

UNDERSTANDING LIVING SYSTEMS

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Quotes relevant to the Modern Synthesis

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The Modern Synthesis led to the view that organisms are passive living systems, which experience environmental changes but play no active role in the process of evolution. On the contrary, we show that organisms are active agents in evolution. This book also addresses another fundamental misconception: that DNA is a 'secret code' or set of instructions to the organisms. Furthermore, the evolution of species has involved major rearrangements of the genome, not just small random mutations. Natural selection is also an active process performed by organisms, not a passive one. Most of what we do does not involve genes directly, and that is particularly true of our behaviour. We do not have a gene for selfishness, and if we did, we would also have a gene for altruism; but these behaviours are more complex than can be explained by a gene hypothesis. Genes are not directly engaged in our behaviours. The only way we have been able to understand genes in relation to function, health and wellbeing is through large-population association studies; that is, the relationship is probabilistic rather than determinate. We discuss why and how this restores agency to organisms.

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The Modern Synthesis

The concept of a gene as an independent hereditary unit was formulated as the Modern Synthesis of evolutionary biology in the 1930s and 1940s. This was not a Darwinian synthesis, since it specifically rejected some of Darwin's key ideas, including the inheritance of acquired characteristics, sexual selection and much else. The objective was to reduce Darwin's ideas to a narrow version of what he actually said. The only synthetic aspect was to incorporate Mendel's work. The assumption is that each gene is responsible for specific characters. It focuses on genes by assuming that characters are determined by genes. It formed the basis of what is now called population genetics, based on calculating the frequencies of ideally independent characters as genes.

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So why then does purpose or agency give modern biology a problem? The answer can be found in a fundamental misunderstanding of the role of genes in living organisms. As discussed in previous chapters, a prevalent view in modern science, often called the Modern Synthesis, would have us believe that genes are the answer to everything, and that our entire existence is devoted to their preservation. Anything else in our behaviour, thoughts, beliefs, hopes and wishes is superfluous, illusory, or driven by genes.

It will require creative ingenuity to shift the culture of biology away from the misunderstandings of the twentieth century. If we date the dogmatic hardening of the Modern Synthesis as 1970, then that misleading culture has embedded itself for half a century. We cannot suddenly recreate the pre-1970s culture when integrative functional biology experienced many golden periods of discovery. It will be for a new generation to discover and create their own culture fit for the challenges of the twenty-first century.