Exploring Science Perceptions through Science Fiction

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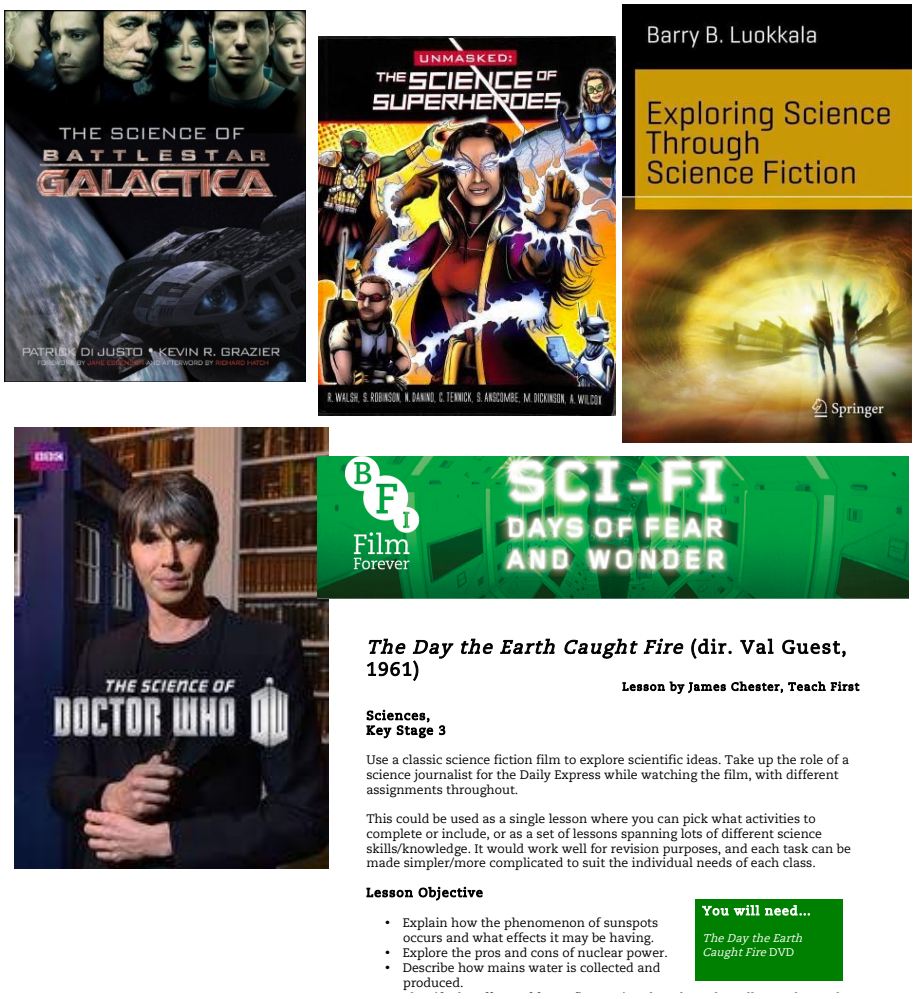
Public perceptions of scientific understanding are most often mediated through indirect channels - including outreach efforts of scientists, news media and fictionalised scenarios in the form of science fiction.

At its best, science fiction provides a powerful tool for widening awareness of and public engagement with aspects of scientific innovation - in particular in astronomy. At its worst, it can distort or entirely misrepresent scientific understanding or the nature of scientific enquiry. Either way, it provides an interesting historical record of the way astronomy and its discoveries are being represented to the public at a point in time - in particular to the children of the past who are the decision makers of the present.

Here, I discuss representations of our Solar System and the science of astronomy in historical science fiction narratives and what they tell us about the way both understanding and communication of knowledge about our Universe has changed over time.



