UNIVERSITY OF SOUTHAMPTON

THE LAND-USE HISTORY OF THE SOUTHERN ENGLISH CHALKLANDS WITH AN EVALUATION OF THE BEAKER PERIOD USING ENVIRONMENTAL DATA:

colluvial deposits as environmental and cultural indicators

Michael John Allen, B.Sc, MIFA

Thesis submitted for the degree of Doctor of Philosophy

Department of Archaeology, Faculty of Arts

May

1994

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF ARTS

ARCHAEOLOGY

Doctor of Philosophy

THE LAND-USE HISTORY OF THE SOUTHERN ENGLISH CHALKLANDS WITH AN EVALUATION OF THE BEAKER PERIOD USING ENVIRONMENTAL DATA: colluvial deposits as environmental and cultural indicators

by Michael John Allen

Recent studies have demonstrated that colluvium is present on the chalklands of southern Britain and have indicated its anthropogenic causal relationship. However, although the extent of hillwash has, to some degree been identified, its occurrence as significant blankets covering archaeological sites and its potential to aid with the interpretation of land-use in the past was unclear. The opportunity was therefore taken to use these deposits in conjunction with detailed land snail analysis from both colluvium and traditional archaeological contexts to interpret land-use in the past.

The Beaker period, which contains a series of distinctive artifact types, was specifically examined. This allowed an examination of land-use in an attempt to identify any specific changes which could be seen to accompany this new material culture. The value of using the Beaker period is that has a short duration (2300-1800 BC), is distinctive and is seen as a marker horizon of human change.

An interpretation of land-use and soil change was largely made by the study of colluvium and by extensive land snail analysis. Observations of modern erosion events allowed the recognition of the precise mode of deposition of ancient colluvium. This also allowed detailed interpretation of past erosion events *per se* and the environmental conditions under which colluvium had accumulated. This research included a total of eight colluvial investigations (three of which involved detailed hand excavation) and land snail analysis from a further twelve sites.

Four study areas were examined: Lewes downland, Isle of Wight, Salisbury Plain and Dorchester environs. In each area (except Dorchester) smaller areas were examined in more detail. The Dorchester area as a whole, was small enough to allow detailed coverage. At least one major colluvial sequence was excavated in each area, using established methods, and complemented by land snail analysis from adjacent sites of the same or similar periods.

In many locations archaeological sites and artifact scatters were buried by up to 3m of hillwash. Even buried Beaker land surfaces with cultivation marks were excavated under hillwash.

Despite the major changes in the cultural assemblages associated with Beaker communities, no comparable change in land-use or expansion of farming could be detected. The thesis concludes that Holocene colluvium can be assigned to an anthropogenic, rather than climatic, origin.

THE LAND-USE HISTORY OF THE SOUTHERN ENGLISH CHALKLANDS WITH AN EVALUATION OF THE BEAKER PERIOD USING ENVIRONMENTAL DATA:

colluvial deposits as environmental and cultural indicators

TABLE OF CONTENTS

	Page
Abstract	i
Table of contents	ii
List of figures	iv
List of tables	ix
Preface	xi
Acknowledgements	xiv
Frontispiece and dedication	xvi
PART ONE: Research Background	1
CHAPTER 1: Using Environmental Studies as an Archaeological Tool	2
1.1 Introduction;- the research aims and framework	2
1.2 Major aims	2
1.3 Subsidiary aims	3
1.4 The spatial framework	3
1.5 The climatic framework	9
1.6 The archaeological framework: Beaker settlement	14
1.7 The chronological framework	17
1.8 Summary	18
CHAPTER 2: Physical Processes and the formation of the Archaeological Record	23
2.1 Erosion	23
2.2 Colluvial Studies	34
CHAPTER 3: Research Strategy and Methodology	42
3.1 Theory and Aims: towards a landscape strategy	42
3.2 Fieldwork Methodology; the investigation of colluvial deposits	44
3.3 Laboratory and Analytical Techniques; theory and method	49

