Construction as Depicted in Western Art

From Antiquity to the Photograph
For Catherine, Emma and Samuel
Acknowledgements

I wish to acknowledge the following for help and support in producing this book: Catherine Tutton, Emma Tutton, Nicole Blondin, James W P Campbell, David Davidson, Monica Knight, Eleonora Scianna, Catherine Yvard, and my editors at AUP.
# Table of Contents

Acknowledgements  
List of Figures  

## Introduction  
- Scope  
- Current Literature and Sources  
- Definitions  
- Layout of the Book  

### 1. The Carpenter  
#### PART 1  
- Access: Scaffolding, Ladders and Ramps, the Raw Materials  
- The Evidence for Early Scaffolding, Ladders and Ramps to the End of the Sixteenth Century  
- Formwork  
- Scaffolding in the Seventeenth Century and Beyond  
- Timber Framing and Roof Structure  
- Accidents and Misadventures  
#### PART 2  
- Cranes, Hoists and other Lifting Equipment  
- Roman Cranes  
- Medieval and Renaissance Cranes  
- When Things Don't Quite Work  
- The Mobile Crane  

### 2. Stone Masons and Bricklayers: Materials, Tools and Equipment  
- Ancient Egypt  
- The Roman Period  
- Medieval and Renaissance  
- Materials Production and Extraction  

### 3. The Smith  
- The Blacksmith on the Building Site
Conclusion

Notes
Glossary of Technical Terms
Bibliography
Index
List of Figures

Figure 1: Gherardo Mechini (?), 1601, The dome of Florence cathedral: *Scaffolding and hoisting devices used in 1601 to repair lightning damage to the lantern*, drawing, pen, brown ink and wash, 248A, Gabinetto Disegni e Stampe, Galleria degli Uffizi, Florence. (Courtesy of the Uffizi Galleries) 36

Figure 2: 1390-1400, Gathering poles from coppicing, Master Wenceslas, Bohemian, *Month of December, Cycle of Months*, fresco, Torre Aquila, Buonconsiglio Castle, Trento, Italy. De Agostini Picture Library, A De Gregorio / Bridgeman Images. 38

Figure 3: Early Christian Painter (active 4th century in Rome) Tomb of Trebius Justus, Rome, 4th century AD. https://www.wga.hu/frames-e.html?/html/zearly/1/2mural/5vialati/latina7.html 40

Figure 4: 890-900, French (West Franconian Empire?), *Building a Church*, The Golden Psalter (*Psalterium aureum*) of St. Gall, St. Gallen, Stiftsbibliothek, Cod. Sang. 22, p64. 41

Figure 5: 1050-1150, English, *Building of the Tower of Babel*, Old English Hexateuch, London, © The British Library Board, Cotton MS Claudius B IV, f. 19r. 42

Figure 6: *Building a Tower*, 11th century, Frankish or Italian, from Rabanus Maurus, *De Universo*, cod.132, f. 394, Romanesque edition of the Carolingian original. (Abbey of Monte Cassino, Italy) 44

Figure 7: c.1244-1254, French, *Construction of the Tower of Bable*, illumination from the ‘Morgan’ Bible possibly commissioned by Louis IX before embarking on his first crusade in 1248, The Morgan Library and Museum, New York. MS M638, f. 3r. Purchased by J P Morgan (1867-1943) in 1916. 45

Figure 8: 1260-1270, Holy Land (Acre ?), *Construction of Rome*, from ‘Histoire ancienne jusqu'à César’, ms. 0562, f. 009, Bibliotheque Municipale de Dijon, France. 46

Figure 9: Unknown artist, *Building the Tower of Babel*, 1385, German, Bavaria, illustration from the *Weltchronik (Chronicle of the World)* by the Austrian epic poet Rudolf von Elms. An illuminated manuscript page: Shelf mark: 2º Ms. Theo. 4 f. 28r Universitatsbibliothek Kassel. Germany (Landesbibliothek und Murhardsche Bibliothek der Stadt Kassel). 47

Figure 10: French, *Construction of a Fortress*, page from a manuscript in the Bibliotheque Nationale de France. Mary Evans Picture Library. 48
Figure 11: Italian, Naples, 1325-1350, *Building of Lavinium*, from *Histoire Ancienne Jusqu'à César*, © The British Library Board, London, Royal MS 20 D1, f. 202v


Figure 14: Italian, Naples, 1325-1350, *Ulysses Building a Castle*, from *Histoire Ancienne Jusqu'à César*, © The British Library Board, London, Royal MS 20 D1, f. 189v.

Figure 15a: Ambrogio Lorenzetti, Italian, active 1319-†1348/9, Detail *The Effects of Good Government in the City*, 1338/9, Fresco, Palazzo Pubblico, Siena, Italy. (Jim Forest Creative Commons)

Figure 15b: Ambrogio Lorenzetti, Italian, active 1319-†1348/9, *The Effects of Good Government in the City*, 1338/9, Fresco, Palazzo Pubblico, Siena, Italy. (Jim Forest Creative Commons)

Figure 16: French, *Tower of Babel*, c.1250, from a *Bible Historiale*, Rylands Collection, MS 5, f. 16r. The John Rylands Library, University of Manchester.

Figure 17: French, *Construction of the Tower of Babel*, 1300-1325, *Bible Historiale*, Bibliothèque de l’abbaye de Clairvaux, ms. 0059, f. 017.

Figure 18: French, 1300-1325, *A King supervising the building of a church*, from *Estoire del Saint Graal*, part of Royal MS 14 E III, f. 85v. London © The British Library Board.

Figure 19: French, 1st half of the 14th century, *Charlemagne orders the construction of a church (Aix-la-Chapelle)*, from the *Grande Chroniques de Saint Denis*, Bibliotheque Municipale de Toulouse, ms. 0512, f. 096r.

Figure 20: French, 1st quarter 15th century (pre 1416), Limbour Paul, Jean and Hermann, *Building in Jerusalem*, from *Très Riches Heures du Duc de Berry*, ms.65, f. 49v, Musee Conde, Chantilly, France.

Figure 21: French, 1st quarter 15th century (pre 1416), Limbour Paul, Jean and Hermann, *The Building of the Jerusalem Temple*, from *Très Riches Heures du Duc de Berry*, ms.65, f. 35v, Musee Conde, Chantilly, France.
Figure 22: The 13th century bible: Cyrus orders the rebuilding of the temple of Jerusalem, Historiated initials ‘I’, from French municipal libraries (except 12) as follows:

2. c.1220, MS. 0036, f.70v. Reims Bibliotheque et Mediatheque de Reims.
3. Late 13th century, MS. 0040, f.163v. Reims, Bibliotheque et Mediatheque de Reims.
8. 1270-1280, MS. 0146A, f. 188v. Bibliotheque de Autun.

Figure 23: Flemish, c.1480, Loyset Liédet, Construction of Alexandria, from History of Alexander the Great, Paris, Bibliotheque National ms. Fr 2247, f. 76r.

