

Contents

1	Four Selected Accident Events	1
1.1	The Concept of Risk	1
1.2	The Sorcerer's Apprentice	2
1.3	Dealing with Knowledge	5
1.4	Chernobyl (26 April 1986; Explosion of Reactor 4)	5
1.5	Fukushima Daiichi (11 March 2011, Destruction of Several Power Plant Units)	8
1.6	Explosion of the Deepwater Horizon Oil Rig (20 April 2010)	9
1.7	Summary of the Four Events	11
	References	14
2	Cause-Effect Structure and Intentional Structure	15
2.1	Introduction to the Question of Directing	15
2.2	Fundamentals of the Cause-Effect Structure	16
2.3	Fundamentals of the Intentional Structure	23
2.4	Establishing a Heuristic for the Cause-Effect Structure	31
2.5	Establishing a Heuristic for the Intentional Structure	32
2.6	Application of the Heuristics Found	35
2.6.1	Application of the Heuristic for the Cause-Effect Structure	35
2.7	Causal Chains for the Presented Individual Events	46
2.7.1	The Ballad "The Sorcerer's Apprentice"	46
2.7.2	Chernobyl (26 April 1986; Explosion of Reactor 4)	50
2.7.3	Fukushima Daiichi (11 March 2011, Destruction of Several Power Plant Units)	55
2.7.4	Explosion of the Deepwater Horizon Oil Rig (20 April 2010)	60
2.8	Condensation of Individual Events	63
2.8.1	Cause-Effect Structure	64
2.8.2	Intentional Structure	66
2.9	Merging Cause-Effect Structure and Intentional Structure	68
2.10	Gaps in Knowledge	83
2.11	Conclusion	85
	References	87

3	Spatiotemporal Structure	89
3.1	Perception of the Spatiotemporal Structure	89
3.2	Spatiotemporal Structure of Physics	92
3.3	Being and Becoming, a Dynamic Approach	99
3.4	Spatiotemporal Structure in Consciousness	105
3.5	Consciousness and Intentionality	109
3.6	Spatiotemporal Gaps in Knowledge	117
3.7	Selected Behavioural Aspects	120
3.8	Spatiotemporal Relationship Framework for the Three Individual Events	129
3.8.1	Chernobyl	131
3.8.2	Fukushima Daiichi	132
3.8.3	Deepwater Horizon	133
3.8.4	US Airways Flight 1549	133
3.9	Our World View	134
	References	135
4	Evaluation and Outlook	139
4.1	Natural Sciences and Humanities in Conflict	139
4.2	Explanations Through the Cause-Effect Structure	142
4.3	Explanations Through the Spatiotemporal Structure	144
4.4	Explanations Through the Intentional Structure	146
4.5	Resolution of the Conflict Between the Natural Sciences and the Humanities	148
4.6	Decide	152
4.6.1	Chernobyl	158
4.6.2	Fukushima Daiichi	159
4.6.3	Deepwater Horizon	160
4.7	The Very Smallest	163
4.7.1	Corporate Culture	163
4.7.2	Decision Premises	166
4.7.3	Decision-Making Processes	167
4.7.4	Dynamics of Decision-Making	172
4.8	The Very Largest	176
4.9	Energy Development of Society	184
4.10	Our Expanded World View	190
4.11	Safety Research	193
4.12	Summary	195
	References	197
	Index	199