## Contents

Foreword

Preface

1. The Beginning
   1.1 History of the Earth
   1.2 Evolution of Mankind
   1.3 First Permanent Dwellings
   1.4 First Evidence of Monolithic Masses, Mortars and Plasters
   1.5 Clay and Loam, a Versatile Building Material
   1.6 First Sights of Adobe Construction
   1.7 Gypsum
   1.8 Bitumen and Asphalt
   1.9 Limestone
   1.10 Chemical Reactions
   1.11 Production of Lime
   1.12 The Early Use of Lime
   1.13 The Birth of Hydraulic Lime, also called Water Lime

References

2. From the Roman period to the Renaissance
   2.1 The Roman period
      2.1.1 General historical context
      2.1.2 Sources of historical knowledge on *opus caementitium* technology
      2.1.3 Materials and formulation. The invention of *opus caementitium*
      2.1.4 Roman technology of *opus caementitium* for terrestrial constructions
      2.1.5 Roman technology of *opus caementitium* for underwater, mainly maritime, constructions
   2.2 The Middle Ages
   2.3 The Renaissance period
   2.4 Conclusion

References
3. Binders and Cements during the Eighteenth and Nineteenth Centuries

3.1 Renaissance
3.2 The Augustan Age
3.3 John Smeaton, 1756
3.4 James Parker’s discovery of Roman Cement, 1796
3.5 French investigators, 1805-1813
3.6 Louis Joseph Vicat, 1812-18
3.7 Early specifications for artificial cements, 1811-1830
3.8 Aspdin’s patent for Portland Cement, 1824
3.9 Early Portland cements, 1824-1844
3.10 William Aspdin and the discovery of clinkering
3.11 Adoption of Portland Cement in major projects
3.12 Testing and improvements in quality control
3.13 The emergence of modern Portland cement, 1887-1904
3.14 Acknowledgement

References

4. Concrete Construction in the Eighteenth and Nineteenth Centuries

4.1 Lime concretes and early cement-based materials
4.1.1 Waterproof mortars
4.1.2 Stucco and architectural mouldings
4.2 Foundations
4.2.1 Dock linings
4.2.2 Masonry
4.3 Early in-situ concrete construction in Britain
4.3.1 Swanscombe 1835
4.3.2 Other cement makers’ houses
4.3.3 United States of America
4.4 The French development of Béton
4.4.1 Cointeraux
4.4.2 Lebrun
4.4.3 The harbour at Algiers