

Continuity and Change in Etruscan Domestic Architecture

Paul M. Miller

Access Archaeology



ARCHAEOPRESS PUBLISHING LTD

Gordon House
276 Banbury Road
Oxford OX2 7ED

www.archaeopress.com

ISBN 978 1 78491 580 3
ISBN 978 1 78491 581 0 (e-Pdf)

© Archaeopress and P M Miller 2017

All rights reserved. No part of this book may be reproduced or transmitted,
in any form or by any means, electronic, mechanical, photocopying or otherwise,
without the prior written permission of the copyright owners.

Contents

Abstract	v
Acknowledgments	vi
Chapter 1: Introduction	1
1.1 Book outline	3
Chapter 2: Theory, methods and a review of the literature	6
2.1 Theory	6
2.1.1 Amos Rapoport and Environment-Behaviour Relations	7
2.1.2 Behaviour	8
2.1.3 Traditional, habitually innovative and actively innovative behaviours; the process of changing behaviour	10
2.1.4 Conclusions	13
2.2 Methods	14
2.2.1 Identifying Techniques	14
2.2.2 Working from concept to abandonment; chaîne opératoire and architecture	15
2.2.3 Conclusions	19
2.3 Domestic architectural change in context	19
2.3.1 Socio-cultural changes in the broader historical context	19
2.3.1.1 Changing society in Early Iron Age Etruria	20
2.3.1.2 Changing society in Orientalising and early Archaic period Etruria	22
2.3.2 Socio-cultural changes in relation to architecture.....	25
2.4 A review of the literature on four key sites	30
2.4.1 San Giovenale.....	31
2.4.2 Acquarossa	37
2.4.3 Lago dell’Accesa.....	40
2.4.4 Poggio Civitate (Murlo).....	43
2.4.5 Conclusions	46
2.5 Conclusion	47
Chapter 3: The foundations of early Etruscan buildings, 800-625 BC	49
3.1 Foundation Type 1.....	52
3.1.1 Ground preparation.....	57
3.1.2 Wall footings.....	60
3.1.3 Flooring	63
3.1.4 Roof supports	64
3.1.5 Rectangular Foundation Type 1 buildings	67

3.2 Foundation Type 2.....	69
3.2.1 Ground preparation.....	73
3.2.2 Wall footings.....	75
3.2.2.1 Robust and refined socles: a sign of technological sophistication?.....	79
3.2.3 Flooring	80
3.2.4 Roof supports	81
3.3 Foundation Type 3.....	81
3.3.1 Wall footings.....	84
3.3.1.1 The interaction between bedrock and rubble in the Large Iron Age Building	84
3.3.1.2 The shelf wall footings of San Giovenale Area F East’s House I	86
3.3.2 Flooring	87
3.3.3 Roof supports	89
3.3.4 Élite residence or communal building? A discussion of function and social stratification	90
3.4 Conclusions	92
Chapter 4: The foundations of Orientalising and early Archaic period Etruscan buildings, 625-500 BC	95
4.1 Foundation Type 4.....	95
4.1.1 Ground preparation.....	100
4.1.2 Wall footings.....	105
4.1.3 Flooring	107
4.1.4 Roof supports	108
4.1.5 The importance of the courtyard and the appearance of the building unit.....	111
4.2 Foundation Type 5.....	114
4.2.1 Ground preparation.....	119
4.2.2 Wall footings.....	126
4.2.3 Flooring	132
4.2.4 Roof supports	134
4.2.5 Variability in Type 5 foundations	137
4.3 Conclusions	140
4.3.1 The traditional and innovative techniques of Foundation Type 4	141
4.3.2 The traditional and innovative techniques of Foundation Type 5	142
4.3.3 Is there a discernable difference in the foundations between a ‘hut’ and a ‘house’?	144
Chapter 5: The walls and roofs of Etruscan domestic structures, 800-500 BC.....	146
5.1 Walls	147
5.1.1 Defining non-stone walling techniques	147

5.1.1.1 Wattle	149
5.1.1.2 Wattle vs. graticcio	151
5.1.1.3 Pisé	153
5.1.1.4 Wall footings and the identification of non-stone walling	156
5.1.1.5 Mud brick	158
5.1.2 Defining stone walling techniques and the debate over the timber-to-stone transition in Etruscan architecture	160
5.1.3 Evidence of wall types	162
5.1.3.1 Direct evidence of wall techniques	162
5.1.3.2 Circumstantial evidence of walling techniques	166
5.1.3.3 Stone walling techniques and circumstantial evidence.....	168
5.1.4 Conclusions on walls	169
5.2 Roofs.....	170
5.2.1 Ö. Wikander's typology and C. Wikander's model: The established concepts of seventh- and sixth-century tile roofing	171
5.2.2 The transition between hipped and saddle roofing types.....	179
5.2.3 Conclusions on roofs	181
5.3 Conclusions	182
Chapter 6: Material Procurement, Production and Use	184
6.1 The difference between building materials and building techniques	184
6.2 Was there a transition in raw material procurement, composition or use from 800-500 BC?.....	186
6.2.1 Stone	186
6.2.2 Timber	189
6.2.2.1 The environmental impact of timber procurement and its effect on Etruscan domestic architecture.....	191
6.2.3 Clay and cane	192
6.2.4 Conclusions	195
6.3 How did the production and use of manufactured building materials change from 800-500 BC? ..	196
6.3.1 800-700 BC	196
6.3.2 699-600 BC	197
6.3.2.1 Clay-revetted thatch and the early manufacture of terracotta tiles.....	198
6.3.2.2 Why does ashlar tufa stone production and use stand out?.....	200
6.3.3 599-500 BC	202
6.4 Were changes in architecture a result of new materials?	205
6.5 Conclusions	207

