Understanding Living Systems Endorsements

This spirited, delightfully readable and accessible refutation of gene-centred biological orthodoxy offers a convincing account of living organisms as active agents and living systems, creatively shaping and responding and adapting to their environments. The authors propose that life resides in the purpose and creativity of the whole organism. Living organisms are not their genes nor are they determined by – or reducible to – their genes. Instead, genes are tools that the organism actively adapts to further the ends chosen by whole organism itself. Written for the non-specialist, while founded on decades of highly respected academic research, the authors' systems approach to our understanding of living organisms heralds a welcome return to common sense and an urgent resetting of our relationship to the natural world in the face of immanent environmental collapse.

Pauline Phemister, Professor of History of Philosophy, University of Edinburgh

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'Ray and Denis Noble have written a wonderful book [...]*Understanding Living Systems* is fundamental – for biology and medicine, and trying to overcome our current, self-induced environmental crisis. Why? Because their whole argument is based on general systems theory thinking – which they present in an entirely natural, didactic, almost anecdotal style, including a remarkable selection of examples, both real and in the form of thought experiments, to make a series of crucial points. Thereby, the Nobles debunk a series of pernicious myths about how living systems work and evolve, including the selfish gene metaphor, gene-centrism, 'nature red in tooth and claw'. Instead, they celebrate the creativity, synergy, intelligence and agency of living organisms in shaping their own evolution, and that of the endlessly changing, interactive biosphere. This book is a gift to the world – but we can only hope the world will listen. '

Dick Vane-Wright, Natural History Museum, London

Focusing on the purposive nature of living organisms, Noble and Noble present a powerful and informed view of biology based on current knowledge. They show, with many examples and clear explanations, how a gene-centered view of the world engendered profound misunderstandings about genetics, evolution and ecology, leading to many of the short-sighted and dangerous practices and ideas that underlie current ecological disasters and widespread existential despair. Against the cynical view of narrow self-interest as the engine of life, they describe an integrated and compassionate view of nature based on our best current understanding of biology. Beautifully written, the book can be appreciated and understood by the young generation of scientists, politicians, economists, sociologists and philosophers, who are facing the great challenge of acknowledging our misunderstandings, remedying our mistakes and reshaping our world.

Eva Jablonka, Professor Emeritus, Cohn Institute for the History and Philosophy of Science and Ideas, Tel Aviv University

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Understanding Living Systems is a remarkable achievement. Focusing on the complex *systems* of which DNA is merely one small part, Raymond Noble and Denis Noble convincingly argue that the active *agency* of living organisms plays a central role in both evolution and development. In this

wonderful book, the authors meticulously present a perspective that offers an understanding of life that touches on events at molecular levels, cultural levels, and all of the analytical levels in between. From their deep understanding of what actually happens inside the living cells that constitute our bodies, Raymond Noble and Denis Noble ascend to a great height, offering a breathtaking view of what it means to be an intelligent animal embedded in socio-cultural contexts, embodied within complex ecosystems, and animated by purpose.

David S. Moore, Professor of Psychology, Pitzer College and Claremont Graduate University, California

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'Takes the story of evolution from where Darwin left it, including his ideas on creative purpose, and acquired characteristics. By adding the control of chance by organisms, it makes Darwin's theories compatible with the freedom to choose. Elegantly and clearly written, at the hopeful core truth of our lives.'

Samuel Shem, Professor of Medical Humanities at NYU School of Medicine; author of *The House of God*, and *The Spirit of the Place*

'The Noble brothers have done an enormous service to biological understanding of evolution in this short book.'

Tony Trewavas FRS, Emeritus Professor, University of Edinburgh

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