Dance to the Tune of Life: Biological Relativity

Denis Noble
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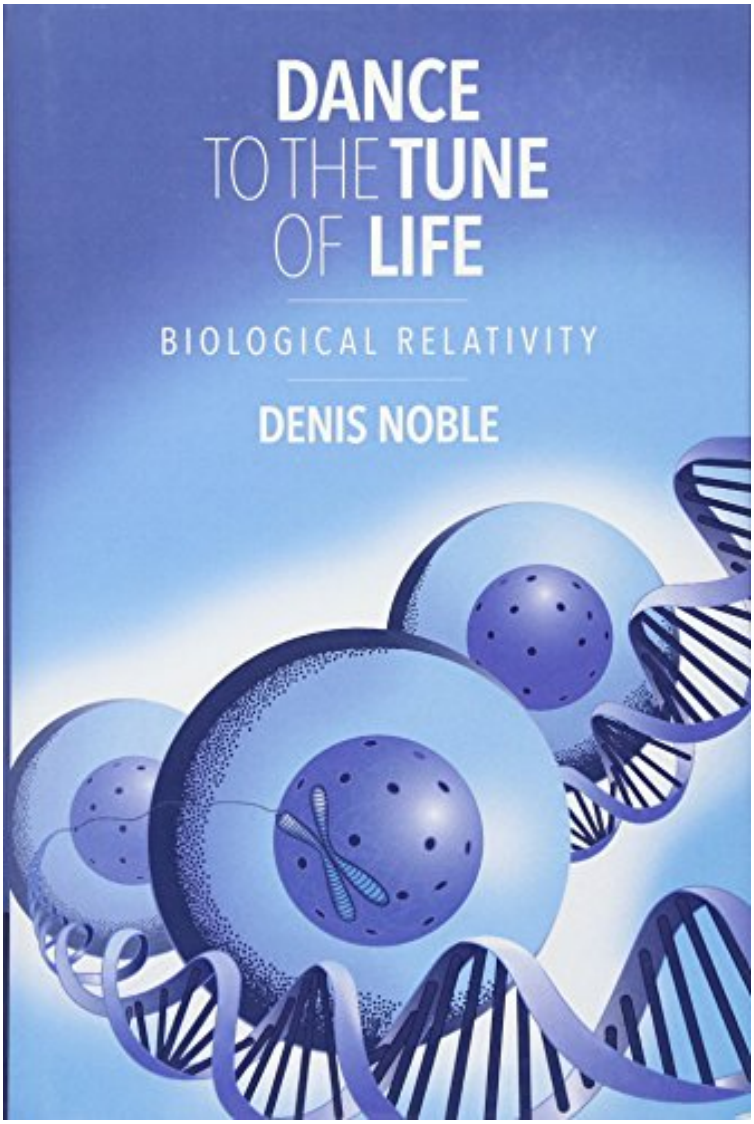

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Denis Noble : Dance to the Tune of Life: Biological Relativity before purchasing it in order to gage whether or not it would be worth my time, and all praised Dance to the Tune of Life: Biological Relativity:

11 of 11 people found the following review helpful. World-class heart researcher demolishes Neo-Darwinism - With Grace and WitBy Perry MarshallJust as modern astronomy has shown us there is no definite center of the universe (and it is most certainly not the earth), in this book Denis Noble shows that in biology there is no starting point of the organism. (And it is most certainly not the gene.)Denis Noble is the man who worked out the details of the cardiac rhythm, which made pacemakers possible, as well as the drug ivabradine. He received the distinction Commander of