Page

PART TWO: Landscape Studies 63

CHAPTER 4: Studies on the Lewes Downs 64

4.1 Introduction 64

4.2 Excavations at Ashcombe Bottom 68

4.3 Investigations at Grey Pit, Round-the-Down 120

4.4 Round-the-Down Barrow 135

4.5 Investigations at Malling Hill 142

4.6 Summary: the Lewes Downs 157

CHAPTER 5: Studies on the Isle of Wight 163

5.1 Introduction to the Isle of Wight Study Area 163

5.2 Investigations in Newbarn Combe 169

5.3 Limpet Run, Culver 204

5.4 The Neolithic and Bronze Age land-use of Arreton Down . 216

5.5 Land Mollusca from the Bronze Age Barrow at Mount Joy . 223

5.6 Summary; the Isle of Wight 229

CHAPTER 6: Investigations on Salisbury Plain 236

6.1 Introduction to the Study Area 236

6.2 Excavations at Strawberry Hill Reservoir 238

6.3 Investigation of colluvium around Stonehenge 268

6.4 Molluscan Studies in the Stonehenge Environs 270

6.5 Summary: the Salisbury Plain 281

CHAPTER 7: Dorchester and its Environs 283

7.1 Introduction to the Study Area 283

7.2 Colluvial deposits and the archaeological site at Middle Farm 289

7.3 Investigations of colluvial deposits at Fordington Bottom 308

7.4 Flagstones 318

7.5 Conygar Hill 329

7.6 Alington Avenue 333

7.7 Neolithic post pits at Greyhound Yard, Dorchester . . 345

7.8 Maiden Castle Farm 356

7.9 Maiden Castle Road 360

7.10 Discussion of the Mollusc Evidence 362

7.11 Summary of the Dorchester environs 369

Page

PART THREE: The Study and Interpretation of the Prehistoric chalk landscape of southern England: review and discussion 379

CHAPTER 8: The Study and Interpretation of the Prehistoric chalk landscape of southern England. 380

8.1 The archaeological value of colluvial studies . . . 385

8.2 Reconstructing land-use history; cultural decision or environmental possibilism 403

8.3 Archaeological and environmental implications of the model; cultural vs. environment 412

8.4 Some conclusions ... and the way forward? 423

Epilogue 428

APPENDICES 429

APPENDIX 1: Soil mapping units and Soil Series 430

1.1 Soil mapping units within the study area 431

1.2 Soil groups and soil Series mapped in the study area . . 434

APPENDIX 2: Lewes Area soil descriptions 435

2.1 Soil descriptions; Ashcombe Bottom 436

2.2 Soil descriptions; Malling Down 441

2.3 Soil descriptions; Grey Pit 443

APPENDIX 3: Isle of Wight soil descriptions 445

3.1 Soil descriptions; Newbarn Combe 446

3.2 Soil descriptions; Limpet Run 453

APPENDIX 4: Salisbury Plain soil descriptions 455

4.1 Soil descriptions; Strawberry Hill 456

Bibliography 459

. . . . . .

LIST OF FIGURES

Page

Figure 1. Location of main colluvial deposits studied on the chalk of southern Britain 4

Figure 2. Hypothetical reconstruction of erosion regimes 27

Figure 3. Soil depth and surface artifact density as a consequence of soil erosion 31

Figure 4. Artifact movement bias and slope 33

Figure 5. Artifact distribution at Bourne Valley, Eastbourne 37

Figure 6. Summary diagram of magnetic susceptibility values from modern chalkland regimes 59

Figure 7. Study area around Lewes 65

Figure 8. Geomorphology of Ashcombe Bottom and surrounding downs 69

Figure 9. Location of trenches and summary section 73

Figure 10. Summary valley cross-profile and plan of excavation showing the extent of the gravel fan and ard marks 75

Figure 11. Cross-profiles of the valley deposits at Ashcombe Bottom 76

Figure 12. Section drawing of tree hollow 78

Figure 13. Plan and section of ard marks at Ashcombe Bottom 80

Figure 14. Distribution of pottery in trench 1 (0 - 11m) 90

Figure 15. Distribution of flint artifacts in trench 1 (0 - 11m) 92

Figure 16. Distribution of artifacts trench 2 93

Figure 17. Beaker and Early Bronze Age pottery from Ashcombe Bottom 96

Figure 18. Flint scattergrams of primary, secondary and tertiary flakes . . . 101

Figure 19. Flint implements from Ashcombe Bottom 103

Figure 20. The Caburn Downs, showing the topography and location of Grey Pit, Round-the-Down and Malling Hill 122

Figure 21. General section of the Grey Pit colluvium showing detail of the sample column location 123

