

The Real Death of Vitalism: Implications of the Wöhler Myth

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Abstract

There is a tendency for extraneous issues to unnecessarily complicate bioethical debate. Vitalism is one of these topics. The implications of the Wöhler Myth, a popular account of science's victory over vitalism, are examined descriptively and normatively: I reflect on how the Myth's prevalence shaped the attitudes of science and religion and evaluate those attitudes.

Introduction

According to a popular anecdote often told to introduce chemistry courses at universities, the birth of chemistry was the death of vitalism, a theory of life which posits the existence of two classes of metaphysically disparate matter. According to the theory, the matter which makes up living organisms is endowed with a vital force that is absent from the matter which makes up non-living objects. The two classes of matter can be referred to as "organic" and "inorganic." Another facet of the theory is that organic matter can only be created by organic matter, since inorganic matter lacks the vital force needed for life. Vitalism, as told by the legend, was overthrown by Friedrich Wöhler's use of inorganic salts to synthesize urea, an "organic" compound. Since Wöhler started with inorganic materials, did not add a vital force, and yet was able to make an organic compound, it was reasoned that vitalism was false. This so-called death of vitalism is believed to have cleared the way for modern science. In fact, contemporary accounts do not support the claim that vitalism died when Wöhler made urea.

The Wöhler Myth, as historian of science Peter J. Ramberg calls it, originates from one account by Bernard Jaffe, the author of a popular history of chemistry in 1931 that is still in print today. "Ignoring all pretense of historical accuracy, Jaffe turned Wöhler into a crusader

who made attempt after attempt to synthesize a natural product that would refute vitalism and lift the veil of ignorance, until 'one afternoon the miracle happened'" (Ramberg, 2000, p. 170-195). Though today's chemistry texts present variations of the story, including those that temper its claims that chemists have disproved vitalism, the story appears in one form or another in most texts. Ramberg proposes compelling reasons for the prevalence of the story, but instead of discussing why the story is prevalent in the pedagogical tradition of chemistry, I will discuss the implications of the Myth's prevalence. I propose that widespread belief in some form of the Wöhler Myth, or in the beliefs that surround it, contributes to an unnecessary opposition between science and vitalism which also puts science and religion in opposition.

A Brief History of Vitalism

Humans have been grappling with the questions of vitalism since the beginning of civilization. What is the nature of that which is "living"? Is the material that makes up living beings inherently different from the material that makes up non-living things? Do we have souls?

At least as early as the Greek philosopher, physician and poet Empedocles (504 to 443 BC), there have been coherent philosophies to answer these questions. Empedocles proposed that the essence of life is from ether, "a subtle fire existing from all eternity and present in air and all matter" (Haller, 1986, p. 81-88). Vitalism was first challenged by the emergence of philosophies like Descartes', which extend a mechanistic explanation of natural phenomena to organisms. Descartes' philosophy included a mind-body dualism, however, and a metaphysical soul is an important element. A more extreme mechanistic view in the form of radical materialism has been posited since then which utterly excludes the soul from existence. Even with the emergence of a new materialist paradigm and the emergence of modern science in the sixteenth and seventeenth centuries, however, vitalism continues to have its constituents. Nineteenth century vitalists include Henri Bergson and the famous embryologist Hans Driesch.

The philosophical dialogue continues today, but some scientists, perhaps raised on the Wöhler Myth and encouraged by the fact that vitalism has fallen out of favor among modern philosophers, are confident that scientific knowledge is outmoding vitalism (Bechtel & Richardson, November 15, 2004, n.p.). Francis Crick addressed the

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vitalist with supreme confidence: “And so to those of you who may be vitalists I would make this prophecy: what everyone believed yesterday, and you believe today, only cranks will believe tomorrow” (Crick, 1967, p. 99).

Some such scientists argue that a metaphysical belief such as vitalism can be overturned by scientific experimentation, just as it was in the Wöhler Myth, and they are on something of a crusade against vitalism. Crick believed that “[...] the motivation of many of the people who have entered molecular biology from physics and chemistry has been the desire to *disprove* vitalism” (p. 24).

Is Vitalism Really Dead?

Vitalistic beliefs persist for reasons that do not appear to be subject to changes in scientific knowledge, as is proposed in the Wöhler Myth. Studies show that children hold vitalistic beliefs. When asked to explain how we get energy in one study, 85% of the children responded using a vitalistic explanation (Kayoko & Hatano, 2004, p. 356-362). It seems that such early beliefs must influence future learning and it is possible that even scientific knowledge gained in future learning is absorbed in the framework of vitalism.

Historically, even scientists have not universally accepted the death of vitalism. Since the beginning of modern biology, there have been those who see in the increasing complexity of our understanding of life a multiplication of ways for vitalism to fit into our beliefs. Lord Kelvin, who penned one of the first versions of the second law of thermodynamics, wrote that, “The influence of animal or vegetable life [vital energy] on matter is infinitely beyond the range of any scientific enquiry hitherto entered upon” (MacFie, 1912, p. 228).

The layman has given credit to such views. In fact, the public has embraced one scientist’s work to prove the existence of a soul and consequentially to prove the validity of vitalism. The conclusion of a 1907 study by Dr. Duncan MacDougall has gained the cultural prominence of an urban legend, stated in the tagline of a 2003 movie *21 Grams*: “They say we all lose 21 grams at the exact moment of our death” (Focus Features, November 16, 2004, n.p.). MacDougall measured the weight of patients when they were dying and reported a sudden decrease in the weight of patients at the moment of death. From his data, he concluded that there is, in fact, a soul substance essential to the body in life and in the form of “gravitative matter” (Haller, 1986, p. 81). That is, there is a soul of determinate weight that departs at the moment of death. Numerous criticisms can be (and have been) made against his methods and his conclusions, but it is significant, nonetheless, because it demonstrates that vitalism is not a dead system of belief among scientists or by lay people.

