

UNDERSTANDING LIVING SYSTEMS

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Quotes relevant to Agency and Values

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Organisms are no longer passive vehicles, but active parties in the process of evolution.

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Organisms become increasingly open to their interactions with other organisms, leading to the forms of learning and anticipation involved in active agency. Harnessing stochasticity forms the basis for organisms editing their genomes. Chance therefore is not just passively experienced by organisms, it is actively managed.

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Agency and purposeful action is a defining property of all living systems. Yet modern science has presented a reductionist, gene-centred view of life, where life is reduced to biochemistry, particularly DNA and proteins. It has even carved out its own areas of study – genomics and proteomics – as if these components can be understood in isolation from the organisms themselves. But they cannot. The gene-centric view of life creates a fundamental problem. If all action can be reduced to genes, or is controlled by them, then purposeful agency cannot exist. Indeed, it has been referred to as an illusion. At best, modern science gives this problem to philosophers, assuming that the answer does not lie in biology itself. This is a mistake. Casting the issue aside ignores the most creative aspect of living things: problem-solving and the agency of organisms.

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Without life, there would be no problems. The issues are the creation of life itself, and so also are the solutions. Life creates both the problems and the solutions. This is what gives agency to the processes of life.

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So how can a living organism constructed from the material of the universe have purposes? How can anything be intended? Philosophers and scientists have struggled with this problem for centuries. But it is the wrong question. Intention does not come from anywhere. It is definitively what living things (organisms) do. Furthermore, ideas generated at a cultural level (Figure 4.3) influence the purposeful state of living organisms.

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This is a transgenerational influence, passing from one generation to another. The very air that we breathe has been created by life before us. Yet science tends to give primacy to the individual living organisms – plants, animals, microorganisms, and humans in particular – as if the group is merely the sum of individual behaviour. But the behaviour of individuals is influenced by group dynamics and history.

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Gene-centrism Removes Agency

The gene-centric view separates the organism from its environment, and in large part, removes agency from the organism. The 'environment' becomes a box within which 'gene-motivated' organisms behave. Thus, it misleadingly partitions 'genetic' from 'environmental' causes, giving primacy to the former. Therefore, altruism is denied because 'in reality' organisms behave to enhance their genes in the 'gene pool' – and love, hate, desires and other motivations flow through and from genes. With this there can be no creativity. The organism is a prisoner of its genes. This is evidently nonsense because, if there is a prisoner, it must be the genes, locked in the organism and obeying its will. It is the organism as a self-organising entity that has motivation and uses genes in its capacity to act. The word 'organism' has its origins in defining organisms as self-organising beings, going back at least to Immanuel Kant's 1790 Critique of Judgment. The gene-centric view strips the organism of its definitive self.

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It is also a system on which we all depend, including humankind. We ignore this at our own peril. The very future of humans as a species depends on us acknowledging and understanding this relationship since we, as active thinking agents, have now become the biggest force driving evolution on earth. We decide what continues to exist. This now presents us with difficult choices. Which species do we protect, and what is the cost of that in relation to other species? What do we mean by an invasive species? In many parts of the world this has become a significant problem, particularly as the climate is changing. We need to understand and implement our own 'forest intelligence' as we urgently seek to save our environment from our own actions.

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The psychosocial level is unique. If there is a privileged level of causation, then it lies at the psychosocial level and not at the level of genes. This is the level at which wilful agency is initiated and organisms can be genuinely selfish or altruistic. In truth you cannot be selfish if you do not have the choice to be altruistic, which is why selfishness cannot be applied at a genetic level, neither metaphorically nor literally.

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We are not the only species with a sense of right and justice. It is present in other cooperative mammals. Recent studies show that wolves also have a sense of fairness, or at least of inequity.

Raising their pups, female wolves will teach obedience and good behaviour. Following social rules, wolves have a sense of order within the pack. These are not written in genes and must be learned. This explains how readily wolves may cooperate with humans, leading to the development of the domestic dog. Wolves cooperate in hunting, raising pups and defending their territory. Equity, or fairness, is essential in maintaining such cooperation. Withdrawal of cooperation may follow any unfairness. Bonding behaviour reinforces cooperation through the sense of wellbeing. Mutual grooming, licking and stroking elicits the release of hormones and neurotransmitters in the brain that reduces stress and enhances wellbeing. Stroking changes gene expression, which is also how our feelings control our genes. Such changes are inherited by later generations.

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A Sense of Fairness

This sense of justice is also seen in non-human primates: apes, monkeys and others. The psychosocial environment of members of a group in non-human primates has cultural complexity that profoundly influences behavioural development. Such cooperation doesn't involve an incident-by-incident 'what's in it for me' assessment. Nor is it hard-wired or genetic. It is socially developed and culturally maintained by cooperation and social cohesion, not self-interest. In this sense the regulation and constraint is not physical, it lies in the ideas about the world, which we may hold in common and develop with others.

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The gene-centric view is very much a product of seeing organisms as automata driven by their selfish genes, and that view has left a powerful imprint on our politics and our economics. It underpins the prevailing view of society as an aggregate of individual self-interested behaviour. The operation of markets has been built on this notion. It is also used to justify the iniquitous exploitation of others by a few. It has transformed the very nature of 'freedom' into the freedom to exploit. It is a strange notion of 'freedom' that is predicated on biogenic determinism. But this was and is a choice.

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In recent times, self-interest has been seen as the main driving force of behaviour and function in organisms. This is particularly evident in the concept of the selfish gene. However, as elaborated in this book, living systems strongly depend on cooperative behaviour, which is found everywhere in nature. All the way from millions of minute bacteria cooperating in the way they feed and grow, to massive whales talking with each other across oceans, organisms communicate with each other, and that communication is used as the glue of cooperation, even between distinct species. The idea of nature as 'red in tooth and claw' is at best a distorted perspective of the entirety of nature. However, in the grand scheme of things, both cooperation and competition are part of the story, and – whether wittingly or unwittingly – organisms form part of and interact with their ecosystems.

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Genes do not change the ever changing architecture of human life, nor do they set the colour chosen for our front doors. They do not choose the latest fashion or alter our language, and they certainly do not give us any moral compass.

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Theirs will be a generation that can try to recover from the damage to society that results from reductionist models of physiology and evolution that have metaphorically shaped ideas and models in fields as diverse as economics, sociology, philosophy, ethics, politics ... the list goes on because no aspect of today's society can have escaped dogmas like 'we are born selfish', 'they [genes] created us body and mind', 'it's in their DNA', and the myriad of other tropes of related types that we now use almost without thinking.

Those future generations will also need to rewrite the textbooks, not only because they see the virtue of 'let us therefore teach our children', but also because their politicians, economists, sociologists and philosophers will also need to find new strategies, in collaboration with biologists who can lead them out of the gene-centric impasse. It is arguably a challenge the scale of which human society has never faced before.

We wish them all well.