

Contents

<i>List of Contributors</i>	<i>page</i> xi
<i>Foreword</i> Anne L’Huillier	xv
Introduction	1
PATRICK CHARBONNEAU, MICHELLE FRANK, MARGRIET VAN DER HEIJDEN, AND DANIELA MONALDI	
Over a Century of Quantum Physics	1
Women in the History of Quantum Physics	5
Emerging Themes	7
Epilogue	14
1 The Spectrum of He ⁺ as a Proving Ground for Bohr’s Model of the Atom: A Legacy of Williamina Fleming’s Astrophysical Discovery	19
MARIA MCEACHERN AND BRETISLAV FRIEDRICH	
1.1 Prologue	19
1.2 The Protagonists	20
1.3 Stellar Spectroscopy at the Harvard College Observatory	29
1.4 Discovery of the Peculiar Spectrum of ζ Puppis	42
1.5 The Spectrum of He ⁺ as a Proving Ground for Bohr’s Model of the Atom	46
1.6 Epilogue	49
2 H. Johanna van Leeuwen, the Other Scientist behind the Bohr-Van Leeuwen Theorem	56
MIRIAM BLAAUBOER AND MARGRIET VAN DER HEIJDEN	
2.1 Two Sisters in Leiden	56
2.2 Flourishing Physics in Leiden	58
	v

2.3	A Graduate Student of Hendrik Lorentz	60
2.4	First Steps	61
2.5	Magnetism as a Quantum Phenomenon	64
2.6	Scooped	67
2.7	Not One of the Boys; Not One of the Women	69
2.8	Assistant at the Technical College of Delft	72
2.9	Reader at Last	75
2.10	Last Years	77
3	Hertha Sponer, Maven of Quantum Spectroscopy	82
	ELISE CRULL	
3.1	Introduction	82
3.2	A Brief Biography of Sponer	83
3.3	First Vignette: Matter Is Wave-Like	88
3.4	Second Vignette: Bringing Quantum Physics to America	94
3.5	Third Vignette: Quantum Tunneling	95
3.6	Conclusion	97
4	Angular and Career Momentum: What Lucy Mensing Contributed to Physics and Why She Left the Field	102
	GERNOT MÜNSTER AND MICHEL JANSSEN	
4.1	Introduction	102
4.2	Student in Hamburg	104
4.3	Postdoc in Göttingen	108
4.4	Assistant in Tübingen	118
4.5	Married with Children in Munich, Königsberg, and Jena	132
4.6	Deportation to Gorodomlya and Return to Jena	138
5	Discouraging Jane: Dewey Among the Lucky Generation of US Physicists	149
	ADRIANA MINOR	
5.1	Introduction	149
5.2	Foundations of the Lucky Generation of US Physicists	151
5.3	The Early Twentieth Century World of Women in Education and Science	152
5.4	A US Woman Scientist in Copenhagen	156
5.5	Struggles for Priority and Recognition	159
5.6	A Quantum Physics Woman in the Professional World	163
5.7	Final Remarks	166

	<i>Contents</i>	vii
6	Laura Chalk and the Stark Effect	172
	DANIELA MONALDI	
6.1	Introduction	172
6.2	Laura Chalk	174
6.3	The Stark Effect, the Lo Surdo Technique, and Quantum Theory	176
6.4	J. Stuart Foster and the Stark Effect	178
6.5	Laura Chalk's Graduate Work	179
6.6	Postgraduate Experience	186
6.7	The <i>Experimentum Crucis</i> That Wasn't	189
6.8	Gender and Physics: Laura Chalk's Choices	190
6.9	Final Remarks: Laura Chalk Rowles and the Quantum Revolution	193
7	Elizabeth Monroe Boggs: From Quantum Chemistry to the Manhattan Project	198
	PATRICK CHARBONNEAU	
7.1	Introduction	198
7.2	Family Background	199
7.3	Bryn Mawr College and Emmy Noether (1931–1935)	200
7.4	Cambridge and John E. Lennard-Jones (1935–1939)	201
7.5	Cornell and John G. Kirkwood (1940–1942)	207
7.6	Explosives Research Laboratory and the Manhattan Project (1943–1945)	211
7.7	Conclusion	214
8	Excelsior! John Wheeler, Katharine Way, and the Role of Women in the Exploration of the Microcosm	223
	STEFANO FURLAN	
8.1	Introduction	223
8.2	Way, "Dear to the Community of Nuclear Physicists"	224
8.3	Way: On the Verge of Nuclear Fission?	230
8.4	Wheeler's Uses of the Past, Daring Conservatism, and the Role of "Heroines" in His Narratives	235
8.5	Conclusion	246
9	Sonja Ashauer from São Paulo to Cambridge: A Journey to Quantum Electrodynamics	250
	BARBRA MIGUELE AND IVÃ GURGEL	
9.1	Introduction	250
9.2	Ashauer's Early Life	251

