

Contents

Part I: Mathematical Foundations

1	From Logic to Mathematical Logic	3
1.1	Revival of Study of Logic in Britain	4
1.2	Elements of Logic by Whately	6
1.3	Ten Rules of Philosophizing by Herschel	14
1.4	Inductive Science by Whewell	18
1.5	Mill and a System of Logic	25
2	Boolean Logic	35
2.1	Formal Logic by De Morgan	38
2.2	Work on Logic by Boole	46
2.3	Mathematical Analysis of Logic	47
2.4	The Calculus of Logic	51
2.5	The Laws of Thought	53
2.6	Boolean Algebra	64
2.7	Work on Logic by Jevons	66
2.8	Jevons and Boole	71
2.9	Mechanization of Boolean Logic	72
2.10	Contributions of P.S. Poreckij	84
3	Algebra of Logic	87
3.1	Algebra of Logic by Schröder	91
3.2	Contributions by Ch. S. Peirce	106
3.3	Venn Diagrams	110
4	Boolean Algebra – A Mathematical Subject	111
4.1	Axiomatization by Huntington	114
4.2	Boolean Algebra – A Strong Mathematical Subject	117

Part II: Switching Theory

5	Application of Algebra of Logic in Engineering	121
5.1	Remarks and Ideas by P. Ehrnfest	124
6	Switching Theory – From Art and Skills to Scientific Methods	129
6.1	Switching Theory from Boolean Algebra	132
6.2	Review of the Work by Shannon	137
6.3	Review by Baylis	139
7	Switching Theory in USSR	141
7.1	Pioneering Work by Šhestakov	144
7.2	Contributions by Other Researchers	149
8	Switching Theory in Japan	153
8.1	Akira Nakashima	156
8.2	Nakashima and Hanzawa	163
8.3	Continuation of Research	166
9	Switching Theory in Europe	167
9.1	Johanna Piesch	170
9.2	Vienna School in Switching	174
10	Postscript	183
10.1	Switching Theory	183
10.1.1	Boolean Algebra	184
10.2	Algebra of Logic	185
10.2.1	Work by G.J. Boole	185
10.2.2	Work by Platon S. Poreckij	187
10.3	Applications of Boolean Algebra	188
10.3.1	First Applications of Algebra of Logic in Circuit Design	188
10.3.2	Work by V.I. Šestakov	188
10.3.3	Work by C.E. Shannon	189
10.3.4	Work by A. Nakashima	191
10.3.5	Work by J. Piesch	193
	References in the Postscript	195
	List of Illustrations	207