

# Contents

<b>Invited Contributions</b> .....	xxv
<b>Major Sources of Information and References</b> .....	xxvii

## Part 1

### Youth, Career, Personality, Legacy, Family and Fatal Accident

<b>1</b>	<b>Bengt Källén: The Childhood and Youth of Gunnar Källén</b> .....	<b>3</b>
<b>2</b>	<b>As a Young University Student</b> .....	<b>11</b>
<b>3</b>	<b>Two Men of Utmost Importance: Pauli and Gustafson</b> .....	<b>13</b>
<b>4</b>	<b>The Young Källén at “Pauli’s Court”</b> .....	<b>19</b>
<b>5</b>	<b>Introducing Himself</b> .....	<b>23</b>
<b>6</b>	<b>As a Staff Member of the Newborn CERN</b> .....	<b>25</b>
<b>7</b>	<b>Professorship at Lund University</b> .....	<b>29</b>
<b>8</b>	<b>Kind to Students Tough on Celebrities, Scientific Honesty and Sharp Tongue</b>	<b>35</b>
<b>9</b>	<b>A Trustworthy and Popular “Helpdesk”</b> .....	<b>39</b>

<b>10</b>	<b>Making Errors</b> .....	43
<b>11</b>	<b>Language, Literature, Music and Sports</b> .....	47
<b>12</b>	<b>Sense of Humor and on Committees</b> .....	51
<b>13</b>	<b>On Scientific Publications and Journals</b> .....	55
<b>14</b>	<b>On the 1965 Nobel Prize in Physics to Feynman, Schwinger and Tomonaga</b>	61
<b>15</b>	<b>Källén-Schwinger Clash of Personalities</b> .....	65
<b>16</b>	<b>Källén and Not Richard Feynman But His Diagrams</b> .....	69
<b>17</b>	<b>On the International Scene</b> .....	73
<b>18</b>	<b>Källén's Scientific Legacy</b> .....	77
<b>19</b>	<b>The "Handbook" Article</b> .....	81
<b>20</b>	<b>R. Stora: Källén's Constant M</b> .....	89
<b>21</b>	<b>Letter to K. Nishijima</b> .....	91
<b>22</b>	<b>Källén's Book: "Elementary Particle Physics"</b> .....	95
<b>23</b>	<b>More on His Book and How It Was Received</b> .....	99
<b>24</b>	<b>Källén Addresses the Student Union</b> .....	105
<b>25</b>	<b>As a Teacher and Supervisor</b> .....	107

<b>26</b>	<b>Young Scientists Supervised by Gunnar Källén</b> . . . . .	111
<b>27</b>	<b>Bengt E. Y. Svensson: Some Reminiscences of Gunnar Källén as Supervisor</b>	115
<b>28</b>	<b>Karl-Erik Eriksson: Some Reminiscences of Gunnar Källén’s Role in Sweden</b>	119
<b>29</b>	<b>Gunnel Källén</b> . . . . .	125
<b>30</b>	<b>Källén’s Last Conference, Vienna 1968</b> . . . . .	133
<b>31</b>	<b>Erland Källén: My Father’s Passion for Flying and His Mortal Accident</b> . . .	135
<b>32</b>	<b>The Future That Never Came</b> . . . . .	141
<b>33</b>	<b>Appendix I-A: More on the Källén and Pauli Collections</b> . . . . .	145
<b>34</b>	<b>Appendix I-B: A Brief Källén Chronology</b> . . . . .	147

## **Part 2**

### **Correspondence With Pauli, Heisenberg and Dirac; Källén in Action**

<b>35</b>	<b>A Brief Overview of Källén-Pauli Correspondence</b> . . . . .	151
<b>36</b>	<b>Källén’s and Pauli’s Views on the Status of Theoretical Physics</b> . . . . .	153
<b>37</b>	<b>Pauli on Källén’s Sharp Tongue and “Nasty Theorems”</b> . . . . .	157
<b>38</b>	<b>The Last Källén-Pauli Letters</b> . . . . .	159
<b>39</b>	<b>Wolfgang Pauli on His Friend and Collaborator Werner Heisenberg</b> . . . . .	161

<b>40</b>	<b>Correspondence With Heisenberg Through Pauli</b> .....	165
<b>41</b>	<b>On the Work by Heisenberg and Pauli – I</b> .....	169
<b>42</b>	<b>On the Work by Heisenberg and Pauli – II</b> .....	173
<b>43</b>	<b>On the Work by Heisenberg and Pauli – III</b> .....	177
<b>44</b>	<b>Correspondence With Paul Dirac – A Brief Introduction</b> .....	181
<b>45</b>	<b>Dirac-Källén Correspondence – The First Letters</b> .....	183
<b>46</b>	<b>Dirac-Källén Correspondence – The Second Letters</b> .....	195
<b>47</b>	<b>Dirac-Källén Correspondence – The Third Letters</b> .....	205
<b>48</b>	<b>Källén and Afaf Sabry</b> .....	211
<b>49</b>	<b>A. A. Sabry: How it Was to Work With Prof. G. Källén</b> .....	213
<b>50</b>	<b>Källén and John Toll</b> .....	215
<b>51</b>	<b>Källén and Arthur Wightman</b> .....	219
<b>52</b>	<b>At 1955 Moscow Meeting</b> .....	223
<b>53</b>	<b>The 1956 CERN Symposium</b> .....	227
<b>54</b>	<b>G. Källén: On the Mathematical Consistency of Quantum Electrodynamics</b>	231
<b>55</b>	<b>At Schladming Winter Schools – An Introduction</b> .....	243

