

Lab Notes - for Teachers

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Science & Science Fiction

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Article - Science & Science Fiction by Dr Paul Willis (from <http://www.abc.net.au/science/slab/willis/>)

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Last year marked one of the most significant events that never happened in the history of space exploration. On October 16th, 1997 the Gemini 12 left Earth for Alpha Centauri with the first family of space colonists on board. At least, that was what was supposed to have happened according to a 1960's television series, but very little went to plan. After the pilot episode was made the Gemini program of space launches by NASA was cancelled, so Irwin Allen (the series producer) changed the name of the space ship to the Jupiter 2. And some unspecified time after launch, while travelling at or near light speed, the most sophisticated space ship ever constructed encountered a meteorite storm and became Lost In Space.

Now here we are, having just seen off 1997, a year in which a probe landed on Mars, the aging MIR space station almost killed its occupants and plans are being made for a large, multinational space station. But no families in space, no travelling at light speed, and we have barely begun to explore neighbouring planets. Alpha Centauri may as well be among the stars.

So what happened? Why has reality fallen so far short of our dreams of 30 years ago? Is it our ambition or our achievement that has failed us? Such questions may be premature because these fantasies were conceived in the realm of science fiction and never had a chance of becoming reality in accordance with the fictional timetable. But this tale does call into question the role of science in science fiction.

The Lost In Space series certainly had its popular appeal. It is the most-repeated series on Australian television having been repeated 24 times. It was the first television drama series to exploit space exploration as its theme and a family in space found a receptive audience in the world of the 1960's when the real space race was at its height. Countless scores of today's scientists, technicians and other technical professionals trace their personal interest in the sciences and technology back to a childhood spent recreating the adventures of the Robinson family, Dr Smith, the Robot and Major Don West as the limped from one contrived plot to the next.

Mark Goddard who played Major Don West in the series concedes, "it was fantasy. But Lost In Space was about the heart, it was not a show for thinking about." Mark remembers how, during the shooting of the pilot episode, some people from Bell Laboratories flew through the set with back-pack jets strapped to them and Goddard remembers remarking that, in 30 years time, everybody was going to have a couple of those things sitting in their garage. But the backpack jets never lived up to expectation. After some initial, small scale success, they were found to be too bulky and cumbersome and their range and payload were too limited to ever be of any practical use. But at least there was a prospect that the machines could exist and function.

Most of the abuses of science in science fiction are of a different kind. The deliberate breaking of the laws of nature in order to make a good story is the most common science heresy. It doesn't matter that Captain Kirk can't go at the speed of light, we'll let him do so if it gets him to the next scene on time. In the book *The Physics of Star Trek* by Lawrence Krauss, many such travesties of the laws of physics are dissected out in detail. Transporters would require an unimaginable amount of computer memory to function. Warp Drive makes theoretical sense but how do you warp space-time at will? And how do you prevent the horrible consequences of inertia when the Enterprise accelerates at rates what should render a mere mortal as a dirty brown smear across the back of the bridge?

"It doesn't really matter" comments Dr Ian Johnson from the Department of Physics at the Sydney University. According to Johnson, mistakes in the big questions are irrelevant; they are usually too big to really worry about. Why knot-knickers over breaking light speed when we know that is it physically impossible to travel at even the smallest fraction of 3×10^8 ? "What does matter is the details." Johnson continues, "Do the details in science fiction make the scene believable?". It's more important in *Aliens* that the weaponry looks like it could inflict serious damage or that the galley looks like it could cook an unpalatable meal than it is to consider the implausibility of an organism with acidic blood that can eat through metals.

In the popular mind, the virtues and implausibility of time-travel or other sci-fi favourites of scientific abuse don't really matter. Science is no worse-off if Trekkies think that we have already invented transporters as seen on TV (we haven't) or if the unwary think that the genetic gobbledy-gook of *Jurassic Park* is about to become reality. While it may create some confusion as to the current abilities of science, such confusion is of little consequence in the broader scheme of things. Providing the

computer programmers and geneticist don't believe the science fiction, then there is little real impact on the advance of science.

