

THE SUBTERRANEAN FOREST

Energy Systems and the Industrial Revolution

Rolf Peter Sieferle

The White



Horse Press

Contents

Preface	vii
I. Energy Systems and Social Evolution	1
1. Palaeolithic Hunter-gatherer Societies	3
2. The Neolithic Revolution and the Problem of Dynamics	9
3. Traditional Agriculture – A Controlled Solar Energy System	14
4. The Structure of the Agrarian Energy System	19
5. The Dynamics of Agrarian Societies	27
6. Crisis and Transformation	34
7. The Industrial System and Fossil Energy	41
II. Forest and Wood in Preindustrial Germany	47
1. Natural Foundations	47
The forest as a component of the agricultural biotope	49
Forms of forest use	52
The transportation problem	57
2. Preindustrial Wood Consumption	61
Commercial consumption	61
Iron smelting	63
Private households	65
3. Regulation Problems	67
III. England: Coal in the Industrial Revolution	78
1. Substitution of Wood by Coal	78
Why was coal first used in England?	78
The rise and decline of coal consumption in the Middle Ages	82
A new rise	86
Resistance to coal burning	89
Coal as trump in the trade war	92
Land gained with coal use	94
Was England dependent on coal?	105

2. Wood and Coal in Iron Smelting	110
Technical problems	110
Fuel shortage and stagnation	112
The breakthrough in iron smelting	115
3. Transport and Steam Power	124
Transportation of coal	124
Power sources for draining coal pits	127
From the steam pump to the rotating steam engine	129
4. Significance of Coal in the Industrial Revolution	133
IV. Germany in the 18th Century:	
Wood Crisis and Strategies for Solutions	138
1. Conserving Wood	143
Fuel conserving stoves	147
Problems in the commercial field	149
2. Functional Separation of Agriculture and Forestry	153
3. Substitution for Wood	158
Substitution of wood by coal	160
State measures in favour of coal	163
Resistance and prejudices	167
Ascendancy of coal	174
4. Was the Wood Crisis an Energy Crisis?	176
V. Perceptions of Fossil Energy	181
1. The Finiteness of Fossil Fuels	184
2. Classical Political Economy and the Stationary State	191
3. Jevons and the Contraction of the Industrial System	197
4. Nuclear or Solar Energy	202
Bibliography	207
Index	223