Cognitive Capitalism

Nations can vary greatly in their wealth, democratic rights and the wellbeing of their citizens. These gaps are often obvious, and by studying the flow of immigration one can easily predict people’s wants and needs. But why are there also large differences in the level of education indicating disparities in cognitive ability? How are they related to a country’s economic, political and cultural development? Researchers in the paradigms of economics, psychology, sociology, evolution and cultural studies have tried to find answers for these hotly debated issues. In this book, Heiner Rindermann establishes a new model: the emergence of a burgher-civic world, supported by long-term background factors, furthered education and thinking. It initiated a reciprocal development changing society and culture, resulting in past and present cognitive capital and wealth differences. This is an important text for graduate students and researchers in a wide range of fields, including economics, psychology, sociology and political science, and those working on economic growth, human capital formation and cognitive development.

HEINER RINDE RMANN is Professor of Educational and Developmental Psychology at Chemnitz University of Technology, Germany. He has published approximately 150 articles and books, and is a fellow of the Association for Psychological Science (APS). His research focuses on cognitive human capital from an interdisciplinary perspective, bringing together ideas on cognitive competence, cognitive development, productivity, politics and culture on individual and national levels.
Cognitive Capitalism

*Human Capital and the Wellbeing of Nations*

Heiner Rindermann

*Chemnitz University of Technology*
# Contents

**List of Figures**

<table>
<thead>
<tr>
<th>List of Figures</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Figures</td>
<td>x</td>
</tr>
</tbody>
</table>

**List of Tables**

<table>
<thead>
<tr>
<th>List of Tables</th>
<th>xiii</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Tables</td>
<td>xiii</td>
</tr>
</tbody>
</table>

**Preface**

<table>
<thead>
<tr>
<th>Preface</th>
<th>xv</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>xv</td>
</tr>
</tbody>
</table>

1 Large Wealth Differences across Time and Nations 1  
1.1 Measures of Production, Income and Wealth 1  
1.2 Some Country Examples 4  
1.3 Problems of Current GDP and GNI Approaches – and Possible Solutions 10  
1.3.1 Differences between Various Sources of the Same Indicator 10  
1.3.2 Hardly Believable Large or Small Values 13  
1.3.3 Differences between GDP and GNI: Rich Countries Transfer Income and Poor Receive 14  
1.3.4 Comparison with ECB and Credit Suisse Indicators of Wealth (Wealth in the Narrow Sense) 15  
1.3.5 Differences between Statistical Indicators and Observations: Cuba and the United States as Examples 18  
1.3.6 Validity Issues and What We Want to Know? 20

2 The Wellbeing of Nations 22  
2.1 Health: Height and Life Expectancy 22  
2.2 The Human Development Approach 26  
2.3 Psychological, Environmental and Holistic Approaches 29  
2.3.1 Gross National Happiness (GNH) 29  
2.3.2 The Stiglitz–Sen–Fitoussi Approach 30  
2.3.3 Happy Planet Index (HPI) 30  
2.4 Including Political and Sociological Criteria 33  
2.5 Why Still Use GDP? 38

3 Human Capital, Cognitive Ability and Intelligence 40  
3.1 Terms and Definitions 40  
3.2 Paradigms and Measurement Approaches 44  
3.2.1 Education as a Proxy for Ability 44  
3.2.2 Psychometric Intelligence Tests 45  
3.2.3 Piagetian Cognitive Development 48  
3.2.4 Educational Achievement 51  
3.2.5 Cognitive Behaviour in Everyday Life and Its Sediments 54  
3.3 Contentious Issues 56  
3.3.1 Fragmentation and Compartmentalisation in Science 56
Table of Contents

