CONTENTS

1.	Science for good and science for bad		
	1.1	A horrible discovery	1
	1.2	The ethical dilemma of hiding research findings	2
	1.3	Some real-world examples	3
	1.4	The need for informed research policy	4
	1.5	A hopeless task?	9
	1.6	Preview	11
2.	Our planet and its biosphere		
	2.1	A note to the reader	14
	2.2	Dramatic changes in past climate	14
	2.3	Greenhouse warming	16
	2.4	Milankovitch cycles	19
	2.5	The role of carbon dioxide	21
	2.6	The need for action	25
	2.7	A geoengineering proposal: sulfur in the stratosphere	26
	2.8	Other forms of geoengineering	29
	2.9	No miracle solution	31
	2.10	Searching for solutions further outside the box	33
3.	Engineering better humans?		38
	3.1	Human enhancement	38
	3.2	Human dignity	44
	3.3	The wisdom of repugnance?	49
	3.4	Morphological freedom and the risk of arms races	51
	3.5	Genetic engineering	57
	3.6	Brain-machine interfaces	59
	3.7	Longer lives	64
	3.8	Uploading: philosophical issues	66
	3.9	Uploading: practical issues	75
	3.10	Cryonics	81
4.	Computer revolution		85
	4.1	Cantor	85
	4.2	Turing	90

viii | CONTENTS

	4.3	Computer revolution up to now	95
	4.4	Will robots take our jobs?	98
	4.5	Intelligence explosion	101
	4.6	The goals of a superintelligent machine	113
	4.7	Searle's objection	123
5.	Going nano		
	5.1	3D printing	127
	5.2	Atomically precise manufacturing	129
	5.3	Nanobots in our bodies	133
	5.4	Grey goo and other dangers	134
6.	What is science?		
	6.1	Bacon	140
	6.2	Are all ravens black?	143
	6.3	Popper	146
	6.4	A balanced view of Popperian falsificationism	150
	6.5	Is the study of a future intelligence explosion scientific?	151
	6.6	Statistical significance	154
	6.7	Decision-makers need probabilities	161
	6.8	Bayesian statistics	163
	6.9	Is consistent Bayesianism possible?	165
	6.10	Science and engineering	168
7.	The fallacious Doomsday Argument		
	7.1	The Doomsday Argument: basic version	171
	7.2	Why the basic version is wrong	173
	7.3	Frequentist version	174
	7.4	Bayesian version	176
8.	Doomsday nevertheless?		183
	8.1	Classifying and estimating concrete hazards: some difficulties	183
	8.2	Risks from nature	188
	8.3	Risks from human action	193
	8.4	How badly in trouble are we?	201
9.	Space colonization and the Fermi Paradox		
	9.1	The Fermi Paradox	203
	9.2	The Great Filter	206
	9.3	Colonizing the universe	215
	9.4	Dysonian SETI	221
	9.5	Shouting at the cosmos	223
10.	. What do we want and what should we do?		
	10.1	Facts and values	226
	10.2	Discounting	230

		CONTENTS ix
10.3	Existential risk prevention as global priority?	237
10.4	I am not advocating Pascal's Wager	240
10.5	What to do?	245
References		251
Index		275