**56** The 1965 Schladming School and J. D. Bjorken’s Recollections . . . . . 245

**57** The Schladming Schools 1966–68 . . . . . 249

**58** Talk at 1961 Solvay Conference . . . . . 255

**59** The Discussions After Källén’s Talk at the 1961 Solvay Conference . . . . . 261

## **Part 3**

### **Promotion of Science in His Honor**

**60** The Royal Physiographic Society in Lund and the Gunnar Källén Lectures . . 273

**61** Steven Weinberg: Living With Infinities . . . . . 279

**62** The Royal Swedish Academy of Sciences and Nobel Guest Professor . . . . . 293

**63** Källén and the Ettore Majorana Centre in Erice . . . . . 297

**64** The 1969 Lund Conference on Particle Physics . . . . . 303

**65** Christian Møller on Gunnar Källén . . . . . 305

**66** A. S. Wightman: Looking Back at Quantum Field Theory . . . . . 311

**67** On H. A. Kramers, Renormalization, and Nobel Prize . . . . . 317

**68** R. Friedberg and T. D. Lee: A Soluble Model of “Higgs boson”  
as a Composite . . . . . 323

# Part 4

## On Källén's Scientific Work

<b>69</b>	<b>A Brief Background to Källén's Scientific Publications</b> . . . . .	<b>339</b>
<b>70</b>	<b>Källén's Debut Article with Early Trace of Supersymmetry</b> . . . . .	<b>341</b>
<b>71</b>	<b>Källén-Yang-Feldman Formalism</b> . . . . .	<b>343</b>
<b>72</b>	<b>On the Renormalization Constants in Quantum Electrodynamics</b> . . . . .	<b>349</b>
<b>73</b>	<b>Källén in Schwinger's "Hall of Fame of Quantum Electrodynamics"</b> . . . . .	<b>353</b>
<b>74</b>	<b>Controversies, Letter to Phys. Rev. Lett. and Recollections of S. G. Gasiorowicz</b> . . . . .	<b>355</b>
<b>75</b>	<b>Letter to Gasiorowicz</b> . . . . .	<b>361</b>
<b>76</b>	<b>Källén's Rejected Rebuttal</b> . . . . .	<b>365</b>
<b>77</b>	<b>Why the Lee Model</b> . . . . .	<b>367</b>
<b>78</b>	<b>Källén-Pauli Correspondence on the Lee Model</b> . . . . .	<b>369</b>
<b>79</b>	<b>Early Work on Vertex Function and Rochester Conference 1957</b> . . . . .	<b>379</b>
<b>80</b>	<b>A. S. Wightman: Theoretical Physics at the IHÉS – Some Retrospective Remarks</b> . . . . .	<b>383</b>
<b>81</b>	<b>Pauli's Complaints about Källén's Work on the n-Point Functions</b> . . . . .	<b>389</b>

**82** Work on Radiative Corrections ..... 393

**83** Alberto Sirlin: Källén and Radiative Corrections ..... 399

**84** Love for Mathematics ..... 405

**85** G. Källén: A Connection Between Bergman-Weil and Cauchy Integral ... 413

## Part 5

### Publications, Selected Papers and Commentaries

**86** List of Publications ..... 429

**87** Paper [1949]: Higher Approximations in the external field for the Problem of Vacuum Polarization ..... 435

**88** Paper [1950b]: Mass and charge-renormalizations in quantum electrodynamics without the use of the interaction representation ..... 455

**89** Paper [1950f]: Formal Integration of the Equations of Quantum Theory in the Heisenberg Representation ..... 465

**90** Paper [1952a]: On the Definition of the Renormalization Constants in Quantum Electrodynamics ..... 509

**91** Paper [1953a]: Charge Renormalization and the Identity of Ward ..... 529

**92** Paper [1953c]: On the Magnitude of the Renormalization Constants in Quantum Electrodynamics ..... 537

**93** Paper [1955a]: Fourth Order Vacuum Polarization ..... 555

<b>94</b>	<b>Paper [1955b]: On the Mathematical Structure of T. D. Lee's Model of a Renormalizable Field Theory</b> .....	575
<b>95</b>	<b>Additional Commentaries</b> .....	601
<b>96</b>	<b>Commentaries on Papers from the Period 1950–1953</b> .....	603
<b>97</b>	<b>Commentaries on Papers from the Period 1954–1961</b> .....	611
<b>98</b>	<b>Commentaries on Papers from the Period 1962–1968</b> .....	619
	<b>Index</b> .....	625