3.3.2 Political-Scientific Concerns and Epistemic-Ideological Confoundings 57
3.3.3 Not All Relevant Aspects of Education Are Covered 63
3.4 Cognitive Development and Its Determinants 64
  3.4.1 Description of Development across Lifespan 64
  3.4.2 Developmental Processes 65
  3.4.3 Genes 68
  3.4.4 Physical and Biological Aspects of Environment 73
  3.4.5 Psychological Aspects of Environment – Family 75
  3.4.6 Psychological Aspects of Environment – Neighbourhoods, Preschool and School 77
  3.4.7 Individual Behaviour 79
  3.4.8 How We Can Bring This All Together: Natascha Kampusch and the Productive Imagination of Malleability 80
3.5 Furtherance of Cognitive Ability 82
3.6 Can We Praise or Blame People for Cognitive Ability? 83
4 International Ability Differences and Their Development 85
  4.1 Historical Differences (FLynn Effect) 85
  4.2 National Differences 89
  4.3 Methodical, Political and Cultural Objections 101
  4.4 Everyday Life Evidence and Sediments 112
    4.4.1 Indicators of Cognitive Ability for Historical and International Analyses 112
    4.4.2 Quantitative Data for Statistical Analyses 116
    4.4.3 A Closer Look into Regions: A First Exercise in Cognitive Hermeneutics of Everyday Life 126
5 Why Some Are Richer, Freer and More Democratic 165
  5.1 Internal vs. External and Idealistic vs. Materialistic Paradigms 165
  5.2 Traditional Explanations 167
    5.2.1 Economic Freedom (Capitalism) 168
    5.2.2 Quality of Institutions 170
    5.2.3 Geography 171
    5.2.4 Dependency 172
  5.3 Interplay of Proximal and Distal Factors 175
6 History, Culture and the Burgher-Civic World 176
  6.1 Worldview as the Core of Culture 176
    6.1.1 Misunderstandings, Development and Components 177
  6.2 Religion, Thinking and Society 178
    6.2.1 One Example: Anshu Jain and Jainism 180
  6.3 The Burgher-Civic World 183
  6.4 Reciprocal Causality Leading to Modernisation 185
7 Why Cognitive Factors Are Important: A Theory of Cognitive Capitalism 188
  7.1 General Cognitive Ability Effects 188
  7.2 Higher Level Effects 192
    7.2.1 Society and Culture: Music as an Example 195
8 The Impact of Cognitive-Intellectual Classes 198
  8.1 General Cognitive and Specific Intellectual Class Effects 198
  8.2 Pilots, Airlines and Accidents 200
8.2.1 Chesley Sullenberger and US Airways Flight 1549 201
8.2.2 Contrasting Examples: Costa Concordia and Ramstein 202
8.2.3 Airline Safety in Statistical Cross-Country Comparisons 204
8.2.4 Accidents, Ruling Classes and Airlines in Turkey 205

9 Methodological Research Problems and Solutions 211
9.1 An Epistemic Rationality Approach to Research 211
9.2 Measurement Problems 215
9.3 Causal Assumptions 216
9.4 Relationship between Individuals and Higher Order Categories (Levels) 218

10 Causes of National and Historical Differences in Cognitive Ability – and Reciprocal Effects 224
10.1 Wealth 225
10.2 Health 233
10.2.1 Parasites, Nutrition and Hygiene 233
10.2.2 AIDS as an Example: Effects and Causes 234
10.3 Politics 242
10.3.1 Peace 242
10.3.2 Rule of Law, Political Liberty and Democracy 244
10.3.3 Meritoric Orientation and Management 248
10.3.4 Fragmentation of Power 251
10.3.5 Demographics: Migration 252
10.4 Modernity and Modernisation 255
10.4.1 When Did Modernisation Begin? The Transition of the Thirteenth Century 258
10.5 Education 261
10.5.1 Reciprocity between Education and Ability 262
10.5.2 Educational Quality 263
10.5.3 Summary on Educational Quality and Methodological Considerations 281
10.6 Geography and Climate 284
10.7 Evolution and Genes 287
10.7.1 Indirect and Tentative Evidence on Genetic Determinants 288
10.7.2 Evolutionary Theories and Indicators 298
10.7.3 Recent Evolution among Humans: Evolutionary Acceleration? 309
10.7.4 Consanguineous Marriages and the Genetic Effects of Culture 313
10.7.5 The ‘Race’ Issue (Biological Categorisation within Species) 316
10.7.6 Summary on Evolutionary Explanations 322
10.8 Culture and Worldviews 323
10.8.1 Animism 326
10.8.2 Judaism 328
10.8.3 Christianity 330
10.8.4 Islam 345
10.8.5 Hinduism 359
10.8.6 Buddhism 360
10.8.7 Confucianism 361
10.8.8 Impact on Cognitive Development and Burgher World 363
10.8.9 Empirical-Quantitative Findings 367
10.9 The Interplay of Determinants 368
viii Table of Contents