Figure 24: French late 15th to early 16th century, Charlemagne visiting the construction of Aix la Chapelle in 796, illustration from Grandes Chroniques de France, edition by Antoine Vérand, hand-painted print in a incunabulum. (Biblioteca Nazionale Universitaria di Torino XV. I. 47, f.133)

Figure 25a: Jacopo Bellini, c.1400-1470, Italian, The Bearing of the Cross, c.1450, drawing, silver point, pen and brown ink on parchment. (Musée du Louvre, Paris)

Figure 25b: Jacopo Bellini, c.1400-1470, Italian, Detail The Bearing of the Cross, c.1450, drawing, silver point, pen and brown ink on parchment. (Musée du Louvre, Paris)
Figure 26: 1443, Domenico di Bartolo, Italian, c.1400-c.1445, *La Limosina del Vescovo*, fresco, Spedale di Santa Maria della Scala. Siena, Italy. Archive photograph, Fondazione Zeri, Universita di Bologna, Italy.

Figure 27: Early 15th Century, French, detail, *Construction of the Abbey of St Denis*, illumination from the *Grandes Chroniques de France*, ms. 0863, f. 056v. Bibiothque Municipale de Besançon, France.

Figure 28: 1444-1461, Flemish (Bruges), *Saint Bathilde et la construction d’une eglise*, illumination from *La Legende Dorée*, ms. 0003, f. 145. Bibiothque Municipale de Mâcon, France.

Figure 29: 1466/7, Flemish, *The Construction of Rome*, illumination from *Romuléon*, ms. 0850, f. 001. Bibliotheque Municipale de Besançon, France.

Figure 30a: c.1440, Follower of Robert Campin, Flemish, *The Virgin and Child before a Firescreen*, 63.4 × 48.5 cm, oil with egg tempera on oak panel, The National Gallery, London.

Figure 31b: Detail of figure 31a

Figure 32: South Netherlandish, Master of the Joseph Sequence, *St Barbara Directing the Construction of a Third Window in Her Tower*, 98 × 35.4 cm, oil on panel. Walters Art Museum, Baltimore, Maryland, USA.

Figure 33: (Detail) South Netherlandish, Master of the Joseph Sequence, *St Barbara Directing the Construction of a Third Window in Her Tower*, 98 × 35.4 cm, oil on panel. Walters Art Museum, Baltimore, Maryland, USA.

Figure 34: 1471-1481, Austrian, Michael Pacher, c.1435-1498, *St Wolfgang Heals the Possessed Woman*, Lower right-hand panel of the workday (closed) aspect of the *St Wolfgang Altarpiece*, 173 × 140 cm, oil on panel. St Wolfgang Church, Salzkammergut, Austria. Flickr, Jaime Antonio Alvarez, with consent.

Figure 35: Flemish, c.1478, *St Barbara*, illumination from a Book of Hours, Latin ms. 39, f. 151r. Rylands Collection, University of Manchester.

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>Southern Netherlands (Ghent?), c.1500, <em>The Building of the Tower of Babel</em>, from a Book of Hours, the 'London Rothschild Hours' or the 'Hours of Joanna 1 of Castile', © The British Library Board, London, Add MS 35333, f. 34r.</td>
</tr>
<tr>
<td>40</td>
<td>Master of James IV of Scotland or Gerard Horenbout, <em>Elijah Begging for Fire from Heaven</em>, 1510-1520, Flemish, Ghent or Bruges, from the Spinola Hours, Ms Ludwig IX 18, f. 32. (The J Paul Getty Museum, digital image courtesy of the Getty’s Open Content Program)</td>
</tr>
<tr>
<td>41a</td>
<td>1520-1525, Netherlandish (Antwerp Mannerist) Painter, <em>A Sermon on Charity (possibly the Conversion of St Anthony)</em>, 85.1 × 58.4 cm, oil on panel. Metropolitan Museum of Art, New York, OASC.</td>
</tr>
<tr>
<td>41b</td>
<td>detail of scaffolding.</td>
</tr>
<tr>
<td>42a</td>
<td>Abraham Bloemaert, Dutch, 1566-1651, <em>Tobias and the Angel</em>, c.1600, oil on canvas. (State Hermitage Museum, St Petersburg. Photograph © The State Hermitage Museum, Photo by Vladimir Terebenin)</td>
</tr>
<tr>
<td>42b</td>
<td>Abraham Bloemaert, Detail of figure 42a.</td>
</tr>
<tr>
<td>44a</td>
<td>1563, Details of figure 166: Pieter Bruegel the Elder, Flemish, 1525-1569, <em>The Tower of Babel</em>, showing some of the formwork on this huge site. oil on Oak panel. Kunsthistorisches Museum, Vienna: KHM-Museumsverband.</td>
</tr>
</tbody>
</table>
Figure 45: Anton M"oller, *Rebuilding of a Temple by King Joash*, 1602, Gdansk, oil on board, 129 × 326 cm, inv. No.: MNG/SD/494/M © Muzeum Narodowe, Gdansk, Poland.

Figure 46: Johannes Lingelbach, Dutch, *Dam Square, Amsterdam, with the new City Hall under construction*, c.1650, oil on canvas, 122.5 × 206 cm, inv. No.: SA 3044, Amsterdam Museum, Netherlands.

Figure 47: Attributed to Jacob van der Ulft, previously attributed to Johannes Lingelbach, *Dam Square with the City Hall under construction*, c.1650, oil on canvas, 81 × 100 cm, inv. No.: SB 1175, Amsterdam Museum, on loan Rijksmuseum Amsterdam.

Figure 48: Michele Marieschi, Italian, 1710-1744, *Entrance to the Arsenale, Venice*, 1741, engraving, sheet 311 × 470 mm. Fondazione Federico Zeri, Bologna, Italy.

Figure 49: Placido Costanzi, Italian, 1702-1759, *Alexander the Great Founding Alexandria*, oil on canvas, 46.3 × 65 cm. Walters Art Museum, Baltimore, Maryland, USA.

Figure 50: Samuel Scott, English, 1702-1772, *An Arch of Westminster Bridge*, oil on canvas, 135.7 × 163.8 cm, Tate Gallery, London.


Figure 52: R D Chantrell, *View of part of the New Infirmary at Chelsea Hospital*, October 1810, pen and watercolour. By Courtesy of the Trustees of Sir John Soane's Museum.

Figure 53: Thomas Lee, *View of part of the New Infirmary at Chelsea Hospital*, October 1810, pen and watercolour. By Courtesy of the Trustees of Sir John Soane's Museum.

Figure 54: R D Chantrell, *View of part of the New Infirmary at Chelsea Hospital*, October 1810, pen and watercolour. By Courtesy of the Trustees of Sir John Soane's Museum.

Figure 55: Thomas Lee, *View of part of the New Infirmary at Chelsea Hospital*, October 1810, pen and watercolour. By Courtesy of the Trustees of Sir John Soane's Museum.

Figure 56: R D Chantrell, *View of part of the New Infirmary at Chelsea Hospital*, October 1810, pen and watercolour. By Courtesy of the Trustees of Sir John Soane's Museum.

