Whippoorwill E-Comment

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The Myth of Space Travel

Despite its incredibly awesome photographic beauty, the universe is a most dangerous entity. It is filled with deadly life-threatening radiation, mostly in the form of cosmic rays which are composed of the nuclei of hydrogen atoms and of heavier elements. These ions travel through space at nearly the speed of light and their destructive, penetrating power is immense. We don't know the origin of such particles; they come from beyond our solar system. As they zip through our bodies, they break chemical bonds that hold us together and make us function as organisms. Our gigantic DNA molecules, which control all cellular functions are particularly susceptible to ionizing radiation. Electrons are knocked off molecules, slicing them apart and disrupting their functions.

We are shielded from cosmic rays, not by the earth's magnetic field, but by the density and thickness of our atmosphere. High speed incoming cosmic particles strike molecules of air releasing a cascade of dangerous secondary particles including gamma rays and pi mesons, which in turn strike other air molecules which degenerate into electrons and anti-matter, positrons, positively charged electrons which annihilate one another releasing more gamma rays of lesser intensity which continue their cascade down through the atmosphere. The amount of ionizing radiation reaching the surface of the earth is about 0.03 REM each year. (*A REM is a common unit of radiation exposure)* This is about the same intensity as two chest X-Rays. As one moves away from the earth the REMs increase greatly. It is most intense in the region of the narrow Van Allen Radiation Belt, where one can encounter as much as 1500 REM, which would be quickly lethal. Farther out in interplanetary space, it increases to more than 25 REM/year. A flight to Mars, one way, would require about three years, and an astronaut would be subject to about 75 REM, and best estimates are that a third of the astronauts' DNA would be altered by radiation, and that over 10% of male space travelers would most certainly develop cancer, and as would nearly 17% of women. Mars has virtually no atmosphere, compared with Earth, and so space explorers would be subject to about 25 REM/year while they are there. Double that exposure for the return journey to Earth, and one is talking about a suicide mission to our nearest planet. In interstellar space the radiation exposure increases to as much as 80 REM/year. Are there any volunteers among AAPA members to visit Mars?

Television and movie space fantasies are just that, fantasies. Spacecraft there have some kind of shielding to protect the astronauts, but to protect our Mars explorers, we would have to provide a small spaceship with a cocoon of water 17 feet thick which would weigh over 500 tons.

On Mars, living quarters of astronauts would have to be buried some hundreds of feet deep in the soil for protection. They would not be shielded when they were on the surface carrying out their explorations.

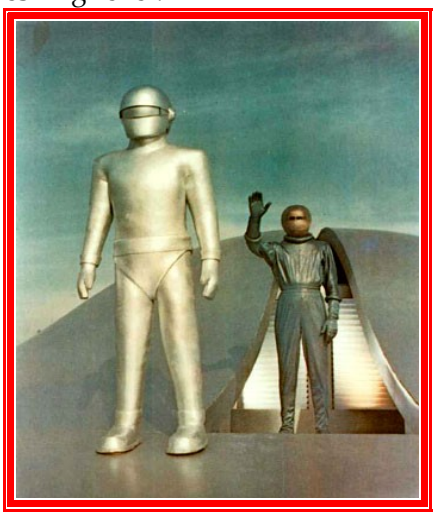
The adventuresome romantic picture of space exploration is a great fiction, at least as far as our current understanding of physics and biology is concerned. It is surely safer and far less expensive to continue our observations and measurements by employing unmanned probes. There might be some hardy souls around who would be willing to subject themselves to killing radiation during years-long journeys to the planets for the adventure, and for the idealistic, even foolhardy pursuit in the attempt to increase our knowledge of the local region of the solar system.

Biologically, humans evolved on Earth, by the same biological processes that all life did. We, like all living beings share common genetic, physiological, and anatomical galaxies of traits. As Charles Darwin wrote, in *The Origin of Species*, one of the greatest works ever written, "There is grandeur in this view of life . .." Our species has been shaped by adapting to the myriad subtle stimuli of mother Earth. It supports us and protects us against cosmic radiation that destructively alters our DNA that controls all our vital functions. Space travel problems are currently insurmountable, given our basic knowledge of physical and biological science..

I enjoy the science fiction adventure movies — particularly episodes of *Star Trek* and *Star Wars*, and am willing to set aside my critical mind, my credulity, when watching them. The movie *2001, A Space Odyssey* is the most realistic presentation of what it is like to travel in outer space. There are no sounds — outer space is an immense vacuum, no shrill trilling of ray guns or the roar of gigantic Dilithium crystal-powered engines which drive the huge spaceships to warp speeds, faster than the universal constant limit of the speed of light. It's all great fun, and the stories are very engrossing but impossible.

I know that science fiction has a way of becoming science fact, and I hope that new discoveries in physics enables us to overcome current technological limits for such journeys. I have a basic faith in man's ability to develop science for the benefit of all beings. I'm glad I've lived in the 20th, and now in the first decade of the 21st century. Guided by Darwin's basic principles, we have enjoyed an explosion of scientific discoveries in medical science, with newly synthesized drugs, almost daily discovery and identification of functions of new genes, and the potential for gene therapy to control, if not cure, diseases that humans have suffered for millennia. It is an exciting time to be alive.

Of all the science fiction movies I have seen, I would rate *The Day the Earth Stood Still* to be the best because of the power of the message, and the general absence of Hollywood's usual overdose of ultra-spectacular special effects. It was set in our lifetime, during the Cold War, and was filmed in glorious black and white. Alas, it is dated because of its display of primitive technology, the cars and planes, and the top speed of the flying saucer spacecraft — *only* 4,000 mph. After all of the incredible computer-generated films of George Lucas, I find this 1951 black and white film to be a refreshing relief.



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