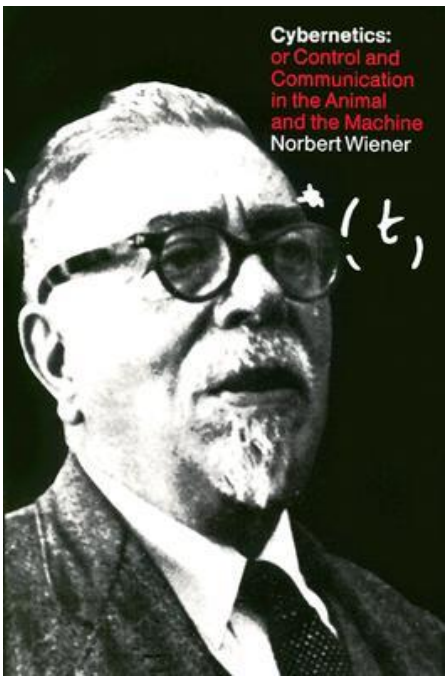

Cybernetics: or the Control and Communication in the Animal and the Machine

Norbert Wiener

Cybernetics: or the Control and Communication in the Animal and the Machine

Norbert Wiener

Cybernetics: or the Control and Communication in the Animal and the Machine Norbert Wiener
It appears impossible for anyone seriously interested in our civilization to ignore this book. It is a ‘ must’ book for those in every branch of science . . . in addition, economists, politicians, statesmen, and businessmen cannot afford to overlook cybernetics and its tremendous, even terrifying implications. "It is a beautifully written book, lucid, direct, and despite its complexity, as readable by the layman as the trained scientist."
-- John B. Thurston, "The Saturday Review of Literature" Acclaimed one of the "seminal books . . . comparable in ultimate importance to . . . Galileo or Malthus or Rousseau or Mill," "Cybernetics" was judged by twenty-seven historians, economists, educators, and philosophers to be one of those books published during the "past four decades", which may have a substantial impact on public thought and action in the years ahead." -- Saturday Review

Cybernetics: or the Control and Communication in the Animal and the Machine Details

Date	:	Published March 15th 1965 by Mit Press (first published 1948)
ISBN	:	9780262730099
Author	:	Norbert Wiener
Format	:	Paperback 212 pages
Genre	:	Science, Philosophy, Nonfiction, Mathematics, Technology

From Reader Review Cybernetics: or the Control and Communication in the Animal and the Machine for online ebook

Malini Sridharan says

I wish I could read differential equations the way that I can read words.

I appreciated the thoughtful and prescient discussions of technology and society, and thoroughly enjoyed following his reasoning through both predictions that turned out to be true and theories that turned out to totally wrong.

Grace says

The book was interesting to read. Cybernetics had everything combined into one book. It covers the biological factors as well as the technological and the historical. It gave me a new perspective on how technology is similar to the human body. An example from the text: “The synapse is a coincidence-recorder, and the outgoing fibre is only stimulated if the number of incoming impulses… ” (29).

Overall the book was fascinating to learn about technology in a new perspective, but because this was for a class, I would not have chosen it to read on my free-time unless I wanted to fall asleep.

Roberto Rigolin F Lopes says

This is a paradigm shift described with dozen applications and rigorous details. Despite the several equations, Wiener did a great job sharing the historical context and igniting discussions; you may have lots of fun reading his predictions about machines playing chess. As a result, you may never run out of entertainment because there are always new stuff to explore here. Just look around and you will find applications of these tools everywhere.

Alexander Curran says

Weiner gives an ethical and comical account of mentalism and cybernetics. A materialist approach which acts as a warning yet for the date 1965 that it was published seems out of date in some areas. It is caught between philosophical investigations that meet scientific experiements being weighed with qualitative and quantative deductions, formatted by the materialist method of outling problems and then stating possible solutions. Cybernetics is a warning about computing being misused or transforming humanity for the worse, yet I find the reality of our present day is the complete opposite, with a technological optimism permeating our current paradigm.

Ben says

Most of my reaction to this book is incidental to its content: First, it's funny what once passed for pop science. The reviews on the back from the *Saturday Evening Post* and others hail its readability for the layman, yet at least 10% of the pages are devoted to difficult equations and proofs, and I had to skip a couple of chapters because the math was way, way over my head.

