

The Relevance of Science

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The ultimate relevance of science is to try to discover man's purpose by every means in our power

When Michael Faraday was asked the question, so tiresome to a scientist, "What is the relevance of your work?" he could give his well-known reply, "Madam, what use is a newborn baby?" Or, when asked the question by the Prime Minister, Robert Peel, about his magnetic induction, he could reply, "I know not, Sir, but I'll wager one day you'll tax it." And in the golden age of Victorian progress, the point was taken and later proved to be correct.

It is not so easy to satisfy the questioner today. The baby is grown up into a man of great achievement and power. It has almost won its battle against disease and the miseries of hard labour; Michael Faraday and James Watt released more men from slavery than did Abraham Lincoln. "Yes," says the man of relevance to the man of science, "I accept this, and I really am grateful. But now I've had enough. I need time to adjust to what I've got already. So will you please find a cure for cancer and then stop."

In some ways the man has a point. I should like to mention one of his anxieties because I share it and because it is urgent. It is nuclear power—not weapons, which are another problem, but reactors. When that first baby reactor was born in Chicago in 1942, scientists saw it growing into a benefactor of mankind. It was also good for science, and billions of dollars have flowed into research of all kinds because of this hope. Today, I don't think I am using emotional terms when I say the baby has grown into a monster. The world is as near to anarchy as it has ever been, and yet we are about to put nuclear reactors all over the earth—in Northern Ireland and Southern Ireland, in India and Pakistan, in Israel and Egypt, in Turkey and Cyprus, in Vietnam and in Chile. We haven't the remotest idea how to destroy the radioactive wastes, but soon everybody will know how to use them for war,

sabotage, or blackmail. If we are making a mistake, then it is—unlike other mistakes we must make from time to time—irrevocable and irreversible because the radioactive products will be with our children and theirs for more generations than have passed since the beginning of civilization. What chance is there of man surviving in a plutonium economy, even as long as one half-life of plutonium, 24,000 years? Yet the momentum, the investment in nuclear power, is now so great that it seems already too late to stop the proliferation.

What do we say now to our man of relevance? I would say the following: Man, being what he is, will demand his megawatts today even if he dies tomorrow. We have made a terrible mistake in offering nuclear power as a solution too soon. We admit it. Now our only way out is to find an alternative which is cheaper; nothing else will be accepted. What is more, we believe we can do this—by using solar energy, for example. But this means more research, more science, more knowledge, not less.

So our man of relevance will probably agree to add energy, and a few other things, to cancer in his list of things still to be done. But he will maintain that we are bound, soon, to reach a limit where we have everything we want. "Then," he will say, "you scientists will just be doing it for your own amusement. I have no objection to this as long as it's safe, and I understand that it's fun and compulsive, like playing chess, but why should I pay for your game?"

I believe that there is a very good reason, though I don't expect it to appeal to every man. So far, we have answered the man of relevance entirely in material terms. This has less and less appeal as material needs are satisfied and spiritual needs assume greater importance. Science has increased our health and wealth; now what about our happiness?

To answer this question we have to ask deeper ones which are at the basis of our philosophy, our religion, and our ethics. What is it that we want of ourselves, of man, of our earth, of the universe? In the past, these questions have been answered by the theologians, and the answer—being rather pleasant—was readily accepted. But man's reason does not permit him to think happy thoughts which are irrational, and many have had to discard the old religions on these grounds. Our great dilemma is that science has not yet helped man to find a new religion which in any way replaces the old ones. There are philosophies of life, such as humanism, which provide a *modus vivendi* but do little to solve the basic questions answered so confidently by the old religions.

Most of our anxieties, problems, and unhappiness today stem from a lack of purpose which was rare a century ago and which can fairly be blamed on the consequences of scientific enquiry. It is well known how the leaders of the established religions resisted the Age of Reason, sometimes literally to the death. By the middle of the 19th century, when it became clear that the establishment had lost the argument, a truce was called. The matter was resolved by the proposition that religion and science were quite separate activities, so there could be no conflict. Religion was concerned with the spirit of man whilst science dealt with the material and physical world.

This compromise and division of territory never rang true and probably deceived nobody. Things had already gone too far, and it was already clear not only that religions had always interpreted the physical world, as Judeo-Christianity does from the first verse of Genesis, but also that the greater understanding provided by science had a profound effect on man's philosophy, ethics, and spiritual beliefs.

The discoveries of Copernicus, Darwin, and the molecular biologists have irrevocably changed our beliefs about our place in the world, but the new understanding has been negative in the sense of destroying old conceptions and religious views and much that goes with them without providing a new positive philosophy and purpose.

If, then, we have changed our traditional faiths through increased knowledge of ourselves and our universe, is it not possible that our way to a new faith, a new purpose for life, is through further knowledge and understanding of nature?

This is the true relevance of science.

It is, of course, quite possible that we can never understand, never discover a purpose, but we shall not succeed if we do not try. Time and time again in science some artificial barrier has been proposed beyond which science could not pass, and many of those barriers are now behind us. There is absolutely no evidence that the great reasoning power with which mankind is endowed has *any*

limitations, and until evidence to the contrary is discovered, we shall be wise not to give up the search. We have nothing to lose and everything to gain.

Once this "ethic of knowledge," as Monod calls it, is accepted, life becomes more meaningful again. The fatalistic mood is tempered with hope. Survival of the species once again becomes important because our search is likely to span many generations, and if we destroy ourselves by some self-inflicted catastrophe, man will never know what his destiny might have been.

It might be argued that it is impossible for us to imagine any conceivable purpose in the universe and therefore what we pursue is a mirage. But not many years ago, it was impossible to imagine any solution to the chicken and egg problem of the origin of life; yet a simple solution, understandable to all, has been found. When the earth was thought to be flat, it was impossible to imagine any solution to the problem: Where does the earth end? But a spherical earth is now so obvious that we hardly need to employ our imagination at all. Could it be that man's purpose will one day be as obvious as the spherical earth?

What areas of science are likely to be most fruitful in this quest? Until the glimmer of an idea appears, a hypothesis to be pursued, it is impossible to know; and it is probably wise to pursue most actively those areas where progress seems to be possible at the time. So-called relevant research does not always lead to relevant discovery, and—if the proper study of mankind is man—it may be equally true that the proper study of man at this time is through physics, chemistry, and biology.

If the problem seems insuperable, we should continue to remind ourselves that modern science started only about 400 years ago and has already transformed our lives and our understanding. What may we not achieve in the four billion years which remain before the earth becomes uninhabitable?

What is it that we want man to achieve? Is it merely the greatest happiness of the greatest number? How many men should there be on earth anyway, and how many birds? How important is an individual compared with the survival and progress of the species? Until we have a better understanding, all our ambitions for a better world are at best short term and, at worst, may be quite wrongly conceived. Our ethics and morals must ultimately be derived from this better understanding.

There is, then, one great purpose for man and for us today, and that is to try to *discover* man's purpose by every means in our power. That is the ultimate relevance of science, and not only of science but of every branch of learning which can improve our understanding.

In the words of Tolstoy, "The highest wisdom has but one science, the science of the whole, the science explaining the Creation and man's place in it." □