow. On the other hand, the "religion of technology" refers to technicism: the secularized faith in technology as savior or rescuer of the human condition. Perhaps the subliminal message of the book is that the two faiths are, at some deeper level, the same: i.e.; millenarian Christianity is technicism and technicism is millenarian Christianity.

Part I of the book, "Technology and Transcendence," traces the historical development of technological triumphalism from the twelfth-century cleric Joachim of Fiore through the thirteenth-century Franciscan Roger Bacon to Christopher Columbus. The discussion of Columbus is particularly revealing:

> Columbus, master of the marine arts, thus identified his epoch-making technical achievement with the ultimate destiny of mankind. To his eyes, the discovery of the New World signaled the imminent End of the World, and hence the promised recovery of perfection . . . . in the manner of the new Adam, he obsessively named all that he surveyed, confident in his expectation that mankind's original dominion might soon be restored. (34)

More than anyone else, Francis Bacon (1561-1626) "defined the Western project of modern technology." And, Noble argues, "his bold vision was framed with reference to the millennial expectation of man's dominion over nature" (49). While Bacon is usually revered as a chief prophet of modern science, Noble cites Lewis Mumford, insisting that Bacon always thought of science as technology:

> "Let no man look for much progress in the sciences," Bacon wrote in his Novum Organum, "unless natural philosophy be carried on and applied to particular arts, and particular arts be carried back again to natural philosophy." (49)

As Noble continues his trek through the history of Western science, he argues that "Almost every important seventeenth century English scientist or promoter of science from Robert Boyle to Isaac Newton believed in the approaching millennium" (59). The dominant members of the Royal Society and the leaders of Western science through the nineteenth century—Joseph Priestley, Michael Faraday, and James Clerk Maxwell—are shown to be millenarians or fundamentalists. (At this point, Noble might be accused of theological sloppiness—painting virtually all fundamentalist Christianity with the same millenarian brush.)

A shift occurs during the eighteenth and nineteenth centuries. The burden of technological utopianism begins to be shared by another group, the Freemasons:

> Following in the footsteps of monks, friars, illuminati, and virtuosi, the Freemasons carried the perfectionist project of the religion of technology into a more secular age, where they, in turn, passed it on to the new Adam of modernity, the engineer. (73)

Benjamin Franklin, DeWitt Clinton, Stephen Van Rensselaer (the patron of the first civilian engineering college in the United States), and Robert Fulton all embraced a Freemasonry that, according to Noble, gave birth to the engineer, the avatar of twentieth-century technicism.

"But the true herald of the engineer was Saint-Simon's disenchanted disciple Auguste Comte" (83). The overriding objective of Comte's positivism, while secular, was "strikingly reminiscent," according to Noble, "of the Christian goal of a transcendent recovery of mankind's original divine image-likeness and dominion over nature" (84). Thus the "religion of technology" becomes ubiquitous in the nineteenth century, shared by millenarian Christians, Freemasons, and positivists. Summarizing Part I of his book, Noble writes the following:

> This, then, was the ideological context of technological development in America, where scientific and industrial revolutions followed in the wake of religious revival. The premillennialists earnestly anticipated and piously prepared for Christ's imminent return and the start of the millennium. The postmillennialists, believing that Christ

would return only at the close of the millennium, which had already begun, righteously set about constructing his earthly kingdom. For both, the arts and sciences were means to millenarian ends: the making of the second creation. (90)

In Part II of his book, "Technologies of Transcendence," Noble examines the religious spirits driving the leaders in four areas of twentieth-century technology: atomic weapons, space exploration, artificial intelligence, and genetic engineering. In each case, he shows that many of the leading personalities had strong religious (often millenarian Christianity) commitments and that those religious commitments reinforced the technological triumphalism that these f our technologies so plainly exhibit. Noble is an historian, and Part II reads more like tabloid journalism than the more traditional, scholarly discussion in Part I. Nonetheless, it reinforces his basic thesis, is fascinating reading, and is deserving of inclusion in his book.

