LIST OF ILLUSTRATIONS (IN PART 2)

1. Site Location Maps.
2. Diagram of Sliced Tree Trunk showing Growth Development of Wood.
3. Micro Photographs showing Cellular Structure of Wood.
4. Preservation of Waterlogged Timber in Roman Wharf.
5. Egyptian Axemen felling Tree by Notching.
6. Egyptian Wood-cutters felling Tree and Debarking.
8. Roman Lumbermen hauling Log with Ropes.
11. Egyptian Carpenters debarking and converting Tree Trunk into Planks with Lever and Wedges.
15. Egyptian Carpenters using Pull Saw horizontally to cut Planks.
17. Roman Sawyers using Box-framed Saw on medium length Timbers.
18. Egyptian Carpenters using Bow Drill.
19. Roman Carpenter’s Tombstone with Representation of Tools including Bow Drill.
20. Egyptian Carpenter glueing Wood.
22. Reconstructed Roman Planes.
23. Simple Joints used in Antiquity for fixing together Timber Members.
24. Earliest Timber Framed Construction in Northern Europe—Lashed Poles clad with Hides, ca 2500 BC.
25. Substantial Round Houses from Lashed Poles clad with Thatch. North West Europe, ca 1500 BC.
   A. Neolithic at Sittard (Netherlands). 5th Millenium BC.
   B. Iron Age Hallstat Culture at Goldberg, South Germany. 7th–6th Cent. BC.
   C. Celtic Oppidum of Bibracte, France. 1st Cent. BC.
LIST OF ILLUSTRATIONS

30. Roman Age Wattle and Daub Construction. Detail.
32. Traditional Flat Mud Terrace Roof Construction.
33. Classical Timber Roofing.
34. Remains of Middle East Mud-brick Building profusely reinforced with Timber. Beyce Sultan, Western Anatolia, ca 1500 BC.
35. Schematic Restoration of Mud-brick and Timber Wall Construction as in pl 34. Beyce Sultan, Western Anatolia, ca 1500 BC.
36. Inset Timbering to integrate Stone Orthostates into Mud Brick Wall. Tell Halaf, North Syria, ca 800 BC.
38. Wooden Fittings and Installations at Herculaneum.
41. Ionic Entablature. Comparative Sketch of Proposed Wooden Original and Ashlar Masonry Construction.
42. Rural Wooden Pavilion in Classical Greece.
43. Lycian Tomb. Comparative Sketch of Proposed Wooden Original and Actual Masonry Construction.
44. “Bird Cage” Shelter of Pliable Plant Materials.
45. Round Hut of Plant Material. Karanog, Romano Nubia.
46. Contemporary Round House from Plant Material. Red Sea Coast of Yemen.
47. Contemporary Lashed Reed Building on Monumental Scale. Marshes of Southern Iraq.
48. Diagram of the Cycle of Rock Formation.
49. Durability of Stone. Repairs to Aspect.
50. Detail of Repairs by Piecing.
52. Neolithic Field-stone Rubble Foundations for Mud-brick House Walls. North Iran. 6th Millenium BC.
53. Megalithic Stone Building. Western (Atlantic) Europe. 5th Millenium BC.
54. Dry Stone Walling in Middle East. 4th Millenium BC.
55. Bronze Age “Cyclopean” Walling of Chinked Boulders. Aegaean, 2nd Millenium BC.
56. Neolithic Flint Mining. S.E. England and Belgium, ca 4000 BC.
57. Source of Megalithic Blocks. Deeply Fissured Outcrops of Bluestone in Western Wales.
58. Megalithic “Quarry”. Filitsos, Corsica, ca 4th Millenium BC.
60. Basalt Outcrop naturally separated into Boulders, quarried in Bronze Age. Tilmen Höyük, Anatolia.
61. Further Working of naturally separated Basalt Blocks. Hittite Quarries at Yesemek and Tilmen Höyük. 2nd Millenium BC.
63. Underground Limestone Quarry. Ma‘asera, Egypt.
64. Detail of Underground Quarry at Ma‘asera showing method of exploitation.
66. Egyptian Method of Quarrying Granite using very Hard Stone (Dolerite) Pounders.
67. Sketch of Method of Separating and Freeing Blocks in Traditional Quarrying.
68. Residual Bed of Quarried out Blocks. Persepolis. ca 500 BC.
69. Map showing Principal Egyptian Quarries supplying Stone to all Parts of Egypt (Pharaoh’s Quarries).
70. Map showing Central Quarries under Imperial Roman Administration.
71. Imperial Roman Exploitation of Grano-diorite Quarries at Mons Claudianus.
72. Slipway for Expediting blocks from Mountainside Quarry. Attica, 5th Cent. BC.
73. Transport of Heavy Stone Blocks by Sledge in Egypt.
74. Transport of Heavy Stone Blocks by Sledge in Assyria.
75. Transport of Heavy Stone Blocks on Wheeled Carriage. Classical Greece.
76. Projects for Transporting Heavy Stone Blocks on Wheels using Blocks as the axle. Classical Greece.
77. Transport of Massive Stone Block by Nile in Egypt.
79. Human Porterage of Stone Blocks on Building Site.
80. Diagram showing Basic Operation of Fine Stone Dressing.
81. Diagram showing Basic Procedure for Dressing a Column Drum.
82. Diagram showing Basic Geometry of Hemispherical Dome.
LIST OF ILLUSTRATIONS