Chapter 7: Conclusions	209
7.1 Reasons for change; building techniques in Etruscan domestic architecture from 800-500 BC	210
7.1.1 What instigated the innovations in foundation techniques?	210
7.1.2 Is there evidence for innovation in walling techniques?	213
7.1.3 What triggered the transitions in the construction of Etruscan roofs?	214
7.1.4 Summary of primary results	216
7.2 The broader implications and limitations of this book	217
7.2.1 The place of this book within the scholarly literature; The broader implications of research on building techniques	218
7.2.2 Limitations of this study	221
7.2.2.1 Limits of the evidence	221
7.2.2.2 Other weaknesses in the evidence	222
Glossary	224
Bibliography	232

LIST OF FIGURES

Figure 2.1. The “model of evaluative process”, used in EBR studies (Rapoport 2000: 146). 7

Figure 2.2. This sequence of morphogenesis in cognitive structures (e.g. habitus) outlines how the individual or the group alter the established habitus. ‘Relation (a)’ is the social conditioning on the agent and ‘Relation (b)’ is the unconscious or conscious decision to reproduce or elaborate upon the existing structure (Archer 2010: 275). 12

Figure 2.3. Tomba della Campana at Veii based on Canina’s (1847: pl. 31) inscription (Leighton 2005: 376). 23

Figure 2.4. Map of Etruria (after Catalli 2001: 89). 30

Figure 2.5. Plan of San Giovenale Area F East (after Karlsson 2006), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome. 32

Figure 2.6. Plan of the Borgo quarter at San Giovenale (Pohl 2009: pl. 114), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome. 33

Figure 2.7. Plan of San Giovenale Area E at the end of excavation (Pohl 1977: fig. 1, p. 14), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome. 35

Figure 2.8. Plan 3 of Capanna I at San Giovenale Area D (Malcus 1984: fig. 21, p. 50), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome. 36

Figure 2.9. Plan of Acquarossa Zones C and F (Persson 1994: fig. 6, p. 297), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome. 38

Figure 2.10. Plan of Lago dell’Accesa Area A (after Camporeale 1985: 132–133). 41

Figure 2.11. Plan of Poggio Civitate (Berkin 2003: 9), courtesy of J. Berkin. 44

Figure 2.12. Section of the agger at Poggio Civitate (Phillips 1967: fig. 20), courtesy of American Journal of Archaeology and Archaeological Institute of America. 45

Figure 3.1. Plan of Capanna I at San Giovenale Area D (Malcus 1984: fig. 21, p. 50), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome. 52

Figure 3.2. Plan of the Rectangular Timber Building under the fifth century BC rampart at Veii (Ward-Perkins 1959: 51). 52

Figure 3.3. Plan of San Giovenale Area E at the end of excavation (Pohl 1977: fig. 1, p. 14), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome. 53

Figure 3.4. Plan of San Giovenale Area F East during the Iron Age (prehistoric remains) (Karlsson 2006: fig. 264, p. 139), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome. 54

Figure 3.5. Site map of Sorgenti della Nova with Section III encircled (Dolfini 2013: 136). 54

Figure 3.6. Plan of the so-called “Timber Structure from the Earliest Age” (Ward-Perkins 1959: 52). 54

Figure 3.7. Section (top) and plan (bottom) of Sorgenti della Nova Section III (Negroni Catacchio 1995: 96); courtesy of Istituto Italiano di Preistoria e Protostoria. 56

Figure 3.8. Plan of Calvario sui Monterozzi at Tarquinia (after Linington 1982: 252). 56

Figure 3.9. Channels of the southern end of Abitazione 2 from Sorgenti della Nova Section III, including several postholes and exterior channels of uncertain function (Dolfini 2002: 21), courtesy of Centro Studi di Preistoria e Archeologia. 57

Figure 3.10. Section of San Giovenale Area E’s Oval Hut I (Pohl 1977: fig. 7, p. 18), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome. 57

Figure 3.11. Abitazione 6 from Section IX at Sorgenti della Nova during excavation (Negroni Catacchio and Cardosa 2007: 111), courtesy of Centro Studi di Preistoria e Archeologia. Note the erosion on the bedrock at the right side of the picture.....	58
Figure 3.12. Plan of the Iron Age capanna at Fidene. Areas marked with the number 1 on the plan indicate the presence of the tufa bench/bank (Bietti Sestieri and de Santis 2001: fig. 3, p. 213), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	59
Figure 3.13. Modern reconstruction of an Iron Age capanna at Fidene (Bietti Sestieri and de Santis 2001: fig. 2, p. 212), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	61
Figure 3.14. Site plan of Montereggioni-Campassini (Bartoloni 2001: fig. 7, p. 364), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	62
Figure 3.15. Diagram of four different types of roof supports (after Büchsenschütz 2001: fig. 6, p. 226), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	65
Figure 3.16. Plan of Abitazione 2 from Section III at Sorgenti della Nova (Negroni Catacchio 1995: 306), courtesy of Istituto Italiano di Preistoria e Protostoria.....	66
Figure 3.17. San Giovenale Area E during excavation (after Pohl 1977: fig. 2, p. 15), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	67
Figure 3.18. A modern capanna in Giovita (Brocato and Galluccio 2001: figs. 19-20, p. 292), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	68
Figure 3.19. Section of Huts A, B and C at Luni sul Mignone (Wieselgren 1969: 109).	71
Figure 3.20. Plan of Complex III of Lago dell'Accesa Area A (Camporeale 1985: 141).....	72
Figure 3.21. Plans of Lago dell'Accesa Area A Complex V (left) and Area B Complex VIII (right) (Camporeale 2010: 150).....	73
Figure 3.22. Plan of Complex II at Lago dell'Accesa Area A (Camporeale 1985: 142).....	74
Figure 3.23. Wall footing of San Giovenale Area E Oval Hut II (Pohl 1977: fig. 18, p. 26), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	76
Figure 3.24. Plan of Iron Age Huts A, B and C at Luni sul Mignone (after Wieselgren 1969: 110).	77
Figure 3.25. Plan of Complex I at Lago dell'Accesa Area A (Camporeale 1985: 136).....	77
Figure 3.26. Plan of Complex VII at Lago dell'Accesa Area B (Camporeale 1997: 322).....	78
Figure 3.27. Plan of Complex IV at Lago dell'Accesa Area A (Camporeale 1985: 149).....	78
Table 3.4. The examples of buildings with Type 3 foundations by site.....	82
Figure 3.28. Plan of Acquarossa Zone K (Rystedt 2001: fig. 1, p. 24), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	82
Figure 3.29. Illustrated reconstruction of the Large Iron Age Building at Luni sul Mignone (Hellström 2001: fig. 4, p. 166), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	82
Figure 3.30. Illustrated reconstruction of House I at San Giovenale Area F East (Karlsson 2006: fig. 277, p. 150), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	83
Figure 3.31. Illustrated reconstruction of Northern Bronze Age Building at Luni sul Mignone (Hellström 2001: fig. 5, p. 167), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	83