Figure 57: John Buxton, *View of part of the New Infirmary at Chelsea Hospital*, October 1810, pen Courtesy of the Trustees of Sir John Soane's Museum.
Figure 58: R D Chantrell, *View of part of the New Infirmary at Chelsea Hospital*, October 1810, pen and watercolour. By Courtesy of the Trustees of Sir John Soane’s Museum.


Figure 60: 1779, English, 1743-1801, *Westgate, Winchester*, oil on canvas, Manchester Art Gallery, Bridgeman Images.

Figure 61: Joseph Walter, English 1783-1856, *A View from Portishead towards Wales*, c.1832, oil on canvas, 48.2 × 63.5 cm. Bristol City Museum and Art Gallery, given by James Fuller Eberle, 1921. Bridgeman Images.

Figure 62: Detail, Joseph Walter, English 1783-1856, *A View from Portishead towards Wales*, c.1832, oil on canvas, 48.2 × 63.5 cm. Bristol City Museum and Art Gallery, given by James Fuller Eberle, 1921. Bridgeman Images.

Figure 63: George Scharf, German, 1788-1860, *Laying the Foundations of the Lycian Room, the British Museum*, dated 1845, but drawn earlier, watercolour over graphite on paper. © The Trustees of the British Museum

Figure 64: George Scharf, German, 1788-1860, *Building the New Gallery of the British Museum*, dated 1828, graphite (with ink and wash?) on paper. Private Collection. Bridgeman Images.

Figure 65: George Scharf, German, 1788-1860, *Accident of a rope breaking when hoisting a girder at the building of the Lycian Room of the British Museum*, 1844, graphite on paper. © The Trustees of the British Museum

Figure 66: George Scharf, German, 1788-1860, *Raising of the girders at the College of Surgeons*, 1835(?), graphite on paper. © The Trustees of the British Museum

Figure 67: George Scharf, German, 1788-1860, *New Covent Garden Market Building taken from Southampton Row*, 1829, graphite on paper. © The Trustees of the British Museum

Figure 68: George Scharf, German, 1788-1860, *Outside Craig’s house in Francis Street, Summer 1841*, graphite on paper. Private Collection. Bridgeman Images

Figure 69: Eduard Gaertner, German, 1801-1877, *The Friedrichsgracht, Berlin*, c.1830, oil on paper laid down on millboard, 25.5 × 44.6 cm. The National Gallery, London.
Figure 70: Eduard Gaertner, German, 1801-1877, Klosterstrasse mit der Parochialkirche, 1830, oil on canvas, 32 × 44 cm. bpk, Nationalgalerie, Staatliche Museen zu Berlin / Jörg P Anders.

Figure 71: Eduard Gaertner, German, 1801-1877, Detail, Klosterstrasse mit der Parochialkirche, detail of figure 70, 1830, oil on canvas, 32 × 44 cm. bpk, Nationalgalerie, Staatliche Museen zu Berlin / Jörg P Anders.

Figure 72: Cologne Cathedral in 1875, wood engraving, drawn by H Toussaint, engraved by Antoine Valerie Bertrand, from a photograph by Johann Heinrich Schonscheidt. (Author).

Figure 73: 1410-1414 Master of the Cité de Dames, French, Rectitude leading Christine and other worthy women into the city, from Christine de Pizan, Collected Works (‘The Book of the Queen’), © The British Library Board, London, Harley ms 4431, f. 323r.

Figure 74: c.1445, Pesellino (Francesco di Stefano), 1422-1457, Italian, The Construction of the Temple of Jerusalem, tempera on panel, 53.5 × 60.3 cm. (Harvard Art Museum/Fogg Museum, Friends of the Fogg Art Museum Fund, 1916.495. Imaging Department © President and Fellows of Harvard College.)

Figure 75: Bedford Master, Construction of Noah’s Ark, c.1410-1430, from a book of hours of the use of Paris (The Bedford Hours), © The British Library Board, London, Add MS 18850, f. 15v.

Figure 76: Hieronymus Rodier, Germany, d. 1539, Perspective: Carpenters Building a House, woodcut published 1531. Württembergische Landesbibliothek, Stuttgart, Germany.


Figure 78: English School, early 18th century, Prospect of Littlecote House from the South, oil on canvas. (1.269) © Royal Armouries.

Figure 79: English School, early 18th century, details, Prospect of Littlecote House from the South, oil on canvas. (1.269) © Royal Armouries.

Figure 80: detail of figure 161, 1500-1533, Northern French, Construction of the Abbey of St Bertin at St Omer, oil on wood panel, lower panel of the right hand leaf of the doors to the treasury of the Abbey © Musee des Beaux-Arts de Dijon. Photo Hugo Martens.

Figure 81: detail of figure 165, 1515-1520, Piero de Cosimo, Italian, 1462-1521, The Building of a Palace, 83 × 197 cm, oil on panel, The Ringling Museum of Art, Sarasota, Florida, USA: Bequest of John Ringling, 1936, Collection of The John and Mabel Ringling Museum of Art, the State Art Museum of Florida, Florida State University.
Figure 82: Ercole d’Roberti, Italian, active 1479-d1496, *The Israelites gathering Manna*, one of two panels from a Predella, 28.9 × 63.5 cm, tempera on canvas, transferred from wood. (NG 1217, London, The National Gallery)

Figure 83: 1876, Illustration from F. Streich and K. de Gerstenberg, *Méthode d’enseignement par l’aspect les métiers et leurs outils*, chromolithograph, published 1876, Paris, editions Bonhoure. Mary Evans Picture Library.

Figure 84: c.1402, Lorenzo di Niccolo, Italian, active 1391-1412, *St Fina saves the life of a carpenter who fell from the roof of a church he was building*, oil or tempera on wood panel, lower right-hand panel of the Santa Fina Altarpiece, Museo d’Arte Sacra, San Gimignano, Italy. Archive photograph, Fratelli Alinari, founded 1852. Fondazione Zeri, Universita di Bologna, Italy.

Figure 85: 1450s, Antonio Vivarini, Italian, active by 1441-d1476/84, *Saint Peter Martyr Healing the Leg of a Young Carpenter*, 53 × 33.3 cm, tempera and gold leaf on wood panel, The Metropolitan Museum of Art, New York, OASC.

Figure 86: 2nd Century, Rome, Italy, one of two surviving reliefs from the Mausoleum of the Haterii showing a tread-wheel crane and tombs, originally located on the Via Labicana, now destroyed, carved stone. Vatican Museums: Gresoriano Profano Museum, Cat. 9998.

Figure 87: Capua, Italy, 2nd Century, detail, carved stone relief, part of a sarcophagus, showing a tread-wheel crane lifting a column with a mason carving a capital. Museo Provinciale Campano di Capua, Sarcofagi (Sala III-IV). Photograph: Dan Diffendale.

Figure 88: 1260-1270, Holy Land, Acre (before the fall of Acre in 1291) *Construction of the Tower of Babel*, from ‘Histoire Ancienne jusqu’à César’, ms. 0562, f. 009, Bibliotheque Municipale de Dijon, France.