83. Setting Out for Cutting Vousoir of an Ashlar Dome.
84. Egyptian Mason’s Boning Rods.
85. Egyptian Stone Dressing Procedure.
86. Egyptian Mason’s Mallet.
87. Egyptian Mason’s Tools of Stone.
88. Mason’s Striking Tools. Combined Axe/Adze/Hammers. Traditional Tools from Cyprus.
89. Roman Mason’s Striking Tools. Combined Axe/Pick/Adze/Hammer.
90. Struck Tools (Punch, Chisel etc.). Use and Traces.
91. Mason’s Axe. Use and Limitations.
92. Large Dragsaw Reconstructed. Egypt 4th Dyn.
95. Roman Mason Drilling Stone.
96. Possible Reconstruction of Lathe for Turning Column Drums.
100. Egyptian Large Block (Pharaonic) Masonry. In situ Dressing. Sketch of Huge Architrave Block. Kalabsha Temple. 1st Cent. AD.
102. Classical Ashlar Masonry set with Projecting Fillets at Arrises. Temple of Segesta, Sicely, ca 430 BC.
104. Classical Ashlar Masonry with Functional Details of Stone Dressing retained as Ornament.
106. Roman Marble Revetting.
107. Polygonal Masonry. Knidos. 5th–4th Cent. BC.
108. Polygonal Masonry Construction for Retaining Walls. Delphi, ca 500 BC.
109. Ashlar Facing to Rubble Retaining Wall. Pasargadæ Persia, ca 530 BC.
111. Ashlar Facing to Rubble (or Concrete) Core. Rome Augustan.
LIST OF ILLUSTRATIONS