Figure 3.32. Model reconstruction of the Large Iron Age Building at Luni sul Mignone at the Chalmers University of Technology at Göteborg (Hellström 1975: pl. 14), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	85
Figure 3.33. Profile of House I at San Giovenale Area F East with excavation underway. Notice the cut bedrock shelves in the foreground, lying underneath the later tufa stones (Karlsson 2006: fig. 14, p. 33), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	86
Figure 3.34. Plan of House I Period 2 at San Giovenale Area F East (Karlsson 2006: fig. 267, p. 143), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	86
Figure 3.35. Building D at Acquarossa Zone K (Rystedt 2001: fig. 2, p. 25), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	87
Figure 3.36. Illustrated reconstruction (left) and photograph (right) of the Tomba della Capanna at Caere (Karlsson 2006: fig. 270, p. 145), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	88
Figure 3.37. Possible design of the floor structure in the Large Iron Age Building at Luni sul Mignone (Hellström 1975: fig. 1, p. 68), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	88
Figure 3.38. Illustrated reconstruction displaying the graticcio walls and roof supports possibly at use in House I at San Giovenale Area F East (Karlsson 2006: fig. 270, p. 145), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	89
Figure 3.39. Illustrated reconstruction of the Foundation Type 3 building at Monte Rovello (Hellström 2001: fig. 5, p. 167), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	91
Figure 4.1. Foundation Type 2 socle of Complex II from Lago dell'Accesa Area A (author's image).....	96
Figure 4.2. Foundation Type 4 socle of Complex IV from Lago dell'Accesa Area A (author's image).	96
Figure 4.3. Plan of the Lower Building from Poggio Civitate with the Upper Building superimposed (Nielsen and Phillips 1986).	97
Figure 4.4. Site plan of Poggio Civitate (Berkin 2003: 9), courtesy of J. Berkin.	98
Figure 4.5. Site plan of Lago dell'Accesa Area A (after Camporeale 1985: 132–133).	99
Figure 4.6. Plan of the first phase of the farmhouse at Podere Tartuchino (Perkins and Attolini 1992: 80).	100
Figure 4.8. Plan and section of Complex VIII from Lago dell'Accesa Area A (Camporeale 1985: 156)....	101
Figure 4.7. Plan and section of Complex VII from Lago dell'Accesa Area A (Camporeale 1985: 155)....	101
Figure 4.9. Partial reconstruction of the Upper Building at Poggio Civitate (Phillips and Nielsen 1985: 67).	102
Figure 4.10. Plan and section of Complex X from Lago dell'Accesa Area A (Camporeale 1985: 162)....	103
Figure 4.11. Plan and section of Complex III from Lago dell'Accesa Area A (Camporeale 1985: 143)....	104
Figure 4.13. Wall footing in Complex IV from Lago dell'Accesa Area A (author's image).	105
Figure 4.12. Section of a wall footing from the Upper Building at Poggio Civitate (Phillips 1967: fig. 6), courtesy of American Journal of Archaeology and Archaeological Institute of America.....	105
Figure 4.14. Reconstruction of the farmhouse at Podere Tartuchino in its first phase (Perkins and Atto-	