Figure 90: German c.1370, *Construction of the Tower of Babel*, from Rudolf von Ems / Jansen Enikel, Jans: *Weltchronik in Versen – Mischhandschrift aus Christ-herre-Chronik*. Bayerische Staatsbibliothek München, BSB Cgm 5, f. 29r.

Figure 91: 1390-1400, German, *Building the Tower of Babel*, Wenceslas Bible, Commissioned by King Wenceslas IV of Bohemia, 1361-1419. Cod. 2759, f. 10v, Österreichische Nationalbibliothek, Vienna.
Figure 92:  Left: The Perronet crane of the mid 18th century, from Diderot, Denis and le Rond d’Alembert, Jean-Baptiste, editors, 1751-72, Encyclopédie, ou Dictionnaire raisonné des sciences, des arts et des métiers, etc., Paris, fig. 7, plate XLVII. Right: Detail of figure 139 showing the same type of crane in use in the late fifteenth century.

Figure 93: 1563, Detail of figure 166: Pieter Bruegel the Elder, Flemish, 1525-1569, The Tower of Babel, Large dockside type crane and simple ‘T’ hoist, oil on Oak panel. Kunsthistorisches Museum, Vienna: KHM-Museumsverband.

Figure 94: 1563, Detail of figure 166: Pieter Bruegel the Elder, Flemish, 1525-1569, The Tower of Babel, treadwheel with simple hoist alongside, oil on Oak panel. Kunsthistorisches Museum, Vienna: KHM-Museumsverband.

Figure 95: 1587, German, unknown master, The Tower of Babel, oil or tempera on panel. Z 2249, Germanisches Nationalmuseum, Nuremberg.

Figure 96: Cologne, c.1455-1460: Legend of St Ursula, Arrival in Cologne and St Ursula’s dream, inside lid of a relic casket, tempera on softwood, 54 × 89 × 248 cm. Collection of Ferdinand Franz Wallraf. WRM 0715. Wallraf-Richartz-Museum & Fondation Corboud, Cologne. Photo: The Print Collector/Alamy Stock Photo.

Figure 97: 1489, Hans Memling, Flemish, The Arrival of St Ursula at Cologne, Reliquary of St Ursula. Hans Memling Museum, Bruges. Photo: Peter Horree/Alamy Stock Photo.

Figure 98: 1684, Jan van der Heyden, Netherlands, 1637-1712, A Street Scene in Cologne, 31.6 × 0.6 cm, oil on oak panel, The Wallace Collection, London.

Figure 99: 1407, Spinello Aretino (Spinello di Luca Spinelli), Italian, 1345/52-1410, The History of Pope Alexander III: Construction of the Town of Alexandria, Fesco, Palazzo Pubblico, Siena, Italy. Archive photograph, Fondazione Zeri, Universita di Bologna, Italy.

Figure 100: 1400-1410, unknown German Master, Regensburg, Bavaria, The Construction of the Tower of Babel, from the Weltchronik, manuscript illumination. 88.MP.70.13, MS. 33, f. 13. J Paul Getty Museum, Los Angeles. Digital image courtesy of the Getty’s Open Content Program.

Figure 101: Bedford Master, The Building of the Tower of Babel, from a Book of Hours of the use of Paris (The Bedford Hours), © The British Library Board, London, Add. MS 18850, f. 17v.
Figure 102: 1645-1648, Eustache le Sueur, French, 1616-1655, *St Bruno orders the Construction of the Monastery*, 193 × 130 cm, oil on canvas, Musee du Louvre, Paris

Figure 103: c.1450, Apollonio di Giovanni, Italian, 1415/17-1465, *Aeneas at Carthage*, 49.7 × 161.9 cm, tempera on panel, Yale University Art Gallery, New Haven, Connecticut. University purchase from James Jackson Jerves, 1871.35. Open access image.

Figure 104: c.1450, Apollonio di Giovanni, Italian, 1415/17-1465, *Aeneas at Carthage*, 49.7 × 161.9 cm, tempera on panel, detail of figure 103, The Construction of Carthage, Yale University Art Gallery, New Haven, Connecticut. University purchase from James Jackson Jerves, 1871.35. Open access image.

Figure 105: Apollonio di Giovanni, Italian, *Meeting of Dido and Aeneas and the Construction of the Medici Palace*, miniature from Vergilius Publius Maro, Bucolicon, Georgicon, Aeneis, 1460-1465. Palazzo Medici Riccardi, Biblioteca Riccardiana, Florence, ms Ricc.492, f. 72r. (©Photo Donato Pineider: ‘Su concessione del Ministero dei Beni e le Attivita Cultural’)

Figure 106: c.1460, Master of San Miniato (attributed), detail of figure 154, *The Victory of Alexander the Great and the Building of the City of Alexandria*, 51 × 160 cm, oil (?) on panel, originally produced for the front of a wedding chest, Ca’ d’Oro, cat. D76. Galleria Franchetti, Venice.

Figure 107: 1457-1468, Giovanni Bettini da Fano, c.1450-?, *Il tempio malatesiano di Rimini under construction*, a temple designed by Leon Battista Alberti, miniature from Basini parmensis, Hesperis, book XIII, code: Ms 52 B L, f. 126r, Bibliotheque de L’Arsenal, Paris.

Figure 108: 1515-1520, Piero de Cosimo, Italian, 1462 -1521, detail of figure 165, *The Building of a Palace*, 83 × 197 cm, oil on panel, The Ringling Museum of Art, Sarasota, Florida, USA: Bequest of John Ringling, 1936, Collection of The John and Mabel Ringling Museum of Art, the State Art Museum of Florida, Florida State University.

Figure 109: Flemish, c.1480, Loyset Liédet, detail of figure 23, *Construction of Alexandria*, from History of Alexander the Great, Paris, Bibliotheque National ms. Fr 2247, f. 76r.

Figure 110: c.1480, French, details, a) left, of figure 140, *Construction of the City of Enoch*, and b) right, of figure 141, *Construction of the Tower of Babel*, illuminations from ‘La Cité de Dieu’, ms 0002, folios 065, and 094 respectively. Bibliotheque Municipale de Macon, France,
Figure 111: George Scharf, German, 1788-1860, detail of figure 66, *Raising of the girders at the College of Surgeons*, 1835, graphite on paper. © The Trustees of the British Museum.

Figure 112: George Scharf, German, 1788-1860, *Mode of moving into the building the iron girders at the College of Surgeons*, 1835, graphite on paper. © The Trustees of the British Museum.

Figure 113: George Scharf, German, 1788-1860, *Mode of conveying the iron girders from Pimlico to the College of Surgeons*, 1835, graphite on paper. © The Trustees of the British Museum.

Figure 114: George Scharf, German, 1788-1860, detail of figure 67, *New Covent Garden Market Building taken from Southampton Row*, 1829, graphite on paper. © The Trustees of the British Museum.

Figure 115: 1876, detail of figure 83, Illustration from F. Streich and K. de Gerstenberg, *Méthode d'enseignement par l'aspect les métiers et leurs outils*, chromolithograph, published 1876, Paris, editions Bonhoure. Mary Evans Picture Library.


