many so-called racial features such as skin color and body shape.

Human populations have been on the move and intermixing for the past 50,000 years. While some human genetic isolates exist, they are rare and represent a tiny fraction of the total human population. Wade does admit that there exist some populations that he calls "admixed," such as the modern residents of Ethiopia who are genetically more European than African. But what he does not seem to understand is that all human populations are mixed—there are no genetically "pure" populations. The idea of a pure race is pure myth.

Wade speculates that Jews have undergone some kind of selection for genes conferring higher intelligence because some of them (actually the wrong ones) were bankers during the middle ages. Wade bases this absurd idea on a misunderstanding of the scientific literature. What the key paper actually showed was that by principal component analysis of 550,000 genetic markers, European Jews can be identified and differentiated from non-Jewish Europeans.[2] This does not mean that Jews differ in any allelic frequencies from other Europeans, only that familial relationships can be detected. It would be quite surprising if the results presented in the paper were not obtained, and they have nothing whatever to do with "evolution."

Despite being a respected science journalist, the author frequently fails to distinguish between scientific arguments based on data and conjectures that are not. Two examples illustrate this serious deficiency. Wade mentions and does not dispute the work of Richard Lewontin showing that there is less genetic variation between populations than between individuals regardless of what population they belong to. To counter this, Wade cites Sewall Wright, as quoted in a famous textbook.[3] The very same textbook clearly indicates that the total average human F_{st} is less than that of different villages within the Amazon tribe of the Yanomamö, confirming Lewontin's point. Neither the textbook's authors nor Wright disagreed with Lewontin's conclusions on the relative importance of genetic diversity within compared to between populations.

The use of pseudo-scientific arguments to advance philosophical and political agendas is quite familiar to most readers. From eugenics to social Darwinism to some of the antitheistic arguments of the new atheists, the name of science has been misused to cloak questionable ideas in a mantle of unassailable truth. The Christian belief that all human beings are created equal in the image of God is a matter of faith and not a scientific statement; there is no scientific evidence to refute it.

Notes

[1]F. Crofts, G. N. Cosma, D. Currie, E. Taioli, P. Toniolo, S. J. Garte, "A Novel CYP1A1 Gene Polymorphism in African-Americans," *Carcinogenesis* 14, no. 9 (1993): 1729–31.

[2]A. C. Need, D. Kasperaviciute, E. T. Cirulli, D. B. Goldstein, "A Genome-Wide Genetic Signature of Jewish Ancestry Perfectly Separates Individuals with and without Full Jewish Ancestry in a Large Random Sample of European Americans," *Genome Biology* 10, no. 1 (2009): R7, doi:10.1186/gb-2009-10-1-r7.

[3]Daniel L. Hartl and Andrew G. Clark, *Principles of Population Genetics,* 3rd ed. (Sunderland, MA: Sinauer Associates, 1997).

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TECHNOLOGY

THE GLASS CAGE: Automation and Us by Nicholas Carr. New York: W. W. Norton, 2014. 288 pages, notes, index. Hardcover; $26.95. ISBN: 9780393240764.

Nicholas Carr, author of popular technology books including *The Shallows*, *The Big Switch*, and *Is Google Making Us Stupid?* preaches another sermon in *The Glass Cage*, his newest book about technology. He echoes millennia of concerns about the detrimental effects of technology on humans if we continue to lunge full steam ahead toward a future of unintended consequences. Carr's sermon ends with a poem. That reminded me of classical Chinese thinkers who valued harmony with nature as more important than conquest of nature, and therefore elevated poetry over technology and mathematics.[1]

Only recently have Western philosophers criticized technology. Aristotle "argued that slaves and tools are essentially equivalent" (p. 224). But he was in favor of both. Adam Smith in 1776 claimed that because of industrial machines, laborers would lose "the habit of ... exertion, and generally become as stupid and ignorant as it is possible for human creatures to become" (p. 106), but he also claimed that the machines would bring workers "convenience and luxury" (p. 22). Alfred North Whitehead a century ago encouraged the use of "technological aids" (p. 65) to free hands for greater dexterity, to free minds for richer intelligence and decision making, and to free souls for a broader perspective (p. 66). But today the

human is the clerk and the automated system is the decision maker (p. 66). Carr asks, "What if the cost of machines that think is people who don't?" (p. 113).

