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Book Review

Review of "Quantum Mechanics and Avant-Garde Music: Shadows of the Void"

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Abstract: This is a review of Rakhat-Bi Abdyssagin's book "Quantum Mechanics and Avant-Garde Music. Shadows of the Void" (Springer, 2024).

Keywords: Quantum Mechanics; Avant-Garde Music

The author of this book is a virtuoso performer, a highly original composer, has an unrivalled command of the history of physics, mathematics and music and, above all, an unusually fluent command of how these apparently different fields of human endeavour have interacted. Anyone who has been privileged to hear him perform and explain his music will attest to what I have just written. He is at home playing the famous pianos of the great German and Russian physicists and musicians as he is in documenting their personal lives and the schools of thought and action they have created.

This book is therefore a testament to the ways in which seemingly different fields of human endeavour have metaphorically strongly influenced each other. In doing so, they have depended on the fact that many of the great practitioners of physics have also been concert-level performers of music. I would go so far as to say that the cultural interactions, that Abdyssagin documents so well, have been as much dependent on the polymaths who were responsible for the successive revolutions in physics and music, as on any natural metaphorical correlations.

The way to test this idea is to compare the histories of the interactions between physics and music with the contrasting situation in my own home ground of biology. In physics there is a clear set of historical correlations with the history of music. The revolutions in physics that produced the theories of relativity and quantum mechanics at the turn of the 19th into the 20th century coincide with the ending of the great periods of classical and romantic music, giving way to the Avant-Garde, with its abandonment of determinate forms mirroring the stochasticity inherent in quantum mechanics.

How does this compare with what has happened in Biology? The answer is that the trajectory in biology has been in precisely the opposite direction! Biology in the twentieth century became

classically determinate at the same time as physics underwent its revolutions away from classical Newtonian and Cartesian determinism. Even more surprising, this hardening of the fundamentals of 20th century gene-centric biology was inspired by great physicists and chemists who entered the field of biology: Erwin Schrödinger, James Watson and Francis Crick.

Schrödinger made the first incorrect move in 1942 when he gave his series of lectures on "What is Life?" at the Dublin Institute of Advanced Studies. He specifically compared physics with biology. Physics is the creation of order from disorder through the equations of thermodynamics. Biology, by contrast, he claimed, must be the creation of order in the living organism from a rigid order at the molecular level. That molecular order, he argued, must arise from whatever forms the genetic inheritable material. His model was the way in which scientists like Dorothy Hodgkin were successfully determining the three-dimensional structures of complex molecules, like cholesterol, insulin and proteins by creating their crystalline form to enable those structures to be unravelled using X-ray crystallography. He concluded that the genetic material must replicate itself like a crystal does.

This move by Schrödinger laid the ground for the work of Watson and Crick, with Wilkins and Franklin, showing that DNA can exist as a double helical crystal form. Since the nucleotides attract each other as pairs, it would be sufficient for the helices to unravel for the nucleotide pairs to attract each other, so naturally capable of forming two new double helical structures. Then, in 1958, Crick went a stage further in formulating what he called the Central Dogma of Molecular Biology claiming that, from the determinate sequence of DNA, proteins would also have a determinate structure. The way was open for Richard Dawkins in 1976 to encapsulate this counter revolution in molecular biology by writing *The Selfish Gene*.

What this brief history of biology shows is that Abdyssagin's brilliantly-told story may depend strongly on the inter-weaving of physics and music together in the lives of the great polymaths he rightly admires. I would say that they were all excellent philosophers, thinking deeply about the foundations of physics and music. It is no coincidence that, by contrast, Watson, Crick and Dawkins all proudly claim that they "are not philosophers".

In that remark, they are more correct than they intended since the mistakes require an understanding of the fundamental philosophical difference between association and causation. With even a modest understanding of the differences between active (mechanistic) causation and causation by form, those mistakes could have been avoided and the fundamentals of biology would have avoided what I call the gene-centric impasse.

Elsewhere, I have therefore argued that all three must be wrong on the biology. There is no way in which biology can be free of the indeterminate nature of the world revealed by the twentieth century revolutions in physics. It is the biology of the last 60 years that is incorrect, not the physics. (Noble & Noble, 2025, *Evolutionary Biology*, https://doi.org/10.1007/s11692-025-09651-0 ; Noble 2025 *The Pacemaker channels of the heart, from reductionism to systems biology*. World Scientific Press, in press).

The subtitle of Abdyssagin's book is "Shadows of the Void" and his work is at its best when he shows that the void in music, silence, is not empty: "The Void is not nothing: it is less than nothing but more than everything. The Void, or 'what does not exist', is more important than

what exists, because 'what does not exist' allows the existence of what exists." (p 6 and p 201). This insight applies well to all music, indeed to all the performing arts. The ability to use pauses and pregnant silence is key to all human performance. It is one of the criteria that we may, even unthinkingly, use when we immediately detect that AI is not the same as human intelligence. But nowhere is this use of silence more evident than in Avant-Garde music. The pauses in Abdyssagin's own compositions, such as *Ombre del Vuoto* (meaning Shadows of the Void), illustrate this perfectly. Deservedly, a whole chapter (16) is devoted to this work. The underlying void is a 9 tone superchord that is conspicuous by its absence in the score, while nevertheless being what "rules everything that 'exists' in the score." (p 204).

I finish this review with a relevant reflection based on my own musical experience in creating and performing with my group *The Oxford Trobadors* (www.oxfordtrobadors.com). We perform both the medieval Troubadours such as Arnaut Daniel and Jaufre Rudel, and their modern equivalents in the troubadour language, Occitan. All the scores we have inherited today for around 250 of the 2500 surviving poems from the medieval troubadour period are written in neumes, with no indication of keys or timings. This is liberating. We give shape to their music by letting the words themselves, their meanings, forms, and the natural pauses of spoken language, determine the rhythms and pauses of the musical performance. Abdyssagin recognises this in his assessment of Webern who, he writes, "through the prism of medieval polyphonic systems developed new structural dimensions within the twelve-tone system." (p 20)

A highly-recommended book by a brilliant author, composer and writer.

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