Scientists may want to seriously consider Kelvin’s warning and ask if vitalism is even a scientific question.

Even in a hypothetical future when we have an immaculately detailed knowledge of the functioning of our bodies, there may still be no way to absolutely prove or disprove vitalism. What experiment could be devised to prove that a rock, which is ostensibly inorganic, has no poetic spirit which would manifest lyrical words if given a set of vocal cords or a way to write?

Religion Engaging the Myth

For those religions in which there is life after death, there must be something of the body which is not bound by the natural laws of science. Vitalism is a theory which allows for the existence of a soul, so concepts of Western theism are often inherently vitalistic. On the other hand, biological science involves the mechanization of natural processes. Scientists observe, quantify, and theorize explicitly within the confines of natural law. If there is allowance for phenomena outside those confines, one might believe that the scientist’s pursuit is undermined. Vitalism and science may be incompatible. Thus, science and religion can position themselves in direct opposition. The Wöhler Myth encourages this opposition, which has manifested itself in a struggle over intellectual authority in society. Religion and Science are now in opposition over how people understand life.

Religious groups have engaged in this debate. The Catholic Church explicitly invokes science to support vitalism: *The Instruction*, a church decree, states that “‘Certainly no experimental datum can be in itself sufficient to bring us to the recognition of a spiritual soul’, [...] but science gives us ‘a valuable indication’” (Coughlan, 1990, p. 67). The Church uses this vitalism as the basis for important doctrines regarding issues such as abortion.

The Church’s acceptance of the scientist’s belief that vitalism can be proven or disproved is dangerous and unnecessary: Dangerous because beliefs of faith should be independent of proof or scientific validation; unnecessary because theistic beliefs are concerned not with the material nature of the universe but with the spirit “behind and beyond” the universe (p. 169). That is, even a mechanistic universe could have been created by a godly mind. Essentially, the question of vitalism is a metaphysical debate outside the realm of and unanswerable by science, contrary to the Wöhler Myth. Religion need not oppose science on this question.

Likewise, science need not engage in the debate. Science gains its authority from its coherent explanations of observable phenomena. Vitalism deals with unobservable phenomena and so the fields of science and vitalism do not intersect. Further, science provides tangible benefits in the form of improvements in health treatments, which gain the trust and acceptance of society. This is empirically verifiable since biomedicine’s paradigm of health and body is so pervasive.

Practical Implications

If vitalism has no philosophical implications for religion or science, does it have implications for society's conduct? One might think that the tension between materialism and vitalism could have importance due to its relationship to free will: If we are purely mechanistic beings, are we really not free to make choices? If not, what are the consequences? In fact, there are no practical implications in the framework of free will that hinge on vitalism. If we accept materialism and we accept that we have no soul, nothing changes. Our lives will still be marked by "[...] thoughts, feelings, hopes, confusions, moral dilemmas, aesthetic experiences, and episodes of dark doubt and deep faith" (Eccles, 1984, p. 48).


Common sense might also suggest that beliefs about vitalism would have importance regarding controversial bioethical questions. One might think that, for example, if someone believes an embryo has a soul, they might also be likely to be against abortion. This claim can be evaluated empirically. A possible approach is to use the research methodology of Robert A. Embree who attempted to correlate "mind-body" beliefs with stances on elective abortion (Embree, 1998, p. 1267-1281). Using a modified version of his method, a possible correlation could be investigated between a subject's beliefs about vitalism, attitude toward abortion (prochoice or antichoice) and beliefs about the meaning of abortion (murder or not murder).

A possible correlation between vitalistic belief and an individual's stance on bioethical issues does not mean that vitalism *ought* to have implications in the modern debate in bioethics, however. Take the American abortion debate, for example. One would be making an unsound judgment if he or she thought that abortion could be decided by a proof or belief in vitalism. Validation of vitalism might separate living and nonliving matter onto separate moral planes, justified by the presence or absence of a vital force, but whether or not the embryo is living is not a question in debate. The embryo is undeniably living, as is a hair follicle. Opposition arises here when the relative moral worth of the embryo in the context of the mother's rights and responsibilities is questioned. This salient question would not be resolved by an answer concerning the vitalism debate.

The debate about embryonic stem cell research is another case. Perhaps scientists believe that a materialistic world-view would lead to societal acceptance of the sacrifice of embryos for the sake of research. If there is no vital force, all matter is the same in essence. The sacrifice of embryos for research, then, would not be a violation of morality since "killing" the embryo is merely

the disassembly of atoms and molecules. Research could then proceed. This would be an untenable conclusion. Would murder then be on the same moral plane as smashing a rock? In a society, it could not be so. We assign moral worth to things regardless of their metaphysical status. Even in the absence of a vital force, we would be left struggling with the same task of deciding the morality of sacrificing embryos.

The Real Death of Vitalism

Logically, vitalism is ultimately not a question of great consequence, and yet there are vehement beliefs on both sides. This can be explained in part by the opposition between science and religion fostered by the Wöhler Myth. Since vitalism and religion are so closely tied, the Wöhler Myth arranged science and religion antagonistically. This antagonistic relationship, perpetuated by the Wöhler Myth's distortion of the importance of the vitalism debate, has resulted in a great deal of unproductive debate. Vitalism ought not to have practical implications in religion or in societal conduct. Care should be exercised to ensure that vitalism is not used as a surrogate to address questions of bioethics or intellectual authority. Its debate belongs in the realm of the philosopher of metaphysics and outside the realm of common discourse. This, perhaps, should be the real "death of vitalism." 

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