

# CONTENTS

<b>1</b>	<b>NATURE'S DISSYMMETRY</b>	<b>1</b>
	The identification of energy	3
	The laws of thermodynamics	8
	Revolutions of dissymmetry	10
	The identification of the dissymmetry	14
<b>2</b>	<b>THE SIGNPOST OF CHANGE</b>	<b>23</b>
	The nature of heat and work	23
	The seeds of change	24
	Towards corruption	29
	Entropy	30
	Measuring the entropy	35
	The dissipation of quality	37
	Ceilings to efficiency	39
	The end of the external	42
<b>3</b>	<b>COLLAPSE INTO CHAOS</b>	<b>45</b>
	Inside energy	46
	Modeling the Universe	50
	Temperature	55
	The direction of natural change	57
	Natural processes	62
<b>4</b>	<b>THE ENUMERATION OF CHAOS</b>	<b>65</b>
	Boltzmann's Demon	66
	The Demon's cage	72
	Chaos, coherence, and corruption	75
<b>5</b>	<b>THE POTENCY OF CHAOS</b>	<b>81</b>
	Carnot under the microscope	82
	Stirling's engine	87
	Internal combustion	94
	Turbine power	102
	Towards coherence	105
<b>6</b>	<b>TRANSFORMATIONS OF CHAOS</b>	<b>107</b>
	Chemical transformations	108
	Iron burning	111
	Cooling as heating	114
	The rate of dispersal	121
	Chaos and order	124

<b>7</b>	<b>POWERS OF TEMPERATURE</b>	<b>127</b>
	Normal life	129
	Catching cold	130
	The first power down	137
	The second power down	139
	Lower powers down	142
	Powers hotter	147
	Hotter than infinity	149
	Toward life	155
<b>8</b>	<b>CONSTRUCTIVE CHAOS</b>	<b>157</b>
	The emergence of intricate form	157
	Proteins	160
	Free energy	165
	The unnatural reactions of life	172
	The electrochemistry of life	175
<b>9</b>	<b>PATTERNS OF CHAOS</b>	<b>179</b>
	Structure	179
	Dissipative structures	183
	The emergence of complexity	189
	The apotheosis of the steam engine	198
	<b>APPENDIX 1: UNITS</b>	<b>201</b>
	<b>APPENDIX 2: FORMALITIES</b>	<b>203</b>
	Thermodynamics	203
	Temperature	207
	<b>SOME SOURCES FOR FURTHER READING</b>	<b>208</b>
	<b>SOURCES OF ILLUSTRATIONS</b>	<b>210</b>
	<b>INDEX</b>	<b>211</b>