Figure 118: Nina de Garis Davies (1881-1965), *Sculptors at Work, Tomb of Rakhmire*, 1927, facsimile painting from the original at the Tomb of Rakhmire, Thebes. Tempera on paper, 54 × 38.5cm. Metropolitan Museum of Art, New York, Rogers Fund, 1930. (Public Domain) (http://www.metmuseum.org/art/collection/search/544655)

Figure 119: Brick makers, tomb of Rakhmire, Thebes, Sheikh Abd el-Qurna. Photograph, November 2016. (Kairoinfo4u, https://www.flickr.com/photos/manna4u/3253653582) (Creative Commons: https://creativecommons.org/licenses/by-nc-sa/2.0/)

Figure 121: Capua, Italy, 2nd Century, detail, carved stone relief, part of a sarcophagus, showing a tread-wheel crane lifting a column with a mason carving a capital. Museo Provinciale Campano di Capua, Sarcofagi (Sala III-IV). Photograph: Dan Diffendale.

Figure 122: Early Christian Painter (active 4th century in Rome) Tomb of Trebius Justus, Rome, 4th century AD, detail of figure 3. https://www.wga.hu/frames-e.html?/html/zearly/1/2mural/5vialati/latina7.html

Figure 123: Flemish, Flemish Converts Building a Church under the Supervision of St. Amand, from the manuscript The First Life of St. Amand, produced in the Abbey of Saint Amand in 1066-1107. (Bibliothèque Municipale de Valenciennes, France, ms. 0502, f. 018.)

Figure 124: Mosaic artist active 1180s, Monreale Cathedral, building the Tower of Babel. Archive photograph c.1910-1940, Fratelli Alinari. Fondazione Zeri, Universita di Bologna, Italy.

Figure 125: Mosaic artist active in the 12th century, Basilica of San Marco, Venice, building the Tower of Babel. Archive photograph c.1910-1940, Fratelli Alinari. Fondazione Zeri, Universita di Bologna, Italy.

Figure 126: French, 13th century Bible, Cyrus orders the rebuilding of the temple of Jerusalem: Historiated initial 'I' (Bibliothèque Municipale de Amiens, France, ms. 0021, f. 167v.)

Figure 127: Studio of Blanche, French, 1220-1230 Bible, Cyrus orders the rebuilding of the temple of Jerusalem: Historiated initial 'I' MS 1185, f. 127v Bibliothéque St Genevieve, Paris, France.

Figure 128: Pietro Lorenzetti, Saint Humility Transports Bricks to the Convent She is Building, c.1341, Tempera on wood app. 40 × 30 cm, part of the now incomplete Beata Umiltà Altarpiece, Uffizi, Florence. (Archive photograph by Brogi, 1900/40, Fondazione Zeri, Universita di Bologna, Italy.)

Figure 129: Construction of Rome, late 13th century, before the fall of Acre in 1291, French, from Historie Ancienne Jusqu’a Cesar, © The British Library Board, London, Add. Ms 15268, f. 156r.

Figure 130: Master of the Rouen Echevinage, active 1455-1485, French, Construction of the Temple of Jerusalem from the manuscript Histoire d’Outremer, written by the chronicler and Archbishop of Tyre c.1130-1186. Bibliotheque Nationale de France, ms 2629 f. 17.

Figure 131: Early 15th Century, French, Construction of the Abbey of St Denis, illumination from the Grandes Chroniques de France, ms. 0863, f. 056v. Bibliotheque Municipale de Besançon, France.
Figure 132: Master of the Cité de Dames, French, Construction of Thebes and Cadmus killing the dragon at Ares's spring, 1410-1414, from Christine de Pizan, Collected works (‘The Book of the Queen’). © The British Library Board, London, Harley ms 4431, f. 109r

Figure 133: Master of the Cité de Dames, French, Christine de Pizan before the personifications of Rectitude, Reason, and Justice in her study, with Christine and Reason building the ‘Cité des dames’, 1410-1414, from Christine de Pizan, Collected works (‘The Book of the Queen’). © The British Library Board, London, Harley ms 4431, f. 290r

Figure 134: Master of Girart de Roussillon, Burgundian, active 1440-1465, Construction of twelve churches by Girart and his wife, c.1460. Österreichische Nationalbibliothek, Vienna, ms Cod. 2549, f. 164r (E 28.568-C)

Figure 135: Apollonio di Giovanni, Italian, Meeting of Dido and Aeneas and the Construction of the Medici Palace, miniature from Vergilius Publius Maro, Bucolicon, Georgicon, Aeneis, 1460-1465. Palazzo Medici Riccardi, Biblioteca Riccardiana, Florence, ms Ricc.492, f. 72v. (©Photo Donato Pineider: ‘Su concessione del Ministero dei Beni e le Attivita Culturali’)

Figure 136: c.1465, Jean Fouquet, 1420-1481, or the Master of the Munich Boccaccio, active 1460-1480, under the former’s supervision (probably one of his sons), Solomon Supervises the Construction of the Temple, from Josephus, Antiquites Judaiques. French, Bibliothèque Nationale, Paris, ms fr. 247, f. 163.

Figure 137: 1466-1467, Flemish, The Construction of Rome, from the ‘Romuleon’. Bibliotheque Municipale de Besançon, France, ms o850, f. 050.

Figure 138: 1467-1470, Attributed to Jacques de Besançon, French, active c.1460-1500, The Origins of Rome, from Ab Urbe condita. Bibliotheque municipale de Tours, ms. 0984, f. 001.

Figure 139: 1475-1500, Master of the Echevinage de Rouen (also known as the Master of the Geneva Latini), French, Construction of Venice, Sycambria, Carthage and Rome, from the Chronique de la Bouquechardiè. © The British Library Board, London, Harley ms 4376 f.150.

Figure 140: c.1480, French, Construction of the City of Enoch, illumination from ‘La Cité de Dieu’, Bibliotheque Municipale de Macon, France, ms 0002, f. 065.

Figure 141: c.1480, French, Construction of the Tower of Babel, illumination from ‘La Cité de Dieu’, Bibliotheque Municipale de Macon, France, ms 0002, f. 094
Figure 142: 1490s, Jean Colombe, French, c.1430-c.1493, *Rebuilding of Troy by Priam*, from *Recueil des Histories de Troie*, bpk / Kupferstichkabinett, Staatliche Museen zu Berlin / Jörg P. Anders.

Figure 143: 1411, French, Bible Historiale, *Building of the Tower of Babel*. © The British Library Board, London, Royal ms 19 DIII, f. 16r.

Figure 144: Bedford Master, *The Building of the Tower of Babel*, from a Book of Hours of the use of Paris (The Bedford Hours), © The British Library Board, London, Add. MS 18850, f. 17v.


Figure 146: 1498, Attributed to (or Studio of) Master of the Echevinage de Rouen, French, *Construction of a town*, from the *Breviare de Charles de Neufchâtel*, ms. 0069, p. 129, Bibliotheque municipale de Besançon, France.

Figure 147: Late 15th Century, French, *Building a tower or fortress*, from a *Book of Hours* ms. 0107, f. 020v, Bibliotheque municipale de Amiens.

