## Contents

Contributors xv  
Figures xxii  
Tables xxxv  
Dedication xxxi  
Acknowledgements xxxiii  
Foreword xxxix 

Chapter 1  Archaeological studies of Maltese prehistory for the FRAGSUS Project 2013–18  
Caroline Malone, Simon Stoddart, Rowan McLaughlin & Nicholas Vella  
1. Introduction  
  1.1. Island studies  
  1.1.2. Chronology and new scientific studies  
  1.1.3. Island criteria  
1.2. Background to FRAGSUS as an archaeological project  
1.3. The Cambridge Gozo Project 1987–95  
1.4. The FRAGSUS Project 2013–18  
  1.4.1. Archaeological concerns in Maltese prehistory and the FRAGSUS Project  
  1.4.2. Time and artefacts  
  1.4.3. Architecture  
1.5. Five research questions  
1.6. The field research programme, 2014–16: the selection of sites for excavation and sampling and the goals for each site  
  1.6.1. Taċ-Ċawla  
  1.6.2. Santa Verna  
  1.6.3. Kordin III  
  1.6.4. Skorba  
  1.6.5. Ġgantija  
  1.6.6. In-Nuffara  
1.7. Additional studies  
1.8. Environmental and economic archaeology  
1.9. Conclusions  

Chapter 2  Dating Maltese prehistory  
Rowan McLaughlin, Eóin W. Parkinson, Paula J. Reimer & Caroline Malone  
2. Introduction: chronology building in the Maltese islands  
  2.1.1. Malta and megalithismus  
  2.1.2. Malta and the Mediterranean: the development of absolute chronologies  
2.2. Methodology  
  2.2.1. Sources of data  
  2.2.2. AMS radiocarbon dating  
  2.2.3. Bayesian phase modelling  
  2.2.4. Density modelling  
2.3. Results  
  2.3.1. Early Neolithic Għar Dalam and Skorba phases  
  2.3.2. Fifth millennium hiatus  
  2.3.3. Żebbuġ phase  
  2.3.4. Mgarr / transitional Ġgantija phase  
  2.3.5. Ġgantija phase  
  2.3.6. Saflieni phase  
  2.3.7. Tarxien phase  
  2.3.8. Therme phase
2.3.9. Tarxien Cemetery phase 33
2.3.10. Borg in-Nadur phase 33
2.3.11. Preferred model summary 34
2.3.12. Kernel density model 34
2.3.13. Comparison with other regions 36

2.4. Non-prehistoric dates 37

2.5. Discussion 37

2.6. Conclusion 38

Chapter 3 Excavations at Taċ-Ċawla, Rabat, Gozo, 2014 39

Caroline Malone, Rowan McLaughlin, Stephen Armstrong, Jeremy Bennett, Conor McAdams, Charles French, Simon Stoddart & Nathaniel Cutajar

3.1. Introduction 39
3.1.1. Location and physical setting 40
3.1.2. History of the site 42

3.2. The Van der Blom and Veen watching brief 42
3.2.1. The initial evaluation 1993–4 42
3.2.2. The archaeological investigation 1993–4 44
3.2.3. The Horton-Trump 1995 investigation 47
3.2.4. Pottery phases Għar Dalam (c. 5500 bc) 47
3.2.5. Tarxien Phase c. 2800 to 2400 bc 48
3.2.6. Later levels of Punic, Roman and Medieval material c. 800 bc to ad 1500 48
3.2.7. Post Medieval 48
3.2.8. The 2014 excavations – methods 48

3.3. Results of the 1995 work and the 2014 work 48
3.3.1. Wall (172) 50
3.3.2. Internal floors and features within the structure: house layers 53
3.3.3. Level 1 deposits 56
3.3.4. Level 2 deposits 60
3.3.5. Level 3 deposits 62
3.3.6. Level 4 deposits 65
3.3.7. Level 5 deposits 67
3.3.8. Level 6 deposits 69
3.3.9. Level 7 deposits 71
3.3.10. Level 8 deposits 73

3.4. Superficial levels and the Roman vine channels 75
3.4.1. North Baulk and Main Quadrant 75
3.4.2. Box Trench 5 75
3.4.3. Box Trench 4 and main (Horton-Trump ‘H’) trench 77
3.4.4. Box Trench 6 79
3.4.5. The prehistoric deposits outside the wall east of the stone structure 81