114. Defective Egyptian Stone Foundations.
116. Finely Dressed Coffered Greek Foundations. Delphi, 5th Cent. BC.
117. Greek Masonry founded on Bed Rock. Apollonia, Cyrenaica, ca 300 BC.
118. Egyptian Monolithic Column. Diagram of Combined Extraction and Dressing.
119. Egyptian Column constructed of Large Blocks. Temple of Kalabsha. 1st Cent. AD.
121. Provincial Hellenistic Column on Plinth built in Coursed Stone Masonry. Hatra, North Mesopotamia. 2nd Cent. AD.
123. Graeco-Roman Columns. In situ Dressing.
124. Egyptian Large Block Masonry. Massive Slab Roofing. Kalabsha Temple. 1st Cent. AD.
125. Egyptian Large Block Masonry. Failure in Bending of Massive Roofing Slabs. Kalabsha Temple. 1st Cent. AD.
126. Egyptian Saddle Roof Construction. Old Kingdom–Middle Kingdom.
127. Egyptian Dressed Stone Vaulting. Late Period.
128. Graeco-Roman Ashlar Masonry Dome Construction Side. Southern Turkey, ca 3rd Cent. AD.
129. Rock Cutting. Unfinished Façade showing Progress of Work from above downwards. Tomb at Medain Saleh, Hejaz. 1st Cent. AD.
130. Unfinished Tomb cut in free standing Knoll of Rock with Evidence of Excavation by Quarrying. Medain Saleh. 1st Cent. AD.
131. Resplendent Rock Cut Façade Monument. The Khazne, Petra. 1st Cent. BC–1st Cent. AD.
132. Architectural Portal to Rock Cut Tomb with Stone Insets and Plastering. New Paphos, Cyprus. 3rd Cent. BC.
133. Hypogeum Tombs with Access Shafts. Ayaa, near Sidon. 4th Cent. BC.
134. Fine Dressing to Internal Faces of Egyptian Rock-cut Monuments.
135. Early Etruscan Rock-cut Tomb with Architectural Interior. Cerveteri, 5th Cent. BC.
136. Late Etruscan Rock-cut Tomb with Architectural Interior. Cerveteri, 3rd Cent. BC.
137. Soil Formation and Classification.
138. Subterranean Dwelling Complex. Abu Matar, Southern Israel, ca 3500 BC.
139. Subterranean Dwelling. Detail. Abu Matar, ca 3500 BC.
140. Large Phrygian Tumulus well over 50 m high. Gordian. Early 7th Cent. BC.
141. Large Lydian Tumulus, surviving height ca 55 m. Bin Bir Tepe, North of Sardis. 6th Cent. BC.
142. Cyproite Tumulus, ca 15 m high, of singular construction. Salamis. 600 BC.
143. Etruscan Cemetery of Tumulus Tombs near Cerveteri. 600 BC and later.
144. Consolidation and Extension of Palestinian Tells by sophisticated Earthworks, ca 1500 BC.
146. Diagram showing Egyptian Building Platform of Earth Fill.
148. Traditional Houses of Plastic Earth said to have survived for up to 800 years. Rawdah, North Yemen.
153. Scenes from Egyptian Tomb Decoration representing Manufacture of Form Moulded Mud Bricks. Thebes, New Kingdom.
154. Types of Brick Moulds used in Preceeding Scenes.
155. Ancient Wooden Brick Moulds. Egypt and Palestine. 2nd Millenium BC.
156. Standard Bonding Patterns in Modern Brick Masonry.
157. Bonding of Rectangular Mud Brick Wall at Maroni Vournes, Cyprus, ca 1250 BC.
158. Bonding of Square Mud Brick City Wall at Eleusis, ca 500 BC.
159. Bonding of Mesopotamian Plano-Convex Mud Brick Masonry. 3rd Millennium BC.
160. Mud Terrace Roofing Construction. Thera, ca 1500 BC.
161. Grandiose Mud Brick Vaulted Roofing. Ctesiphon. 6th Cent. AD.
163. Ancient Mesopotamian Kiln for firing Terra-cotta Objects. Eshnunna, ca 2250 BC.
164. Classical Greek Tile Kiln. Olympia. Late 4th Cent. BC.
165. Classical Greek Tile Kiln. Corinth. Late 5th Cent. BC.
166. Mesopotamian Funerary Chamber of Burnt Bricks. Mari. Late 3rd Millenium BC.
167. Roman Load Bearing Burnt Brick Masonry. Kizil Avlu, Pergamum. 120–130 AD.
169. Late Roman Burnt Brick Dome Construction. Diocletian’s Mausoleum, Spalato. 300 AD.
170. Early Mesopotamian Cone Mosaics. Uruk, ca 3000 BC.
171. Mesopotamian Glazed Terra-cotta Wall Plaques (‘Knaf’ Plates). Choga Zambil, Elam, ca 1250 BC.
172. Mesopotamian Glazed Terra-cotta Wall Plaques (Sikkatu). Assur. 9th–7th Cent. BC.
173. Mesopotamian Relief Decoration in Burnt Brick. Uruk, ca 1450 BC.
174. Mesopotamian Relief Decoration in Glazed Burnt Brick. Ishtar Gate, Babylon. 6th Cent. BC.
175. Mesopotamian Relief Decoration in Burnt Brick. Detail of Preceding. Ishtar Gate, Babylon. 6th Cent. BC.
176. Achaemenid Relief Decoration in Polychrome Glazed Brickwork. Susa, ca 500 BC.
177. Achaemenid Relief Decoration in Polychrome Glazed Brickwork. Detail. Susa, ca 500 BC.
178. Archaic Greek Painted Fictile Revetment. Metapontum, ca 500 BC.
181. Diagram showing Mesopotamian Brick Column Construction.
182. Mycenaean Terra-cotta Roofing Tiles.
183. Diagram showing Classical Greek Roof Tiling Systems.
186. Terra-cotta Roofing Tiles. Lighting and Ventilation.
188. Schematic Section showing Roman Hypocaust Installations.
189. Diagram showing Terra-cotta Flues (Tubuli, Box Tiles) set within Walls.
190. Tubuli set within Walls of Bath. Forum Baths. Ostia. ca 160 AD.
191. Tegulae Mammatae Types and Installation. Roman.
192. Typical Terra-cotta Drainage Installation in the Ancient Middle East.
193. Conspectus of Terra-cotta Segments for lining Sumps in Ancient Middle East.
194. Ancient Middle East Terra-cotta Drain Pipes. Nuzi, North Mesopotamia, ca 1400 BC.
195. Archaic Greek Terra-cotta Water Pipes. Athens, 6th Cent. BC.
196. Hellenistic and Roman Terra-cotta Water Pipes.
197. Roman Terra-cotta Cylinder Segments for Concealing Drainage. Downpipes within Walls.
LIST OF ILLUSTRATIONS