viii	<i>Contents</i>	
	9.3 Training at FFCL-USP	253
	9.4 Life in Cambridge	261
	9.5 Ashauer’s Cambridge PhD	266
	9.6 Final Remarks	272
10	Untangling Entanglement History: Early Quantum Contributions of Chien-Shiung Wu	277
	MICHELLE FRANK	
	10.1 Introduction	277
	10.2 Formative Years	280
	10.3 Entangling Photons	284
	10.4 Entangled Timelines	287
	10.5 Parity Redux	294
	10.6 Critiquing Wu	297
	10.7 Recovering a Quantum Legacy	300
	10.8 Concluding Remarks: Connection and Perception	302
11	From Quantum Physics to Ethics: Grete Hermann on Heisenberg’s Cut	309
	ANDREA REICHENBERGER	
	11.1 Introduction	309
	11.2 Grete Hermann: A Biographical Sketch	310
	11.3 Grete Hermann on Johann von Neumann’s Proof	314
	11.4 Grete Hermann on Werner Heisenberg’s Cut	318
	11.5 Widening Perspectives	324
	11.6 Conclusion and Outlook	327
	11.7 Appendix: Contribution to the Third Zurich Dialogue, April 20, 1951	328
12	Women Take the Lead: A Physics Laboratory Under the Dictatorship in Portugal, 1940s–1960s	337
	ANA SIMÕES AND MARIA PAULA DIOGO	
	12.1 Introduction	337
	12.2 From a Male-Dominated Polytechnic School to a Female-Friendly Faculty of Sciences	338
	12.3 Fighting for Research: The Exemplary Case of the Laboratory of Physics	342
	12.4 Reorganizing Research: A New Leadership and an Unexpected Hub for Women	347
	12.5 Concluding Remarks	355

<i>Contents</i>		ix
13	Carolyn Parker's Electronic Frequencies	361
	CHARNELL CHASTEN LONG	
13.1	Introduction	361
13.2	A Note on Method	362
13.3	Raising a Scientist (1917–1933)	363
13.4	Entering the World of Physics at Fisk University (1934–1938)	365
13.5	From Teaching to Michigan and Back Again (1938–1942)	367
13.6	Applying Physics to Electrical Engineering (1943–1947)	370
13.7	Joining the Faculty at Fisk University (1947–1951)	372
13.8	Comparing Nuclear Data with Theoretical Values (1951–1953)	375
13.9	Remembering Carolyn Parker	377
14	The Chew–Low–Salzman Method and Freda Friedman Salzman: A Physicist Between Nuclear and Social Interactions	384
	JENS SALOMON	
14.1	Introduction	384
14.2	Biographical Notes	384
14.3	Coming to Terms with Nuclear Interactions	390
14.4	The Chew–Low–Salzman Method	396
14.5	Epilogue	398
15	Out of the Ivory Tower: Maria Lluïsa Canut and X-Ray Crystallography	402
	MARTA JORDI TALTAUVLL	
15.1	Introduction	402
15.2	Canut's Early Years: From Menorca to Barcelona (1924–1955)	403
15.3	The Context	405
15.4	Canut's Early Research in Barcelona	408
15.5	The Consolidation of a Research Program in Madrid	411
15.6	Working in the Ivory Tower at Southern Illinois University	415
15.7	Out of the Ivory Tower: Canut as a Feminist in the US	418
15.8	Final Remarks	423
16	Ana María Cetto Kramis: Light in Quantum Mechanics and Open Science	430
	MAR RIVERA COLOMER	
16.1	Introduction	430
16.2	Revisiting Oral History	430
16.3	Ana María Cetto Kramis: Her Beginnings	436

x	<i>Contents</i>	
	16.4 Collective and Dissident Quantum Mechanics?	441
	16.5 Darkness and Light in Open Science	447
	16.6 In Between Two Worlds. Regionality in Global Science	451
	16.7 Conclusions. All-In-One: International Year of Quantum Science and Technology	455
	<i>Index</i>	460