3.5. The lower levels of extramural occupation 83
3.5.1. Summary 83
3.5.2. The Northern Sector 83
3.5.3. The North Central Sector 88

3.6. Destruction layers, middens and a torba remnant outside the building wall 91
3.6.1. The South Central Sector 91
3.6.2. The South Sector 95
3.6.3. Summary of the stratigraphic sequence of the eastern exterior of the stone structure 96
3.6.4. East extent of the Taċ-Ċawla site 96

3.7. Ancient soils and deposits and the Roman vine channels and pits 103

3.8. The agricultural channels in the northeast area of the site 103
3.8.1. The Roman agricultural channel sequence and fills 104

3.9. Recent historical remains 114
3.10. The material culture of Taċ-Ċawla
   3.10.1. Ceramics
   3.10.2. Lithics and artefacts
3.11. The plant economy of Taċ-Ċawla
3.12. Summary
   3.12.1. Conclusions and discussion

Chapter 4 Santa Verna
Rowan McLaughlin, Charles French, Eóin W. Parkinson, Sara Boyle, Jeremy Bennett,
Simon Stoddart & Caroline Malone

4.1. Introduction
4.2. The site
   4.2.1. Location and physical setting
   4.2.2. History of the site
   4.2.3. The 1911 excavations
   4.2.4. The 1961 excavations
   4.2.5. The Cambridge Gozo Survey
   4.2.6. The 2014 Survey
4.3. The 2015 excavations
   4.3.1. Methodology
   4.3.2. Trench A
   4.3.3. Trench B
   4.3.4. Trench C
   4.3.5. Trench D
   4.3.6. Trench D western extension
   4.3.7. Trench D northern extension
   4.3.8. Trench E
   4.3.9. Keyhole investigations between Trenches C, D and E
   4.3.10. Trench F
   4.3.11. Trench G
4.4. Soil micromorphology and geochemistry
   4.4.1. Introduction
   4.4.2. Physical and elemental characterization
   4.4.3. Summary of earthen floor micromorphology
   4.4.4. Conclusion
4.5. Discussion
   4.5.1. Pre-temple features and deposits
   4.5.2. The prehistoric temple at Santa Verna
   4.5.3. Destruction and collapse of the temple
   4.5.4. Evidence of Punic, Roman and Arab phases
   4.5.5. The medieval chapel of Santa Verna
   4.5.6. Previous excavation campaigns at the site
4.6. The megalithic survey
4.7. Summary and conclusions

Chapter 5 Ġgantija
Catriona Brogan, Charles French, Sean Taylor, Jeremy Bennett,
Eóin W. Parkinson, Rowan McLaughlin, Simon Stoddart & Caroline Malone

5.1. Introduction
5.2. Location and physical setting of the site
5.3. History of the site
   5.3.1. Museum Department excavations
5.4. 2014 survey and excavations
   5.4.1. Methodology
Chapter 6  Kordin III  193
Rowan McLaughlin, Catriona Brogan, Eóin W. Parkinson, Ella Samut-Tagliaferro, Simon Stoddart, Nicholas Vella & Caroline Malone

6.1. Introduction  193
6.2. The site
  6.2.1. Location and physical setting  193
  6.2.2. History of the site  194
6.3. Methodology and personnel  199
6.4. Results: Trench I
  6.4.1. Trench IA  201
  6.4.2. Trench IB  208
  6.4.2. Trench IB  208
  6.4.3. Trench IC  212
6.5. Results: Trench II  214
  6.5.1. Trench II A  214
  6.5.2. Trench II B  215
6.6. Results: Trench III  217
6.7. Results: Trench IV
  6.7.1. Trench IV A  219
  6.7.2. Trench IV B  219
6.8. Discussion
  6.8.1. Palaeosols  220
  6.8.2. Possible Skorba phase features  221
  6.8.3. Mgarr phase layers  221
  6.8.4. Pre-temple Ġgantija phase layers  221
  6.8.5. The megalithic ‘temple’ and its date  221
  6.8.6. Later activity  222
  6.8.7. Re-arrangement of the megaliths  222
6.9. Conclusion  223