Figure 22. Beaker sherds from the Grey Pit colluvium 127

Figure 23. Mollusc histogram from the Grey Pit colluvium 131

Figure 24. Section of sampled ditch and plan of NE Quadrant 136

Figure 25. Mollusc histogram from Round-the-Down 138

Figure 26. Section of the Malling Hill deposits 143

Figure 27. Peterborough ware from the pit & flints from the colluvium 147

Figure 28. Mollusc histogram from the Malling Hill colluvium 151

Figure 29. Geology and topography of the Isle of Wight 165

Page

Figure 30. Isle of Wight showing the location of the study areas and sites selected for analysis 168
Figure 31. Geomorphology and archaeology of Newbarn Combe and surrounding downs 171
Figure 32. Newbarn Combe valley cross-profile and summary section of colluvium in trenches 1a and 1b 174
Figure 33. Newbarn Combe; Section of the hand-excavated colluvium in the valley floor and artifact distributions 176
Figure 34. Newbarn Combe; Section of deposits on the valley side, trench 1b . 180
Figure 35. Newbarn Combe; Section through the bank and ditch of the rectilinear valley entrenchment 181
Figure 36. Newbarn Combe; Section trench 2 hand excavated colluvium and artifact distributions in trench 2 193
Figure 37. Mollusc histogram from the valley floor colluvium 195
Figure 38. Newbarn Combe; Mollusc histogram through the colluvial sequence in trench 2 198
Figure 39. Geomorphology and archaeology of Limpet Run, Redcliff and surrounding downs 206
Figure 40. Soil catena at Redcliff to Bembridge Down 208
Figure 41. Cliff section at Limpet Run, Culver 210
Figure 42. Limpet Run; mollusc histogram 213
Figure 43. Arreton Down; Plan of barrow PRN 890 217
Figure 44. Arreton; Ditch section showing sample location 221
Figure 45. Composite mollusc histogram from Arreton barrow PRN 890 222
Figure 46. Plan of the excavated Mount Joy barrow 224
Figure 47. Mount Joy; Mollusc histogram from the ditch fill 226
Figure 48. The Salisbury Plain study area 237
Figure 49. Geomorphology and archaeology of the Strawberry Hill area 239
Figure 50. Strawberry Hill Reservoir; valley and palaeo-valley profile . . . 241
Figure 51. Strawberry Hill Reservoir; section of the main deposits and plan of ditches cut into the valley floor 244
Figure 52. Plan and section of the excavated chalk fan 245
Figure 53. Distribution of artifacts from the colluvium 249
Figure 54. Mollusc histogram from Strawberry Hill Reservoir 257
Figure 55. Schematic section of footslope deposits at Vespasians Camp 269
Figure 56. Geomorphology and archaeology of the Stonehenge Environs 271
Figure 57. The changing prehistoric landscape of the Stonehenge Environs . . 277

Page

Figure 58. Geomorphology and archaeology of the Dorchester area 284

Figure 59. Location of sites analysed in the study area 285

Figure 60. Location of the excavations at Middle Farm 290

Figure 61. Middle Farm valley profile, colluvial section and artifact distribution 292

Figure 62. Beaker & Bronze Age pottery from the colluvium 295

Figure 63. Middle Farm; mollusc histogram from the colluvium 297

Figure 64. Plan of the Bronze Age settlement enclosure at Middle Farm 304

Figure 65. Middle Farm; mollusc histograms from the ditches 307

Figure 66. Fordington Bottom; plan of the excavated areas 309

Figure 67. Fordington Bottom; mollusc histogram from colluvium in trench M . 311

Figure 68. Fordington Bottom; colluvial profile and features in trench F . . 313

Figure 69. Fordington Bottom; mollusc histogram from ditch 262 and colluvium 315

Figure 70. Schematic section through Fordington Bottom 317

Figure 71. Flagstones; phased plans of the excavated features 319

Figure 72. Flagstones; section of pit 00221 320

Figure 73. Flagstones; mollusc histogram of Early Neolithic pit 221 321

Figure 74. Flagstones; Neolithic enclosure ditch sections 323

Figure 75. Flagstones; mollusc histograms from the enclosure ditches 325

Figure 76. Flagstones; section of the Bronze Age barrow ditch 327

Figure 77. Flagstones; mollusc histogram from the barrow ditch 327

Figure 78. Conygar Hill; plan of the hengiform pit circles 330

Figure 79. Conygar Hill; mollusc summary diagram 330

Figure 80. Alington Avenue; summary phase plan of the excavation 334

Figure 81. Alington Avenue; mollusc histogram from the long barrow and mortuary enclosure ditches 339

