

The relationship between the discipline of science generally, and biology more specifically, and the discipline of Environmental Studies is intricately interconnected. In fact, environmentalism can be seen as merely another aspect of the evolution of scientific thought in that it facilitates the development of science in a manner most suitable to human and environmental conditions, desires, and needs. However, the respective roles of these two disciplines set them and their characteristics apart.

I believe that science as an institution has three main inadequacies and that modern environmentalism has developed as an institutional response to these inadequacies. First of all, the unrestrained use of scientific knowledge results in the overexploitation of natural resources, both human and environmental. Second, scientific inquiry has tacitly discouraged respect and humility for that which is sacred within the universe. Thirdly, science as an institution has failed to adapt scientific application to present conditions.

First, we must look to the roots of science in order to shed light on the role that it plays within society today. I have periodically researched different aspects of science and scientific thought throughout my academic career. The examples that I am going to include are not directly or causally related in substance, but reveal monumental trends within the discipline of science at different moments over time. I'm not trying to make sweeping generalizations but only am trying to show inadequacies in scientific thought that still may play out in serious dilemmas for the present.

The earliest conception of science was manifest in early Europe in the seventeenth century. Just before the dawn of European Imperialism, Francis Bacon, "the father of modern science," advocated science as a social program which could be used as a tool for

human power over nature. Ecological deterioration within Europe as a result of human use had accelerated to a point that political and population demands upon the environment were no longer being met. Europeans needed to master new forms of resource exploitation in order to survive. Bacon, on behalf of all Europeans, was in dire need of a method that could be used to dominate, control, and extract that which nature had to offer. Carolyn Merchant, using Bacon's words from "The Great Instauration" (written in 1620), articulates this tendency when she writes that "the new man of science must not think that the 'inquisition of nature is in any part interdicted or forbidden.' Nature must be 'bound into service' and made a 'slave,' put 'in constraint' and 'molded' by the mechanical arts. The 'searchers and spies of nature' are to discover her plots and secrets. This method, so readily applicable when nature is denoted by the female gender, degraded and made possible the exploitation of the natural environment" (Foltz 41).

Bacon's use of the inductive method facilitates a factual understanding of nature, natural processes, and phenomena that take place within the universe. Thus, science is meant as a method to catalogue the natural world in a way that will be useful to humans at a later date. Furthermore, Merchant's words illustrate how early scientific method was intricately connected with mechanical application and technological innovation. Both science and technology are descendents of early Baconian thought and philosophy. Science and technology are methods of study facilitated by observation and driven by the intention of application.

Secondly, we must look to the historical context in which this method was applied. The majority of early scientific thought and application was conducted under the heavy influence of the Christian church. This resulted in placing a high emphasis on the

order of God's creation that was manifest throughout the earth. Under this mode of thought, God's design is omnipotent and unquestionable. Thus, it was man's duty to identify God's omnipotent design throughout the world because it was created for the discovery and use of man. Man could identify divinity, worship God's plan, and catalogue the natural world through Bacon's scientific and mechanical method. Reliance on this belief gave scientists the religious justification necessary to break down parts from the whole in order to find God's order within them. It was their god-given right. An environmental historian, Carolyn Merchant articulates this phenomena when she writes that "the mechanical method [which facilitates human control over the environment] that evolved during the seventeenth century operated by breaking down a problem into its common parts, isolating it from its environment, and solving each portion independently" (Foltz 43). This technique gives scientists the ability to conceptualize parts of an organism, ecosystem, or social institution as commodities capable of other ends within themselves. Therefore, by breaking down objects into their respective constituents, scientists implicitly acknowledged their own right to do so.

Furthermore, the natural environment was seen as existing in a static equilibrium. Before the introduction of Darwin's theory of evolution and adaptive change, scientific knowledge and study was seen as being incapable of change. It was a definitive catalogue of environmental conditions. Natural history is the most obvious example of this tendency. Thomas Jefferson, one of our nation's most prominent natural historians, writes that "Such is the economy of nature, that no instance can be produced of her having permitted any one race of her animals to become extinct; of her having formed any link in her great work so weak as to be broken" (Jefferson 53-54). Jefferson's words

and inaccuracies within the discipline of natural history are simply examples of a larger trend within scientific method: it fails to consciously take into account a dynamic social and environmental universe that must be constantly reevaluated. Again, I am not trying to make a sweeping generalization about scientific thought, it no doubt takes into account a dynamic universe within specific scientific disciplines. However, science as a social institution has not properly redefined the legitimate use of known carcinogens, pollutants, and toxic substances. As the world has continued to industrialize over the past century and these problems have become more exaggerated, environmentalism has developed to address these issues.