lini 1992: 112).....	106
Figure 4.15. Plan of the Upper Building of Poggio Civitate (after Phillips and Nielsen 1985: 66).....	109
Figure 4.16. Plan and section of Complex I from Lago dell'Accesa Area A (Camporeale 1985: 136).....	110
Figure 4.17. Plan of Complexes II and III and Tomb 2 from Lago dell'Accesa Area B (Camporeale 1997: 276).	111
Figure 4.18. Hypothetical plan of Complexes VII and VIII from Lago dell'Accesa Area A (after Camporeale 1985: 132).	112
Figure 4.19. Hypothetical plan of Complexes III and IV from Lago dell'Accesa Area A (after Camporeale 1985: 133).	112
Figure 4.20. Plan of Lago dell'Accesa with the possible massiciata roadways indicated (after Camporeale 1985: 132–133).....	113
Figure 4.21. Hypothetical plan of San Giovenale Area F East in Period 3 (after Karlsson 2006: fig. 290, p. 156), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	114
Figure 4.22. Plan of Acquarossa Zones C and F (Persson 1994: fig. 6, p. 297), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	117
Figure 4.23. Plan of the excavations of Areas I and V in the Piazza d'Armi at Veii (Acconcia et al. 2009: 31).	118
Figure 4.24. Plan of the Borgo at San Giovenale (Pohl 2009: pl. 114), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	118
Figure 4.25. Plan of the early monumental complex from Acquarossa Zone F (Wikander and Wikander 1990: fig. 9, p. 199), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	119
Figure 4.26. Plan of Acquarossa Zone F with plough damage indicated (Strandberg Olofsson 1989: fig. 17, p. 173), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	120
Figure 4.27. Cross-section of Building C from Acquarossa Zone F in the first phase (Wikander and Wikander 1990: fig. 5, p. 195), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	121
Figure 4.28. Cross-section of Room 5 in Building C from Acquarossa Zone F in the second phase (Wikander and Wikander 1990: fig. 2, p. 192), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	121
Figure 4.29. Plan of Acquarossa Zone B (Persson 1994: fig. 5, p. 295), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	122
Figure 4.30. North-south section of San Giovenale Area F East, with north toward the right (Karlsson 2006: fold out plan 2), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	123
Figure 4.31. North-south section of House I from San Giovenale Area F East with north toward the left (Karlsson 2006: fig. 34, p. 47), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	123
Figure 4.32. Section of the Foundation Type 2 rubble socle wall footings beneath Room A of House III and below the wall footings of House II (Karlsson 2006: fig. 26, p. 42), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	124

Figure 4.33. East-west cross-section of Building A from the Borgo at San Giovenale with east toward the left (Pohl 2009: fig. 3, p. 26), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	124
Figure 4.34. East-west cross-section of Building B, Rooms A and B, from the Borgo at San Giovenale with east toward the right (Pohl 2009: fig. 7, p. 72), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	125
Figure 4.35. The Borgo at San Giovenale facing northwest (author's image).	127
Figure 4.36. Cross-sections of Houses D and F in the Borgo at San Giovenale (Pohl 2009: pl. 113, SS-10), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	128
Figure 4.37. Fahlander's reconstruction of House I from San Giovenale Area F East in Period 3 (Karlsson 2006: fig. 293, p. 157), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	129
Figure 4.38. A hypothetical reproduction of the wall proposed by Wendt for House A of Zone D (Wendt 1986: 60).	130
Figure 4.39. Tower photograph of House III from San Giovenale Area F East. Note the holes in the centres of two of the blocks in the southern room (Karlsson 2006: fig. 25, p. 41), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	131
Figure 4.40. Hypothetical reconstruction of the edifici monumental from Acquarossa (Strandberg Olofsson 1989: fig. 25, p. 180), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	135
Figure 4.41. Hypothetical reconstruction of the edifici monumental from Acquarossa Zone F (Strandberg Olofsson 1989: fig. 26, p. 181), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	135
Figure 4.42. Hypothetical reconstruction of San Giovenale Area F East showing House II with a high, saddle roof (Karlsson 2006: fig. 295a, p. 161), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	136
Figure 4.43. Hypothetical reconstruction of San Giovenale Area F East showing House II with a shed roof (Karlsson 2006: fig. 295b, p. 161), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	136
Figure 4.44. Hypothetical reconstruction of San Giovenale Area F East showing House III without a roof over Room A (Karlsson 2006: fig. 295c, p. 161), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	136
Figure 4.45. Map of the areas Tarquinia may have had greater influence (Bonghi Jovino 2010: fig. 1), courtesy of M. Bonghi Jovino, American Journal of Archaeology, and Archaeological Institute of America.	138
Figure 4.46. A comparison of the ground plans of major, monumental buildings from relatively contemporary urban centres (Wikander and Wikander 1990: fig. 11, p. 203), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	139
Figure 5.1. Illustrated reconstruction of the self-supporting walls of the Northern Bronze Age Building at Luni sul Mignone (Hellström 2001: fig. 4, p. 167), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	147
Figure 5.2. Illustrated reconstruction of the timber frame of House 4 at Nola (Livadie et al. 2005: 205).	148

Figure 5.3. Illustrated reconstruction of Capanna D at Ficana with both self-supporting walls and timber frame roof support (Brocato and Galluccio 2001: fig. 36, p. 307), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	148
Figure 5.4. Illustrated reconstructions of Capanne 1 and 2 at Sorgenti della Nova Section I, with timber frame (Negroni Catacchio 1995: 318), courtesy of Istituto Italiano di Preistoria e Protostoria.....	150
Figure 5.5. Fragments of daub from House I at San Giovenale Area F East (Karlsson 2006: fig. 272, p. 147), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	151
Figure 5.6. An interior hallway in the House of Opus Craticium at Herculaneum (Meiggs 1982: pl. 8).	152
Figure 5.8. The construction of pisé walls at Allumiere using traditional techniques (Genovesi 2001: fig. 2, p. 314), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	153
Figure 5.7. 1793 illustration of traditional tools used in the creation of pisé walls in Tuscany (Genovesi 2001: fig. 3, p. 314), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	153
Figure 5.9. The reconstruction process of the Iron Age structure at Fidene (Bietti Sestieri and de Santis 2001: figs. 13-14, p. 218), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	154
Figure 5.10. The construction process of a timber-framed structure with pisé walls as imagined by R. Merlo (Bietti Sestieri and de Santis 2001: fig. 8, p. 216), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	155
Figure 5.11. Illustration of the half-timber frame of a modern capanna in Giovita (Brocato and Galluccio 2001: fig. 22, p. 293), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	157
Figure 5.12. Modern capanna with dry stone walls at Monti Lepini (Almagià 1966: 257).....	160
Figure 5.13. Illustration of the half-timber walling system proposed by Wendt for House A at Acquarossa Zone D (Wendt 1986: 60).....	163
Figure 5.14. M. Fahlander’s illustrated reconstruction of House I at San Giovenale Area F East displaying the graticcio walls (Karlsson 2006: fig. 269, p. 145), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	164
Figure 5.15. Plan of the Rectangular Timber Building beside the Northwest Gate at Veii (Ward-Perkins 1959: 51). Note the post holes in the wall lines; they are some of the best evidence for half-timbering found in Etruria.	165
Figure 5.16. Stratigraphic section of a mud brick wall from the Upper Building at Poggio Civitate (Phillips 1970: fig. 9, drawing by H. Lindén), courtesy of American Journal of Archaeology and Archaeological Institute of America.....	166
Figure 5.17. Sections of the Borgo’s House B at San Giovenale with an illustrated reconstruction overlay (Blomé 2001: figs. 2-5, pp. 242-243), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	166
Figure 5.18. Schafer’s illustrated reconstruction of the farmhouse at Podere Tartuchino in the first phase (Perkins and Attolini 1992: 112).	167
Figure 5.19. Excavation of Acquarossa Zone F with Building C on the right (Wikander and Wikander 1990: fig. 4, p. 194), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	169