11 Global Models for Education, Cognitive Capital, Production, Wealth and Wellbeing 371
  11.1 Economy: Produced Income (GDP) and the Wealth of Nations 373
  11.2 Politics: Democracy, Liberty, Rule of Law and Gender Equality 377
  11.3 Explaining National Wellbeing Differences between Countries 381
  11.4 The Impact of Education and School Education on Cognitive Ability 382
  11.5 Summary on National Wellbeing Differences 385

12 Challenges of Future Development and First Predictions 388
  12.1 Rising Complexity 388
  12.2 Demographic Changes 391
    12.2.1 Ageing 391
    12.2.2 Differential Fertility Effect: Lower Birth Rates among Higher Ability Adults 392
    12.2.3 Immigration 396
  12.3 Resource Reduction 399
  12.4 Climate Change 400
  12.5 Rising Inequality within Societies 400
  12.6 Predictions in Research 403
    12.6.1 Historico-Philosophical Ideas of Progress Versus Cyclic Theories of Rise and Fall 403
    12.6.2 Keynes’ Famous Prediction from 1930 404
    12.6.3 Current Predictions from other Researchers 407
    12.6.4 Problems of Predictions 412

13 Models for Cognitive and Wealth Development in the Twenty-First Century 414
  13.1 A First and Simple Model: Prediction of Rising Education Leading to Favourable Ability and GDP Development 416
  13.2 Sophisticated Model for Ability Development 420
    13.2.1 General Assumptions 420
    13.2.2 Continuing Environmental Improvements 421
    13.2.3 Migration Effects 421
    13.2.4 Asymmetric Children Rates and Generation Lengths 424
    13.2.5 Identical or Different Cognitive Ceilings: Train or Sailboat Model 428
    13.2.6 Intelligence of the Future – Results 432
    13.2.7 FLynn Effects Based on Expected Environmental Improvements 439
    13.2.8 Combining Birth Rate, Migration and FLynn Effects 442
  13.3 Model for Wealth Development 450
    13.3.1 Past Growth and Wealth 450
    13.3.2 Cognitive Determinants 450
    13.3.3 Cognitive Determinants and Baseline Economic Growth 452
    13.3.4 Including Further Factors 453
  13.4 Wealth at the End of the Twenty-First Century 468
    13.4.1 Comparisons with other Models 474

14 Summary, Comparisons and Suggestions 480
  14.1 Summary on Results of This Study 481
  14.2 Comparison with Alternative and Complementary Approaches and Their Insights 485
14.2.1 The Relevance of Enlightenment, Elites and Innovation 
(Margaret Jacob and Joel Mokyr) 485
14.2.2 Institutions: Economic Rights and Freedom (Douglass North, 
Daron Acemoglu) 486
14.2.3 Economic Freedom (Mises, Hayek, Friedman, Rothbard, Hoppe) 488
14.2.4 The Human Capital Approach within Economics (Eric Hanushek 
and Colleagues) 489
14.2.5 Effects of Intelligence for the Economy (Garett Jones) 491
14.2.6 The Climate Approach (Jared Diamond) 492
14.2.7 The Genetic-Economic Approach (Gregory Clark) 493
14.2.8 The Psychometric and Genetic-Psychological Approach at the 
International Level (Lynn & Vanhanen) 493
14.2.9 The Economic History Approach (David Landes) 495
14.2.10 Culture (Lawrence Harrison) 496
14.2.11 The Burgher World as Bourgeois Dignity (Deirdre McCloskey) 497
14.2.12 Interplay of Cognitive Psychogenesis and Sociogenesis (Georg 
Oesterdiekhoff) 501
14.2.13 Integrative Model: Evolution and Culture as Background 
Determinants, Cognitive Ability and Institutions as Crucial 
Intervening Factors and The Burgher World as the Societal and 
Ideological Frame, All Combined in a Reciprocal Network 503
14.3.1 Health 505
14.3.2 Family Environment 506
14.3.3 Formal Education 507
14.3.4 Cognitive Training 514
14.3.5 Welfare Policies 515
14.3.6 Demographic Policies 516
14.3.7 Immigration and Emigration 517
14.3.8 Political and Institutional Reforms 522
14.3.9 Culture 523