Figure 148: c.1465, Antonio di Pietro Averlino, known as Filarete, Italian, c.1400-c.1469, illuminated letter ‘P’ from his *Trattato d’architettura*. Biblioteca Nazionale Centrale di Firenze, ms II. I. 140 (giá Magl. XVII, 30), f. 1r.

Figure 149: 1488-1489, Bernardino Butinone, Italian, 1435/6-c.1489, *A Palace under Construction*, detail of figure 150, illumination from ‘Trattato d’Architettura’ by Antonio Filarete. Biblioteca Nazionale Marciana, Venice, ms. Lat. cl.VIII, 2 (-2796) f. 5r.

Figure 150: 1488-1489, Bernardino Butinone, Italian, 1435/6-c.1489, *A Palace under Construction*, illumination from ‘Trattato d’Architettura’ by Antonio Filarete. Biblioteca Nazionale Marciana, Venice, ms. Lat. cl.VIII, 2 (-2796) f. 5r.

Figure 151: 1430-32, Stefano di Giovanni, called il Sassetta, Italian, c.1392-c.1451, *Madonna delle Nevi*, 240 × 216cm, panel, formally in Siena Cathedral, Uffizi, Florence. Anonymous archive photograph, c.1950, Fondazione Zeri, Universita di Bologna, Italy.

Figure 152: 1430-32, Stefano di Giovanni, called il Sassetta, Italian, c.1392-c.1451, *Construction of the Church which became Santa Maria Maggiore, Rome*, second panel from the right of the predella of the Altarpiece *Madonna delle Nevi*, 31 × 27.5 cm, panel, formally in Siena Cathedral, Galleria degli Uffizi, collezione Contini Bonacossi, cat. 00281712(7).
Figure 153: 1437, Jan van Eyck, Flemish, 1380/1400-1441, *Saint Barbara*, 41.2 × 27.6 cm (including original frame), black ink and oil on panel, signed and dated on frame, Royal Museum for Fine Arts, Antwerp © www.lukasweb.be – Art in Flanders vzw, photo Hugo Maertens.

Figure 154: c.1460, Master of San Miniato (attributed), *The Victory of Alexander the Great and the Building of the City of Alexandria*, 51 × 160 cm, oil (?) on panel, originally produced for the front of a wedding chest, Ca’ d’Oro, cat. D76. Galleria Franchetti, Venice.

Figure 155: c.1460, Master of San Miniato (attributed), detail of figure 154, *The Victory of Alexander the Great and the Building of the City of Alexandria*, 51 × 160 cm, oil (?) on panel, Ca’ d’Oro, Galleria Franchetti, Venice.

Figure 156: 1471-1481, Austrian, Michael Pacher, c.1435-1498, *Saint Wolfgang and Helper Building the Church of St Wolfgang*, Lower left-hand panel of the workday (closed) aspect of the *St Wolfgang Altarpiece*, 173 × 140 cm, oil on panel. St Wolfgang Church, Salzkammergut, Austria. Flickr, Jaime Antonio Alverez, with consent.

Figure 157: c.1489, Andrea Mantegna, Italian, 1431-1506, *Madonna of the Grotto*, 29 × 21.5 cm, tempera on panel, Galleria degli Uffizi, Florence.

Figure 158: c.1489, Andrea Mantegna, Italian, 1431-1506, *Madonna of the Grotto*, detail of figure 157, 29 × 21.5 cm, tempera on panel, Galleria degli Uffizi, Florence.

Figure 159: 1474, Andrea Mantegna, Italian, 1431-1506, *The Arrival of Cardinal Francesco Gonzaga*, fresco west wall, ‘Camera degli Sposi’, Ducal Palace, Mantua, Italy. GNU Free Documentation Licence.


Figure 161: 1500-1533, Northern French, *Scenes from the life of St Bertin*, oil on wood panel, pair of doors to the treasury of the Abbey of St. Bertin at St. Omer, © Musee des Beaux-Arts de Dijon. Photo Hugo Martens.

Figure 162: 1500-1533, Northern French, *Construction of the Abbey of St Bertin at St Omer*, oil on wood panel, lower panel of the right hand leaf of the doors to the treasury of the Abbey © Musee des Beaux-Arts de Dijon. Photo Hugo Martens.
Figure 163: c.1505, Rueland Frueauf the Younger, Austro German, 1470-1547, Margrave Leopold III (St Leopold) Inspecting the Construction of Klosterneuburg Abbey, 76 × 39 cm, tempera on panel, Monastery of Klosterneuburg, Austria.

Figure 164: 1505-1508, Giovanni Antonio Bazzi, called Il Sodoma, Italian, *Life of St Benedict: Benedict Appears in the Dreams of Two Monks*, from a series of frescoes depicting the Life of St Benedict, Abbey of Monte Oliveto Maggiore, Asciano, Italy. Archive photograph c.1895, Fratelli Alinari. Fondazione Zeri, Università di Bologna, Italy.

Figure 165: 1515-1520, Piero de Cosimo, Italian, 1462 -1521, *The Building of a Palace*, 83 × 197 cm, oil on panel, The Ringling Museum of Art, Sarasota, Florida, USA: Bequest of John Ringling, 1936, Collection of The John and Mabel Ringling Museum of Art, the State Art Museum of Florida, Florida State University.

Figure 166: 1563, Peter Bruegel the Elder, Flemish, 1525-1569, *The Tower of Babel*, oil on Oak panel, 114 × 155cm. Kunsthistorisches Museum, Vienna: KHM-Museumsverband.

Figure 167: c.1680, Adam-François van der Meulen, Flemish, 1632-1690, *Construction of the Chateau de Versailles*, 103 × 138.5 cm, oil on canvas, Royal Collection Trust / © Her Majesty Queen Elizabeth II 2016.

Figure 168: c.1725, Giovanni Antonio Canal, called Canaletto, Italian, 1697-1768, *The Stonemason's Yard*, 123.8 × 162.9 cm, oil on canvas, The National Gallery, London.

Figure 169: Samuel Jackson, English, 1794-1868, *A View from the Park Place across Whiteladies Road to the Royal Fort, Bristol*, 1824, 202 × 253mm, watercolour. Bristol City Museum and Art Gallery, Bequest of William J Braikenridge, 1908. Bridgeman Images.

Figure 170: 1802, Johann Christoph Frisch, German, 1738-1815, *Friedrich II, King of Prussia and the Marquis d’Agens visit the Construction of the Palace of Sanssouci at Potsdam*, oil on canvas, 91 × 74.5cm. Stiftung Preußische Schlösser und Gärten Berlin-Brandenburg/Photograph: Gerhard Murza.

Figure 171: 1852-1863, Ford Madox Brown, English, 1821-1893, *Work*, oil on canvas, 137 × 197.3 cm, Manchester Art Gallery, UK/Bridgeman Images.

Figure 173: 1876, Illustration from F. Streich and K. de Gerstenberg, Méthode d'enseignement par l'aspect les métiers et leurs outils, chromolithograph, published 1876, Paris, editions Bonhoure. Mary Evans Picture Library.