Figure 5.20. Map of early Etruscan roof tile distribution in central Italy (Wikander 1993: fig. 61, p. 161), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	171
Figure 5.21. Photo (taken 1991) of a modern tiled roof with tiles resting directly on the rafters (Wikander 1993: fig. 50, p. 123), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	172
Figure 5.23. Two variants of the C. Wikander model roof (Wikander 1988: fig. 11, p. 50), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	173
Figure 5.22. Conceptual reconstruction of an Etruscan roof in the Gaggera style (Turfa and Steinmayer 1996: 20). The C. Wikander model roof rejects the use of sheathing and clay revetment for a simpler alternative.	173
Figure 5.24. Plan of farmhouse at Podere Tartuchino, Phase I (Perkins and Attolini 1992: 80). Note the central post hole, which likely held the ridge pole.....	174
Figure 5.25. Plan of the Upper Building at Poggio Civitate, Room 5 in detail (after Phillips 1972: ill. 1, drawing by H. Lindén), courtesy of American Journal of Archaeology and Archaeological Institute of America.	175
Figure 5.26. Östenberg's illustrated reconstruction of the edifici monumentali at Acquarossa Zone F (Strandberg Olofsson 1989: fig. 16, p. 170), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	176
Figure 5.27. Strandberg Olofsson's illustrated reconstruction of the edifici monumentali at Acquarossa Zone F (Strandberg Olofsson 1989: fig. 25, p. 180), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	176
Figure 5.28. One of Fahlander's illustrated reconstructions of San Giovenale Area F East (Karlsson 2006: fig. 295c, p. 161), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome. Houses II and III are shown here unconnected; however, the gap in the wall between the two buildings is entirely imagined.	177
Figure 5.29. A typology of hut cinerary urns as described by Bartoloni et al. (1987:123-133). Note the hipped roofing style, as well as the prevalence of roof decoration.....	178
Figure 5.31. Illustrated reconstruction of the edifici monumentali of Acquarossa Zone F (Strandberg Olofsson 1989: fig. 26, p. 181), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome. Building A, on the left, is shown with a portico extending below the eave of the saddle roof in a possible reflection of the traditional hipped roof.	178
Figure 5.30. Plans and sections of the early seventh-century, Prayon (1975:168) type B1 Tomba delle Antare, notable for its depiction of a hipped roof (Damgaard Andersen 2001: fig. 12, p. 254), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	178
Figure 5.32. Abitazione 2 from Section III at Sorgenti della Nova (Negroni Catacchio and Domanico 2001: fig. 3, p. 342), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.	179
Figure 5.33. Diagrams of Büchschütz roof support types (Büchschütz 2005: 56).	180
Figure 6.1. Limestone socle wall footing of Oval Hut II at San Giovenale Area E (Pohl 1977: fig. 18, p. 26), courtesy of the Editorial Committee of the Swedish Institutes at Athens and Rome.....	187
Figure 6.2. Site plan of the necropolis at Populonia (Baratti and Coccoluto 2009: 39).	188
Figure 6.3. Map of the clay deposits in the so-called badlands of northern Etruria (Battaglia et al. 2011: 15).	194

Figure 6.4. Geological map of the Ombrone basin around Poggio Civitate (Murlo) (after Carmignani et al. 2013). Numbers 7, 8, 12 represent Pliocene clay deposits and the number 26 represents a conglomeration of argillaceous siltstones, shale and calcareous sandstone. 194

LIST OF TABLES

Table 3.1. Examples of building foundations from 800-500 BC by type and site.....	50
Table 3.2. The examples of buildings with Type 1 foundations by site.....	55
Table 3.3. The examples of buildings with Type 2 foundations by site.....	70
Table 4.1. The examples of buildings with Type 4 foundations by site.....	97
Table 4.2. The examples of buildings with Type 5 foundations by site.....	116

Abstract

Etruscan architecture underwent various changes between the later Iron Age and the Archaic period (c. 800-500 BC), as seen in the evidence from several sites. These changes affected the design and style of domestic architecture as well as the use of raw materials and construction techniques. However, based on a supposed linear progression from inferior to superior building materials, explanations and interpretations often portray an architectural transition in Etruria from 'prehistoric' to 'historic' building types. This perspective has encouraged a rather deterministic, overly simplified and inequitable view of the causes of change in which the replacement of traditional materials with new ones is thought to have been the main factor.

