This book provides a survey of the development of scientific disciplines and technical projects under National Socialism in Germany. Each contribution addresses a different, new aspect which is important for judging the interaction between science, technology and National Socialism. In particular, the personal conduct of individual scientists and engineers as well as the functionality of certain theories and projects are examined.

All essays share a common theme: continuity and discontinuity. All authors cover a period that reaches back to the Weimar Republic and forward beyond the end of National Socialism to the post-war period. This unanimity of approach provides answers to major questions about the nature of Hitler’s regime and about possible lines of continuity in science and technology which may transcend political upheaval. The book is also the most comprehensive to date on this subject, and includes essays on engineering, geography, biology, psychology, physics, mathematics and science policy. It thus offers something of interest for the specialist, scientist, engineer and historian as well as an unprecedented overview of science and technology before, during and after the Third Reich.
Science, Technology and National Socialism
Science, Technology and National Socialism

Edited by
Monika Renneberg
Assistant Professor in the Institute for the History of Science, Technology and Mathematics, University of Hamburg

and
Mark Walker
Assistant Professor of the Department of History, Union College, Schenectady
This book is dedicated to all those critical voices who have tried to illuminate this ambivalent chapter of history, but were unappreciated, ignored and discouraged.
Contents

List of illustrations .................................................. xi
List of contributors .................................................. xiii
Acknowledgements .................................................... xvi
List of abbreviations ................................................ xvii

1 Scientists, Engineers and National Socialism
MONIKA RENNEBERG and MARK WALKER ........................ 1

2 Keinerlei Untergang: German Armaments Engineers
during the Second World War and in the Service of the
Victorious Powers
ANDREAS HEINEMANN-GRÜDER .................................... 30

3 The Guided Missile and the Third Reich: Peenemünde
and the Forging of a Technological Revolution
MICHAEL J. NEUFELD .................................................. 51

4 Self-mobilization or Resistance? Aeronautical Research
and National Socialism
HELMUTH TRISCHLER .................................................. 72

5 Military Technology and National Socialist Ideology
ULRICH ALBRECHT ..................................................... 88

6 ‘Area Research’ and ‘Spatial Planning’ from the Weimar
Republic to the German Federal Republic: Creating a
Society with a Spatial Order under National Socialism
MECHTILD RÖSSLER ..................................................... 126

7 The Ideological Origins of Institutes at the Kaiser
Wilhelm Gesellschaft in National Socialist Germany
KRISTIE MACRAKIS .................................................... 139
<table>
<thead>
<tr>
<th>CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 Biological Research at Universities and Kaiser Wilhelm Institutes in Nazi Germany</td>
</tr>
<tr>
<td>UTE DEICHMANN and BENNO MÜLLER-HILL</td>
</tr>
<tr>
<td>9 Pedagogy, Professionalism and Politics: Biology Instruction during the Third Reich</td>
</tr>
<tr>
<td>SHEILA FAITH WEISS</td>
</tr>
<tr>
<td>10 The Whole and the Community: Scientific and Political Reasoning in the Holistic psychology of Felix Krueger</td>
</tr>
<tr>
<td>ULFRIED GEUTER</td>
</tr>
<tr>
<td>11 Pascual Jordan: Quantum Mechanics, Psychology, National Socialism</td>
</tr>
<tr>
<td>M. NORTON WISE</td>
</tr>
<tr>
<td>12 The Ideology of Early Particle Accelerators: An Association between Knowledge and Power</td>
</tr>
<tr>
<td>MARIA OSIETZKI</td>
</tr>
<tr>
<td>13 The ‘Minerva’ Project. The Accelerator Laboratory at the Kaiser Wilhelm Institute/Max Planck Institute of Chemistry: Continuity in Fundamental Research</td>
</tr>
<tr>
<td>BURGHARD WEISS</td>
</tr>
<tr>
<td>14 The Social System of Mathematics and National Socialism: A Survey</td>
</tr>
<tr>
<td>HERBERT MEHRTENS</td>
</tr>
<tr>
<td>15 The Problem of anti-Fascist Resistance of ‘Apolitical’ German Scholars</td>
</tr>
<tr>
<td>REINHARD SIEGMUND-SCHULTZE</td>
</tr>
<tr>
<td>16 Irresponsible Purity: The Political and Moral Structure of Mathematical Sciences in the National Socialist State</td>
</tr>
<tr>
<td>HERBERT MEHRTENS</td>
</tr>
<tr>
<td>Notes</td>
</tr>
<tr>
<td>Index</td>
</tr>
</tbody>
</table>
Illustrations

