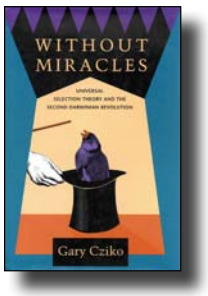
# *Without Miracles*
## *Universal Selection Theory and the Second Darwinian Revolution*

Reviews from
the web



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*By Gary Cziko*

Amazon USA:

### *A brilliant tour de force*

By Bernard Oppenheim on July 13, 2001

We all know about the theory of evolution by natural selection, but what I didn't know was that this idea could be extended to any field in which something new is produced. Cziko brilliantly reviews the application of selection theory (blind variation followed by selection of best fits) to fields as different as neurology, immunology, linguistics, education, pharmacology and artificial intelligence, and presents a strong argument for the claim that innovation in any field can only arise through an application of selection theory. How does our immune system deal with a potentially infinite variety of antigens? Not directly through information contained in the genes, which are quite limited in number. Not through direct copying of the shapes of antigens, since no mechanism allows it to copy an infinite number of potential shapes. Rather, sequential generations of B lymphocytes produce antibodies that fit the antigen better and better, with continual selection of the B lymphocytes that produce the best-fitting antibodies. How do we acquire new knowledge? It is not innate, as Plato claimed. And we don't directly "learn" it from others, except in the sense that a parrot learns. Rather, we are constantly trying to make better and better sense of our perceptions, by building better and better explanations in our minds and rejecting inadequate explanations. Information and instruction received from others are only perceptions to us until we have incorporated them into our own explanatory schemes. So "learning" is actually an active process of explanation-building through trial and error, in other words, a form of blind variation of explanatory schemes and selection of the best ones.

This book is well-written, clear, and immensely "instructive", causing me to modify a number of explanatory schemes in my own mind. I put it alongside the best of Dawkins, Dennett and Wilson. It should have a much wider readership than it apparently has.

### *A Must! But far from flawless...*

By Julio C. S. Barros on November 22, 2001

This book is surely a must for anyone interested in phylosophical discussions concerning "darwinian" (or better, neo-darwinian) evolution theory, and its potential to explain other fields where any kind of innovation is created. The author describes these innovations as "puzzles of fit" of an organism or of a system to another organism or system, and he brilliantly equals all these "fits" to "knowledge". Cziko reached a good level of quality in his transdisciplinary approach, putting together data from fields like evolutionary biology, immunology, neurobiology, animal and human learning, human thought and language, scientific knowledge growth, and cultural adaptation. For this, he no doubt deserves a four-star ranking. But then, there come the flaws...

The central issue in the book is that just any kind of innovation, puzzle of fit, knowledge growth, or whatever you call it, can only be achieved through a process very much like biological evolution as accepted by the neo-darwinian paradigm: cumulative blind variation followed by the survival of the fittest. Cziko also shows how explanations for these puzzles of fit have evolved in all fields from providential explanations (like in the book of Genesis, where things happened to achieve a pourpose previously devised), through instructionist ones (like Lamarck's "Use and Disuse" plus "Inheritance of Acquired Characters", where the environment would "force" the individual creatures to change just in the right, successful way, and then the creatures would pass these changes on to their offsprings), and finally to selectionist ones (Darwin's Selection Theory). He says that only selectionist explanations can give truly "scientific" and "naturalistic" accounts for these fits, without recoursing to miraculous schemes. In short: Cziko brings us the good news that not only are we merely machines (like we have feared ever since the mechanical physics of Newton), but we are blind ones too!

The starting point of his reasoning is evolutionary biology, and Cziko's understanding of it seems to me too narrow-minded, with a strong bias toward the old notions of New-Darwinism. Consequently, his report and deductions on it are misinformative. Evolution was (and, to a large extent, still is) thought to be based on "variation and survival of the fittest". But in the past the view of the causes of these variations were believed to be basically errors: DNA damage by the environment, and failure of the organism to correct damages or to make precise copies of the DNA. It's been a long time now that this view has changed dramatically, and organisms, even as simple as bacteria, are now known (from before 1990) to possess amazing control over the ways and the contexts in which these variations happen. They can trigger DNA mutation under appropriate conditions (stress, threats to survival), and even control which areas of the genome will be subject to change. This renders organisms much more "smartly" interactive with the environment as might be expected from reading Cziko.

