

Contents

INTRODUCTION	v
The scope of the book	v
Previous works on the subject	viii
Definitions	xv
 <i>Part One: The Organ in the Ancient World</i>	
I THE INVENTION OF THE ORGAN	3
The Alexandrian background	3
Who invented the organ?	5
Where and when Ktesibios lived	10
The character and reputation of Ktesibios	14
Philo of Byzantium and Hero of Alexandria	17
II THE HYDRAULIC ORGAN (I)	23
Preliminary inventions	23
Hero's description	27
Vitruvius's description	34
III THE GRAECO-ROMAN ORGAN: THE EVIDENCE OF THE TEXTS	43
To the middle of the first century A.D.	43
The second century A.D.	50
The first appearance of the bellows organ	51
The third century A.D.	54
The fourth century A.D.	56
The fifth and sixth centuries A.D.	63
IV THE GRAECO-ROMAN ORGAN: ICONO- GRAPHICAL EVIDENCE	71
The organ with orchestra and human figures	73
The organ with human figures	80
The organ alone	99
V THE GRAECO-ROMAN ORGAN: ARCHAEOLOGICAL EVIDENCE	107
The 'organs' in the Museo Nazionale, Naples	107
The organ in the Aquincum Museum	109
VI GRAECO-ROMAN MUSIC	117
Musical theory and notation	118
The status of music	124
Musical instruments	126

VII	THE GRAECO-ROMAN ORGAN: THE PIPES AND THEIR TUNING	132
VIII	THE HYDRAULIC ORGAN (2)	143
	Some theoretical considerations	143
	The hydraulis reconstructed	147
IX	THE GRAECO-ROMAN ORGAN: A SYNTHESIS	154
	The hydraulic organ	154
	The bellows organ	161
	The organ as a solo and orchestral instrument	163
	The organists	164
 <i>Part Two: The Organ in the Middle Ages</i>		
X	THE ORGAN AND THE EASTERN EMPIRE	169
	The historical background	169
	The Byzantine organ	170
	The ceremonial use of the organ	173
	Organs at the Palace: The Golden Tree	177
	Organists	180
	Appreciation of organ music	181
XI	THE ORGAN IN THE ARAB WORLD	184
	The historical background	184
	The organ presented to Shih Tsu	185
	Muristus and pseudo-Jerome	189
	Musical automata	202
XII	THE ORGAN IN WESTERN EUROPE FROM THE EIGHTH TO THE TENTH CENTURIES	205
	The return of the organ	206
	Georgius the organ-builder	210
	'Organum hydraulicum' in medieval texts	216
	The Church's attitude to the organ	218
	The organ in the ninth and tenth centuries	222
XIII	TECHNIQUES IN ORGAN-BUILDING IN THE TENTH AND ELEVENTH CENTURIES	229
	The organ at Winchester	229
	The treatises of Theophilus and the Anonymous of Berne	232
	Making the pipes	233
	The wind-chest and manual	238
	The bellows and collector	245
	Siting the organ	249
	Measuring and tuning the pipes	252
	Scales and tessitura	260

XIV	THE ORGAN IN WESTERN EUROPE FROM THE ELEVENTH TO THE THIRTEENTH CENTURY	265
	The organ in the eleventh and twelfth centuries	265
	The organ in the thirteenth century	269
	Aspects of performance	274
	The cymbalum	275
XV	SOME ILLUSTRATIONS OF THE MEDIEVAL ORGAN	277
XVI	THE ORGAN AND ORGANUM	287
XVII	CONCLUSION	292
	APPENDIX: Original Texts concerning the Hydraulis and the Medieval Organ	295
	(a) Hero of Alexandria	295
	(b) Vitruvius	296
	(c) Theophilus	297
	(d) Anonymous of Berne	302
	(e) Aribio	304
	INDEX OF INSTRUMENTS AND THEIR COMPONENTS	307
	GENERAL INDEX	311

List of Plates

(The plates are to be found between pages 116 and 117. For full details refer to the pages listed after each plate.)