3.1 Rudolf Nebel with Willy Ley and Klaus Riedel at the Raketenflugplatz, April 1931  
3.2 Test stand I at Peenemünde  
3.3 The first successful A4 (V-2) is prepared for launch  
3.4 General Fellgiebel congratulates Colonel Leo Zanssen after the first successful launch  
3.5 An American soldier guards a captured and nearly completed A4  
3.6 Peenemünde engineers brought to the United States, 1946  
3.7 Gen. Holger Toftoy, Dr Ernst Stuhlinger, Hermann Oberth, Dr Wernher von Braun and Dr Robert Lusser at the US Army Redstone Arsenal, c. 1955  
5.1 German high-tech projects at the end of the war  
5.2 Intercontinental bomber project by Daimler-Benz, late 1944  
5.3 Jet fighter project by BMW. 1944  
5.4 High-tech at the end of the Third Reich  
5.5 German combat aircraft projects with pilot in prone position  
5.6 Arado AR E 381 mini-fighter, 1944  
5.7 Bids by German industry for the Emergency Fighter Programme, 1944  
5.8 Heinkel He 161 ‘Volksjäger’ (People’s Fighter)  
5.9 Wernher von Braun’s rocket plane, 1939  
5.10 ‘Vengeance weapon 1’, the V-1  
5.11 Bachem ‘Natter’ point defence fighter  
5.12 Submissions by German industry for the Emergency Fighter Programme, 1944
<table>
<thead>
<tr>
<th>Illustration</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.13</td>
<td>Unpowered combat glider, Blohm &amp; Voss BV40</td>
<td>121</td>
</tr>
<tr>
<td>5.14</td>
<td>Messerschmitt’s unpowered fighter Me 328</td>
<td>121</td>
</tr>
<tr>
<td>8.1</td>
<td>Funding of biologists by the DFG/RFR from 1930 to 1945</td>
<td>167</td>
</tr>
<tr>
<td>8.2</td>
<td>Relationship between membership in the NSDAP and funding by the DFG/RFR</td>
<td>168</td>
</tr>
<tr>
<td>8.3</td>
<td>Funding by DFG/RFR of biological research at KWIs in comparison to universities</td>
<td>169</td>
</tr>
<tr>
<td>8.4</td>
<td>Reichsmarshal Göring in the Kaiser Wilhelm Institute for Breeding Research, 1940</td>
<td>178</td>
</tr>
<tr>
<td>11.1</td>
<td>Vibrating string</td>
<td>230</td>
</tr>
<tr>
<td>11.2</td>
<td>Identity and spontaneity</td>
<td>231</td>
</tr>
<tr>
<td>13.1</td>
<td>Situation plan, KWI for Chemistry</td>
<td>277</td>
</tr>
<tr>
<td>13.2</td>
<td>Construction plan, KWI of Chemistry</td>
<td>278</td>
</tr>
<tr>
<td>13.3</td>
<td>(a) Neutron generator (cascade) part 1; (b) neutron generator (cascade), part 2</td>
<td>280–281</td>
</tr>
<tr>
<td>13.4</td>
<td>KWI of Chemistry after air raid</td>
<td>283</td>
</tr>
</tbody>
</table>
Contributors

Ulrich Albrecht is Professor of Peace and Conflict Studies at the Department of Political Science of the Free University of Berlin. He also holds a degree in aeronautical engineering. His recent books are The History of the Soviet Armaments Industry (1992) and Die Abwicklung der DDR (The Liquidation of the GDR: 1992).

Ute Deichmann teaches biology and chemistry at the Georg-Büchner-Gymnasium in Cologne. She has published Biologen unter Hitler - Vertreibung, Karrieren, Forschung (1992).


Kristie Macrakis is Assistant Professor of the History of Science at Michigan State University. She is the author of Surviving the Swastika: Scientific Research in Nazi Germany (New York: Oxford University Press, 1993).

List of Contributors


Michael J. Neufeld is a curator in the National Air and Space Museum, Smithsonian Institute. He is the author of The Skilled Metalworkers of Nuremberg (1989), The Rocket and the Reich (1994), as well as articles in German social history and history of technology.

Maria Osietzki, Ruhr-University Bochum, Germany, has published on the history of big science in nuclear research. She is coauthor of the book Wissenschaft für Macht und Markt. Her publications include articles about gender in the history of science and technology. She is preparing a book about the history of energy and entropy.

Monika Renneberg teaches at the Institute for the History of Science, Mathematics and Technology at the University of Hamburg. She is author of Gründung und Aufbau des GKSS-Forschungszentrums Geesthacht. Ein Beitrag zur Geschichte der Großforschungseinrichtungen in der BRD (Ph.D., 1989).

Mechtild Rössler is a programme specialist in the World Heritage Centre at UNESCO in Paris. She has written a number of articles on the history of geography and spatial planning in Germany, 1918–1945 and has published Wissenschaft und Lebensraum. Geographische Ostforschung im Nationalsozialismus (Berlin, Hamburg: Dietrich Reimer, Verlag, 1990).

Reinhard Siegmund-Schultze is currently Fellow of the Alexander von Humboldt Foundation and visiting scholar at Harvard University. His publications include papers on the history of mathematical ideas and on the social history of mathematics in Nazi Germany in particular, Mathematische Berichterstattung in Hitlerdeutschland (1993).

Helmuth Trischler is Director of Research at the Deutsches Museum, Munich, and Senior Lecturer at the University of Munich. His books include Luft- und Raumfahrtforschung in Deutschland 1900–1970. Politische Geschichte einer Wissenschaft (1992).