This book aims to reconsider the nature of architectural changes in this period by focussing on the building materials and techniques used in the construction of domestic structures. Through a process of identification and interpretation using comparative analysis and an approach based on the *chaîne opératoire* perspective, changes in building materials and techniques are examined, with special reference to four key sites: San Giovenale, Acquarossa, Poggio Civitate (Murlo) and Lago dell'Accesa. It is argued that changes occurred in neither a synchronous nor a linear way, but separately and at irregular intervals. In this monograph, they are interpreted as resulting mainly from multigenerational habitual changes, reflecting the relationship between human behaviour and the built and natural environments, rather than choices between old and new materials. Moreover, despite some innovations, certain traditional building techniques and their associated materials continued into the Archaic period, indicating that Etruscan domestic architecture did not undergo a complete transformation, as sometimes asserted or implied in other works. This study of building techniques and materials, while not rejecting the widely held view of a significant Etruscan architectural transition, argues for a more nuanced reading of the evidence and greater recognition of the nature of behavioural change during the period in question.

Acknowledgments

This book results from the thesis I wrote in support of my PhD Archaeology candidacy at the University of Edinburgh. As such, I am deeply indebted to a number of individuals and institutions who provided me with the support needed to accomplish this work. First, I would like to thank my supervisor Dr Robert Leighton for his ongoing mentorship. His aid and advice has helped me to better understand not only my research, but also my limits as a writer and researcher. Over the last decade, I have grown as an academic and as an individual. This growth is thanks in no small part to his guidance.

I also extend my thanks to Jim Crow, Ian Ralston, Gordon Thomas, Eberhard Sauer, Wendy and Keith Rutter, and Manuel Fernández-Götz for their assistance, as well as for their interest in me and my research. The encouragement that I have received from the staff at the University of Edinburgh has ensured the completion of this formidable task. Thanks are also due to my colleagues and friends who were there for me to try ideas and half-baked theories out on and who made sure that I stayed on target: Douglas Fox, Graeme Erskine, Piotr Jacobsson, Emanuele Intagliata, Scott Stetkiewicz, Manuel Bermúdez Vásquez, Elena Casares Landauro, Chenching Cheng, Sophia Huang, Edward Rayner, Annamaria Diana, Gabriele Meloni, Chelsey Noble, David Cree and Alex Currie. There are, of course, many more friends to thank than can be fit here.

I cannot emphasise my appreciation of my family enough, without whom none of this would be possible. Special thanks to Mom and Dad who sat through numerous ramblings and read through countless iterations of this work. Their confidence in me was ever reassuring, and I relied heavily on their steady and often profound counsel.

My final thanks go to my wife, Annahita. She has been my friend, confidant, and occasional boss throughout this process.

Chapter 1: Introduction

The purpose of this book is to examine the nature and extent of changes in building techniques in the domestic structures in Etruria from 800-500 BC. Where a transition is demonstrable, the degree and possible reasons for change are examined. To fulfil this purpose, it is necessary to identify the building techniques used in domestic structures in Etruria and interpret how and why they were used through time. The framework established by the environment-behaviour relations model of architectural theory (see section 2.1.1), as well as the broader theories of behavioural archaeology, governs these interpretations. The identification of building techniques is conducted through descriptive analyses of structural features and associated evidence. Identified techniques are then interpreted using the *chaîne opératoire* approach and comparative analysis.

Both introductory textbooks (e.g. Bartoloni 2012a: 266–267; Becker 2014: 9–12; Donati 2001: 321–324; Ridgway 1988: 666) and in-depth studies (e.g. Brandt and Karlsson 2001b; Colantini 2012; Izzet 2001a, 2007: 143–164; Steingraber 2001a) commonly assume a transition in building technology and architectural style in the seventh and sixth centuries BC. Of the publications that recognise the supposed transition, the seminar proceedings edited by Brandt and Karlsson (2001b) is most significant. The title of their volume, *From Huts to Houses: Transformations of Ancient Societies*, sums up the widespread perception of the architectural transition. In their introduction to the volume, they assert that a transformation occurred in “building material and technologies” (Brandt and Karlsson 2001a: 8). Accordingly, they state that the common use of the terms ‘huts’ and ‘houses’ arose in the literature to distinguish between structures supposedly resulting from the use of different materials and technologies (Brandt and Karlsson 2001a: 7–8).

As noted by Brandt and Karlsson (2001a), the transition in the domestic architecture of Etruria is thus commonly recognised through terminology as a transformation in building materials and technologies (e.g. Colantini 2012; Colonna 1986; Izzet 2007: 152–154; Steingraber 2001a: 26; Torelli 1985). The terminology used to characterise the transformation, particularly the terms ‘huts’ and ‘houses’, creates a simplified system for the interpretation of architectural features. Typically, structures made from wood, wattle and daub and thatch are referred to as ‘huts’, whereas structures made from mud brick, stone and terracotta roof tiles are ‘houses’. However, the terminology also paints the transition as one of linear evolution based on the adoption of superior materials. Domanico (2005) is one of the few authors to criticise this approach for inaccurately diminishing the complexities and variety of techniques in earlier structures. Based on this linear depiction of the transition, one technology is replaced by another, as evidenced by the appearance of new building materials. From such a depiction it is not clear how building techniques (which are the learned behaviours of architectural creation, maintenance, demolition and reuse; see section 2.1.2) fit into the perceived transition, if they do at all.