198. Map indicating regional Distribution of Lime and Gypsum Plaster.
199. Iron Age Lime Kilns north of Jerusalem.
201. Roman Legionary *fabricatio* lime burning Plant. Iversheim, Lower Germany.
202. Reconstructed 'Clamp' burning of Lime.
203. Neolithic Painted Wall Plaster. Çatal Hüyük. 7th–6th Millenium BC.
204. Neolithic Modelled Wall Plaster. Çatal Hüyük. 7th–6th Millenium BC.
207. Plastered Column Construction. Achaemenid. Persepolis, ca 500 BC.
208. Plastered Brick Built Columns. Roman.
211. Roman Plastered Column Shafts and Fluting. Amathus, Cyprus.
213. Roman Wall Plaster in Three Coats. Adam’s Diagram.
214. Unfinished Roman Wall Plastering. Pompeii. 1st Cent. AD.
216. Major Scheme of Stucco Decoration as preserved on Temple Wall. Qasr Bint Fir’aun. Petra. 1st Cent. BC–1st Cent. AD.
217. Reconstruction of above Scheme.
218. Detail of Stucco Decoration on Inner Wall of Qasr Bint Fir’aun. Surviving Evidence and Reconstruction.
221. Use of Prefabricated Elements in Early Byzantine Stucco. Salamis, Cyprus, ca 400 AD.
222. Stucco Decoration in the East—Architectural Feature. Firuzabad, ca 300 AD.
223. Typical Developed Eastern Wall Plastering—All Over Impressed Pattern. Nizamabad. 7th–9th Cent. AD.
224. Plaster as a Sealant for Joints. Egypt. Middle Kingdom.
225. Deposition of Core Material in Roman Concrete.
226. Roman Concrete faced with *opus quadratum*. Temple of Antoninus and Faustina. Rome. 140 AD.
LIST OF ILLUSTRATIONS