So, what Cziko did not tell about the process of antibody creation by B-Lynphocytes is that when they undergo somatic hypermutation to fine tune their antibody production to the antigen, this hypermutation is, first, triggered by the interaction with the very antigen, and second, it is far from blind: the mutation happens only in a very restricted area of the chromosome, changing only the areas of the antibody molecule that interact with the antigen (and not even the whole molecule!). So this is a very "thematic" kind of mutation-variation; maybe "short-sighted", but surely not "blind"!

When he comments on the phenomenon of "directed mutation", the strange capability of many procarionts (like bacteria) to seemingly direct their mutation to the desired result, he takes a rather cynical and slightly arrogant stand, apparently rejecting the existance of the phenomenon itself, even saying "But let us continue to imagine for a moment that a bacterium was able to change just those genes regulating metabolism in just the right way to allow for the digestion of a foreign sugar". It seems that he read only two research articles on this, and not quite well, and draw much of his attitude towards the phenomenon from his academic-environment prejudiced and uninformed criticism. By the time he was writing his book , directed mutation had been fully demonstrated by many researchers, and not only by Cairns. Actually, even as early as 1984, four years before Cairns revolutionary and controversial paper on it, J.A. Shapiro had already shown the phenomenon fully (Observations on the Formation of Clones Containing araB-lacZ cistrons fusions. Molecular & General Genetics 1984;194(1-2):79-80), only in a much more discreet maner. By 1995, a wealth of information was already available, from researchers like Shapiro and B.G. Hall, among others, and now even eukariotes (yeast) are known to perform "directed mutation" (Hall BG. Adaptive Mutagenesis: a Process that Generates Almost Exclusively Beneficial Mutations. Genetica 1998;102(103):109-125.). Strikingly, this process shows some resemblance to human B-lynphocyte somatic hypermutation!

When Cziko moves on to the other areas, scientific knowledge growth, etc, the already "short-sighted" (and not blind) variation seems to have undergone a surgical operation on its eye and starts to see almost sharply. Also, the second step, that is, the survival of the fittest (in biology, through killing the non-fit) seems to change to a true "selection" process (choosing one among many, by identifying its desirable qualities, which is quite different from "survival of the fittest"). Even Campbell and Pinker, which he defines as fully (or almost) selectionists, seem to turn to rather providential viewpoints, like "innativism" and "constraints", for triggering and orienting the variation, and guiding the selection, not succeding in solving Meno's providential dilema: "...if you don't already possess the knowledge you are looking for, how will you know when you have found it?"

Cziko, like many, wrongly equals "scientific" and "naturalistic" explanations to "mechanical" ones, and since our mechanistic view of nature is basically deterministic, he only sees lamarckism as an instructionist process, not a "freely-willed" one, failing to address vital phenomena like human consciouness and apparent free-will.

### *Deceptively simple process generates beauty!*

By Nando M Pelusi on January 23, 2002

That applies to this book, as well as the concepts described herein.

When a book can alter your perception and understanding of the world for the better you reread it. I'm currently on my third formal reading of this masterpiece. I go back to it often.

Cziko has brought to life the simple but powerful concept that Campbell called evolutionary epistemol-

ogy: blind variation and selection. I use these concepts in everyday life (risk-taking, creativity, trade-off decision-making). Even if not useful, the concept would enegender admiration for its sheer beauty. The fact that it can be useful and fun is an added benefit.

Amazon UK:

By Neutral on 20 April 2009

Gary Cziko proposes that three major types of explanation have been proposed for the growth and origin of knowledge; the providential, instructionist and selectionist theories. He further argues that the first two explanations have been replaced by the third as divining the increasing fit between organisms and their physical and social environment.

It's an interesting idea and, unlike so many books which concentrate entirely on the latter at the expense of the former, provides an unusually wide coverage, including the interaction between various disciplines in dealing with the concept universal selection theory. In terms of breadth it's an excellent contribution to the subject.