The architecture of an individual structure varies based on the surrounding built environment and the behaviours of the builders (Rapoport 1977, 2000, 2006; see section 2.1.1). If a shift in the structural evidence is archaeologically apparent, then the built environment or the behaviours (including building techniques) of the builders changed. The identification and interpretations of building techniques attempt to understand architectural change as a product of behaviour. Rather than identify the transition based on the appearance of new or different building materials, an investigation of the building techniques forces a reconsideration of how (via identification) builders interacted with their surroundings and why (via interpretation) change in behaviour is evident.

This approach departs from the identification and interpretation of Etruscan architectural features based on building materials and technology. Identification is relatively straightforward in the traditional,

terminological classifications. In Etruscan studies, the typical evidence for change in architecture is primarily based upon: the presence of different building materials (both raw and manufactured) between contexts in the archaeological record, the interpretation of artefacts with architectural features (e.g. cinerary urns) or the architectural descriptions in Classical sources (e.g. Vitruvius). Interpretation of architectural features, particularly of the seventh and sixth centuries BC, often relates in some way back to the transition in materials (e.g. Izzet 2007: 152–154; Steingraber 2001a: 25–27). Many interpretations also use evidence for material change in other contexts to understand the supposed architectural transition (e.g. Bartoloni 2012a: 266–269; Torelli 1985). The resulting depiction is thus a linear, evolutionary progression from inferior to superior materials that is often reliant on non-architectural contexts.

Making a transition in building materials and technology the focal point of interpretation has in effect created the common perception of significant architectural change between the Iron Age and the Etruscan period. Continuity of tradition is only rarely proposed as a continuation of traditional architecture (e.g. Damgaard Andersen 2001; Karlsson 2006: 142–144; Ö. Wikander 1990). Instead, similar building techniques are viewed altogether differently based on the different materials being used. For instance, walls made of self-supporting pisé are typically interpreted as inferior and fundamentally different from ashlar stone, despite their similarity as walling techniques and their function in buildings.

Furthermore, the interpretations of the transition in Etruscan domestic architecture have changed considerably over the last forty years (see section 2.3). Initially, the transition was interpreted as a result of the spread of the superior Greek and Near Eastern manufactured materials, artisans and artistic motifs to the western Mediterranean (e.g. Pallottino 1975: 174). A decade later, the transition was explained as the rise of an élite class who used new, foreign materials to display their wealth (e.g. Torelli 1985). More recently, the use of new building materials (particularly of terracotta tiling and stone) is often associated with urbanisation and the need to use space in new ways (e.g. Izzet 2007: 143–164; Rohner 1996).

Altering the interpretive focus from building materials and technology to building techniques shifts the common perspective of architecture from a discussion of new materials and technologies to one of identified behaviours.¹ A focus on techniques emphasises the behavioural tendency toward habit and the maintenance of tradition rather than the more noteworthy appearances of change (see section 2.1.3). In effect, this shift of interpretive focus encourages the identification of differences in building behaviour rather than instances of technological progress.

Moreover, with its basis in technique, the recognition of change becomes more dynamic. Changing techniques, following psychological and sociological theories of behaviour (see section 2.1.3), can be recognised as habitually or actively innovative. The distinction is based on a number of factors, the primary factor being the relationship between habitus and choice. Interpretations following a *chaîne opératoire* approach can recognise the subtleties separating the habitually and actively innovative techniques through the comparison of the different operations over time (see section 2.2.2).

One of the main problems with the ways that scholars have engaged with domestic architecture is the relativism in the definitions it uses when discussing and describing the evidence. There is often little standardisation in defining architectural features. Simple differences between, for instance, what is and is not considered structural, where foundations end and walls begin and what makes a building a hut as opposed to a house are rarely directly addressed. Even how to identify certain techniques using material evidence is not immediately clear or even wholly accurate (as is the case, for example, with pisé; see

¹ The terminological difference between a building technology and technique is subtle. Described further in the Glossary, ‘technology’ refers to the know-how and ability to apply calculated, practical and mechanical ideas to create an end product, as opposed to a ‘technique’, which is a pragmatic operational sequence often (though not necessarily) associated with a specific technology (Oxford University Press 2014). A technique, as a specific set of actions, is a behaviour (see section 2.1.2), whereas a technology is typically a concept or group of concepts.

section 5.1.1). Definitions of any technique based on material evidence are essentially relative to intra-site standards or to comparable cases elsewhere, which themselves are caught up by similar insecure definitions.

The ambiguity of discussion regarding the evidence has produced a muddled use of architectural terminology. The same ambiguity has also led to the misrepresentation of evidence. Widespread, vague assumptions about building features seem to be used by scholars as an attempt to support findings defined by unclear terms. This imprecision has given rise to models of architectural development that are not well-founded. Similarly, incorrect, outdated or unclear terms have made it difficult to recognise specific materials or techniques (a common problem when discussing the foundations of later, sixth-century BC structures; see section 4.1.2). Some terminology is even left out or changed because of how a term is perceived (as is likely the case with the use or, rather, neglect of the term ‘timber’ for wall structures in early Etruscan buildings; see section 5.1.1). This use of terminology corresponds with the common use of a similarly outdated evolutionary taxonomy, which has been critiqued since the 1970s (Abrams 1989: 50–51; Athens 1977; McGuire 1983; McGuire and Schiffer 1983; Wenke 1981; Yoffee 1979).

In this work, therefore, the evidence from sites across Etruria is described according to a strict definition of terms. This is intended to help clarify the material evidence. It also helps to reveal what direct evidence for building techniques and technologies exists and what else has merely been assumed. To build specific definitions for terms used in this book, it was essential to look beyond archaeology to vernacular architecture and structural engineering. Incorporating the definitions used in these fields for common terminology into specific archaeological definitions creates the boundaries for the terms necessary for a meticulous evaluation (for a full list of defined terminology, see Glossary).