- I The Nennig mosaic (see p. 73)
- II The Zliten mosaic (see p. 75)
 - 1. The first orchestra
 - 2. The second orchestra
- III 1. The consular diptych of Verona (see p. 79)
 - 2. The Via Appia graffito (see p. 78)
- IV The obelisk of Theodosius at Constantinople
 - 1. Right-hand organ
 - 2. Left-hand organ
- V The Alexandrian terracotta statuette (see p. 77)
- VI The uninscribed sarcophagus of Arles (see p. 83)
- VII 1. The stele in Autun Museum (see p. 95)
 - 2. The Rheims vase (see p. 81)
 - 3. The Roman terracotta (see p. 81)
 - 4. The Copenhagen vase (see p. 82)
- VIII 1. Aphrodisis' organ (see p. 86)
 - 2. The British Museum gem (see p. 84)
 - 3. The Rheinzabern vase (see p. 85)
 - 4. The Tatarevo organ (see p. 87)
- IX 1. The Nero contorniate (see p. 90)
 - 2. A second Nero contorniate (see p. 91)
 - 3. The Valentinian III medallion (see p. 89)
 - 4. The Caracalla contorniate (see p. 91)
 - 5. A second Caracalla contorniate (see p. 92)
 - 6. The Saint-Germain fragment (see p. 104)
 - 7 and 8. Other Caracalla contorniates (see p. 92)
- X The Saint-Maximin sarcophagus (see p. 94)
- XI 1. The Orange medallion (see p. 93)
 - 2. The Grenoble medallion (see p. 92)
 - 3. The organist of the Carthage lamp (see p. 96)
 - 4 and 5. Terracotta fragments in the Lavigerie Museum at Carthage (see p. 98)
 - 6. The Carthage lamp (see p. 96)
- XII The Carthage lamp (see p. 96)
 - 1. Front view
 - 2. Back view
- XIII The lamp in the Copenhagen museum (see p. 98)
 - 1. Front view
 - 2. Back view

- XIV The sarcophagus of Julia Tyrrania (see p. 100)
- XV The Rusticus organ (see p. 101)
- XVI
 - 1. The Tarsus terracotta (see p. 99)
 - 2. Gentilla's organ (see p. 102)
- XVII
 - 1. The Rheinzabern terracotta (see p. 105)
 - 2. The organ in the Winghe manuscript (see p. 103)
 - 3. One of the Pompeii 'organs' (see p. 107)
 - 4. The author's reconstruction of a hydraulis (see p. 147)
- XVIII The glass vase in the Museo Nazionale, Naples
(see p. 105)
- XIX Earlier reconstructions (see pp. ix-xi)
 - 1. By Barbaro (1556)
 - 2. By Commandini (1575)
 - 3. By Schott (1654)
 - 4. By Perrault (1673)
- XX Earlier reconstructions (see pp. x-xii)
 - 1. By Kircher (1650)
 - 2. By Newton (1791)
 The Aquincum organ (see p. 109)
 - 3. The tabula summa
 - 4. The slotted sliders
- XXI The Aquincum organ (see p. 109)
 - 1. Pipes
 - 2. The sliders in position
 - 3. The springs
- XXII
 - 1. The automaton of Archimedes (see p. 202)
 - 2. Illustration in the St. Blasien manuscript (see p. 202)
 - 3. The Grado wind-chest (see p. 243)
- XXIII The illustration in the manuscript of Hero's
Pneumatics (see p. 28)
- XXIV
 - 1. The illustration in the Utrecht Psalter (see p. 278)
 - 2. The illustration in the Psalter of Eadwin (p. 279)
- XXV
 - 1. The Harding Bible (see p. 280)
 - 2. The Pommersfelden Psalter (see p. 280)
 - 3. The Cambridge Manuscript (see p. 281)
- XXVI The Munich Manuscript (see p. 283)
- XXVII
 - 1. The Cividale del Friuli Manuscript (see p. 282)
 - 2. The Belvoir Castle Psalter (see p. 282)
 - 3. The St. Blasien Manuscript (see p. 179)
- XXVIII
 - 1. The British Museum Manuscript (see p. 269)
 - 2. The Solomon Glossary (see p. 284)
 - 3. The Arras Manuscript (see p. 272)
 - 4. The Bibliothèque Nationale Manuscript (see p. 284)