Although Cziko appears to put too much faith in the applicability of universal selection theory he acknowledges that "theories that seem to be well founded and clear improvements over previous ones are eventually seen as inadequate and replaced by newer, more encompassing perspectives in the way that Newtonian physics gave way to Einstein's relativity and Bohr's quantum mechanics"

He also acknowledges the criticism of Darwinian selection theory by biologists such as Lynn Margulis, whose advocacy of the endosymbiosis theory (that evolution occurs by networking rather than competition), has earned the admiration of Richard Dawkins. Margulis considers the slow accrual of mutations represents " a minor twentieth-century religious sect within the sprawling religious persuasion of Anglo-Saxon Biology". Cziko also provides a sharply critical analysis of Dawkins's theory of memes as units of cultural replication.

Cziko describes what he considers are the achievements of selection (biological structures, instinct, the immune system and brain evolution) and the promise of selection (the origin and growth of knowledge, adaptive modification of behaviour, cultural knowledge and language amongst others) before discussing and describing the use and universality of selection. He appears to be over-reliant on the theories of Donald T Campbell, with whom he cooperated on a bibliography of Campbell's theory of evolutionary epistemology, which is based on Darwinian ideas of blind variation and selective retention. At times it seems as if he is Campbell's propagandist.

Cziko acknowledges the existing conflict between evolution inspired epistemology and philosophy whose aim is "to establish an infallible, justifiable foundation for human knowledge". His - not unexpected - conclusion is that future developments in understanding the brain will support the universal selection theory. In that respect one of the weakness of the book is that it produces the false knowledge Campbell spent his life studying and arguing against.

The other weakness is the perfunctory treatment of the concept of miracles. Citing David Hume that rationality depended on evidence for the miraculous outweighing the evidence against, he restates the theory of Ockham's Razor by suggesting, " stubborn belief in miraculous accounts for which we have non-miraculous explanations is inconsistent with the scientific enterprise that involves the continual search for the simplistic and most parsimonious explanations of the goings-on of the universe". However, his example of the desert dwellers first sight of a refrigerator is banal in the extreme. His premise is that the universal selection theory is, in effect, the only one worthy of consideration.

Notwithstanding these weaknesses the book is an excellent read, primarily for its consideration, however brief, of things outside the universal selection theory. Cziko is not unbiased and will find willing readers from the Darwinist and materialist schools of thought. However, his coverage of the inter-interdisciplinary nature of the subject, including philosophy and psychology, does provide a good reference for everyone, even those who do not share his conviction that universal selection provides an adequate explanation of who or what we are and how we came to be. It's worth five stars for that alone.

Gary Cziko's website:
http://tinyurl.com/WithoutMiracles

"...it is a truly admirable work, and should prove extremely valuable. There is really nothing to compete with it for its broad scope and lively, easy style."

— John Ziman, Professor Emeritus of Physics at the University of Bristol, and Fellow of the Royal Society.

"Cziko outlines universal Darwinism as clearly and comprehensively as is possible in a book designed for a popular audience. Some readers will find his views as misleading as they are seductive. Others will find them highly suggestive, possibly worth pursuing in their own right. I find myself in this second group."

— David L. Hull, Nature 1995, October 12, Vol. 377, p. 494.

"Fascinating and unique, this strictly Darwinian presentation balances current attacks on Darwinism. Highly recommended . . ."

— H. James Birx, Library Journal, 1995, October 15, pp. 83-84.

"This book is clear, well-written, and shows an admirable range of scholarship. Cziko covers a diverse range of topics with considerable sophistication. The work is original and creative, and should appeal to a wide audience. In fact, it is one of those rare books that is both accessible to any educated reader and which makes a set of substantive and controversial claims of interest to specialists across many scientific fields."

— Paul Bloom, Department of Psychology, University of Arizona

"An up-to-date collection of selectionist arguments that will be useful to many readers. To the best of my knowledge, the existing recent book that is closest to this is Richard Dawkins' The Blind Watchmaker, to which Cziko liberally refers. But Cziko is arguing for a much more radical thesis— that a Darwinian mechanism is the only way to account for any kind of systematic fitness, in any domain. Even if one does not end up accepting this thesis, one cannot fail to be impressed by the breadth of the argument."

— Andrew G. Barto, Department of Computer & Information Science, University of Massachusetts, Amherst