Second, much of the science Wiener pioneered has been obviated by the development of more powerful tools in neurology and computing, among others. One on hand, his ruminations on the potential of the machine to perform this or that task feel lost in a hastening genealogy of technological developments.

On the other hand, Wiener was both philosopher and scientist. As a scientist he was evidently peerless at the time; as a philosopher he reads as ... quirky. But at least he's trying. A dyed-in-the-wool materialist, his assertion that the body is a machine - a wonderfully complex machine, but a machine nevertheless - apparently had not been so internalized by his intended audience (again, a mathematically literate lay audience) that it was unnecessary to make the point. But this hardly exhausts his argument. Wiener was clearly an instrumentalist, and explicit in his theory of the human body is the idea that the workings of neurons, synapses, and brain waves could be translated to computing technologies for many applications, good or bad, which he discusses at length in other books like "The Human Use of Human Beings." It was prophetic of Wiener to predict that computing power would scarcely be limited, except by the efficiency of the vessel in which the computer operated, including considerations like energy conservation.

The last and most pressing reason that the book is interesting is because Wiener, probably the highest authority in the world on the science of intelligence at the time the book was written, was clearly committed to a program of ethical research and development. He warned of the danger of developing dangerous computing applications, and dismissed the idea that we can always "turn off" machines that we don't like, since it isn't always clear that the danger exists until after the damage is done. We have to be careful lest we find ourselves cobras fighting mongooses (mongeese?)

Anthony James says

This is a good read if you want to try and trace how mid-twentieth century scientific thought developed. There are some interesting sections that can be read in a stand alone manner. However, a lot of the material is now very dated from a scientific perspective. There is a section of "Language, Information and Society"

that is still very strong today regarding markets and games though.

Anthony Bello says

I was surprised to learn that Wiener actually cautioned against applying game theory and its models too generally. Also, I didn't realize that the math of a book this influential, with applications to a diverse range of subjects, would require such an advanced understanding of calculus. Suffice it to say, I was unable to appreciate the finer points of Wiener's mathematical scope. Nevertheless, this book will only get more influential with time, and the easy parts are still worth reading.

Dan Rera says

This was a very interesting book. It had some idiosyncrasies that prevented me from giving it a higher rating, but other than that, the subject matter and breath were fascinating enough for me to certainly recommend it to anyone with any interest in cybernetics as a broad concept.

Let me first say that there were a few chapters in the beginning and end that were needlessly technical and mathematical. It isn’t so much that I object to the existence of mathematical proofs in their proper context, but it seemed unnecessarily detailed for the overall purpose and thrust of the book. After working my way through a few of the demonstrations, I eventually gave up an took the author’s word on the soundness of his conclusions. I think this is fair enough to do, so much so, in fact, that I started to wonder why he was making me flip past pages upon pages of dense calculus only to arrive at a summary paragraph that would elucidate the meaning of his findings. At one point he attempts to justify this technique by saying something to the effect of: it would take me much longer to put these formulae into common English, so read them for their condensed shorthand value. I, as the reader, would have been perfectly willing to let him dispose of the rigor for the sake of cleaner text. But whatever; maybe people really wanted to delve into that level of demonstration.

In addition, for as direct and focused Wiener seems to be as a mathematician, his thoughts, and even his prose, seem disjointed and meandering. He quickly moves from one large concept to the next, sometimes leaving the reader reeling trying to catch up. He goes on digressions that seemed opinionated and lengthy, and, when returning to the original thread, makes no real indication that he has returned. Other times these digressions will be nearly freeform transitions between concepts, similarly lacking indication that he has departed one concept and started addressing another. That he does both of these leaves the reader wondering if the text is moving forward or looping back. I would like to think that the author was making some larger point about the nature of cybernetics though this ambiguity, but this seems doubtful to me.

These criticisms are small, however, taken in relation to the positive aspects of this book. The conclusions being reached by Wiener might seem banal to a contemporary reader, but this only lends credibility to their influence. Weiner not only anticipates a great deal of the future of computing, he also strongly develops a theory of the animal (and human) as, essentially, an organic computing machine; not just the brain, but the whole organism. Early in the work, he distinguishes this position from simplistic Cartesian materialism (i.e. with respect to Descartes’ conception of animals as sophisticated machines), and, instead, argues for a vitalism that explains the soul as a material concept. It is non-symmetrical feedback, as unfolding through time, that makes the system seem vital as opposed to mechanical, and it is this level of complexity that

makes the behavior of animals and humans seem so radically different than the motions of planets or pendulums.