References 525
Index 571
Figures

1.1 Income (annual GDP/c) development in different regions from 0001 to 2008 (data from Maddison, 2008)  
1.2 Wealth around the world (annual GDP 2010, Penn V7.1, per capita ppp, N = 188 countries)  
2.1 Life expectancy development in different regions from 1950 to 2010 (data from UN, 2013)  
2.2 National wellbeing around 2010 (built upon wealth, health, psychology, security-stability, politics)  
3.1 Raven Matrices-like tasks  
3.2 Sketch of Piaget’s three mountains task  
3.3 PISA 2000 Lake Chad task  
3.4 Development of fluid and crystallised intelligence according to the model of Cattell  
3.5 Increase of cognitive competences and of individual differences from form 1 to form 9 in the constant norms of form 1  
3.6 Illustration of positive or negative running, spiral-shaped, dynamical developments  
3.7 Proportions of variance attributable to genetic and shared and non-shared environmental effects depending on age in cognitive ability  
3.8 Determinants of cognitive ability of primary school students  
4.1 Comparison of older and newer data on cognitive ability levels of nations  
4.2 G factor of international differences in cognitive ability scales  
4.3 Cognitive ability levels around the world; darker represents higher values  
4.4 Top cognitive ability level and cognitive achievement across millennia for 99 countries  
4.5 Core regions of top intellectual achievement within Europe 800 BCE to 1950 CE according to Murray  
6.1 Macrosocial process of development including worldview, society and the individual
List of Figures

9.1 Possible causal paths between two and more related variables 216
9.2 Path analysis with adult educational level, cognitive ability and wealth 217
10.1 Cross-lagged effects; stronger cognitive effect in the raw-GDP analysis; stronger wealth effect in the log-GDP analysis 229
10.2 Cross-lagged effects; stronger wealth effect on cognitive capital in the poorer country sample 231
10.3 Wealth is relevant for the cognitive development of the poor and cognitive ability is relevant for the wealth development of the rich 232
10.4 Influence of education and cognitive ability on health behaviour resulting in health of HIV-infected persons and diabetics (following Goldman & Smith, 2002) 238
10.5 Education, cognitive ability, political modernity, economic wealth, percentage of Muslims and HIV-infection rate $N = 143$ to 146 nations 239
10.6 Cross-lagged effects; stronger reducing cognitive effect on HIV than of HIV on cognitive human capital 241
10.7 Main results from cross-lagged analyses with rule of law, political liberty and democracy and cognitive capital controlled for wealth 245
10.8 Results from cross-lagged analyses with rule of law, political liberty and democracy and cognitive capital controlled for wealth; stronger cognitive effect on politics than of wealth on politics or of politics on cognitive capital 246
10.9 Effects of meritoric principles on cognitive capital development controlled for past ability and annual GDP/c 250
10.10 Effects of technological, societal-cultural-political and cognitive-intellectual modernity on cognitive capital development controlled for former cognitive capital and GDP 258
10.11 Cross-lagged effects between cognitive ability (as measured by student assessment tests, SAS) and education (years at school), 1970 to 1990 263
10.12 Discipline and students’ cognitive competence for 93 countries 283
10.13 Direct instruction and students’ cognitive competence for 80 countries 284
10.14 Prediction of cognitive ability by using two haplogroup sets as genetic markers of evolution and by a general development indicator of society (HDI) 292
10.15 Prediction of proximity in cognitive ability by proximity in latitude, longitude, HDI and genes 293
10.16 Cladistic model of the evolution of human populations following Andreasen (2004) 321
xii List of Figures

