



**Book Review: Peter W. Singer's *Wired for War: The Robotics Revolution and Conflict in the 21st Century***

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Peter Singer, *Wired for War: The Robotics Revolution and Conflict in the 21st Century* (New York: Penguin Press HC, 2009). 512 pgs. ISBN 978-1594201981. \$29.95.

Brookings Institute Senior Fellow Peter W. Singer's latest book, *Wired for War*, is a survey of recent thinking and developments in robotics aimed at giving the reader a picture of what the author claims is "the most important weapons development since the atomic bomb." The point that the change is vast, deep and ongoing apart, there is no attempt to persuade readers of a given set of arguments, let alone construct elaborate pictures of probable futures (as robotics experts Hans Moravec and Ray Kurzweil have done in their books), the book instead focused on explaining what the issues are.

To that end the discussion is divided into two parts. Part One, "The Change We Are Creating," concerns the technology itself, providing basic concepts and essential history (including the answer to the question of "What is a robot?"), and a round-up of recent projects of note, with chapters devoted to the idea of a "technological Singularity," the impact of science fiction on the field, and a survey of the careers and views of a number of prominent roboticists.

Part Two, "What Change is Creating For Us," concerns the implications, possibilities and consequences, as far as these can be guessed at. Accordingly it discusses the related matter of the Revolution in Military Affairs, some of the impacts the "robotics revolution" may have on international competition and wars large and small, as well as national leadership, the culture and traditions of soldiering, and the perception of war by civilians.

Unlike Singer's first two books, *Corporate Warriors: The Rise of the Private Military Industry* (Ithaca, NY: Cornell University Press, 2003) and *Children at War* (New York: Pantheon, 2005), *Wired for War*, Singer has written *Wired for War* for a popular audience. Indeed, not only does it seem to be written to be accessible to a general audience, but also to entertain it, so that the book is packed with personal anecdotes, reminiscences, pop cultural references and personal sketches of the authorities cited (actually described on the book's dust jacket as its "cast of characters").<sup>[1]</sup> As the author himself says in that introductory note, *Wired for War* is "as far as I know, the first book to come out of a think tank with a recommended music playlist, designed to get into the vibe of the research results," as well as a contest giving an award to the reader who submits a complete list of all of the book's cultural references.<sup>[2]</sup>

The result is that *Wired for War* comes off as not only more journalistic than scholarly, but downright "fluffy" at times. Singer does make the case that this is part of his "methodological rationale," specifically his view that it is worthwhile to use a variety of approaches in conveying a "feel" for what is happening at this moment.<sup>[3]</sup> Given this particular subject matter, there is something to be said for such an approach, especially when the direct influence science fiction (often written by authors actually accomplished in the sciences) has had on the thinking of those actually doing the practical work of transforming these ideas into reality is considered. Additionally, there is no denying that culture shapes the broader context in which these new technologies develop, proliferate and enter use, and that this is well worth paying attention to—especially when the technology brings as much cultural baggage with it as robotics does. There is also nothing wrong with an author trying to be as interesting as possible.

To his credit, Singer does not lose his focus on his subject in the course of all this, his more colorful touches never weighing down the book so as to cost it clarity or readability (though some readers will understandably wish he had used the space more efficiently). Those who have followed the field closely for any length of time are likely to come away feeling that they have seen most of this before, and many times at that, but as his forty-four pages of endnotes testify, Singer's research is adequate for his purposes. Indeed, he does a particularly good job setting forth the relevant historical background and explanations of basic concepts, and surveying the technological state-of-the-art. (The only shortcoming I found with the book in this regard is his failure to devote sufficient attention to developments outside the United States—the noteworthy activity in South Korea, for instance, rarely receiving mention, except when he specifically makes cross-cultural and international comparisons.)

Nonetheless, the desire to be entertaining, and the close proximity of science fiction with science fact in this discussion, raises the risk that this examination of an issue which is particularly susceptible to wild speculation will succumb to technological hype. (After all, telling the reader that this or that exciting notion is unlikely would diminish the fun.) Singer is not insensible to these risks, and he does address the issue in the author's note where he assures the reader that the book is

only about technologies either operating now or already at the prototype stage. I steer clear of the imaginary ones fueled by the Klingon power packs, dragon's blood, or the hormones of teenage wizards.<sup>[4]</sup>