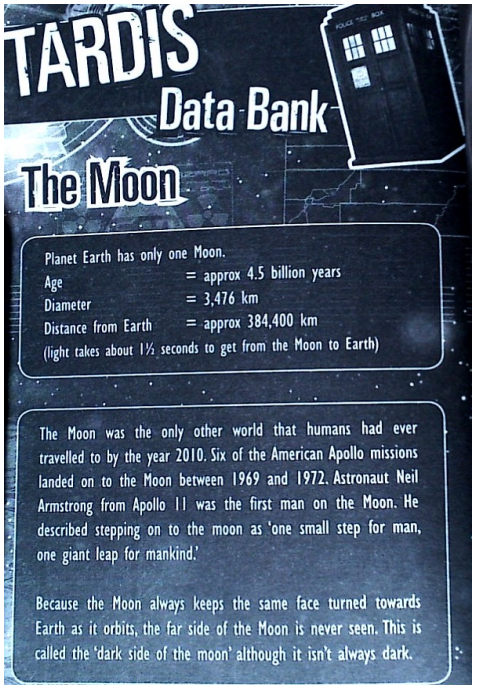
Above: Examples of science fiction used for science outreach, including “science of” books, television programmes and websites (e.g. https://www.bfi.org.uk/resources-events-teachers/resources-teachers/sci-fi-classroom).

Case Study: The Moon in Doctor Who

The relationship between the long-running UK television series Doctor Who (1963-present) and scientific method has been explored in the recent volume *Doctor Who and Science* (eds. Harmes & Orthia, 2020). Unusually, this is not a "Science of" book, but rather an accessible series of academic papers on the relationship between Doctor Who and aspects of scientific knowledge, practice and identity.

Two essays have been contributed by astronomers: Eldridge on Exoplanets, and Stanway on Earth's Moon. Both consider representations on screen in the context of historical and modern research.

Representations of the Moon in Doctor Who have ranged from its use as a political prison to proposing that it is a giant alien egg. Setting aside the more extreme of these, the most common explanation of the Moon's nature in the show was introduced in the 1973 story "The Silurians": the Moon is described as a captured planetoid which arrived in orbit around Earth during the reign of the dinosaurs.



The ups and downs of Doctor Who's Moon. Left: Accurate factual information provided in children's adventure book "The Dust of Ages" (Richards 2009). Below: The Twelth Doctor explains that the Moon is, in fact, a giant egg in one of the most scientifically illiterate Doctor Who stories ("Kill the Moon" 2014)

This representation shows the use of science fiction for science communication at both its best and its worst: when first broadcast it was based on a then current astrophysical research paradigm. When repeated as series-specific canon in the decades since, it has been misleading for young audiences. Indeed, some supporting tie-in media have been actively anti-scientific in their support for this scenario, presenting the fiction as if it were undisputed fact.

"Who's Moon", E R Stanway in *Doctor Who and Science: Essays on ideas, identities and ideologies in the series*, Harmes & Orthia (eds), Macfarland (2020)

Case Study: Solar System Habitability in Dan Dare

Dan Dare: Pilot of the Future was a comic story which debuted in the first edition of *Eagle* comic in 1950. Across full-page spreads, Dare and his colleagues explored our own Solar System and beyond, while battling the plots of the villainous Venusian, The Mekon. In every decade since, *Dan Dare* has been adapted or reimagined for new audiences, providing a seventy-year baseline of representations of Solar System habitability.

Dan Dare's Venus

Illustrated before the first successful probes, Dare's world captures an earlier conception of Venus – a young, hot, water-rich jungle planet that can also be found discussed in astronomy textbooks of the time. A 2017 audio drama adaptation by B7 Media Productions jettisons this in favour of floating cloud cities and no native life forms.

Image: Lush jungle representations of Venus were common in the 1950s. From Eagle #24 (1950, Titan books reprint)

Biosignatures as discussed in 1952

Lewis Jewell (AJ, 1, 11) proposed searching Mars for a chlorophyll biosignature as early as 1895, and intensive observations with this goal were made during the opposition of the 1930s.

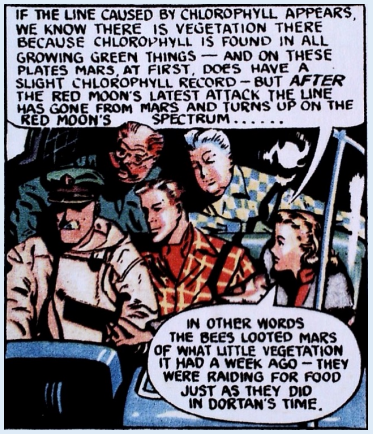


Image: Professor Peabody explains spectroscopic biosignatures, showing the level of scientific detail common in comics at the time.. From Eagle vol 3 #6 (1952, Titan books reprint)

An astronomical cameo

Dan Dare artist Frank Hampson was known to work from photographic reference materials and consult encyclopedias to ensure accuracy of his work. The degree to which this embedded his stories in contemporary science can be seen in his Professor Bronstein, a stellar astrophysicist and mathematician, most likely modelled on Astronomer Royal and science popularizer Harold Spencer Jones.