The remainder of the work goes on to apply the cybernetic concept of feedback to a whole range of biological phenomena and computational questions in a way that demonstrates the power of the theory and the broadness of its application. So much of what Wiener says is taken as understood in modern times that it is easy to lose sight of how striking his claims really are.

Kyle says

Wow. If you are perhaps a science/engineering sort who takes to feedback & control theory, you find that you can apply it to anything! Some thinkers have already been there & done that, though, as evidenced by this book. This text has the trappings of an intellectual fashion gone out of style. ...but that's okay by me.

I could see ways to modernize the content and some of the sentiment of the book, but in general the thrust remains inspiring.

If cybernetics was really ever in vogue, I believe it must have been a more industrious and intrepid era.

Joseph Carrabis says

Cybernetics:... is a foundational read. Much of my technology has involved 2nd order work and my patents rely on Wiener's work as a basis.
Good stuff. Not for the light-hearted, though.

Ushan says

This is a disorganized book that mixes super-brief mathematical treatment of statistical mechanics, ergodic theory, control theory and stochastic processes with an explanation of the difference between digital and analog computers, and speculations about learning machines and the human nervous system. It finds the same patterns of control and feedback occurring throughout the world, from the nervous system through society, and notes that while automatic control is not new (centrifugal governors on steam engines were invented by James Watt in the 18th century, and analyzed by James Clerk Maxwell in the 19th, as mentioned in this book), ever more powerful electronic digital computers will carry it to a new level. The book warns that humanity needs to be super-careful not to become a sorcerer's apprentice from the fairy tale, and have its power taken away by mindless computers. In the next 65 years, computers did become far more powerful, but they did not usurp power from humanity because they operate on data humans give to them, and if humans have an incentive to lie, garbage will both flow into the computers and come out of them. The Soviet economy was a classic example. If a factory manager was given a production plan, his compensation depended upon the fulfillment of the plan, but his suppliers let him down, he had an incentive to lie and to bribe any inspectors, and so on down the supply chain through the entire economy. As a child I heard adults say that the Soviet State Planning Committee had an American VAX computer acquired in circumvention of

CoCom restrictions; a Cray would add and multiply fake numbers much faster, but the sums and products would be no less fake. A more modern example is the Enron bankruptcy scandal. If Enron executives reported fake profits, no stock-trading computer could understand that they are fake and make them stop; only human prosecutors and judges could.

In the Soviet Union in the early 1950s there was an ideological campaign against cybernetics, "a reactionary pseudoscience", "an ideological weapon of the imperialist reaction." Having read this book, I still don't understand the reason for the campaign. The idea that there are some common control and feedback patterns between mechanisms, animals, the human mind and human society can be construed as contradicting Marxism-Leninism, which proclaims the primacy of matter over immaterial information; at around the same time, genetics was also persecuted, and the idea that the development of an organism follows from the information in its DNA was denounced as a bourgeois pseudoscience. But then, every branch of non-Communist human thought can be construed as contradicting Marxism-Leninism.

Maureen says

I stumbled through this book the best I could as a non-mathematician, because a friend suggested I read it. There was also a movement afoot in the psychology world at the time called "Psycho-cybernetics," which borrowed heavily from Weiner's ideas. Perhaps the most significant aspect of *Cybernetics* to me was Weiner's exploration of human bodies as machines, coupled with the ethical considerations of tinkering with the mechanics.

Stephen Lee says

Not as good as I was expecting. Has some good explanations of mathematical ideas with motivating examples that are absent in a textbook on signals and systems. Even if you can't follow the math (there are some long integral derivations), you can get the gist of what he's saying with some thought.

Most of the book gives a mad-scientist kind of feel (talks of experiments on cats, lobotomies, psychotherapy...).

He doesn't actually explain communication/information theory that well in an introductory sense in its modern form, but as always seeing how and why ideas were developed leads to deeper understanding.

Ilknur says

This is one of the two books I was obsessed with during my college years. Luckily it is freely available on archive.org

---

Jeff Rowe says

I picked this up after reading "The Information". I'm familiar with Shannon's work on information theory but

had never read, and wasn't even aware of Norbert Wiener's contributions. Some nice ideas on feedback control but the vision hasn't gained traction somehow. In the end I think Claude Shannon wins in the Wiener/Shannon visionary cage match.