Chapter 7  Skorba  227
Catriona Brogan, Eóin W. Parkinson, Rowan McLaughlin, Charles French & Caroline Malone

7.1. Introduction  227
7.2. The site
  7.2.1. Location and physical setting  227
  7.2.2. History of the site  228
  7.2.3. The 1961–63 campaign  228
7.3. Methodology of the 2016 campaign  230
7.4. Results
  7.4.1. Northern corner  231
  7.4.2. Central sondage  232
Chapter 8  In-Nuffara

Stephen Armstrong, Catriona Brogan, Anthony Bonanno, Charles French,
Rowan McLaughlin, Eóin W. Parkinson, Simon Stoddart & Caroline Malone

8.1. Introduction 245
8.2. The site
  8.2.1. Location and physical setting
  8.2.2. History of the site
8.3. Surface survey
8.4. The 2015 excavations
  8.4.1. Excavation rationale
  8.4.2. Methodology and personnel
  8.4.3. Results
  8.4.4. Geoarchaeological report
8.5. Discussion
  8.5.1. The Bronze Age settlement at In-Nuffara and contemporary use of the
        rock-cut pit
  8.5.2. The silos and their construction
  8.5.3. Site abandonment and later activity at In-Nuffara
  8.5.4. Punic, Roman and later activity at In-Nuffara
8.6. Conclusions
8.7. The pottery from In-Nuffara
  8.7.1. Introduction: In-Nuffara pottery overview report
  8.7.2. The catalogue
  8.7.3. Catalogue numbers
8.8. Characteristics and manufacture
  8.8.1. Fabric
  8.8.2. Surface treatment
  8.8.3. Decoration
8.9. Comparanda
  8.9.1. Noteworthy missing shapes
  8.9.2. Unique representations, without parallels elsewhere
8.10. Stratigraphic context and date
8.11. Recent archaeometric results
8.12. Impact of the above on the In-Nuffara assemblage
8.13. Concluding remarks
8.14. Catalogue of Bronze Age pottery from In-Nuffara

Chapter 9  Economy, environment and resources in prehistoric Malta

Rowan McLaughlin, Finbar McCormick, Sheila Hamilton-Dyer, Jennifer Bates,
Jacob Morales-Mateos, Charles French, Petros Chatzimpaloglou, Catriona Brogan,
Alastair Ruffell, Nathan Wright, Patrick J. Schembri, Christopher O. Hunt,
Simon Stoddart & Caroline Malone

9.1. The environment of early Malta 281
9.2. Material resources
  9.2.1. Indigenous materials
  9.2.2. Exotic materials: their origins and distribution
9.3. Economy and foodways
  9.3.1. Introduction: the lines of evidence
9.3.2. Palaeoecology 289
9.3.3. Plant remains 289

9.4. Faunal remains: mammal bone
  9.4.1. Introduction 294
  9.4.2. Fragmentation 295
  9.4.3. Species distribution 295
  9.4.4. Sheep/goat 295
  9.4.5. Cattle and pig 298

9.5. Other species 299

9.6. Mammal bones: discussion
  9.6.1. Livestock and religion 302

9.7. Birds and fish
  9.7.1. Bird bones 303
  9.7.2. Fish bones 304

9.8. Faunal remains: conclusions 304

9.9. Human remains
  9.9.1. Dental wear 305
  9.9.2. Stable isotopes 305

9.10. Conclusions: the economic basis of prehistoric Malta 306

Chapter 10  The pottery of prehistoric Malta
Caroline Malone, Catriona Brogan & Rowan McLaughlin

10.1. Introduction 309
  10.1.1. History 310
  10.1.2. Dating pottery 311
  10.1.3. Recent research on Maltese pottery 311

10.2. The FRAGSUS ceramic research programme 313
  10.2.1. Pottery phase descriptions 314
  10.2.2. The typology and recognition of pottery types in Malta 320
  10.2.3. The FRAGSUS pottery analysis: general data from across the sites 323
  10.2.4. Pottery frequency 323
  10.2.5. Phase frequency on the 2014–16 excavated sites 323
  10.2.6. Fragmentation of pottery 323

10.3. Għar Dalam pottery (Phase 1) 324
  10.3.1. Għar Dalam pottery from FRAGSUS sites 326
  10.3.2. Għar Dalam style representation 326
  10.3.3. Għar Dalam: catalogue descriptions 326
  10.3.4. Għar Dalam: style characteristics 327
  10.3.5. Għar Dalam: fabric, finish and decoration 330
  10.3.6. Regional style 330