Carr details his complaint in at least three areas. First, in controlling a plane or car—or in wayfinding in general—automation results in humans losing skills. Pilots "without their digital assistants … feel helpless" (p. 12). New generations of Inuit who find their way across the tundra using GPS lose their ability to find their way without automation. They die when their GPS dies (p. 126). Second, computer-aided architecture gives way to an inhospitable style called "parametricism" that begins with the CAD software instead of beginning with insight and pencil sketching (p. 140). Third, computerized medicine actually hinders evidence-based practice of medicine. When a physician diagnoses a patient based on electronic medical records, she loses the ability to grasp how thick the patient's file is, how many different hands have prepared it, and how intensely each contribution is or is not made—all tacit clues that inform her judgments.

To keep workers thinking, claims Carr, we must design tasks that involve moderate stimuli—neither unusually weak nor unusually strong stimuli. Psychologists Yerkes and Dodson discovered over 100 years ago that mice learned best in such an environment (p. 89). We must promote "human-centered automation," which, thanks to regular feedback, is "adaptive," keeping "the operator at the peak of the Yerkes-Dodson performance curve" (pp. 164–65). We must limit technology (p. 154). We must avoid "an almost religious faith in technology" (p. 160). We must not allow computer programmers to "legislate" what should be automated (p. 161).[2]

But who is this "we"? In the case of Inuit wayfinders, Carr is clear: The "tribal elders" decide. Carr is rightly concerned about Big Brother deciding for us (p. 194). He fails to offer examples to support his concern that technology can be used for evil. I offer a strong example: Adolf Hitler used tabulating machine cards—the height of technology of his time—to track Jewish families marked for destruction.

Carr admits that ethical issues can challenge a pluralistic society. A Roomba automatic vacuum cleaner, for example, is an ethical robot in the sense of Isaac Asimov's Three Laws of Robotics because it harms no humans, but not ethical for a Jainist because it harms insects (p. 185).

Initially Christians were optimistic about technology. Carr gives as an example Sir Francis Bacon's seventeenth-century utopian novel *New Atlantis*. In recent decades, however, Christians have been more pessimistic about technology. Readers of *PSCF* will be familiar with Michael Polyani and Jacques Ellul as two examples, although Carr mentions neither author. As early as 1953, Polyani warned us that although machines can model algorithmic knowledge, they overlook tacit knowledge—a point which Carr makes as well (pp. 9, 105, 144). Ellul worried that with technology "means … have established primacy over ends"[3] and Carr echoes the warning.

Christians know that work is not the curse of Adam. Carr agrees with Christians that work should bring joy and freedom (pp. 20, 232). But we miswant: "We're inclined to desire things we don't like [such as leisure] and to like things we don't desire [such as work]" (p. 15). The term "miswant" is only fourteen years old; the sentiment is as old as Romans 7, for we too easily sell our birthright of long-term gains for the mess of pottage that is immediate gratification.

The strength of Carr's book is that it is a lively, up-to-date, interesting, often first-person account of the problems that society faces in the "quasi-Darwinian process" (p. 173) of increasing technology. The weakness of Carr's book is that it is short on solutions. But that is true of most other accounts of our technological future. The book includes an index and endnotes, but a bibliography would have been helpful. If you do not already know what Carr has said repeatedly in blogs, news articles, and his previous books, then *The Glass Cage* is an excellent introduction to his passion for the right use of technology. He should say more about how we decide what that right use is.

Notes

[1]Frank J. Swetz, "How does a society support and nurture the growth of an intellectual discipline?" Lecture at Messiah College, Mechanicsburg, PA, March 4, 2010.

[2]Several books use the term "technological priesthood" instead of Carr's weaker term "technological legislators." For example, Robert C. Scharff and Val Dusek, eds., *Philosophy of Technology: The Technological Condition – An Anthology*, 2nd ed. (Hoboken, NJ: Wiley-Blackwell, 2014). They all credit Alvin M. Weinberg as coining the term "technological priesthood" in his "Social Institutions and Nuclear Energy," *Science* 177, no. 4043 (July 7, 1972): 34. In fact, that article contains the term "military priesthood," but not "technological priesthood."

[3]Jacques Ellul, *Living Faith: Belief and Doubt in a Perilous World*, trans. Peter Heinegg (San Francisco, CA: Harper and Row, 1983; Eugene, OR: Wipf & Stock, 2012): 86.

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