Examining building techniques with clarified terms allows for the recognition of the building process through time, with all of the continuances, modifications, adaptations, adoptions and innovations involved in each step of that process. By contrast with the focus on building material and technology, this approach makes it easier to identify the persistence of tradition and the dynamism of change. Whether that change is revolutionary and caused by radical alterations to the social fabric or part of a gradual, centuries-long development where the visible aspects of the change appear at irregular intervals (or even some point in between these two), analysing the construction process is essential in order to establish a more reliable interpretation of architectural development in Etruria from 800-500 BC.

1.1 Book outline

There are seven chapters in this book, including this introductory chapter. Chapter 2 presents the major sites in this study and the theoretical and methodological foundations for this work. In the first section, behaviour and the environment-behaviour relations are reviewed. The focus on behavioural theories throughout the book emphasises the relationship between domestic structures and the people that created, used and destroyed them within a social context. A behavioural archaeological approach is intended to free the interpretations here from the wider ideographical concepts commonly used in the literature. The first section also examines the causal nature of actions with reference to habitus, structuration and the dual-process theory.

The second section details the methods employed in this research. It outlines the descriptive reconstruction process used to identify techniques. Then, it describes the *chaîne opératoire* approach and why it is an increasingly necessary method for interpreting past building techniques. Along with comparative analysis, the *chaîne opératoire* approach forms the basis for interpretations and is therefore discussed in some detail, including an examination of the limitations and problems with the approach.

The third section of Chapter 2 asserts how the research presented in this study corresponds to the established historical context. Along with a summary of broader socio-cultural development from 800-500 BC, the third section examines the state of scholarly discourse on Etruscan architecture. In particular, it considers how certain approaches to the general study of central Italian society and culture have formed the prevailing perceptions of Etruscan architecture. In the conclusions to this book, the wider concepts discussed and raised in this section will be considered in relation to the results of this study and architectural change.

The final part of Chapter 2 reviews the literature on four sites that have greatly influenced the overall discussion of domestic architecture. San Giovenale, Acquarossa, Lago dell'Accesa and Poggio Civitate are the most extensively excavated sites with domestic architecture for the period in question (Izzet 2001a). As Brandt and Karlsson (2001a) note, the excavations and publications by the Swedish Institute, in particular, have been essential to the overall concept of architectural transformation. The end of Chapter 2 therefore critiques both the excavation reports of these sites and discusses their wider impact on the literature.

Chapters 3 and 4 consider foundation techniques. Chapter 3 focusses on the early types of foundations that appeared up to 625 BC and Chapter 4 focusses on those types that appeared following 625 BC. Chapter 3 also explains the terminology and classification system used in both chapters. Foundations, being the most likely to survive archaeologically, are perhaps the best part of a building to analyse when attempting to understand changes in building technique. By defining the foundations of buildings based upon their typical features (i.e. ground preparation, wall footings, flooring and roof supports), building techniques can be identified through time. As detailed in Chapter 3, the foundation techniques have been grouped into 'types' based on evidence for similar operational chains. Grouping techniques into larger 'types' allows for a broader recognition of change over time, which in turn leads to a more rigorous evaluation through comparative analysis.

The investigation of architectural features continues in Chapter 5 with walls and roofs. Supposed material and technological changes suggest a transformation in walling and roofing in the seventh and sixth centuries BC. Based on these material and technological changes, many scholars use a model of evolutionary progression in wall construction from wattle and daub and pisé to mud brick and, finally, stone. Chapter 5 challenges this evolutionary progression by calling into question the evidence for material and technological change. The subsequent identification of walling techniques suggests the need for rethinking the standard interpretations. It is suggested that continuity of tradition is more evident than generally asserted.

Roofing techniques are also discussed in Chapter 5. The identification and interpretation of roofing techniques contrasts with the earlier examination of the walling techniques in the chapter because, in comparison, roofing evidence is clearer in the literature. Yet, interpretations of roofs are, akin to walls, based on some false assumptions. The appearance of terracotta roof tiles in domestic contexts has been suggested as evidence for a marked change in technology, possibly spurred by foreign influence (e.g. Torelli 1985). A number of scholars (e.g. Damgaard Andersen 2001; Ö. Wikander 1990, 1993) have offered dynamic interpretations of the transition in materials but the appearance of terracotta tiling is the major factor in most interpretations. While the roof covering techniques are identified and discussed, the section on roofing techniques broadens the focus by also identifying the structural roofing techniques. Interpretations of roofing in Chapter 5 attempt to create a holistic understanding of roofing that recognises the entire roof, not just the covering materials.

Chapter 6 examines interpretations of architectural change based on raw and manufactured building materials. Further to discussions of technique, the chapter examines the procurement, manufacture, use and reuse of building materials and how these facets of the *chaîne opératoire* affected building

techniques. Chapter 6 also discusses the progression of building materials, indicating noticeable changes to procurement, manufacture, use and reuse with reference to possible causes for change. Based on this approach, it is argued that there was consistency in building material procurement, manufacture, use and reuse over time. Ultimately, local traditions, rather than the choice of superior foreign over inferior native building materials, appear to have been the key factor in the progression of material procurement, manufacture, use and reuse.

The conclusions presented in Chapter 7 offer both a summary of the key points of the individual chapters and an interpretation of the changes to domestic architecture from 800-500 BC. This interpretation allows for a conclusive answer to the main research question of this book: how did the use of building techniques in the domestic structures of Etruria change from 800-500 BC? Further discussions of the implications of transition are also presented in Chapter 7, focussing on the interaction between the maintenance of and innovation to building techniques over time. Finally, possible areas for further research are suggested, highlighting some of the limitations of the current evidence and this work.