10.17 Theoretical model for effects of religion on cognitive ability and the development and preservation of a burgher world 324
11.1 Global wealth model 373
11.2 Global politics model (political wellbeing) 378
11.3 The wellbeing of nations and its determinants 381
11.4 Model for education 383
12.1 Relationship between assumed (linear) genotypic intelligence development and (zigzag) innovation over time (r = .88; Woodley, 2012) 395
13.1 Education-based estimated cognitive ability development in the twenty-first century 418
13.2 Estimated GDP/c development in the twenty-first century 419
13.3 Migration-ability paradox exemplified for two countries with a d = 1 (15 IQ) gap (similar to US and Mexico, France and Tunisia, UK and Trinidad, Germany and Turkey) 422
13.4 Simulation of combined fertility and generation length effects on population development 426
13.5 Simulation of combined fertility and generation span effects on cognitive ability development 426
13.6 Train model of twenty-first-century cognitive ability development 428
13.7 Sailboat model of twenty-first-century cognitive ability development 429
13.8 Same-boat-but-different-team model of twenty-first-century cognitive ability development 430
13.9 Estimated migrant share development in the twenty-first century 436
13.10 Estimated ability development in the twenty-first century based on migrant model 2 437
13.11 Estimated cognitive ability development in the twenty-first century based on Flynn effect and gap closing 442
13.12 Ability changes due to migrant share changes 444
13.13 Final integrative model predictions for the twenty-first century 446
13.14 Effects of the three factors on cognitive development in the West in general, in selected regions and countries and in Qatar in the twenty-first century 447
13.15 Predicted GDP per capita development in the twenty-first century 469
13.16 Predicted economic growth development in the twenty-first century 471
14.1 Summary on education 514
Tables

1.1 Income differences across time and continents (annual per capita GDP and GNI in comparable units) page 5
1.2 Income differences across time and regions (annual per capita GDP and GNI in comparable units) 7
1.3 Differences in GDP ppp per capita 2000 between Maddison and Penn 12
1.4 Wealth means and differences across regions (assets from Credit Suisse per adult in 2013 US dollar) 17
2.1 Height and life expectancy 25
2.2 Human development indices 1870–2010 28
2.3 Happy Planet Index 2012 and three subindices 32
2.4 National wellbeing index (around 2010) 37
4.1 Results of older student assessment studies (SAS) 90
4.2 Correlations between national measures of cognitive ability 97
4.3 Cognitive ability estimates 100
4.4 Indicators of cognitive achievement in historical development 118
4.5 Indicators of cognitive achievement in modern times 119
4.6 Correlations between cognitive ability estimates and indicators of cognitive achievement in past and present 122
5.1 Paradigms for national differences in wellbeing 166
8.1 Correlations between cognitive ability estimates and technological safety measures 204
9.1 Correlations between variables at different data levels 219
10.1 Correlations between wealth and cognitive ability indicators 227
10.2 Cognitive ability averages, natives and migrants and gains (or losses) for receiving countries 254
10.3 Correlations of modernity ratings and estimates (and meritoric principles) 256
10.4 Correlation between cognitive ability and educational variables 262
10.5 Correlations between educational indicators and cognitive ability 266
xiv List of Tables

10.6 Correlations of geographical indicators and cognitive ability (compared with wealth) 286
10.7 Correlations of skin lightness and cognitive ability and GNI 296
10.8 Correlations between brain size (cranial capacity) and cognitive ability and GNI 301
10.9 Percentages of consanguinity and correlations 314
10.10 Correlations among three genetic indicators 316
10.11 Religions and ability and education 364
10.12 Religions and enlightenment, society and politics 369
11.1 Correlations between background compared to ability and historical indicators of intellectual achievement, wealth and democracy 380
12.1 Wealth increases indicated by GDP/c ($) from 1930 onward 405
12.2 Correlation of Figure 11.1 2010 wealth determinants with wealth increases from 1930–2010 406
12.3 Hart’s chronology of human intelligence and 2100 prediction 410
12.4 Average annual growth rates and achieved GDP 2050 411
13.1 Education, cognitive ability and GDP/c in 2010 and 2100 417
13.2 Cognitive ability and theoretical finishing lines 431
13.3 Cognitive ability prediction 2100 (only based on assumptions on asymmetric fertility) 433
13.4 Cognitive ability prediction 2100 (only based on assumptions on migration), new immigrants with same or different ability levels 434
13.5 Cognitive ability prediction 2100 (based on assumptions on Flynn effect and no changes in migrant shares) 440
13.6 Cognitive ability prediction 2100 (based on assumptions on Flynn effect and changes in migrant shares) 443
13.7 Cognitive ability prediction 2100 (final integrative model) 445
13.8 Cognitive ability predictions (models 2018 and 2011 compared for 97 countries) 449
13.9 GDP per capita in 2010 and 2100 (different models) 451
13.10 GDP/c in 2010 and 2100 (different cognitive models) 454
13.11 GDP/c in 2010 and 2100 (different demographic models) 457
13.12 GDP per capita in 2010 and predicted for 2100 (modifying factors: advantages of backwardness, complexity burden, risk factors, regional umfeld-neighbourhood) 461
13.13 Correlations of background factors and cognitive ability with growth and production estimations in the twenty-first century 472
13.14 Economic predictions (models 2018 and 2011 compared for 88 countries) 475
Preface

Why are we much richer today than our ancestors? Why in the last centuries so many nations have developed towards liberty, rule of law and peace? And why are some nations still on average much richer, freer and safer than others which lag behind? Why do countries and populations progress or regress, prosper or fail, fall or rise?