227. Roman Concrete faced with *opus vittatum*. Baths at Trier, ca 150 AD.
228. Roman Concrete faced with *opus incertum*.
229. Roman Concrete faced with *opus incertum*. Cistern in Baths at Pompeii. Late 2nd Cent. BC.
230. Roman Concrete facing transitional between *opus incertum* and *opus quasi reticulatum*.
231. Roman Concrete *opus reticulatum* schema.
232. Roman Concrete faced with *opus reticulatum*. Capitol at Terracina, ca 40 BC.
233. Preparation of *opus reticulatum* stone facing units.
234. Ruined *opus reticulatum* Wall showing Facing and Core. Pompeii. End of 1st Cent. BC.
235. *Opus reticulatum* Facing where stone units have disappeared leaving only a network of plaster about the empty emplacements.
236. *Opus reticulatum* Facing where stone units have disappeared. Comparative examples.
237. *Opus reticulatum* Facing including some units of burnt bricks.
239. Preparation of *opus testaceum*. Facing Units.
240. Roman Concrete *opus testaceum* showing Facing and Core. Rome. Mid 2nd Cent. AD.
241. Roman Concrete *opus testaceum* showing Core Material including Brick. Pompeii. 1st Cent. AD.
242. Wall Plaster over Roman Concrete.
243. Wall Plaster over Decorative Facing of Roman Concrete.
244. Reconstructed Drawing of Unfaced Roman Concrete Foundations with Impressions of Timber Uprights.
245. Reconstructed Drawing of Unfaced Roman Concrete Foundations with wooden shuttering.
246. *Opus testaceum* Concrete Wall on unfaced Concrete Foundations. Ostia. 2nd Cent. AD.
247. Roman Concrete Columns. Pompeii, ca 70 AD.
248. Elevation of Walls and part Dome of Pantheon showing Projection of Brick Arches set into Concrete Structure. Rome. 112 AD.
249. Choisy’s Drawing of Roman Concrete Vault Construction.
250. Supplies of Bitumen in the Ancient Middle East.
252. Refacing of Existing Tigris Embankment. Assur, ca 1300 BC.
253. Neo-Babylonian Bathroom with Bitumen Waterproofing.
254. Geological Sections showing Formation of Ore Deposits.
255. Sketch Plan of Occurrence of Alluvial (Surface) Gold.
256. Section showing Origin of Surface Gold.
257. Sections showing Deposition of Surface Gold.
258. Conspectus of Egyptian Metallurgical Practice from Delivery of Raw Material to Finished Metal Product. Theban Tomb Decoration. 1500 BC.
259. Reconstructed Drawing of Copper Smelting Furnace at Timna. 1300 BC.
260. Etruscan Shaft Furnace for Copper Smelting.
261. Plano Convex Copper Ingot. Late Bronze Age.
262. Chronological Development of Oxhide Ingot Form. 1500 BC–1200 BC.
263. Comparative Sections of Bloomery Hearth for Wrought Iron and of Middle East Baking Oven.
265. Basic Design of Shaft Furnace for Iron Smelting. 6th Cent. BC and later.
266. Greek Smithy on Black Figure Vase, ca 500 BC.
267. Site Plan of Romano-British Iron Smelting Furnaces. 2nd–3rd Cent. AD.
268. Roman Smithy on Funerary Relief. Aquileia.
270. Large Roman Anvil of Iron.
271. Romano-British Blacksmith’s Tongs.
272. Type of Ancient Middle East City gate, shod, fixed and fortified with Metal.
274. The Moulded Bronze Doors of the Parthenon.
275. The Moulded Bronze Doors of the Pantheon.
278. Inset Wrought Iron Beams. Temple of Apollo, Bassae. 450 BC.
279. Wrought Iron Beams from Roman Bath Installations. Catterick, Yorkshire. 2nd Cent. AD.
281. Renaissance Sketches of Roofing Truss in Pantheon.
283. Iron Reinforcing Rods in Brick and Concrete Architrave. Hadrian’s Villa at Tivoli.
284. Wrought Iron Tie Rods in Mixed Concrete and Stone Construction. Rome. 1st–3rd Cent. AD.
285. Plan of Ayia Sophia showing Position of Iron Ties. 530 AD.
286. Iron Tie Rods across Arches and Iron Collars around eccentrically Loaded Columns. Ayia Sophia, Constantinople, 530 AD.

287. Detail Drawing of Iron Tie Rods and Collars. Ayia Sophia, Constantinople. 530 AD.

288. Basic Forms of Graeco-Roman Metal Cramps.

289. \( \pi \) Form Iron Cramp with Medial Lozenge. Phillipeion at Olympia. ca 335 BC.

290. Cramps and Dowels in Anta. Temple of Athenians, Delos. ca 420 BC.

291. Cramps and Dowels in Angle. Temple of Athenians, Delos. ca 420 BC.

292. System of Dowelling between Courses in Classical Greek Ashlar Masonry. Temple of Athena Nike, Athens. 425 BC.

293. Iron Dowels secured in Emplacements with Molten Lead.

294. Roman Dowelling in Ashlar Masonry.

295. Fixation of Column Drums by Wooden Polos and Empolion (of Hardwood or Metal).


297. Enormous Stock of Iron Nails from Roman Fortress. Inchtuthil, Perthshire, Scotland, ca 130 AD.

298. Classification of Inchtuthil Nails.

299. Iron Hooks for Suspended Ceiling.

300. Lead Cramps in Late Egyptian Masonry. Temple of Kalabsha. 1st Cent. AD.

301. Detail of Lead Cramp. Temple of Kalabsha. 1st Cent. AD.

302. Lead Damp-proofing in Masonry Joints. Hephaisteion, Athens. 440 BC.


304. Acry stalline (Liquid) Atomic Structure of Glass.

305. Sketch Reconstruction of Primary “Tank” Kiln (Furnace) for Producing Bulk Glass. Northern Israel. Late Antiquity.

306. Reconstructed Sequence showing Use of Primary Glass Kiln (Furnace) in Northern Israel.

307. Glass Kiln/Furnace for Manufacturing Objects in Roman and Later Times.
