

ABSOLUTE SAFETY.

By

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Demands are frequently made by environmental groups for standards of safety that, in effect, carry a zero level of risk. A zero level of risk is impossible to achieve in any sphere and such demands are therefore unreasonable. These demands can also force the concentration of all the available but limited safety resources into certain areas targeted by environmental groups in an attempt to eliminate small residual risks, at the expense of ignoring larger risks in non-targeted areas.

Picture a typical scene. An environmental activist and a technical expert are publicly debating the safety of a commercial product. The expert is convinced that the product is safe and quotes the tests that have been performed to illustrate this point. The environmentalist is not convinced, citing other evidence to show the product is doubtful. Then the environmentalist asks the expert - 'Can you guarantee that there is no risk attached to this product?' The expert replies - 'There is no evidence that this product poses a risk and there is much evidence that it is safe. However, as a scientist, I cannot give an absolute guarantee that there is no risk'. In a public debate the expert has now lost the argument because the public wants a guarantee. The activist guarantees risk; the expert cannot guarantee safety.

Science can make pronouncements in its own sphere probably with greater confidence than most other disciplines can make in their own spheres. But it is also the nature of science that there is no certainty. In science there are only degrees of probability. Scientific knowledge must remain revisable in the light of new evidence. For example, an astronomer cannot guarantee that the sun will rise tomorrow. The sun has risen every dawn since the formation of the earth, and we know why from the laws of celestial mechanics. The probability that the sun will rise tomorrow is enormously large and from a common-sense point of view the matter is certain. However, the probability that the sun will fail to rise is not zero. It is computable, and from a scientific viewpoint sunrise cannot be guaranteed.

Let me return to the expert and the activist. Let us assume that the expert is unbiased, that he/she has carried out extensive tests and has reviewed all [all in italics] the literature on the subject. Let us say that as a result the expert can have a confidence level of 96% that the product is safe. This leaves a doubt of 4%, mainly because product safety has not been tested under an absolutely enormous number of conditions. The activist's case that the product is dangerous has only a 4% chance of being correct, but a 96% chance of being incorrect.

Of course, I deliberately fabricated the preceding scene in order to make a particular point. However, my aim is not to canonise experts and to damn environmental activists. In some cases the expert is no more than a 'hired-gun', recruited to put an acceptable face on self-interest, and in some cases the activists are experts who take every effort to base conclusions on objective data. Many other cases fall somewhere in between. But unfortunately the scene I painted, where the activist seems largely motivated by an evangelical faith, is not uncommon.

Life is a risky business. You cannot avoid risk even if you stay in bed. If you do, your muscles will waste from disuse and a plane may drop on the house from the sky and kill you. Things get really hairy when you arise from bed. There is a real danger you will trip and fall down the stairs. Next you must avoid electrocuting yourself as you cook breakfast. Then to the deadliest

danger of all - driving to work. About 500 people are killed on Irish roads every year and thousands are injured. And so it goes on through the day, everyday. Every living moment is accompanied by risk.

The only way to live therefore is to decide what activities are worth pursuing, try to understand and measure the risk involved, devise ways to avoid/minimise the risk, and then proceed with caution. Sometimes our analysis will indicate that the risk so far outweighs the benefit that we should avoid the activity altogether, e.g. unprotected sun-bathing for fair-skinned people.

Demands are often made in the environmental area that we must not proceed in certain directions until we are certain that it is safe to do so. This sounds sensible, but we must remember that little or no human progress would ever have been made if this advice had always been followed. The only sensible way to do things is to proceed with caution as previously described. For example, in the 1950s, a strong argument was made that man should not land on the moon lest he carry back an alien organism that might devastate life on earth. It was decided after much analysis to go ahead anyway, although returning astronauts from the first missions were quarantined for a period on earth to check them out. Going ahead with the moon missions was the right decision, even though absolute guarantees could not be given in advance that the missions posed no risk. To cancel the missions based on the fears of a tiny theoretical risk would have dealt a massive blow to the human spirit. On the other hand, there is now sufficient evidence that the build up of greenhouse gases is causing the world to heat up. It would therefore be irresponsible to continue to allow these gases to increase.

And finally, an example of the selective targeting of one risk while ignoring another. We all continually breathe in the natural radioactive gas radon which emanates from rocks in the earth. It is estimated that radon is responsible for 10% of lung cancers, but public consciousness of the problem is very low. In some parts of Ireland indoor radon builds up to unacceptable levels in domestic houses, e.g. in a 10km square in the south-east of Cork city and surrounds, including part of the harbour. A few years ago I described this in an article and pointed out that it is relatively easy and inexpensive to reduce high radon levels. I received a telephone call from an environmental activist who asked me to identify the industries in Cork harbour that emit radon. I explained that radon was not coming from industry but from the earth. The activist immediately dropped interest in radon since it is not an industrial hazard.

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