People as individuals as well as nations had and have to face large differences in given political and economic conditions. And peoples themselves, from historical and cross-country comparisons, largely differ in habits, values, preferences and, less known but importantly, in competences. All these characteristics are connected. Of course they are connected; simple correlational studies show empirical relations. However, mere descriptions of various indicators of development and of their usually positive associations are intellectually unsatisfactory. We want to understand why peoples and societal conditions are how they are, why they are interrelated, what causes are at work and what we can learn to improve the fate of societies. Big questions!

Big questions call for big theories. Nevertheless, for solid answers in the search for reasons and causes we need the nitpicky work on numbers led by epistemic rationality. This is even more important, as these questions are tangential to religious, cultural, ethical and political worldviews. In classical German philosophy and social science such worldviews were termed Weltanschauungen (Jaspers, 1919). They shape our perceptions of what happens around us and also influence our judgement in epistemic questions; in those questions in which answers have to be solely judged according to their approximation of truth and not according to their affinity to our likes and dislikes.

We consider ‘cognitive capital’ to be crucial for economic growth, especially in modernity. Cognitive capital is conceptualised as the ability to think, to solve problems by cognitive means, to reason inductively and deductively, to deal with abstraction, to understand and construct meaning, to learn, to acquire and use true and relevant knowledge. In psychology, this cognitive capital is termed intelligence, cognitive ability or cognitive competence. Cognitive capital has driven and continuously drives technological and
cultural modernisation. For these macro-social processes, the level of high ability cognitive classes is especially important, shaping an intellectual climate, working through innovation and management, expressing itself in technology and companies, in law and politics, in science and the arts.

In historic development and in cross-cultural comparison, cognitive ability and its rise are related to the emergence of a burgher-civic world, supported by cultural factors furthering education and intelligence. Such a development includes mediated reciprocal effects, from culture via physical, societal and psychological environments to ability and back to environment and culture. This has led in the past and present to differences in cognitive capital and wealth.

However, this is not the only approach developed in the field. What impact do the accidental determinants of geography, climate and mineral resources and the less accidental circumstances of history, politics and power structures have? And what about evolutionary factors? The quality of political and economic institutions? The contribution of a scientific model cannot be sufficiently evaluated by mere empirical proof using data, statistics and causal modelling, but also needs a careful comparison to alternative, complementary or rival scientific approaches.

I hope this book will stimulate discussion and scientific progress. I could not have written it without the help of many others. First of all, every study is built on the work of many predecessors, whose work and discoveries enriched our understanding and thinking. Colleagues helped me through their research and stimulating, sometimes critical, comments. There is a vivid international scene; we remain close by reading the publications of our colleagues, by email and by exchanges at annual meetings. My work benefited from receiving stimulating ideas and extensive data sets. The best way to honour such contributions is by referring to and working with them. In particular, I give thanks to David Becker, Gregory Christainsen and Justus Sänger, who carefully checked earlier drafts of the book and contributed many valuable suggestions. Erich Weede and Garett Jones read my final drafts, which then turned out to be very preliminary versions as they were greatly improved by their advice.

Phil Good and Chris Harrison from Cambridge University Press supported me a lot with their always helpful and appreciative comments from the beginning to the end of the writing and editing of this book and my copyeditor, Kevin Hughes, made my book readable – thanks to you all! We do not come out of nowhere. My parents, Dr Karin and Dr Wigbert Rindermann, had a hard time educating a frequently difficult boy. Also, I remember the attic of my grandfather, Dr Joseph Rindermann, whom I never met; he died around the time of my birth. The attic was full of ancient books on science, humanities and philosophy. In the evening, after his daily strenuous work as a physician, he was an intellectual. Last, but not least, I want to thank my wife and our children for all their contributions to transforming mere existence into life.