Figure 82. Alington Avenue; mollusc histogram from the Final Neolithic/ Early Bronze Age aeolian deposits and barrow ditch 342

Figure 83. Greyhound Yard; plan of the Neolithic post pit arc 346

Figure 84. Greyhound Yard; post pit sections and sample location 348

Figure 85. Greyhound Yard; mollusc histogram 352

Figure 86. Maiden Castle Farm; location, excavated plan sections 357

Figure 87. Maiden Castle Farm; mollusc histogram from the barrow ditch . . . 359

Figure 88. Radiocarbon chart for the main monuments and features in the Dorchester area 365

Figure 89. Hypothetical reconstruction of the Dorchester landscape 368

Page

Figure 90. Colluvial sequences at Strawberry Hill and Newbarn Combe 387

Figure 91. A representative selection of colluvial deposits 389

Figure 92. Plan of Duxmore Combe, showing location of trenches 395

Figure 93. Schematic figure of hypothetical thresholds and deposits 400

Figure 94. Occurrence of evidence for pine on the chalk 407

Figure 95. Schematic representation of the development of land-use 415

Figure 96. Weighted, schematic representation of the development of land-use 420

Figure 97. Saxon parish boundaries in East Sussex 425

* *ooOoo* *

LIST OF TABLES

Page

Table 1. Summary of the topography and soils for the four study areas . . . 5

Table 2. Summary of climatic zonation, basic vegatational change and archaeological events for southern England 11

Table 3. Basic chronology adopted throughout this thesis 17

Table 4. List of main documented colluvial deposits on the chalk of southern England for distribution . . . . . 19 - 22

Table 5. An attempt to quantify:
a) the extent of erosion represented by surviving colluvium
b) the numbers of artifacts in excavated sections 38

Table 6. The Soil Survey of England and Wales soil classification used throughout this thesis 46

Table 7. The number and proportion of artifacts types from trenches 1 and 2 at Ashcombe Bottom 88

Table 8. Beaker pottery; sherds, vessels and fabrics 95

Table 9. Flint assemblages from hand excavation 100

Table 10. Composition of the flake assemblage 101

Table 11. Composition of the flint tool assemblage 104

Table 12. Ashcombe Bottom; land Mollusca from the tree hollow 107

Table 13. Ashcombe Bottom; magnetic susceptibility 109

Table 14. Location and description of undisturbed soil (micromorphology) samples 110