Noble summarizes his basic thesis as follows:

When people wonder why the new technologies so rarely seem adequately to meet their human and social needs, they assume it is because of the greed and lust for power that motivate those who design and deploy them. Certainly, this has much to do with it. But it is not the whole of the story. On a deeper cultural level, these technologies have not met basic human needs because, at bottom, they have never really been about meeting them. They have been aimed rather at the loftier goal of transcending such mortal concerns altogether. In such an ideological context, inspired more by prophets than by profits, the needs neither of mortals nor of the earth they inhabit are of any enduring consequence. And it is here that the religion of technology can rightly be considered a menace. (206-207)

The Religion of Technology is a book reformational Christians, particularly those involved in science and technology, will find both fascinating and instructive. It is fascinating because it supplements the traditional reformational understanding of the impact of the Reformation on the Scientific Revolution and vice-versa. It is instructive in that it provides us with historical insights that can sharpen our reformational vision of science and technology in the twenty-first century.

Donald A. Norman's *The Invisible Computer* is quite different from Noble's book. Rather than dealing with how we humans have shaped technology, it deals with how technology—specifically modern communication technology—is shaping (or misshaping) us. Although different than Noble's book, it confirms his basic thesis, because the problems that Norman elucidates are obvious results of "the religion of technology."

Norman is a Professor of Cognitive Science at the University of California at San Diego. He is also an executive at Hewlett-Packard Corporation, and has served in a similar capacity at Apple Computer. His basic thesis is that humans and digital computers are fundamentally different kinds of creatures, and that it is a characteristic of the communication technology industry to attempt to treat people like computers. The result is that today's digital technology has become "intrusive and overbearing."

In the early chapters of his book, Norman discusses the success and failure of various technological artifacts: from Edison and the phonograph to Visicalc and the Apple II+. In demonstrating the "maturing" of a technological artifact, he points to the electric motor. In a delightfully antiquated page from a 1918 Sears Catalog, he shows how the electric motor was once sold as a basic, household device for which one would purchase "peripherals" such as fan, vibrator, beater, mixer, and churn attachments. He makes the point that after an artifact matures, it "disappears." That is, people purchase appliances where the electric motor is built-in rather than buy stand-alone electric motors. So too, by anology, with the modern Personal Computer (PC) and its wide array of peripherals: printers, scanners, disk drives, etc. His argument is that the computer should likewise "disappear" (and thus the title of the book). This "disappearance" occurs most completely when the appliance becomes a "natural extension of the person." In this regard, he identifies three design axioms (what others might label "design norms") for what he calls information appliances: simplicity, versatility, and pleasurability. With regard to these axioms, the contrast between the PC and other household appliances is stark:

How many hours a week do you spend keeping your computer working, updating hardware or software, reading instruction manuals, help files, or the monthly PC magazine? Too many. How many hours a day do you spend keeping your TV set or telephone or refrigerator working? Updating it? Reading instruction manuals or help files? Not very many. There is a lesson to be learned from that contrast. (71)

There are remarkable insights in this book that stand conventional wisdom on its head. For example, it is often said that young people have no problem with computer technology because they have grown up with it; it is only the less-resilient aged folk among us that share a sense of being overwhelmed. Norman looks at it differently:

To me, the maddening point about those who have grown up with the technology is that they don't realize that there might be a better way. When I have problems, I fret and fume and suggest a dozen better solutions. When they have those very same problems, they shrug their shoulders. They have grown up believing that it is natural and correct to spend a large portion of every day redoing one's work, restarting systems, inventing "workarounds." What a horrible heritage we have passed down to them. (90)

Norman's position contrasts with that of technological optimism, which believes that a "magical cure" is just around the corner. He identifies speech recognition, expert systems, network computers, and small, hand-held devices as technologies on which the hopes of many a technophile rest but which, for reasons he discusses in some detail, will likely aggravate current problems.