He also makes clear the important point that scientists' predictions have tended to overstate the positive, by which he refers to the positive social implications of the technologies under discussion. Tellingly, however, he fails to note that the overstatement of the positive can also take the form of an overselling of the feasibility of their pet ideas and projects, since the book does not stay as grounded as one might expect from these cautions. In fact, the weaknesses of *Wired for War* tend to be in the more speculative chapters, and in particular the author's easy acceptance of many of the most radical claims made for what these technologies may achieve in the near future where a more critical eye was warranted. Singer is quick to point to the pessimistic predictions that proved wrong, but he also ignores the optimistic ones that proved incorrect. The fizzling of the household robotics market and "fifth generation" computing in the 1980s, are both noteworthy instances deserving of mention, as is the fact that the most optimistic experts, like Kurzweil (who is discussed at length in the book), have repeatedly erred in their guesses about how much would be achieved, how quickly.<sup>[5]</sup>

That is not to say that grounds are lacking for a broadly "optimistic" position. The reality is that robotics is an area seeing rapid development, with some practical consequences, particularly in military service. According to Singer, the number of robots serving with U.S. forces in Iraq went from zero in 2003 to 12,000 in 2008, in a wide variety of capacities, combat included. Indeed, the 174th Fighter Wing of the Air National Guard is converting from manned F-16s to remotely piloted MQ-9 "Reapers." However, it is worth noting that truly autonomous systems (rather than remote-

controlled ones like the RQ-1 Predator and Reaper)-which Singer correctly recognizes are key to the revolution he describes-have yet to enter service on a significant scale. Additionally, many of the predictions discussed in the book (the entry of systems that can properly be considered robot infantrymen into service by the 2020s, for instance) rest to a considerable degree on simple guessing.

The chapter discussing the technological Singularity, titled "To Infinity and Beyond: The Power of Exponential Trends" in particular suffers from this problem. The idea underlying the "Singularity" is that increases in computing power will create artificial intelligence that not only matches, but exceeds, the capacities of flesh-and-blood human beings, resulting in an "intelligence explosion." Additionally, these changes are expected by some to converge with advances in molecular-scale engineering, neuroscience, genetic engineering and other such areas in ways that utterly redefine every aspect of the "human condition," from birth to economic scarcity, in ways we cannot predict (hence the term). While Singer makes it clear that there is a great deal of disagreement about the desirability of the Singularity, he overlooks the arguments against its plausibility, despite his attachment of a couple of caveats.[6]

Singer's book would be more useful if it provided the other side of this issue, and in general, readers already familiar with the body of work on which he draws would do better to look elsewhere if they want to plumb one of the matter's many dimensions in great depth. Nonetheless, as it is, *Wired for War* is a robust introduction to a fascinating and worthwhile subject. Newcomers will find it worth their while for that reason, while those with a greater familiarity with military robotics will still find it worth a look because of its impressive breadth, and the impact that this heavily publicized book seems likely to have on the dialogue about the issue in the years to come.

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## References

1. The first couple of pages of the book illustrate the point. The first text the reader encounters is an epigram from *The Matrix*, following which is an author's note, "Why a Book on Robots and War?" that is headed by a quote from science fiction writer Isaac Asimov, after which he answers his own question with the declaration that robots are "frakkin' cool" (the euphemism a reference to *Battlestar Galactica*, for the uninitiated), then turns to a recollection of how he came to be interested in security affairs in childhood.
2. Peter W. Singer, *Wired for War: The Robotics Revolution and Conflict in the 21st Century* (New York: Penguin Press HC, 2009), 14. The playlist can be found at the book's rather elaborate promotional web site, <http://wiredforwar.pwsinger.com/>.
3. Singer, 13.
4. Singer, 14.
5. In addition to Kurzweil's questionable track record with political, military and economic predictions, a quick check of the prognostications for 2009 in his classic *The Age of Spiritual Machines: When Computers Exceed Human Intelligence* shows him to have been overoptimistic

about the pace of technological development. In particular, he appears to have been far off the mark regarding neural nets, voice-recognition software, virtual reality and the automation of motor vehicles (for instance, "intelligent roads" enabling fully automated long-distance driving by this year). Kurzweil, *Age* (New York: Penguin, 1999), 189-201.

6. Such arguments include the trend of diminishing, rather than increasing, returns on investment in technological innovation identified by a number of experts, including Theodore Modis, Jonathan Huebner and Joseph Tainter, and the frequently discussed point that "Moore's Law" (according to which computer power increases exponentially) may be physically limited by today's computer architectures. Others have pointed to the frustration of such developments by ecological and other systemic limits as discussed in, for instance, Thomas Homer-Dixon's *The Upside of Down: Catastrophe, Creativity and the Renewal of Civilization* (Washington D.C.: Island Press, 2006). (*Strategic Insights* carried a review of this book in 2007, Nader Elhefnawy, "A Review of The Upside of Down: Catastrophe, Creativity and the Renewal of Civilization by Thomas Homer-Dixon," *Strategic Insights* 6.1 (2007). Accessed at <http://www.ccc.nps.navy.mil/si/2007/Jan/elhefnawyJan07.asp>, Jun. 1, 2009.)