Table of Contents

Preface I (Robert Heimann) V	
Preface to the German edition (1991)	VIII
Preface II (Thilo Rehren) IX	
About the authors XII	
Table of contents XIV	

Chapter 1 Introduction 1

1.1 The janiform nature of ceramic	s ´
------------------------------------	-----

- 1.2 In the beginning, there were ceramics 3
- 1.3 Ceramics the first pyrotechnology? 6

Chapter 2 Methods of investigation 8

- 2.1 Instrumental analytics 8
 - 2.1.1 Chemical compositions 9
 - 2.1.2 Phase content 12
 - 2.1.3 Micromorphology and texture 15
- 2.2 Reconstruction of the manufacturing process based on material analyses 17
 - 2.2.1 Chemical and phase composition 17
 - 2.2.2 Detection of forgeries 20
 - 2.2.3 Antique sources and pictorial documentation 20
- 2.3 Contemporary pottery techniques as interpretive tools 21

Chapter 3 Ancient ceramics 23

- 3.1 Fundamentals of ancient and modern ceramics 23
- 3.2 The ancient ceramic material 25
 - 3.2.1 Chemical composition 25
 - 3.2.2 Phase composition 33
 - 3.2.3 Texture 43
 - 3.2.4 Colour 51
- 3.3 Contemporary autochthonous ceramics as proxy for ancient materials 55
- 3.4 Clays of contemporary autochthonous pottery 61
 - 3.4.1 Crete 62
 - 3.4.2 Mainland Greece 65
 - 3.4.3 Mesopotamia 68
 - 3.4.4 Egypt 69
 - 3.4.5 Roman Rhineland 71



3.5	3.5.1 3.5.2	truction of green clay processing methods 71 Preparation of clays 73 Forming 76
2.6	3.5.3	Decoration, application of handles, drying 80
3.6		amic firing process 81
	3.6.1	Ceramics as a heterogeneous system out of equilibrium 81
	3.6.2	The influence of the gas atmosphere 83
		Phase formation in calcareous clays 91
		Phase formation in non-calcareous clays 97
		Development of ceramic texture during firing 100
	3.6.6	Thermometry of the ancient ceramic firing process 103
Chap	ter 4	Décor, design, and pattern 110
4.1	Fundam	nentals 110
4.2		painting 112
	4.2.1	Iron oxide black/iron reduction technique 113
	4.2.2	Manganese black/manganese black technique 128
	4.2.3	Carbon black/C-black technique 141
		Iron oxide red/iron oxidation technique 142
		Copper red 143
		White pigments 145
	4.2.7	Mixed pigments 149
	4.2.8	Bi- and polychrome colours 150
4.3	Smoking	g 153
	4.3.1	Carbon content 153
	4.3.2	Nature of carbon 157
	4.3.3	Methods of decoration by smoking 159
	4.3.4	Distribution of C-black technique 162
4.4	Cold pa	
	4.4.1	The pigments 164
		Adhesives 188
4.5	Metallic	appliqués 193
	4.5.1	Tin, tin alloys and lead 193
	4.5.2	Gold and silver 199
Chap	ter 5	Regional ceramic developments 201
5.1	Mesopo	tamia (Neolithic to Chalcolithic) 201
	5.1.1	The ceramic body 203
	5.1.2	The painting (iron reduction technique) 207
	5.1.3	The white 'slip' 215
	5.1.4	C-black techniques 216

XVI Table of Contents

5.2	Anatol	ia (Neolithic-Chalcolithic, Phrygian) 217	
	5.2.1	The ceramic body 218	
	5.2.2	The painting 219	
5.3	Iran 2	222	
	5.3.1	The ceramic body 223	
	5.3.2	The painting 225	
5.4	Sistan,	Indus Valley cultures 229	
	5.4.1	Sistan 229	
	5.4.2	Indus Valley cultures 234	
5.5	Egypt	236	
	5.5.1	Role of pottery in ancient Egypt 236	
	5.5.2	The ceramic body and its raw materials 240	
	5.5.3	The coloured decoration 247	
	5.5.4	Specifics of ancient Egyptian ceramic technology	259

Plates 261 References 269 Subject Index 294 Location Index 298

Appendix I Important mineral phases present in ancient ceramics and detectable by X-ray diffraction 301

Appendix II Compositions of ancient ceramics, plotted in the ternary phase diagram SiO₂/Al₂O₃/(CaO+MgO) 302