the British Empire from the Queen of England for his service to the sciences. His heart research involved knocking out genes and altering gene expression. This work convinced him that the Neo-Darwinian conception of the gene and its role was deeply flawed.The book begins with a history of astronomy, where ideas that the earth is not the center, and not even our sun or galaxy are at the center, were met with great resistance. He makes the case that making the gene the immortal center of evolutionary biology is at least as great a mistake as earth-centric astronomy. It has negatively impacted fields as diverse as economics, theology, sociology, politics and literature.Noble is a strong historian and his book uncovers the detailed history of the language and development of the ideas behind modern evolutionary theory.He says:Neo-Darwinism is a product of nineteenth-century scientific thought in the last decades before the revolutions in physics leading to quantum mechanics and relativity theory.Since Neo-Darwinism has dominated biological science for over half a century, its viewpoint is now so embedded in the scientific literature, including standard school and university textbooks, that many biological scientists may themselves not recognise its conceptual nature, let alone question incoherencies or identify flaws.the language of Neo-Darwinism is itself a powerful barrier to the development of a more inclusive theory it is the whole conceptual scheme of Neo-Darwinism that creates the difficulty. Each concept and metaphor reinforces the overall mind-set until it is almost impossible to stand outside it and to appreciate how beguiling it is."He shows how the entire field has become a prisoner of its own circular reasoning, and of an unjustified antagonism towards teleology, or purpose in nature. He explains how it is manifestly impossible to understand something like a heart if you will not acknowledge that it exists for the purpose of pumping blood, and doing so in a very particular manner.He shows that you can only understand the behavior of a heart *at a certain level of the system* and that, at other levels of the system, the same behavior may appear random or invisible or incomprehensible. He shows that biology is systems within systems within systems, and that every system has a relationship to other systems. He shows that you cannot pinpoint any particular starting or ending point to a living organism. Each effect flows from multiple causes and each cause produces multiple effects.This reminds me of a statement made by Gary Fugle, an author and biologist who said, there is no single place in nature where you can say Aha - THERE is the hand of God, you can see it right there!Although people who espouse God-of-gaps arguments take comfort in such things, those gaps have a way of migrating elsewhere in the face of growing scientific knowledge. Noble is making a complementary statement, but aimed at scientific reductionists instead: There is no one all-encompassing, explanatory, simplistic Final Answer In Nature that says this is the spot where everything starts.Rather, says Noble, goals are contextual, and just like randomness, only have meaning *with respect to something else.* He says, It is in this context that we can understand why many prominent Neo-Darwinists are also prominent atheists. That also is a statement of faith. Part of that statement of faith is that creative purpose, consciousness and intentionality are all mirages, epiphenomena without significance or effect.Thus his argument for Biological Relativity. Every system, every goal and behavior is relative to others around it, both smaller and larger scales and levels of systems. This book will be liked by anyone who creates for a living and instinctively knows that nothing in nature is as simplistic as Dawkins just-so explanations and stories.He rigorously demonstrates new models of evolution via the work of several researchers including Conrad Waddington: In direct defiance to Neo-Darwinism, learned traits are inherited, and Lamarck was right 200 years ago: organisms direct the evolution of their progeny. Noble spends some time describing the evolutionary toolbox of Horizontal Gene Transfer, Epigenetics, Symbiogenesis and Transposition. He shows that many evolutionary events are grand movements of large-scale sections of DNA.He gives Neo-Darwinism credit for a number of fields of study such as population genetics but also shows how it has slowed discovery in other fields for 50 years. He blames some of this on the ever-narrowing scope of scientific categories, fragmentation of disciplines, increasingly unable to see the whole for the parts.Some memorable quotes:I saw a film of a living unicellular organism, an amoeba. It could hardly have been more different from the two-dimensional sections of dead cells that I had drawn as a student. Nothing stood still. Everything was streaming this way and that as the organism moved around. When it found an object that was sensed (I assumed chemically) to be food the movements became beautifully co-ordinated as two extrusions called pseudopodia (false feet) encircled the object, eventually allowing it to be taken in as a membrane coated vesicle to be digested.This tiny organism had a nose: the chemical receptors on its membrane surface. It had muscles: in fact formed of protein molecules, some of them very similar to those in our cells, only not organised into separate muscular organs. It clearly had a nervous system to connect the two together, although it had no nerves as we know them. It had a clear goal: to feed itself. As we will see later when we discuss the cell cycle, it knows when and how to reproduce itself in an intricately co-ordinated activity when it makes its genes dance as they and their predecessors have done for at least one billion years. Those working on a systems approach were openly denigrated as not doing real science, not being where it is at. Later, in the 1970s when I became a member of research grant committees, I was to hear that phrase often. Being where it is at was committee-speak for excluding any other approach. Sadly that exclusion was so successful that very little integrative research remained. Molecular biology and genomics sucked up most of the funding.Neo-Darwinism is incomplete as a theory of evolution. It also suffers from deep conceptual confusions, and is not compatible with the wider range of experimental evidence we now have.Why are scientists like me apparently in such a small minority? There is a simple answer to that question. We are only apparently a minority. I have discussed extensively with

