

Contents

I The geological framework

- Preface ix
Acknowledgements x
Introduction xi
- 1 The geography of Santorini 7
Thera – the main island of Santorini 9
Therasia – the Little Thera 11
Aspronisi – The White Island 11
The Kameni Islands 12
The Caldera – the large central basin 13
Kolumbos – the invisible volcano 13
The Christiana-islands – relatives of the Santorini 14
An island with deep roots in history 14
- 2 Santorini and plate tectonics 23
Continental drift and Plate tectonics 24
Geology of the Aegean region 28
- 3 The geological development of Santorini 33
Non-volcanic rocks 34
Volcanic rocks and their deposition 36
- 4 Stratigraphy – the backbone of geology 51
Paleontological remains 52
Marine fossils of the Profitis Elias 52
Marine fossils at Archangelos Vouno 52
Absolute dating 54
Dating of organic remains 55
Tephrochronology 55
- 5 Plant remains and geological time 61
Plant fossils in volcanic regions 62
The plant fossils of Santorini 63
Plant remains of the Fira Beds 65
Plants as indicators of climate 73
The flora of Santorini today 73

II The Minoan eruption

- 6 The mechanism of the Minoan eruption 79
Was there warning of the eruption? 83
The first (plinian) phase 85
The second (base surge) phase 88

III

The volcano releases its secret

- The third phase 89
- Was there a fourth eruption phase? 90
- The effects of the Minoan eruption 90
- Effects on flora and fauna 94
- What do the adjacent islands show? 94
- Destructions on Crete 95
- Climatic deterioration in China 97
- Comparable eruptions 97
- 7 When did the catastrophe occur? 99
 - Absolute and relative dating methods 100
 - Archeological estimates of age 101
 - Other attempts at dating 102
 - Olive trees and their history 109
 - Investigation of the olive branch 115
 - Discussions and questions 117
- 8 A Bronze Age Pompeii 125
 - The first discoveries on Therasia 126
 - The discoveries on Thera 131
- 9 What was living on the island in the Bronze Age? 137
 - Plants and animals 138
 - The flora 139
 - The fauna 148
- 10 An idea takes hold 151
 - Geological clues for reconstruction of the island 152
 - Fossils solve the problem 155
 - Pieces added to the reconstruction 157
 - Minerals for color pigments 158
 - Stones and building materials 164
 - Clay deposits 169
 - Metallurgy 170
 - Archeological evidence 171
 - Rocks shown on frescoes 171
 - Old settlements on the caldera walls 173
 - The findings on northern Thera 175
 - Findings in the Karageorghis quarry 176
 - Findings in the Mavromatis quarry 177
 - Ships fresco decoded? 178
 - Home harbor found? 182
 - A photo from the Bronze Age 183
- 11 Geological observations and mythology 187
 - Did the Minoan eruption cause the Exodus? 188
 - Was Atlantis on the Bronze Age island? 188
 - The Minoan culture and Atlantis 189
 - The Atlantis theory of Galanopoulos 192

IV

The island is changing its appearance

- Thinking the unthinkable 192
Modern Geology and Atlantis 198
- 12 The caldera is filling again 205
Volcanic activity in historical time 206
The present day caldera 206
The eruption of 197 BC 206
A precursor of Palea Kameni? 206
The eruption of 46 AD 206
A historical turning point (726 AD) 210
Mikra Kameni appears (1570-1573) 213
The Kolumbos eruption of 1649-1650 213
The appearance of Nea Kameni 218
Mikra and Nea Kameni unite 220
The eruptions of 1925 to 1928 224
The eruptions of 1939 to 1941 227
The eruptive activity of 1950 227
- 13 Volcanism today 229
Fumaroles, solfataras, and hot springs 230
Ore minerals in hot springs 230
Volcanic hazards 231
Earthquakes 235
Tsunamis 240
Lava flows and ash-falls 240
Floating pumice 241
Slumping, landslides and stone fall 241
Volcanic gases 241
Natural hazards 243
Seismic monitoring 245
Tectonic lines 245
- 14 Present and future changes of the island 247
Erosion due to flooding 250
Changes due to human activity 251
Strange structures on the sea floor 252
Volcanoes are unpredictable 253

V

Appendices

- A Plato: Critias and Timaeus 262
B List of illustrations 276
C Fossils from Santorini 278
D The modern flora of Santorini 282
E Excavations at Balos in 1870 288

VI

References and indices

- A References 292
B Name index 307
C Subject index 309