10.4. Skorba pottery (Phase 2) 331
  10.4.1. Skorba (Red and Grey) bowl and jar forms from Santa Verna and Skorba: catalogue descriptions 334
  10.4.2. Skorba general forms: catalogue descriptions 334
  10.4.3. Red Skorba: catalogue descriptions 335
  10.4.4. Forms and shapes 335

10.5. Żebbuġ pottery (Phase 3) 339
  10.5.1. The Żebbuġ assemblage 339
  10.5.2. Trefontane style: forms 340
  10.5.3. Trefontane 340
  10.5.4. Trefontane-Żebbuġ bowls: catalogue descriptions 342
  10.5.5. Żebbuġ bowls: catalogue descriptions 344
  10.5.6. Żebbuġ cups, handles, lugs, bases and profiles: catalogue descriptions 346
  10.5.7. Żebbuġ jars and bowls: catalogue descriptions 346
10.5.8. Żebbuġ inverted jars and bowls, sherds and decoration: catalogue descriptions 349
10.5.9. The Żebbuġ assemblage 349
10.6. Mgarr pottery (Phase 4) 351
10.6.1. The FRAGSUS assemblage 351
10.6.2. Mgarr inverted bowls: catalogue descriptions 351
10.6.3. Mgarr patterned sherds and bowls: catalogue descriptions 354
10.6.4. Mgarr decoration 354
10.6.5. Mgarr inverted and everted forms and lugs: catalogue descriptions 355
10.7. Ġgantija pottery (Phase 5) 357
10.7.1. Ġgantija ceramic repertoire 357
10.7.2. Ġgantija everted tapered rim bowls and cups: catalogue descriptions 359
10.7.3. Ġgantija everted rolled rim bowls: catalogue descriptions 359
10.7.4. Ġgantija tapered rim bowls: catalogue descriptions 361
10.7.5. Ġgantija inverted rolled rim jars: catalogue descriptions 363
10.7.6. Ġgantija inverted tapered rim bowls and cups: catalogue descriptions 366
10.7.7. Ġgantija inverted tapered rim bowls: catalogue descriptions 366
10.7.8. Ġgantija rolled rim jars (biconical forms): catalogue descriptions 367
10.7.9. Ġgantija rolled and collared rim jars and bowls: catalogue descriptions 367
10.7.10. Ġgantija deep and tapered rim jars: catalogue descriptions 371
10.7.11. Ġgantija lids, bases and base decorated sherds: catalogue descriptions 373
10.7.12. Ġgantija handles, lugs and decorated sherds: catalogue descriptions 373
10.8. Saflieni pottery (Phase 6) 374
10.8.1. Saflieni vessels and sherds: catalogue descriptions 374
10.8.2. Discussion of Saflieni ceramics 376
10.9. Tarxien pottery (Phase 7) 376
10.9.1. The Tarxien assemblage 376
10.9.2. Tarxien open carinated bowls and cups: catalogue descriptions 376
10.9.3. Tarxien small carinated bowls and cups: catalogue descriptions 378
10.9.4. Tarxien inverted jars and bowls: catalogue descriptions 381
10.9.5. Tarxien textured and rusticated surface vessels: catalogue descriptions 384
10.9.6. Tarxien rusticated coarseware and larger vessels: catalogue descriptions 384
10.9.7. Tarxien two-sided patterned vessels, lids and bases: catalogue descriptions 386
10.9.8. Tarxien handles and lugs: catalogue descriptions 389
10.10. Early Bronze Age pottery 389
10.10.1. Pottery from Thermi-Tarxien Cemetery phases 391
10.10.2. Thermi and Early Bronze Age pottery from Taċ-Ċawla: catalogue descriptions 393
10.10.3. Bronze Age and Thermi pottery: catalogue descriptions 395
10.11. Conclusions 397