Making sweeping generalizations about the progression of scientific thought does little to contrast the different roles of science and environmentalism. However, these historical examples are tools that can be used to illustrate aspects of scientific thought that still play themselves out in the present. Each of these examples illustrates an inadequacy that I believe Environmentalism is meant to control and answer. This makes modern environmentalism a form of scientific wisdom. It has developed as a separate institution in order that it may check the institution of science within our culture and society.

First, Bacon's scientific method shows the basic purpose and value inherent within the development of the institution of science: it is meant to be applied. All research, development, inquiry, observation, testing, proof, and study is meant to be conducted in order to expand our understanding of the world in that we may manipulate it to better suit our needs, beliefs, and desires. Although individual experiments and scientists may be motivated and interested in scientific ends entirely separate from

application and domination, the discipline of science as a social organization is meant to serve humans with its application. For example, space exploration is the next frontier in scientific study and exploration. Although some astrophysicists, engineers, and astronauts may be purely interested in the exploration of space, the funding for their efforts is definitely allocated with other intentions. Society wants to use this knowledge for our own benefit. The institution of science is driven by society in order to reap the benefits of its application. Environmentalism questions the intentions of scientific application, attempts to reinterpret societal motivation, and has developed to govern unrestrained application.

Furthermore, science tacitly assumes the *very right* to quantify, commodify, separate, and use nature for our own needs. This capability is actually a religious belief, religious in that it is culturally indigenous to the discipline of science. In other words, some cultures may find it abominable to break a tree down into its constituent nutrients and molecules. Doing so may fail to respect the power or supernatural state of the tree. It could awaken the gods and create some karmic condition on earth that will take many lifetimes to be felt. Why do scientists think differently, and who is to say which belief is correct?

I credit the religious capability to quantify and measure nature to the historical belief in the power of God and the Christian right to find His order within nature. Without God's permission to break the sanctity of natural phenomena humans may have never had the social comfort necessary to break into the DNA of plants and alter their genetic composition. I am not saying that I do not believe that these are worthwhile enterprises. However, I do believe that it could get us into trouble. This is why a belief

in the sacred and a genuine care for the earth and its power is persistent throughout environmental agenda. It places emotion, respect, and humility back into the equation.

I see the inadequacy of the application of science to adapt to the present. Natural history failed to place humans and the natural world within an adaptive matrix. This misunderstanding is an example of a larger trend that has caused gross misconceptions about evolutionary extinctions and drivers. Much in the same way, I believe that the *application* of science has not been placed within a changing framework. It is now obvious that unrestrained growth, fossil fuel consumption, and the use of many chemical pesticides are very detrimental to the long term sustainability of environmental and population health. However, this scientific knowledge is still applied on a massive scale. Environmentalism serves as a balance for this tendency. The problem is not that we have used scientific and technological knowledge in the past for human benefit, but that the application of this knowledge must be reinterpreted in a new framework. Thus science and environmentalism in the future will reciprocally affect and shape one another.

Popular culture claims environmentalism to be the result of a growing concern over environmental degradation and exploitation throughout the world. I believe this to be merely an aspect of a much larger trend. I credit the development of modern environmentalism as an institutional answer to the inadequacies of scientific thought. Environmentalism brings respect and humility back into dominant social institutions that recklessly commodify and separate the natural world from the sacred. For me, environmentalism questions the intention of scientific study and guarantees that our motivation is meant not just for power over nature but an application of that which will be the most beneficial to a balance within nature. Environmentalism checks unrestrained

application. It facilitates the skepticism necessary to constantly reinterpret the application of scientific knowledge within a framework that is ever changing.

Environmentalism is, in fact, scientific wisdom.

Works Cited

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