

FROM THE EDITOR

What do they think we know?

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Despite being set in the future and, more often than not, outside our solar system, science fiction manifests and sometimes deliberately addresses contemporary concerns. In the novel *The Forever War* (1974) by Joe Haldeman, soldiers from Earth return to their home planet after fighting a distant war against an alien enemy. Because of time dilation, the soldiers arrive 30 years after they set off. The changes in human society that had taken place in their absence are alienating to the returnees, in a way that echoes the experiences of soldiers, like Haldeman, who came home after serving in the Vietnam War.

Michael Crichton's novels and films exploited contemporary fears of developing technologies: bioweapons in *The Andromeda Strain* (1969), autonomous robots in *Westworld* (1973), genetic engineering in *Jurassic Park* (1990), and nanotechnology and artificial intelligence in *Prey* (2002).

Sometimes the science fiction future is rosier than the present. The original *Star Trek* and its successor series and spin-off movies posit a future in which human race relations are more harmonious than they were in the late 1960s, when the original series was first broadcast. Race relations are the main sources of strife in *Star Trek*, but between humans and aliens.

Even in the original three *Star Wars* movies (1977–83), which seem like a recapitulation of the American colonists' struggle to shed Britain's imperial yoke, it's possible to detect contemporary concerns. Shot at a time of stagflation, energy crises, industrial strife, and international terrorism, *Star Wars* can be read in retrospect as a beacon of optimism in a dark period. Indeed, writer and director George Lucas said of the series, "My main reason for making it was to give young people an honest, wholesome fantasy life, the kind my generation had. We had westerns, pirate movies, all kinds of great things."

What science fiction tells us about contemporary society follows a well-worn critical groove. Less worn is the question of what science fiction tells us about scientific literacy. Nearly all science fiction violates scientific laws—sometimes for good reason. Interstellar travel would be narratively tedious even at the speed of light; hence the need for warp drives, jump drives, hyperspace, slipstreams, and other fanciful faster-than-light technologies. The ability to dial up gravitational acceleration to 1g aboard a spacecraft spares filmmakers from outfitting characters with sticky boots or filming actors floating about in simulated microgravity.

Those violations are acceptable. What bothers me more are cases in which directors, screenwriters, and authors seemingly rely on their audiences knowing so little about science that they

can include plot elements that are gratuitously and manifestly preposterous.

Take *Prometheus* (2012), director Ridley Scott's prequel to *Alien* (1979) and its sequels. Viewers are expected to believe that a tentacled xenomorph can spontaneously and rapidly grow in size without a source of nutrition—or, to put it more starkly, without a source of atoms from which to build its new body tissue. In *The Man with the Golden Gun* (1974), James Bond's antagonist has built a solar energy plant that can also power a laser weapon. A few seconds of sunlight collected by the plant's few-square-meter-sized reflectors suffice to destroy Bond's Republic RC-3 amphibious aircraft. That amount of energy collected would not even bring a kettle to a boil!

In addition to underestimating what its audiences might know about current science, filmmakers also seem to underestimate what technological feats humans can already perform. On 26 February 1991 during the Gulf War, a British Challenger tank destroyed an Iraqi tank with a fin-stabilized armor-piercing round fired at a range of 4700 meters. Such high-tech gunnery is absent in the universe of *Star Wars*, whose land warfare technology and tactics—planet-killing Death Stars aside—are no more advanced than those of World War II. By applying its deep learning algorithms to satellite imagery, Orbital Insight, a startup based in Mountain View, California, identified and counted all the petroleum storage tanks in China. Yet again and again we see futuristic explorers continue being surprised by this or that feature on the surface of a new planet, as if they lacked maps.

Admittedly, I've exaggerated my disapproval for rhetoric's sake. My favorite science fiction author, Iain Banks, had drones that could float, deadly weapons the size of insects, and a cast of aliens whose evolutionary path to sentience strains credulity. I still enjoyed his stories, because they were never just or even mostly about the technology.

When presumed ignorance of current science stops appearing in science fiction, we'll know that efforts to raise scientific literacy have succeeded.