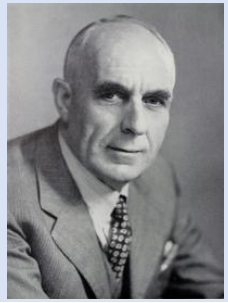


Image credits: Eagle vol 3 #7 (1952), UIG via Getty Images

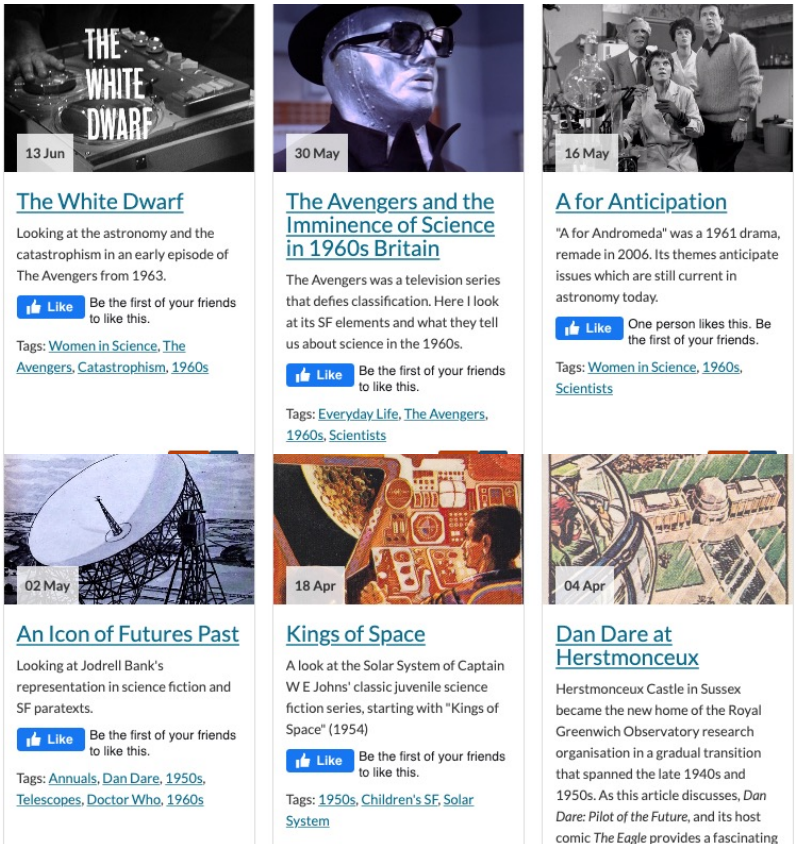
See "Changing Conceptions of Solar System Habitability in Dan Dare Between the 1950s and the 2010s ", E R Stanway, *Foundation* (winter 2021, in press)

Does Discussing Science Fiction Benefit Science Outreach?

Science Fiction shares many of the same characteristics as scientific research: it expresses a curiosity and wonder regarding our Universe, and it considers logical extrapolations and possibilities based on our current understanding of the world around us.

- I have used science fiction in my public outreach – presenting talks on the science in science fiction to groups ranging from schools to local astronomy societies and the general public, both in person and online.
- I have also used science fiction in teaching activities, to provide interesting scenarios for solving traditional physics problems, and in discussions of cosmic habitability.
- I have begun to post articles on a personal blog called Cosmic Stories – these explore the links between science and science fiction, as well as pointing out the strengths and inaccuracies of scientific representations

Cosmic Stories: warwick.ac.uk/cosmicstories



I am very interested in hearing comments from other astronomers about the ways they use science fiction in their outreach:

- Does talking about SF engage or turn-off general audiences?
- Does the science fiction enhance or distract from the exciting realities of astronomy research? Is there a risk of confusing the public?
- Are representations of scientists in science fiction (whether classic or modern) useful to discuss, or does encouraging viewers to consider these just propagate harmful stereotypes?

Comments, thoughts and critiques would be very welcome!

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