

Cambridge University Press

978-0-521-34680-1 - An Introduction to Science Studies: The Philosophical and Social Aspects of Science and Technology

John Ziman

Table of Contents

[More information](#)

# Contents

	<i>Preface</i>	ix
1	'Academic' science	1
	1.1 Different aspects of science	1
	1.2 The chain of discovery	2
	1.3 'Internal' and 'external' sociologies of science	3
	1.4 Three dimensions of 'academic' science	6
	1.5 Academic science as 'public knowledge'	9
2	Research	13
	2.1 Scientific knowledge	13
	2.2 Description	14
	2.3 Generality	15
	2.4 Patterns of fact	16
	2.5 Investigation	18
	2.6 Instrumentation	19
	2.7 Measurement	20
	2.8 Experiment	22
	2.9 Scientific laws	23
	2.10 Explanation	24
	2.11 Cause and effect	25
	2.12 Models	26
	2.13 Theory	28
	2.14 Hypotheses	29
	2.15 Problem-solving and the growth of knowledge	31
3	Validity	34
	3.1 Epistemology	34
	3.2 Empiricism	35
	3.3 Phenomena and sense-data	37

Cambridge University Press

978-0-521-34680-1 - An Introduction to Science Studies: The Philosophical and Social Aspects of Science and Technology

John Ziman

Table of Contents

[More information](#)

vi	<i>Contents</i>	
	3.4 The problem of induction	40
	3.5 Inference	41
	3.6 Prediction	43
	3.7 The hypothetico-deductive method	46
	3.8 Established knowledge	48
	3.9 Does science describe reality?	52
	3.10 Regulative principles of scientific work	55
4	Communication	58
	4.1 The archival literature of science	58
	4.2 Linkage by citation	60
	4.3 What does a scientific paper say?	61
	4.4 How do scientific papers get published?	62
	4.5 Selection by peer review	64
	4.6 The accreditation process	65
	4.7 'Informal' communication between scientists	67
5	Authority	70
	5.1 Recognition	70
	5.2 Exchange of gifts – or competition?	72
	5.3 Specialization	74
	5.4 Invisible colleges	75
	5.5 Stratification	76
	5.6 Functions and dysfunctions of authority	78
6	Rules and norms	81
	6.1 Behaving as a scientist	81
	6.2 The Mertonian norms	84
	6.3 An ethos of academic science	86
	6.4 Does academic science have an ideology?	87
7	Change	91
	7.1 Cognitive change	91
	7.2 Institutional change	93
	7.3 Change by revolution	94
	7.4 The historical structure of scientific revolutions	96
	7.5 The sociodynamics of scientific life	99
8	The sociology of scientific knowledge	102
	8.1 Science and the sociology of knowledge	102
	8.2 Epistemological relativism	103
	8.3 The 'strong programme' in the sociology of knowledge	105

Cambridge University Press

978-0-521-34680-1 - An Introduction to Science Studies: The Philosophical and Social Aspects of Science and Technology

John Ziman

Table of Contents

[More information](#)

	<i>Contents</i>	vii
	8.4 Science as a social enterprise	106
	8.5 Establishing a consensus	108
	8.6 Sociological epistemology	109
9	Science and technology	112
	9.1 Science as an instrument	112
	9.2 Science-based technology	113
	9.3 Technology-based sciences	114
	9.4 Scientific technique	114
	9.5 Science <i>or</i> technology	115
	9.6 Science <i>from</i> technology?	116
	9.7 'S & T'	118
10	Pure and applied science	121
	10.1 'R & D' in 'S & T'	121
	10.2 Growth	123
	10.3 Amateurism and state patronage	123
	10.4 The rise of academic science	124
	10.5 The external relations of academic science	126
	10.6 Industrial science	127
	10.7 Pure science – and its applications	129
11	Collectivized science	132
	11.1 Societal demand	132
	11.2 Apparatus	134
	11.3 Sophistication and aggregation	136
	11.4 Collaboration	137
	11.5 The collectivization of science	138
12	R & D organizations	140
	12.1 Science as an instrument of policy	140
	12.2 The spectrum of relevance	141
	12.3 The philosophy and methods of R & D	143
	12.4 The management of R & D	144
	12.5 The internal sociology of collectivized science	145
13	The economics of research	149
	13.1 Costing the benefits	149
	13.2 Macroeconomics of R & D	150
	13.3 The sources of invention	152
	13.4 The microeconomics of research	154
	13.5 Economic incentives for R & D	156

Cambridge University Press

978-0-521-34680-1 - An Introduction to Science Studies: The Philosophical and Social Aspects of Science and Technology

John Ziman

Table of Contents

[More information](#)

viii	<i>Contents</i>	
14	Science and the State	159
	14.1 Government support for science	159
	14.2 The politics of science	160
	14.3 Criteria for choice	161
	14.4 The dilemma of patronage	164
	14.5 The limits of control	166
	14.6 Science in government	169
15	The scientist in society	173
	15.1 Towards a social psychology of science	173
	15.2 The scientist as intellectual entrepreneur	174
	15.3 Citizen of the republic of science	176
	15.4 The scientist as technical worker	177
	15.5 The scientist as expert	178
	15.6 Social responsibility in science	180
16	Science as a cultural resource	183
	16.1 Beyond the instrumental mode	183
	16.2 Public understanding of science	184
	16.3 Folk science, pseudo-science and parascience	185
	16.4 Academic scientism	187
	16.5 Science and values	190
	16.6 The value of science	192
	<i>Index</i>	195