Chapter 11 Small finds and lithics: reassessing the excavated artefacts and their sources in prehistoric Malta 399
CAROLINE MALONE, PETROS CHATZIMPALOGLOU & CATRIONA BROGAN
Part I – The excavated artefacts
11.1. Introduction 399
11.2. Small finds – ‘Temple’ Culture artefacts 399
11.2.1. Stone artefacts – querns and ground stone 399
11.2.2. Ceramic objects, figurines 403
11.2.3. Shell, beads 403
11.2.4. Bone tools and artefacts 403
11.3. Lithic tools: raw materials and technology 406
11.3.1. Chert – Santa Verna 410
11.3.2. Obsidian – Santa Verna 412
11.3.3. Chert – Taċ-Ċawla 412
11.3.4. Obsidian and chert – Taċ-Ċawla 413
11.3.5. Chert and obsidian – Ġgantija 417
11.3.6. Chert and obsidian – Skorba 417
11.3.7. Chert and obsidian – Kordin III 417

11.4. Discussion 418

Part II – The lithic sources
11.5. Assessing the lithic assemblages and sourcing chert artefacts 420
11.6. Lithic provenance 420
   11.6.1. Geological background and chert rocks 421
11.7. Materials and methods 423
   11.7.1. Field research 423
   11.7.2. Laboratory research 423
   11.7.3. Chert sources of Malta and Sicily 424
   11.7.4. Geochemical examination 428
11.8. Lithic assemblages 431
   11.8.1. Macroscopic examination 432
   11.8.2. Mineralogical examination 434
   11.8.3. Geochemical examination 435
11.9. Summary and conclusions 440
11.9. Chaîne opératoire 442
11.10. Integration with FRAGSUS 445

Chapter 12  Megalithic site intervisibility: a novel phenomenological approach 447
Josef Caruana & Katya Stroud

12.1. Introduction 447
12.2. GIS and the study of the Neolithic in Malta 447
   12.2.1. Technical background and crucial advances in pixel coverage 447
12.3. The Neolithic landscape 447
   12.3.1. Project aims 448
   12.3.2. Methodology 448
12.4. QGIS and associated analyses 449
12.5. The parameters used 450
   12.5.1. Height 450
   12.5.2. Extent of view 450
   12.5.3. Height of observer 450
   12.5.4. Curvature 450
12.6. Assumptions and limitations 450
12.7. Results and observations 451
   12.7.1. Correlation analysis 451
12.8. Agglomerative hierarchical clustering 454
12.9. Conclusion 454

Chapter 13  Conclusions 457
Caroline Malone, Catriona Brogan, Reuben Grima, Eóin W. Parkinson,
Rowan McLaughlin, Simon Stoddart & Nicholas Vella

13.1. Introduction 457
13.2. Excavation, sampling and some lessons learnt 457
   13.2.1. Challenges and opportunities 457
   13.2.2. Excavation and recording methods 464
   13.2.3. Public engagement 466
13.3. New discoveries 471
   13.3.1. Prehistoric settlement 471
   13.3.2. ‘Temples’ and their evolution 474
   13.3.3. Dating and the culture sequence 474
Appendix to Chapter 7
A7.1. Skorba context register 665
A7.2. Small find register 666
A7.3. Pottery database 667
A7.4. AMS dates 668
A7.5. Skorba soil samples 668
A7.6. OSL (optically stimulated luminescence) sample list 669
A7.7. Soil micromorphology and geochemistry 670

Appendix to Chapter 8
A8.1. In-Nuffara context register 676
A8.2. Small find register 677
A8.3. Palynological analysis of samples from In-Nuffara 678
A8.4. AMS dates 685
A8.5. Soil sample register 686
A8.6. In-Nuffara: soil micromorphology of selected pit fills 687

Appendix to Chapter 9
A9.1. Palaeobotanical assemblages 692
A9.2. Zooarchaeological assemblages 714

Appendix to Chapter 10
A10.1. Drawn pottery 724
A10.2. Ceramic thin section analysis of Temple Period, Neolithic and Bronze Age material from Malta 742
A10.3. Phase sequence and forms after Evans (1971) and Trump (1966, 1989) 750

Appendix to Chapter 11
A11.1. Worked stone artefacts 763
A11.2. Terracotta and shell artefacts 765
A11.3. Worked bone and shell artefacts 765
A11.4. Taċ-Ċawla obsidian assemblage, length and width 766
A11.5. Chert and obsidian numbers from the FRAGSUS sites 769
A11.6. Geological description and analysis of lithic samples 775