Figure 174: 1482, Assistant to the Master of the Flemish Boethius and/or the Master of Edward IV, South Netherlands (Bruges), Miners at Work in a Quarry, from Bartholomaeus Anglicus, translated by Jean Corbechon, De proprietatibus rerum (Livre des proprietez des choses), MS Royal 15 E III, f. 102, British Library, London, UK © British Library Board/Bridgeman Images.

Figure 175: c.1799, Joseph Mallord William Turner, View of Fonthill from a Stone Quarry, pen, ink and watercolour, Leeds Museums and Galleries (Leeds Art Gallery), UK/Bridgeman Images.

Figure 176: c.1620, Peter Paul Rubens, Flemish, 1577-1640, Landscape with Stone Carriers, 86 × 126.5cm, oil on canvas transferred from panel. State Hermitage Museum, St Petersburg, Russia/Bridgeman Images.

Figure 177: 1786, Francisco Jose de Goya y Lucientes, Spanish, 1746-1828, Transporting a Stone Block, 127 × 169cm, oil on canvas. Private Collection/Bridgeman Images

Figure 178: Before 1690, David Teniers the younger, 1610-1690, Brickmakers near Hemiksem, 43.8 × 67cm, oil on panel. DPG57, by permission of the Trustees of Dulwich Picture Gallery, London.

Figure 179: 1852-1855, Alfred Clint, English, 1807-1883, Hampstead from the south-east, oil on canvas, 610 × 914mm. Purchased 1935, N04809, © Tate, London 2016.

Figure 180: 17th century, David Teniers the Younger, Flemish, 1610-1690, A Lime Kiln with Figures, oil on canvas, 58.5 × 88cm. Apsley House, The Wellington Museum, London, UK © Historic England/Bridgeman Images.

Figure 181: Late 18th century-early 19th century, Patrick Nasmyth (attributed) 1787-1831, or Charles Towne, 1763-1840, Lime Kilns, oil on panel, 23.3 × 30.9 cm, Museum of Barnstable and North Devon, UK.

Figure 182: 1811-1812, John Linnell, English, 1792-1882, Kensington Gravel Pits, 711 × 1067 mm, oil on canvas. ©Tate Gallery, N05776, London, UK.

Figure 183: 1816, William Turner of Oxford, English, 1789-1862, Gravel Pit on Shotover Hill, near Oxford, 17 × 40 cm, oil on board, ©Ashmolean Museum, University of Oxford.

Figure 185: 1563, Peter Bruegel the Elder, Flemish, 1525-1569, *The Tower of Babel*, detail of figure 166, oil on Oak panel, 114 × 155cm. Kunsthistorisches Museum, Vienna: KHM-Museumsverband.

Figure 186: c.1200, the smith Regin forges the sword Gram (*Grani*) for Sigurd son of Sigmund, carved wood door portal from Hylestad Stave Church, Norway, now demolished, University of Oslo Museum, Oslo, Norway. Photo: Author.

Figure 187: 1630, Velazquez, Diego Rodriguez de Silva y, Spanish, *The Forge of Vulcan*, oil on canvas, 223 × 290cm, Prado, Madrid, Spain. Photo © Photo Josse/Bridgeman Images

Figure 188: 1327-1335, *The Smith’s Wife Forges Nails for the Crucifixion*, © The British Library Board, Add Ms 47682 f. 31r.

Figure 189: 2nd or 3rd quarter of the 14th century, *Blacksmith and Striker Forging a Piece of Iron*, Georgius Fendulus, *Liber Astrologiae*. © The British Library Board, Sloane Ms 3983 f. 5r (detail).

Figure 190: 1550-1791, House book of the Mendelian Twelve Brothers Foundation, Vol. 2, Nuremberg, 75-Amb-2-317b, f. 72r. Stadtbibliothek im Bildungscampus Nürnberg, Amb. 317b.2°, f. 72r.

Figure 191: Francisco de Goya y Lucientes, Spanish, 1746-1828, *The Forge (La Fragua)*, oil on canvas, 181.6 × 125.1 cm. The Frick Collection, New York, Henry Clay Frick Bequest.

Figure 192: Wooden scaffolding in India in 2015, complete with guardian. (Author)

Figure 193: Wooden scaffolding in Gondar, Ethiopia in 2017. (Richard Wiseman)

Figure 194: Carver working with an axe in modern Palermo. http://www.artofmaking.ac.uk/content/essays/2-stoneworking-tools-and-toolmarks-w-wootton-b-russell-p-rockwell/ (accessed 14/02/2019)
Introduction

The aim in writing this book is to provide a comprehensive handbook for the professional, academic and general reader interested in art, architecture, construction and the process of building as it has been depicted in Western or European Art. The origins lie in my own deep-seated interest in art and my professional involvement in working on the repair and maintenance of historic buildings. The genesis goes back to the exhibition *The Art of Invention* at the Science Museum, London, which ran from October 1999 to April 2000. Particularly two images relating to Filippo Brunelleschi’s dome of Florence cathedral, Santa Maria del Fiore. These are Biagio di Antonio’s (attributed), c.1470, *Tobias and the Archangels*,\(^1\) where in the distant background is seen the dome with scaffolding around the lantern, and Gherardo Mechini’s 1601 drawing showing scaffolding and hoisting machines used in that year to repair lightning damage to the lantern. (Fig. I)

**Scope**

The scope of the book explores how the process of building, with all its various trades and operations, has been depicted. This exploration into ‘The Art of Building’ addresses a gap in research by focusing on the history of building construction from antiquity to the advent of widespread photography at the end of the nineteenth and the beginning of the twentieth centuries. It investigates the representation of the building construction process, trades and materials as depicted in paintings, illuminated manuscripts, watercolours, prints, drawings and sculpture, although the latter is limited to the Roman period only. Building operations and activities are analysed and explained including appropriate technical terms in the glossary, with descriptions of the works and, here and there, insights into the artists’ sources of inspiration. Not many paintings are entirely or principally devoted to construction sites, but many give tantalizing glimpses of such activity within the composition. How do these images carry meaning, how much is imagined and how much can we interpret as being taken from reality? Why do artists depict buildings under construction and what can this tell us about their perception and rendering of this process? What can it tell us about how the process has changed over time? Images of building construction in art are not common but there are more than readily meet the eye when looked for. Those selected here, and it is only a selection, will hopefully give a comprehensive picture of the genre available.

There are limitations in researching and writing the book: It is not an intrinsic history of building, does not cover architectural styles, or architectural and technical
drawings; nor does it attempt to cover architectural treatises, building accounts or contracts, or the various Guilds and their rules. Many images and models in the *The Art of Invention* exhibition were of construction machinery, however these works are deemed technical drawings and models rather than artistic creations. The nearest images to purely technical representations are the progress drawings and watercolours produced by Sir John Soane’s pupils and assistants and George Scharf’s sketches, nevertheless these works lean more heavily towards, and should be considered as, works of art rather than technical representations.

