

## Further Reading

### 1. WHAT IS LIFE?

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### 2. ENTER THE DEMON

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#### 5. SPOOKY LIFE AND QUANTUM DEMONS

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# Notes

## 1. WHAT IS LIFE?

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## 5. SPOOKY LIFE AND QUANTUM DEMONS

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## 7. THE GHOST IN THE MACHINE

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## EPILOGUE

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6. Other commentators have suggested something similar. For example, Philip Ball writes, ‘If there’s a kind of physics behind biological teleology and agency, it has something to do with the same concept that seems to have become installed at the heart of fundamental physics itself: information.’ See ‘How life (and death) spring from disorder’, *Quanta*, 26 January 2017, p. 44.
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10. A start along these lines has been made in the following paper: Ivo Grosse et al., ‘Average mutual information of coding and noncoding DNA’, *Pacific Symposium on Biocomputing*, vol. 5, 611–20 (2000), where they write, ‘Here, we investigate if there exist species-independent statistical patterns that are different in coding and noncoding DNA. We introduce an information-theoretic quantity, the average mutual information (AMI), and we find that the probability distribution functions of the AMI are significantly different in coding and noncoding DNA.’
11. There is the even thornier question of where any laws ultimately come from, a topic that I tackled in *The Goldilocks Enigma* (2006).

12. Jacques Monod, *Chance and Necessity*, trans. A. Wainhouse (Vintage, 1971), p. 180.
13. Christian de Duve, *Vital Dust: The Origin and Evolution of Life on Earth* (Basic Books, 1995), p. 300.