evolutionary and other biologists in the course of lecturing to audiences, large and small, all around the world. Exceedingly few of the tens of thousands involved have seriously defended the orthodox Neo-Darwinist view as a complete explanation.On the benefits of updating our evolutionary models:Whole areas of economics, sociology and philosophy are based on interpretations of selfish gene viewpoints. No field of human endeavour will remain untouched since the implications affect even our concept of humanity.This field of Extended Evolutionary Synthesis is growing rapidly and its great that a person of Nobles stature has taken the time to write such a careful book. Just as Neo-Darwinism has leaked poison into many fields, Biological Relativity has the potential for bringing new insights into economics, sociology and many other disciplines. Noble is mature enough and well-enough read to speak to these other disciplines.Noble is no stranger to this debate. He has every qualification necessary to critique evolutionary biology from the outside. Noble organized the first debate about Richard Dawkins bestseller The Selfish Gene in 1976 and again between Dawkins and Lynn Margulis in 2009. He was on Dawkins PhD review committee at Oxford. Hes an Emeritus professor at the University of Oxford.Hes a Fellow of the Royal Society, the oldest scientific body in the world. He organized the Royal Societys November 2016 Conference New Trends in Evolutionary Biology and chaired the 2nd day of the conference.At the London conference, the overwhelming consensus from both presenters the 300 in attendance was that Neo-Darwinism is due for a major upgrade and perhaps needs to be replaced entirely.Hes written over 500 scientific papers and hes President of the International Union of Physological Sciences, the global umbrella organization for physiology. His keynote talks to physiologists worldwide regularly include critiques of Neo-Darwinism, and he often hears complaints from members that the evolutionary biology clique refuses to publish their papers.Hes one of the pioneers of the field of Systems Biology and he is also editor of the Royal Societys cross-disciplinary publication Interface Focus.The book is very readable, its in middle-school to high school level English, and the glossary and explanations take pains to explain complex ideas in simple language.It is part of a growing body of works that provide alternatives to the classical, textbook version of evolution that is repeated ad nauseum in the media. Other books include Evolution: A View from the 21st Century by James Shapiro; COSMOSAPIENS by John Hands; The Music of Life also by Denis Noble, and Acquiring Genomes by Lynn Margulis and Dorion Sagan.2 of 2 people found the following review helpful. Review: DANCE TO THE TUNE OF LIFEBy RichDenis Noble's book represents a much needed and welcomed holistic and systems approach to evolutionary biology. It essentially replaces the stand-alone theories of pure Darwinism, Neo-Darwinism, and Lamarckism with an integrative new synthesis much of which has been supported by empirical studies. Evolutionary changes are no longer the sole purview of genes, DNA, and random "only" forces, but include systems network interactions. He views evolution as an open systems process; organisms operate on multi levels of complexity including responses to the external environment which then can be inherited. It appears that the dance to the tune of life is represented by a multitude of interconnected multi-level and nested positive and negative feedback loops.He named his new model/theory " Biological Relativity" and it goes a long way in explaining many unanswered questions in evolution biology and the weaknesses of Darwinism, Neo-Darwinism, and Lamarckism. Noble pounces heavily on reductionists approaches to evolution. His model incorporates parts of these earlier three models, but supplements and supplants much as well. This is not the first time systems science has been applied to biology, but a new angle is presented.His book is fascinating and impressive and I intend to re-read portions of the book. It also has astrobiological implications.Rich2 of 2 people found the following review helpful. Another step in the Copernican revolutionBy James D. MacAllisterDenis Noble has written a profoundly important book for the biological sciences. For 70 years, evolutionary biology has been beguilded by assertions about mistakes and molecules. Random mutations to the genes were believed to be the drivers of evolution even if the odds of that being the case are exceedingly long. Noble points out that when physicists invaded biology in the 1940s and 1950's, they forgot the most important concept from physics, relativity. Evolutionary biology has steadfastly resisted the application of relativity even as discoveries have shown the Modern Synthesis and the gene-determinist view (popularized by Richard Dawkins in The Selfish Gene and other works) are no longer sufficient or inclusive of mechanisms, such as natural genetic engineering (NGE), symbiogenesis, hybridization, gene/genome duplication, and horizontal gene/genome transfer, which actually drive evolution. Noble's book is another step in the Copernican revolution and a must read for any practicing biologist, biology teacher or biology student.

In this thought-provoking book, Denis Noble formulates the theory of biological relativity, emphasising that living organisms operate at multiple levels of complexity and must therefore be analysed from a multi-scale, relativistic perspective. Noble explains that all biological processes operate by means of molecular, cellular and organismal networks. The interactive nature of these fundamental processes is at the core of biological relativity and, as such, challenges simplified molecular reductionism. Noble shows that such an integrative view emerges as the necessary consequence of the rigorous application of mathematics to biology. Drawing on his pioneering work in the mathematical physics of biology, he shows that what emerges is a deeply humane picture of the role of the organism in constraining its chemistry, including its genes, to serve the organism as a whole, especially in the interaction with its social environment. This humanistic, holistic approach challenges the common gene-centred view held by many in modern biology and culture.