Many images of construction are biblical scenes from Medieval and later manuscripts, where paintings or illuminations depicting the construction of the Tower of Babel, the rebuilding of the Temple of Soloman, the construction or reconstruction of cities such as Rome or Troy are common. Such subjects were generally accepted as historical fact, however it must have been accepted as common knowledge that these constructions took place a millenia earlier and their physical form would have been unknown so how else would these artists have been able to illustrate such a scene without recourse to their own experience? This is aptly summarised by Francis B Andrews:

>F]or there can be no question that the artist who used the costume and other items of his common daily experience, gave also the current practice in building operation as he saw it being done.⁴

**Current Literature and Sources**

Together with *The Art of Invention* exhibition, and the accompanying catalogue with its plentiful references and extensive bibliography,⁵ the other source of inspiration was Günther Binding’s 2004 English edition of *Medieval Building Techniques*, a copiously illustrated book with some 650 line drawings copied from Medieval manuscripts together with 26 monochrome photographic plates.⁶ This was a result of decades of painstaking research by Binding and his team from the University of Cologne where he was Professor of Art History. Other notable texts that I have made use of are: Andrea Louise Matthies’s unpublished 1984 Ph.D., thesis *Perceptions of Technological Change: Medieval Artists View[s] [of] Building Construction*⁷ and Dr Frieda Van Tyghem’s 1966 *Op en Om de Middeleeuwse Bouwwerf*,⁸ written in Flemish, where the 286 plates speak eloquently. Other texts that I should mention here are L F Salzman’s 1952 *Building in England Down to 1540 A Documentary History*⁹ and among John Harvey’s many books his *Medieval Craftsmen* of 1975.¹⁰ Salzman’s work is essential for anyone wanting to delve deeper into building contracts and accounts in the Medieval and early Renaissance periods and Harvey for craftsmen, including
the building crafts, in general. In addition many other sources are recorded in the notes and bibliography.

Images for the works reproduced were gathered together from prior knowledge, visiting galleries and museums and online databases. Of particular note in the latter category are the British Library resources and the French website ‘Enluminures’, devoted to images of illuminations in manuscripts held in French municipal libraries, where every image has been examined.

Definitions

A note on terms is essential, what craftsmen called their tools and processes varied enormously, they differ from country to country, from region to region, from workman to workman and from period to period. Technical terms were generally in Latin in documents up until the seventeenth century, but these were typically Latinised versions of local terms. Therefore for simplicity, and those unfamiliar with Latin or the many scripts to be found in early documents and manuscripts, the terms used in this book are modern English usage. The reader is referred to the full glossary which gives definitions of technical and unusual terms.

The terms architect, clerk of works and foreman are used loosely. These terms before, and well into, the Renaissance are controversial as they did not really exist as separate and distinctive jobs or professions. With the master carpenter or master mason, they morph into what appears to be a ‘person in charge’ in many images. This is not to mention the owner or person paying for the work, however we can be sure that one or other responsible for these duties was present to advise, take responsibility, or oversee the work.

The terms primitive and naïve are used in the text, but these are not used in their art historical categorisations but because in comparison to contemporary or similar images of better or higher quality they are simply just that in the literal sense.

Layout of the Book

Images are arranged broadly chronologically: Roman practice is seen before Medieval, and in turn, Medieval before Renaissance and later. Although where it is convenient for comparison this chronology is not strictly adhered to.

The first chapter is on the work of the carpenter and is divided into two parts. Part One deals with temporary access scaffolding, formwork (also temporary) and the permanent timberwork incorporated into the building. The second part looks at cranes and other lifting devices, largely made of wood or timber and also
temporary; although some lifting machines were left inside larger buildings such as cathedrals and survive today. Much of this temporary carpenters work was used almost exclusively by masons; it was built by the carpenter to aid them. Scaffolding is the backbone of the construction site and little is achieved without it. Some will argue that scaffolding is little understood because of its temporary nature; it starts to disappear towards the end of a project and is soon forgotten. However the scaffold structure is removed to the scaffolder’s yard for use elsewhere. It is self-resurrecting equipment, is moved from one site to another and so on. Individual elements may wear out or get damaged and be discarded but the basic process is rotational. The hardware is too valuable to abandon at the completion of a building project, whether it be poles or other products from the management of woodland, or today’s steel and timber products. Many large cathedral and castle building projects had their own permanent scaffold yards. Formwork is temporary wooden or timber structure erected to support masonry whilst construction proceeds and the mortar cures. Masons depended on it when building arches, door or window heads and vaults. It would often need to be in place for several days, or even weeks. On dismantling it would be set aside for alternative uses. These components when finally finished with, particularly in remote areas where transport was expensive, may well have been sold on as fire wood or for other rural purposes such as fencing. Finally cranes and lifting devices were invariably made by the carpenters, either at the point of use or in the yard and then moved to where they were needed.

The second chapter deals with masonry and this includes both stone and brick. Masons and their ancillary workers are the most widely depicted workers in this particular genre of art works. The crafts of the stonemason and brickmason go back to early antiquity. The basic raw materials are however quite different. Stone is a natural geological product, which is part of the structure of the earth’s crust. It is quarried at the surface or mined, depending on how and where it outcrops or is found. Virtually any stone that is easily accessible above ground, has been used as a building material in the past. Brick however, is a manufactured product, albeit also from a geological material, clay. It is formed into blocks, or bricks, allowed to dry and then fired in a kiln. In antiquity, before kiln technology was perfected, bricks would have been fired in direct sunlight. The masons other vital material is mortar; in the time-line of this book all mortar would invariably have been produced by firing limestone in a kiln, although in antiquity and the pre Roman world, clay-earth mortars would also have been used.

Following these two excursions into carpentry and masonry the third chapter looks at the role of the blacksmith, without whom neither the carpenter or mason could work, for they depended on the blacksmith for their tools and indeed transport. There are images of blacksmiths in art but very few relating directly to the construction site.
This book comes at a time when the representation of architecture in painting is becoming more widely and intensively researched. Recent scholarship over the last twenty five years or so has led to important exhibitions on the depiction of buildings in art. Recently at the National Gallery in London was ‘Building the Picture – Architecture in Italian Renaissance Painting’. This was preceded by four other recent exhibitions exploring different aspects of architectural representation in art. Those in Madrid in 2010; in Princeton also in 2010; in Lisbon in 2012 and Urbino in 2012.\(^2\) These in turn followed the earlier exhibition *The Renaissance from Brunelleschi to Michelangelo: The Representation of Architecture*, which toured Venice, Washington, Paris and Berlin in 1994-1995. In the forward of the accompanying book, Feliciano Benvenuti wrote, ‘[t]he exhibition [...] is therefore, as always, not merely a gift to its visitors, but a prompt to scholars and historians to carry their personal enquiries a stage further, and thereby raise awareness of our cultural and scientific legacy.’\(^2\) It is in the furtherance of this legacy that the current book has been researched, for it is a natural and logical progression to include not only the buildings but also their very mode of construction.
Figure I: Gherardo Mechini (?), 1601, The dome of Florence cathedral: Scaffolding and hoisting devices used in 1601 to repair lightning damage to the lantern, drawing, pen, brown ink and wash, 248A, Gabinetto Disegni e Stampe, Galleria degli Uffizi, Florence. (Courtesy of the Uffizi Galleries)