Evolution Extended: Biological Debates on the Meaning of Life

Edited by C. Barlow. 1995. The MIT Press, Cambridge, Massachusetts xi + 333 pp., illus. U.S. $17.95

Although evolution is a widely accepted theoretical concept, we as scientists have not yet succeeded in providing a working definition whereby the scientific community understands one another when we speak of evolution. Each discipline has its own working definition that has been cast within the framework of that science's existing paradigm and differs from those of other disciplines. These subtle differences have, and continue to be contentious, providing the impetus for some of the greatest histor-

ical and modern philosophical debates on evolution. It is these differences of opinion that Barlow endeavors to illustrate in the first part of the book entitled "Is evolution going anywhere".

The central theme of the first two chapters focuses on the relationship between progress and evolution. Julian Huxley's exceedingly anthropocentric viewpoint that human behavior and intelligence are signs of progress, and therefore more evolved, contrasts sharply with those of Francisco J. Ayala and Edward O. Wilson. Ayala considers progress to be a value-laden judgment that cannot be defined biologically, while Wilson eloquently illustrates that progress implies a goal and that evolution has no goal, therefore evolution has nothing to do with goals or progress. Ayala and Wilson do nevertheless agree that evolution is a directional process, progressing from simple to more complex.

George G. Simpson also takes exception to Huxley's viewpoint and defines progress as an increasing awareness and perception in the environment and the ability to react accordingly. Evolution may not necessarily be accompanied by progress nor is it characterized by progress. Simpson believes that evolution is not a linear process, but rather, one that branches with the rate and direction being highly variable. Chapter 2 closes with excerpts from David M. Raup's *Extinction: bad genes or bad luck?*, leaving the reader to reconcile whether evolution is a directional or simply random process.

Part two entitled "Tools and metaphors of evolution" includes three chapters that address evolutionary processes. Whether Barlow intended it or not, she indirectly addresses a theme central to the philosophy of science. That is, the impact of societal values, public opinion, and the existing scientific paradigm on the way that science is conducted and manner in which these ideas are presented. Chapter 3 opens with a number of lengthy excerpts from the *Origin of the Species* to illustrate Darwin's metaphorical writing style and the manner in which he presented his ideas on natural selection and competition. Fortunately Darwin's ideas on evolution were not perceived as being heretical, even though they challenged the very essence of creation and authority of the church. Had the church not been so intertwined with politics and society, the theory of evolution might have gained popularity much earlier than the late 19th century. Excerpts from Richard Dawkins' *The Blind Watchmaker* provide good examples of contemporary writing style and the continued use of metaphors to illustrate the parallels between natural selection and competition and an arms race. For those of us who remember the cold war (this unfortunately dates us) it is an appropriate metaphor, but for those who were too young or not born during this period of history, the metaphor loses its familiarity and significance.

Integrative processes in evolution are presented in chapter 4. Gregory Bateson, François Jacob, Lynn Margulis, Mark McMenamin, and Peter A. Corning expound on the notion that muticellular organisms are merely components of a system operating in dynamic equilibrium with the other components. Jacob equates evolution to a "tinkerer" who produces a product out of existing material, with no clear plan as to what the end product is. Based on this model, we can see how convergent evolution may have occurred. Corning adds an anthropocentric twist to this idea by considering it to be some form of co-operative behavior. However, is this really co-operation or some form of parasitism that we do not yet understand? Corning takes the discussion one step further by introducing the reader to the concept of sociobiology and a number of other social theories. This adds a new dimension of confusion to the evolutionary theme of the book, but beautifully illustrates the degree to which evolutionary theories are value laden.

Behavior and evolutionary stability, in light of the 2nd law of thermodynamics are the central themes of chapter 5 "Ratchets, Uroboros, and the Role of Initiative". Passages from Jacob Bronowski's *Ascent of Man* illustrate the progression from simple to more complex organisms without their breakdown into component elements, a process which he calls "stratified stability". Stuart Kauffman's Newtonian viewpoint on evolution portrays simple and complex systems that exhibit order spontaneously while co-existing with natural selection under some type of driving force.

Part three entitled "Embracing the Cosmos" launches the reader into the realm where biological evolution and the human condition are juxtaposed. Pierre Teilhard de Chardin, Thomas Berry, and Julian Huxley's endeavor to justify the human condition as a part of the evolutionary process and illustrate the philosophical and moral dilemma some scientists are faced with when they attempt to reconcile their innermost personal thoughts, beliefs, and values with the scientific knowledge they possess.

In my opinion this is the most challenging chapter to read, for it addresses some of the most philosophically demanding questions that we as scientists are being asked to provide answers to. Should science and religion come together to formulate a single belief system? How does religion, which is based on faith fit in with the scientific process where hypotheses are testable and falsifiable? How ingrained are society's values in the scientific process? Is humanity really the pinnacle of evolution? Is humanity the custodian of evolution?

That the scientific process and religion are two separate, mutually exclusive concepts is the focus of chapter 7 "Banishing Cosmic Meaning". Criticisms of Chardin's unified view of science and humanity are presented in excerpts from the works of Peter Medewar and Jacques Monad. Medewar's considers

Chardin's work to be misleading and *The Phenomenon of Man* to be nothing but nonsense and tedious metaphysical conceits. Monad, although not as harsh as Medewar, denounces Chardin's work as being sloppy and lacking imagination. Monad himself attempts to explain the problem of science and religion and concludes that, though science dominates and permeates modern society, many people still retain ancient belief systems that are inherently anti-science in their philosophy. Society as a whole is faced with a moral dilemma. While science can unequivocally demonstrate that humanity is destroying this planet, the old value systems still determine our reaction and approach to solving problems. Often, the solution is morally unacceptable and the problem continues (e.g., population growth). Society tends to use or turn against science depending on the circumstance.

In Chapter 8, "Beyond the Binary", Barlow attempts to temper the two previously diametrically opposed viewpoints with comments by Mary Midgley, Stanley Salthe, and Theodosius Dobzhansky and introduces the Gaian/humanist view. The essence of this chapter focuses on the question that all of us have thought of at some point. Why are we here?

Part four "Evolution and Religion" begins with the chapter entitled "Evolution as Religion". Comments by Edward O. Wilson, Julian Huxley, Alister Hardy, and John C. Greene illustrate points of view that are scientific, anti-scientific, humanistic, and somewhere in between. Humanity is unable to comprehend the meaning of life and our purpose on this planet, seemingly without a unifying theory. Man has used his intellectual ability to answer some of these questions, but there is still much that we do not know or understand, and that is where we presently find ourselves - in the unknown. Some continue to search for the answers, even though there may not be any, while others prefer to wait and criticize.

The final two chapters, "Responding to Creationism" and "Science into Myth" address the science versus creationism debate. Barlow presents an excellent historical overview of both sides of the debate, the conviction of the proponents of each side, and the chasm that continues to erode at the very fabric of our society and educational system. Will this problem ever be resolved? I doubt it. To do so requires one system of beliefs and values at the expense of humanity's cultural diversity and identity. Governments and cultures have been attempting (and still continue) to unify humanity into a single collective for thousands of years. The result of these activities has been bloodshed and genocide.

Barlow has meticulously constructed a concordance of ideas that span more than one hundred years of scientific history into a cohesive, thought provoking, and insightful view of what we know about evolution, but more importantly, what we don't know. If you are looking for answers to the meaning of life, you won't find them here. What is presented here is a variety of viewpoints, some you'll like, others you won't. The answers, if there are any, lie in the mind of the individual.

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