But Johnson warns that there are other liberties in science fiction, particularly in recent movies, that may well have a negative effect on science fact. There was a time when science fiction movies always contained scientists and they were venerable, respected and lovable (if somewhat eccentric most of the time). OK, so they occasionally went mad and wanted to rule the world, but it was usually for a good (if misguided) reason. But more recently, scientists have been portrayed as both the hero and the villain. And, worst still, the villain has sold his soul (it's usually a male) by prostituting his science for commercial or political gain. Luckily, they always get their comeuppance and are always dead by the end of the movie. But what message does it send to the audience when under-funded, struggling scientists (usually pursuing a radical theory) are the ones with all the redeeming virtues while properly funded researchers with mainstream theories are the personification of evil?

Take the movie Twister for example. Sure the hero is a scientist, a squash-buckling meteorologist who chases tornadoes and gets to sleep with the heroine (also a scientist). But his nemesis is an evil meteorologist who dresses in black, drives black vehicles and has enough research funding to pay for a whole entourage of followers who also wear black. And how do we know he is evil (apart from the post-modernist bohemian fetish for black)? He's taken corporate money. He's been bought. He's sold his soul for thirty technical assistants in black and enough funding to actually do the science he is interested in. What message does this send to the younger audience who may be contemplating science as a career?

For all its mixed messages about science, science fiction doesn't do a lot of damage to science fact in the realm of theories but there is a worrying trend in the portrayal of scientists. Another area where science fiction does a disservice to science is in the realm of portraying crackpot fringe belief systems as if they were mainstream science. Think of the support that the UFO lobby get when films such as Close Encounters present the investigation of UFOs as if it were a legitimate science.

Steve Roberts of the Australian Skeptics has made an interesting observation with regard to the portrayal of UFOs and aliens in movies and the types of spaceships and aliens people claim to have encountered. In the 1950's for example, the cutting edge of sci-fi was movies such as The Day The Earth Stood Still and Forbidden Planet. Both movies featured flying

saucers with smooth metallic exteriors and the aliens or spacemen were clean-cut Anglo-Saxon types dressed in metallic suits who flew around the universe with benevolent messages for humanity. In the 1950's most reported sightings of UFO's reported flying saucers personed by male Anglo-Saxon type aliens wearing metallic suits. But after the release of Close Encounters with its more complicated spacecraft dominated by fantastic light displays and aliens that were dwarfs with smooth grey skins and big dark eyes, most UFO reports claimed to have seen ships lit up like Christmas trees staffed by four foot greys (as they have become known in Ufologist circles).

There is some question as to what comes first, the movie or the sighting, and so there is a question regarding cause and effect in the observations made by Roberts. For example, there are a few reports of four foot greys and light ships prior to the release of Close Encounters. In fact Spielberg based his aliens and spaceships in the movie on these few reports. However, after the release of the movie, this type of sighting became much more common indicating that Hollywood had changed the conception of what people might expect from a close encounter. Similarly the recently released Men In Black is based on a few cases of people claiming to have been visited by mysterious men (yes, they are all male again) in black suits who remove evidence of recent UFO sightings. It will be interesting to see if reports of MIBs increase in the years following the release of the movie.

But does this really constitute a danger to science? Does it really matter that some people are chasing what appear to be nothing more than ghosts created by Hollywood? It only really matters if the public obsession with the paranormal and allied strange phenomena becomes fueled by fiction to the extent that precious research dollars are diverted away from bona fide research areas. It will be a sad day when a single research dollar is diverted from investigations of greenhouse science to investigations of UFOs. But in a society where research priorities are determined as much by popular concern as they are by scientific need, such a day may not be far off. In December 1997, an international conference on UFOs held in Brazilia determined that this is exactly the way that research dollars should be spent.

On reflection, it could be asked why the genre is called "science fiction". Where is the science and is the science portrayed in a faithful manner? On the whole, one would have to say that science comes off second best in most of its close encounters with Hollywood, but does it really matter? Can the abuses of science in science fiction be quarantined under the catch phrase "it's only entertainment"? Is it realistic to think that popular

movies could be a vehicle for the promotion of science? Will irreparable damage be done to the advance of science by its poor representation to the masses in mass culture? We can only wait and see. On the other hand, if only I had one of those time machines that Rod Taylor had...

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Activities

Read the article carefully and complete the following activities.

