

Are There Limitations to Science?



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Some writers claim that there are no limits to what science can do. They are either ignorant or are having you on.

Great progress has been made by science in the past century, and this underlies the technology that has transformed our lives. Flush toilets, washing machines, refrigerators, telephones, television, computers, CD players, jumbo jets, and laser surgery have resulted from this progress. Science has also led to profound new understanding about the world in which we live and the way our bodies work. We know about the expanding universe, continental drift, the many cycles in the biosphere on which life depends, the chemical and physical functioning of our body. We even understand a great deal about how our mind works—the underlying transfers of ions, the electrical impulses, the connectivity of neurons, and so on. No one imagined a century ago that today we would understand the molecular basis of heredity and know the genetic code. Given the boundaries science has already overcome, one might easily get the impression that it will find no limits in the future.

This idea is wrong. As our understanding of the universe develops, so does our understanding of the limits on what science will ever be able to do. I leave aside here the question of whether science is reaching its limits in many scientific areas (which may well be true). The point is that the scientific method itself has fundamental limits, and many important areas lie outside those limits.

One example is aesthetics. Suppose I were to produce a device looking like a video recorder, which I called an Aesthetic Meter. Imagine I make the following claim: if I point the meter at a picture, it produces a score on a screen—98 for a Rembrandt, 85 for a van Gogh, 20 for a Jackson Pollock, and so on, telling you precisely how beautiful the picture is. Would you believe it? Of course not! Beauty is not a quantity science can

deal with; no known experiment is able to measure the beauty of a painting. That is not a scientific concept. The same holds for music, sculpture, poetry, literature, theater, dance: the whole world of aesthetics is beyond the scope of science. But it is of great importance to human life.

The same is true of ethics. Neither “good” nor “bad” is a scientifically measurable quality. We do not have a scientifically based scale, like the Richter scale for earthquakes, for morality: stealing a bicycle is -2 moral units, giving two hundred dollars to the poor is $+5$, and so on. Any claim to measure good or bad by some scientific experiment is rubbish. Science cannot tell you what is morally valuable. It cannot say if saving gray squirrels or minke whales is an ethical act—for this also is not a scientific category. What science can do is tell you what environmental policies are likely to save them from extinction. But there is no way it can tell you whether it is either just or good to let arctic fisherman make their living off seals and whales. That has to be determined on the basis of policy analysis informed by an ethical stance that comes from somewhere else—your religious beliefs, for instance. And the same limitation of science applies to many issues important to us. In the film *Contact*, at one point Elle is asked, “Did your father love you?” The response to her definite “Yes” is, “Prove it.” She is silenced by this—for as a scientist, she knows that this is not something that science can prove, even though she knows it to be true.

Another category science cannot deal with is metaphysical issues. Underlying science is a series of such issues which cannot be probed by any scientific experiment. We know gravity exists, we can describe its effects, but we cannot tell you why it works. How indeed does the Earth pull the Moon, at that great distance? By a gravitational force? That is just a restating of the effect in new words, not an explanation in any funda-

mental sense. What is the reason that gravity holds matter under its spell and what enforces the rule that gravity is always attractive (unlike electromagnetism)? We do not know—if we did, we would be close to inventing an antigravity machine. What we can do is observe it in action and describe that action ever more accurately. We do not know how God or nature makes matter obey those rules. Science can tell you what the laws of physics are, but it cannot tell you why they exist. Science cannot tell you why the universe exists. And above all it cannot tell you whether or not God exists.

These limitations cannot be changed by future advances in science; they are fundamental to its nature. So we can expect many major advances in science in the future—in terms of understanding the future of the universe, the course of evolutionary history, the way the brain functions, for example—but we cannot expect it to solve ethical or moral or metaphysical issues. Science forms a valuable part of human life, but it is not the basis for a whole human life. We shall always need to study and teach ethics, aesthetics, and philosophy, as well as science—and this should include comparative religion if you want a whole human being. Those who claim science will supplant any or all of them are indulging in a little fantasy. Be kind to them, but don't take them seriously.

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