Humans, Robots, and the Ultimate Turing Test

Less than a century ago, the first robot disguised as a living woman appeared on screen in Fritz Lang's 1927 science-fiction extravaganza, *Metropolis*. Even then, stories about humanoid robots were nothing new. Writing in the *New York Review of Books*, classicist Daniel Mendelsohn reminds us that intelligent robots have been with us for at least 2,700 years, since Homer's *Iliad*.

Those too were female. Homer's robot builder and programmer was Hephaestus, the lame blacksmith among the Olympian gods:

Brigitte Helm as the robot, Rudolf Klein-Rogge as Rotwang
Fritz Lang's *Metropolis*

> ...round their master his servants swiftly moved,
> fashioned completely of gold in the image of living maidens;
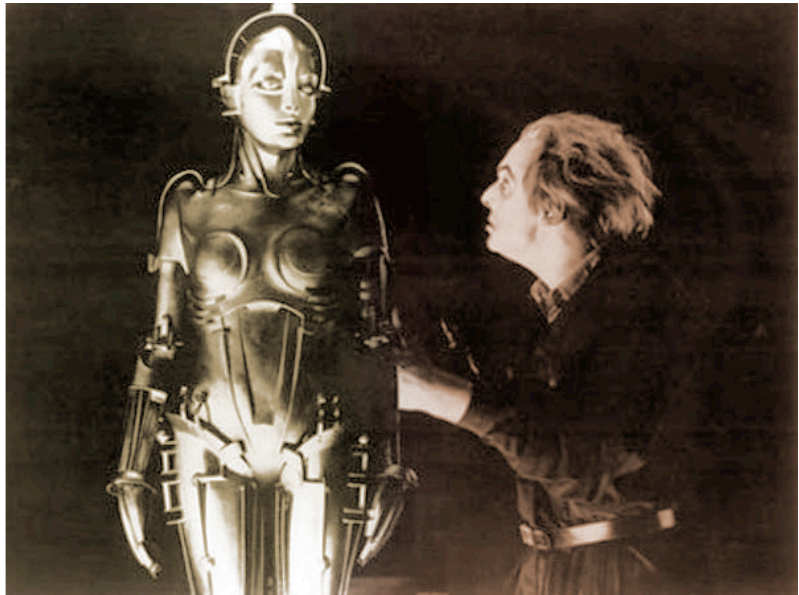> in them there is mind, with the faculty of thought; and speech....

The millennia since Homer have seen many other fictional versions of intelligent robots, including the creature in Mary Shelley's *Frankenstein*—made of flesh, not metal, but a kind of robot nevertheless. In some, like HAL in Stanley Kubrick's *2001*, or the program named Samantha, played by Scarlett Johannson in Spike Jonze's *Her*, the imitation of humanity resides entirely in a voice.

The challenge goes further than either a voice or a humanoid machine in Greg Bear's powerful *Blood Music* and in my own *Human Error*. Neither of us knew what the other was up to until our books came out almost simultaneously in 1985. These were perhaps the first novels to deal with the implications of nanotechnology for human evolution.

The two stories seem eerily similar, but only in the beginning. Greg's protagonist, Vergil Ulam, creates biocomputers using his own lymphocytes; my Adrian Storey and Toby Bridgeman base their biocomputers, for geometrical reasons, on the polio virus. In both novels the inevitable infections occur.

Then the stories diverge. Greg's conclusion is intellectually compelling but undeniably gloomy (or perhaps gray-gooey). But for those who believe machine intelligence is not only possible but as much a promise as a threat, *Human Error* is actually optimistic.

Human Error was conceived as a story of the ultimate Turing Test, what Turing called the "imitation game." For some reason the publisher wasn't eager to use that as a tag

line; Benedict Cumberbatch's riveting performance in the film *The Imitation Game* was yet to come. Not only was Turing my inspiration, thanks to Wikipedia I can pinpoint the when and why.

Early in the 1980s Martin Gardner, who wrote *Scientific American*'s Mathematical Games column, was handing the column over to Douglas Hofstadter, a different sort of polymath. For a while they alternated monthly, and in May, 1981, Hofstadter published "A Coffeehouse Conversation on the Turing Test." Hofstadter's book *Metamagical Themas* (an anagram of Mathematical Games) reprints that column.

In Hofstadter's coffee house conversation, a philosopher named Sandy proposes the following:

> ... when it [artificial intelligence] comes, it will be mechanical and yet at the same time organic. It will have that same astonishing flexibility that we see in life's mechanisms. And when I say mechanisms, I mean mechanisms. DNA and enzymes and so on really are mechanical and rigid and reliable.... it's that exposure to biology that convinces me that people are machines. That thought makes me uncomfortable in some ways, but in other ways it is exhilarating.

Rediscovering Hofstadter's words, which so neatly spell out the theme and climax of the story I spent months working out, was humbling. But it was also a pleasure to be reminded that, by courtesy of what was then largely imaginary bio-nanotechnology, *Human Error* was the first tale of a fully human robot.

Not humanoid, human. And, one might argue, a hell of a lot more like the humans we all wish we were than we can otherwise hope to be.

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References

Hofstadter, Douglas. 1981. "A Coffeehouse Conversation on the Turing Test." *Scientific American* (May). The "symposium," plus Hofstadter's amusing and informative 1985 post scriptum, are available online at http://bit.ly/2Zetizi.

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Polio virus simulation by Jason Roberts of the Victorian Infectious Diseases Reference Laboratory, Melbourne, Australia. Available online at http://bit.ly/38WvKi6.