Meanings

What do these words and phrases mean in this article? (A dictionary and thesaurus will help!)

encountered

multinational space station

premature

a receptive audience

back-pack jets

heresy

genetic gobbledey-gook

other liberties in science fiction

negative effect

portrayed

come-uppence

mainstream science

Questions

1. Was Gemini 12 Science Fact or Science Fiction?
2. What happened to Jupiter 2?
3. Why is the Jupiter 2 space craft so well known?
4. The article asks: "Why has reality fallen so far short of our dreams of 30 years ago?" What answer does the article give to this question?
5. Why are back-pack jets not practical at this stage?

6. Science Fiction often deliberately breaks the laws of nature. What are three such ways that the article mentions?
7. What are some ways that Science Fiction could harm Science?
8. The article suggests that movies have made us picture aliens in certain ways. What did aliens look like in *The Day The Earth Stood Still* and *Forbidden Planet*? What did they look like in *Close Encounters*? How did UFO sightings copy these images, after each of these movies?
9. The article asks "Which came first, the movie or the sighting?" Does the article answer the question? What answer (if any) does it reach?
10. According to the article, is Science *ever* portrayed faithfully in Science Fiction?

Cloze Activity

Here are some extracts from the article. Complete the sentences by filling in the spaces.

Most of the abuses of science in _____ fiction are of a different kind. The deliberate breaking of _____ laws of nature in order to make a good _____ is the most common heresy. It doesn't matter that Captain Kirk can't _____ at the speed of light, we'll let him do so if it _____ him to the next scene on time. In the _____, the *Physics of Star Trek* by Lawrence Krauss, many such travesties of the laws _____ physics are dissected out in detail. Transporters would _____ an unimaginable amount of computer _____ to function. Warp drive makes theoretical sense but _____ do you warp space-time at will? And _____ do you prevent the horrible consequences of inertia when _____ Enterprise accelerates at rates that _____ render a mere mortal as a dirty brown smear across the back of the bridge?

On reflection, it could be _____ why the genre is called "science fiction". Where is the _____ and is the science portrayed in a faithful manner? On the _____, one would have to say that _____ comes off second best in most of its encounters with Hollywood. But _____ it really matter? Can the abuses of science be quarantined _____ the catch phrase "it's only entertainment"?

Summary

This article has a number of sections. Each section has a main point. Work out the main point of these sections and write them here.

The Creation of Lost In Space

Abusing Science

Scientists in Science Fiction

Science Fiction on the Fringe

Does It Really Matter?

Debate

Think of all the arguments for and against these statements. (To help you, use this article and others that you can find.)

"It doesn't matter that Science Fiction gets the facts wrong."

"Science suffers because of Science Fiction."

Research

Use this article, the Internet and libraries to find information on one of these topics:

- a) The Gemini program of space exploration.
- b) Different types of aliens and UFOs that people say they have seen.

- c) Antigravity devices - what methods have been devised to try to help people fly?
- d) The "fabric of space-time".
- e) The genetic basis of the movie, Jurassic Park? How likely is it that this could ever come true?
- f) One of the numerous "mad scientists" of fiction (eg Dr Frankenstein).
- g) The time machine imagined by HG Wells.

Instructions to Students

Use the library or the Internet to collect information about the topic. Find at least four different articles or chapters.

Write down about three ideas from each article you find.

You now have about a dozen ideas on this topic. Choose which idea is the most important, which is second-most important, and so on.

Write them in order, from most important to least important.

Write a paragraph to explain each idea.

Write down where you found the information you used. This is your "bibliography".

Be prepared to deliver your report on the date it is due!

Teachers Guide for the Research Section

Oral Reports

Have students work in groups of two or three to prepare a short talk on one of the research topics.

Write down which topic each group chooses to research. Make sure there is at least one group for each topic.

Tell the class:

- how long the talks are to be (two to four minutes is effective),
- when they will give the talks, and
- how marks will be allocated.

Go through with the students the instructions on how to research (or use your own version!)

Written Reports

Have students write a report on one of the research topics.

Tell the class:

- how long the written reports are to be,
- when the reports are due, and
- how marks will be allocated.

Go through with the students the instructions on how to research (or use your own version!)

Suggested Marking Scheme

5 marks - Quantity of information

5 marks - Accuracy of information

5 marks - Relevance of information

5 marks - Clarity of presentation / use of diagrams

20 marks TOTAL