'Among its many merits, this remarkable book deserves to become a classic text in the philosophy of science. Almost alone among philosophers of science, Noble is a practising scientist; and unusually among practising scientists, he is an accomplished philosopher. His book brings out, with unparalleled clarity, how the scientific endeavour involves not only empirical inquiry but also conceptual structure. Noble shows how, on the negative side, popular presentations of sound biological results may be vitiated by bad metaphysics, and how, on the positive side, science and philosophy may extend the boundaries of knowledge by a unified epistemology. He ends, however, with a salutary warning that there may well be a limit to the human capacity to know the answers to ultimate questions.' Sir Anthony Kenny, University of Oxford'I think this a marvellous book. Denis Noble emphasises that genes, organs and systems dance to the tune of the organism its social and physical environment. He sets the relativity of biology in a remarkable scientific sweep, ranging from cosmology to human belief systems. He reminds me of another great biologist, C.H. Waddington, to whom Noble pays handsome tribute. Writing with clarity and charm, Noble attempts to break down silos of knowledge inhabited by scientists who fail to come out and engage with others. Self-serving priesthoods have never been attractive. Broadening minds in an era of intense specialisation is more important than ever. Noble deserves to be successful in his desire to do just that and I hope that he will be.' Sir Patrick Bateson, University of Cambridge'In my view Dance to The Tune of Life is a 'must read'. In it Denis Noble lucidly deconstructs how and why reductionism came to prominence in biology and led to the current state of molecular Humpty-Dumptyism. His central idea that there is no privileged level of causation is the first conceptual step to putting Humpty Dumpty back together again.' Michael J. Joyner, Mayo Clinic, Minnesota'Denis Noble is renowned for his mission to reintegrate the physiological sciences with mainstream biology, including evolutionary theory. His new book combines clear exposition of basic principles with many valuable examples. He gives the reader, general or expert, a completely new view of life.' Yung E Earm, Seoul National University, South Korea'Dance to the Tune of Life is one of the most fascinating and impressive books I have ever read. Denis Noble, a world-renowned physiologist and systems biologist, has revolutionized our traditional notion of the nature of life. The title Dance to the Tune of Life mirrors the essence of the argument of the book. The life emerges from numerous biological processes at different scales and levels. Such actors and actresses, stage properties, and stage are not separately present they act together in harmony, dancing to a tune with a music performed by an orchestra, an organism. By describing his research experiences and achievements on the cardiac rhythm evolutionary biology, medicine, and philosophy, Denis has not only provided us with very modern knowledge of the biological reactions and their network but also described to us the nature of life. I believe that this book impacts everyone involved in biomedicine.' Yoshihisa Kurachi, Osaka University, Japan'Having demolished the 'Selfish Gene' fiction, Noble in this marvelous book moves both science and philosophy from an antiquated 'either/or' static model to an 'and' model. 'Dance' shows elegantly and brilliantly that from the miracle of the ancient symbiosis of mitochondrial bacterial remnants in human cells, through the rock-solid interrelationship between genes and the feedback from the environment in all senses - from the core phenomenon of functional epigenetics, to the universe itself and our place in it - that we are, at heart, inter-beings, co-arising.' Samuel Shem, New York University'Denis Noble is a pioneer in understanding human physiology through quantitative studies linking behaviour across multiple scales of biological organization - from proteins to cells, tissues, organs and organ systems. These studies have led him to characterize biological function in terms of a Principle of Biological Relativity: there is no privileged level of causation in biology, because living organisms are multilevel open stochastic systems in which the behaviour at any level depends on higher and lower levels, and so cannot be fully understood in isolation. This engaging book defends this view in depth, and thereby also provides strong support for an extended synthesis of evolutionary theory that goes beyond the Modern Synthesis of Neo-Darwinism. It is highly recommended as a thoughtful study of the kind of complexity real living organisms display.' George Ellis FRS, University of Cape Town, South Africa'In this elegantly written and personal book world-renowned physiologist and systems biologist Denis Noble effectively argues for a fundamental revision of the theory of evolution. Against the reductionist, gene-centered approach of Neo-Darwinism, which has dominated biology for more than a century, Noble passionately pleas for a more integrated approach. Massively supported by recent postgenomic and epigenetic empirical research, Dance to the Tune of Life deepens and synthesizes ideas Noble earlier developed in The Music of Life. Biology beyond the Genome(2006) and subsequent writings. Just like Newtonian physics underwent a major transformation in the beginning of the 20th century due to Einstein's general theory of relativity, the life sciences are facing a no less fundamental transformation. Noble's book is a must read for anyone who wants to understand this transformation.' Jos de Mul, Erasmus University Rotterdam, NetherlandsAbout the AuthorDenis Noble, CBE, FRS, is Emeritus Professor of Cardiovascular Physiology and Director of Computational Physiology at the University of Oxford. He is one of the founders of the field of systems biology and is the current President of the International Union of Physiological Sciences (IUPS).