Mark Walker teaches history at Union College in Schenectady, has written German National Socialism and the Quest for Nuclear Power 1939–1949 and edited (with Teresa Meade) Science, Medicine, and Cultural Imperialism.

Burghard Weiss is Assistant Professor in the History of Science at the Technische Universität Berlin and the author of publications on the evolution of Physics and Technology in the 18th and 20th centuries, including Zwischen Physikotheologie und Positivismus (1988).
List of contributors

Sheila Faith Weiss is Associate Professor of History at Clarkson University. She is the author of *Race Hygiene and National Efficiency* (California, 1987). At present she is working on a history of social biology education during the Third Reich.

M. Norton Wise is Professor of History at Princeton University where he specializes in nineteenth- and twentieth-century physics. He is co-author with Crosbie Smith of *Energy and Empire: A Biographical Study of Lord Kelvin* (1989).
Acknowledgments

We are grateful to the University of Texas Press, Campus Verlag, and Springer Verlag respectively for permission to republish the following articles: Herbert Mehrtens, ‘The Social System of Mathematics and National Socialism: A Survey’; Herbert Mehrtens, ‘Irresponsible Purity: The Political and Moral Structure of Mathematical Sciences in the National Socialist State’; Ulfried Geuter, ‘The Whole and the Community: Scientific and Political Thought in the Holistic Psychology of Felix Krueger’. We are also grateful to Philips Company and the Archives of the Max Planck Society for permission to reproduce illustrations.
Abbreviations

AAW  (former) Archives of the Academy of Sciences of the German Democratic Republic
AEG  German General Electric Company
AQ   Die anschauliche Quantentheorie
ARGB Archiv für Rassen- und Gesellschafts-Biologie
AVA  Aerodynamic Experimental Centre
BAK  Federal German Archives, Koblenz
BA/MA Federal German Military Archives, Freiburg
BDC  Berlin Document Centre
BSC  Bohr Scientific Correspondence, Archives for the History of Quantum Physics (American Institute of Physics)
CIOS Combined Intelligence Operations Service
DBV  German Union of Biologists
DFG  German Research Foundation
DFL  German Research Centre for Aviation
DFR  German Research Council
DFW  German Aircraft Works
DIB  German Industrial Bank
DMV  German Union of Mathematicians
DNDS Die neue deutsche Schule
DNVP German National People’s Party
DVL  German Experimental Centre for Aviation
FHJ  Flying Hitler Youth
GAMM Society for Applied Mathematics and Mechanics
GDR  German Democratic Republic
ABBREVIATIONS

HA/DLR  Historical Archives of the German Research Centre for
       Aeronautics
HJ    Hitler Youth
HN    Heisenberg Papers, Max Planck Institute for Physics, Munich
HU    University Archives of the Humboldt University, Berlin
HWA   Army Ordnance
ICBM   Intercontinental Ballistic Missile
IFZ    Institute for Contemporary History
IG.    I. Physical Institute, University of Göttingen
KPD    Communist Party of Germany
KWG    Kaiser Wilhelm Society
KWI    Kaiser Wilhelm Institute
LAB    State Archives of Berlin
MPG    Max Planck Society
MPGA   Archives of the Max Planck Society
MPI    Max Planck Institute for Chemistry, Mainz
MPIA   Archives of the Max Planck Institute for Strömungsforschung
MR     Reich Union of Mathematicians
NASM   National Air and Space Museum
NKVD   Soviet Secret Police
NS     National Socialist
NSBO   National Socialist Factory Organization
NSDAP  National Socialist German Workers Party
NSFK   National Socialist Teachers Union
NSV    National Socialist People’s Welfare
NWM    Naturwissenschaftliche Monatshefte für den biologischen,
       chemischen, geographischen und geologischen Unterricht
OHI    Oral history interview
OKW    Armed Forces High Command
OMGBS  Office of Military Government, Berlin Sector
OSB    Higher School Authorities
PD     Physikalisches Denken in der neuen Zeit
PMS    Philips Medizin-Systeme (formerly C. H. F. Müller), Hamburg
PZ     Pedagogical Center
RAF    Royal Air Force
RBE    Radium-Beryllium-Equivalent
R&D    Research and Development
REM    Reich Ministry for Education
RFR    Reich Research Council
List of abbreviations

RLM  Reich Aviation Ministry
RM   Reich Marks
SA   Storm Troopers
SAM  Siemens Archives, Munich
SB   Prussian State Library, Berlin
SBZ  Soviet Occupation Zone
SCI  Science Citation Index
SED  Socialist Unity Party of East Germany
SO   Suicide (as in SO mission: suicide mission)
SPSL Society for the Protection of Science and Learning
SRW  Siemens Reiniger Werke
SS   Defense Squadron
STA-HH Hamburg State Archives
TH   Technical University
UA   Archives of German and Austrian Universities
UAM  University Archives, Mainz
V-1  Revenge Weapon 1
V-2  Revenge Weapon 2
VfR  Society for Space Travel
VTOL Vertical takeoff and landing (plane)
WGL  Scientific Society for Aviation
ZstA  (former) Central State Archives, Potsdam