Faith, physics and biology

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Abstract *Issue is taken with views about religion and morality in a paper by the late Pesi Masani. Reference is made to a general principle that he defends, to the effect that mathematical theory corresponds more closely to reality as it becomes more advanced. A unified view of physics and biology is suggested here, embodying this.*

Faith

Many interesting and contentious points are raised in the papers in the recent issue commemorating Pesi Masani, as well as in his earlier contributions. In one of the recent papers (Masani, 2001), he likens the faith underlying science to that underlying religion, but it seems to me that in this he ignores significant differences.

As he points out, science depends on several assumptions whose acceptance can be described as "faith". It is assumed that nature is orderly, and that the future will be, in at least some respects, similar to the past. Science also relies on idealised concepts such as the straight line and circle of Euclidean geometry, which cannot be demonstrated as material entities.

There is no way of proving that the future will be like the past, but the "working hypothesis" that it will underlies not only scientific work but everyday living. There is really nothing to be done as a response to the demonstration that it is an unwarranted assumption except to make a mental note and to continue as before. Since there is no alternative it hardly seems appropriate to regard this as an act of faith.

The assumption that nature is orderly receives retrospective confirmation from the achievements of science in allowing economical descriptions and accurate predictions of phenomena, and applications in technology. These may be summed up colloquially by saying that science "works".

Similarly, the idealised concepts of the straight line and circle prove useful and allow results that conform approximately to experience. They are found to conform more and more closely the more care we take over our constructions and measurements. Although perfect straight lines and circles cannot be demonstrated as material entities they are plausible as limiting cases. Apart from the matter of the future being like the past, the "faith" underlying science is of a cautious kind, demanding acceptance of principles that admittedly cannot be proved but that are arguably plausible.

Religious faith is different. In modern times reference is seldom made to observable miracles, and any retrospective justification for acceptance of a belief has to be in terms of individual conviction, an emotional response. The arguments that can be used to try to persuade another individual that a religious belief is sound or plausible are, it seems to me, in a different category from those just outlined for believing that the essential assumptions of science

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are plausible. This is not to deny that the basis of science is less clear-cut than is often supposed.

Morality and religion

Masani also appears to assume that moral behaviour necessarily stems from religion, and this should not go unchallenged. Many atheists and agnostics are highly moral.

Religion is the ostensible motivation for much valuable, and often heroic, effort by charities and such people as medical missionaries, and at a less dramatic level local clergymen perform a valuable social function. It is difficult to know what part is played by religious faith since the individuals concerned may simply be intrinsically good people who would perform good works in any case. On the other side of the coin, it is easy to point to many atrocities that have been comrmtted in the name of religions, and that continue. It is difficult to know whether religion should be seen as the root cause of many of these, since difference of faith is often the most obvious distinction between ethnic groups, and it is possible that often the real conflict is territorial or economic and would be fought under other banners if there was no difference of religion.

As presented by Masani, the suggestion that a religious faith is necessary for morality has a smack of circularity, since the conviction that morality is a "good thing" seems to have preceded the choice of a religion, or at least to have arisen without direct reference to religious teachings. The fact that the conviction can arise without such reference is consistent with the view that it can be felt equally strongly by atheists and agnostics.

It can be argued that this ready acceptance of moral principles is itself evidence of something that can be termed spiritual (whatever is meant by the term). It can be partly accounted for by theories about the evolutionary emergence of altruism as discussed by Haldane (1955) and Hamilton (1964) and rather more recently by Ozinga (1981) and Axelrod (1984), with discussion of Axelrod's results to be found also in Hofstadter (1983a,b).

It is easy to feel that these evolutionary theories do not quite account for human morality as observed, but, even so, the assumption that morality is necessarily linked to religious faith should be challenged.

Physics and biology

In the same paper, Masani defends the very interesting observation, based on quotations from Dirac and others, that mathematical theory seems to have an increasing correspondence to physical reality as it becomes more advanced and abstruse. The mathematics that is used, and proves adequate, for everyday purposes can apparently be seen as an approximation to other versions whose wider applicability becomes apparent in the extreme environments of atomic physics and cosmology.

There seems to be, here, a certain parallel with biology, where the essential features of life are matters of molecular biology, not directly accessible to our senses. The accessible macroscopic aspects, including the apparent working of

our own bodies and our psychology and social interactions, depend on what could be described by the computer analogy of a simplified user-interface to something enormously complex.

The idea is supported by the observation that cells of our bodies engage in complex molecular interactions that are still being unravelled, and various micro-organisms, including disease germs, have ways of sharing genetic material that are advantageous to them but outside our repertoire.

Further support comes from Lovelock's Gaia hypothesis. Although we tend to think of ourselves as masters of the earth's biosphere, this hypothesis suggests that our occupancy depends on regulatory processes in which micro-organisms and algae play important roles. The hypothesis was advanced by Lovelock (1979) and some of the later literature is reviewed by Andrew (1996). It is also treated in various websites, of which particular mention may be made of: ⟨http://www.magna.com.au/~prfbrown/gaia_jim.html⟩.

It appears that in both physics and biology the environments in which we have our everyday experiences and interactions have the nature of simplified user interfaces to systems of enormously greater complexity. The "user interfaces" are powerful and make possible the many achievements of humanity including space travel, but everything depends on underlying processes to which we do not have ready access. Following the computing analogy, it could be said that in the biological case the micro-organisms are "closer to the machine" and to its basic language than we can approach with unaided senses.

The suggestion is of course extremely tentative but seems worth pursuing. The unified treatmentof physics and biology is a particularly intriguing aspect.

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