Perhaps the most interesting part of Norman's book is his contrast between the analog character of humanity and the digital world that we are increasingly building for ourselves. For example, people have the ability to be insensitive to simple speech errors. But it takes a very powerful program running on a very powerful computer to give to a speech recognition program even a small fraction of that same kind of insensitivity. An important difference between people and computers has to do with the importance of accuracy and precision.

> Why do accuracy and precision matter? In our natural world, they don't. We are approximate beings; we get at the meanings of things, and for this, the details don't much matter. Accurate times and dates matter only because we have created a culture in which these things are important. Accurate and precise measurements matter because the machines and procedures we have created are rigid, inflexible, and fixed in their ways, so if a measurement is off by some tiny fraction the result can be a failure to operate. (137)

In this regard, consider the following two perspectives on people and machines (160):

The Machine-Centered View

People	**Machines**
Vague	Precise
Disorganized	Orderly
Distractible	Undistractible
Emotional	Unemotional
Illogical	Logical

The Human-Centered View

People	**Machines**
Creative	Unoriginal
Compliant	Rigid
Attentive to change	Insensitive to change
Resourceful	Unimaginative

The basic point, according to Norman, is that the two viewpoints are complementary. "People excel at qualitative considerations, machines at quantitative ones" (160). We need both. Problems arise when we expect machines to behave like people or when we expect people to behave like machines. It thus seems that we have yet to overcome the legacies of Fredrick Taylor, who, in the early 1900s introduced the concept of "scientific management," and Henry Ford, who introduced the assembly line. In those situations, people were treated like machines and were then found to be deficient when they behaved like humans.

Another example of standing conventional wisdom on its head is Norman's assertion that we are not living in as technologically-revolutionary times as we may think. "Today," he writes, "the 'revolution' in which we live consists mainly of improvements in what has already existed" (164). In making this point, he cites the far-reaching changes that occurred during the latter part of the nineteenth century. Rapid travel, for example, did not exist in the nineteenth century. The end of the nineteenth and start of the twentieth century gave us first ocean liners and the railroad, followed by automobiles and airplanes. Likewise, talking to someone over long distance was not possible for most of the nineteenth century. In the twentieth century, we began regularly using telegraph, telephones, and television. Instant recordings of sights and sounds (photographs and the phonograph) were developments that occurred over the turn of the century. As we move from the twentieth to the twenty-first century, these technologies are all being improved—not radically changed. Norman can be faulted here for not giving sufficient recognition to the revolution beneath the surface (analog to digital). But then his point is that most of us are people who function "above the surface." The analog to digital revolution is revolutionary primarily for engineers and scientists. For most citizens of the twenty-first century, the changes are those of "improvement" rather than revolution.

Finally, Norman makes the case that quality ergonomic design requires a variety of disciplines and a variety of expertise. Narrowly trained engineers design complex products that are difficult to use. Ergonomically normative products—artifacts that disappear as an extension of the user—require broadly educated technologists with some expertise in sociology, cognitive science, aesthetics, communication, and anthropology, as well as expertise in mechanical or electrical engineering. Despite the lack of Reformed Christian perspective to the book, this is an observation that those of us in the Reformed tradition can and ought to endorse. It rings true to the multidimensionality, coherence, and unity of creation as described by reformed thinkers from Calvin to Kuyper and Dooyeweerd.

Technology is one way in which we humans respond to the Lord's command to unfold, develop, and care for creation. Obedient technology is driven by a faith in our faithful Creator and in his covenant promise to "make all things new." When the driving faith for doing technology shifts, is misplaced in the creation and in our own creaturely ability to bring about redemption, then the products of that technology turn on us. They become agents for the kind of degradation, depravity, and dehumanization that Paul wrote of in Romans 1. Noble's *The Religion of Technology* and Norman's *The Invisible Computer*, each in its own way, make that abundantly clear.