Table 15. Pottery recovered from cleaning the Grey Pit quarry section 128

Table 16. Charcoal identifications from the Grey Pit colluvium 129

Table 17. Land Mollusca from the Grey Pit colluvium 133

Table 18. Round-the-Down land Mollusca (including hand picked shells) 140

Table 19. Artifacts recovered by cleaning the section at Malling Hill 149

Table 20. Land Mollusca from the Malling Hill colluvium 152

Table 21. Occurrence of Final Neolithic and Early Bronze Age artifacts . . . 158

Table 22. Pottery from Newbarn Combe 186

Table 23. Flints from the hand-excavated section; assemblage composition . . 188

Table 24. Colour attributes of the flint 188

Table 25. Composition of the flake assemblage 189

Table 26. Composition of the total non-flake material 189

Table 27. Newbarn Combe; Land mollusc data from samples in trench 1b 192

Table 28. Newbarn Combe; Land mollusc data from the valley floor colluvium . 194

Table 29. Newbarn Combe; Land mollusc data from the trench 2 colluvium . . . 197

Page

Table 30. Limpet Run; Land mollusc data 212

Table 31. Land mollusc data from both Arreton barrows 220

Table 32. Land mollusc data from Mount Joy 225

Table 33. Pottery data; fabric and context 252

Table 34. Strawberry Hill Reservoir; Land mollusc data 258

Table 35. Strawberry Hill Reservoir; Charcoal identifications 264

Table 36. Strawberry Hill Reservoir; Carbonised plant remains 265

Table 37. Middle Farm, Trench B; Land mollusc and MS data 298

Table 38. Middle Farm, Trench A; Land mollusc and MS data, ditch 03050 . . . 305

Table 39. Middle Farm, Trench A; Land mollusc and MS data, ditch 03051 . . . 306

Table 40. Fordington Bottom; Land mollusc and MS data 314

Table 41. Flagstones; Neolithic Land mollusc and MS data 324

Table 42. Flagstones; Bronze Age & Iron Age land mollusc and MS data 328

Table 43. Conygar Hill; Land mollusc and MS data 331

Table 44. Alington Avenue; Land mollusc data 336

Table 45. Greyhound Yard; Land mollusc data 350

Table 46. Greyhound Yard; Correlation coefficients & significance levels . . 354

Table 47. Maiden Castle Farm; Land mollusc and MS data 358

Table 48. Maiden Castle Road; Land mollusc data 361

Table 49. Radiocarbon dates from the Dorchester environs 363

Table 50. Presence and date of recorded deposits in southern England 392

Table 51. The dates of the occurrence of pine on the chalk 406

Table 52. Density of data-sets in the study areas and the calculation of a 'confidence factor'. 419

* *ooOoo* *

PREFACE

One of the main areas of study in archaeology is that of settlements and landscapes. But how should these be studied and defined? Moreover, no study of past communities should be divorced from considerations of the environment or the symbiotic relationship between that community and its environment. Bradley, for example, queries 'whether landscape history can really be studied using an intellectual structure formed almost entirely around artefacts' (1978a, 2). Indeed, it has been argued that artifact based studies of the landscape are potentially highly misleading (Hammond 1980). Barrows, hillforts and settlement sites are all single and localised interventions within the landscape; areas designated for specific purposes within the cultural framework.

It is my contention in this thesis that in order to understand how communities survived and operated in the past it is necessary to do more than just examine the obvious foci of attention. Although these foci are recognisable today as archaeological 'sites' or monuments, they may have played a less significant part to the communities concerned than the less archaeologically obvious areas surrounding them. The areas in which we work, eat and sleep are just portions of our landscape. A description of any, or each, however, does not necessarily provide the *modus operandi* of that individual, let alone the community, within which they operated. Similarly the detailed architectural description of a farmhouse tells us little of the way in which the farm operates. It is necessary to look at the entire arena within which communities act and interact. That arena is the physical landscape. Thus landscape archaeology should attempt to examine all aspects of that arena; physical remains, archaeological sites and environmental history (pedology, flora and fauna), in order to provide a more comprehensive perspective on human action in the past.

Environmental archaeology, i.e. a structured environmental approach within archaeology, is ideally suited to analysing the landscape especially now that it has progressed beyond being merely a technique for compiling floral, faunal and climatic sequences and has proved itself as a means to interpret of human activity (Evans 1975).

For environmental archaeology to succeed it must consider more than simply studies of the environment. It must be 'directed toward a fuller understanding of the human ecology of prehistoric communities.' (Butzer 1964). Therefore, any study of the human environment needs to be thoroughly integrated into the archaeological field of investigation. It is only when questioning of the evidence is designed within an archaeological framework that the use of the natural and environmental sciences as a method of enquiry can be archaeologically relevant.

The discipline of environmental archaeology can be divided into two parts; that relating to the physical environment (flora, fauna, pedology, climate etc.), and that of economy (crop and animal husbandry). As can be seen below the emphasis here will be on the former; the physical environment. Changes in the attributes of the physical environment affect human communities within that environment, they also affect their crop and animal husbandry. This thesis accepts as its premise that studies in environmental archaeology and the natural sciences can directly benefit archaeology by providing evidence for;

a) environmental and landscape background

b) a history of anthropogenic activity in, and modification of, the landscape

c) the responses of prehistoric communities to environmental change, e.g. soil degradation

d) effects of colluviation and alluviation upon the choice of prehistoric communities' settlement and activity location

e) taphonomic effects of colluviation and erosion upon the present day distribution of archaeological activity

The basis of this thesis is the premise that human impact on the landscape is more fundamental than climate. It is postulated that major landscape changes shown by Bell (1981a; 1983) and Allen (1992) are the result of human action rather than environmental change and that such activity can be assessed by the study of colluvial sequences.

One of the main aims of this research is to understand the significance of colluvial deposits and their implications for both archaeological

and environmental aspects of the chalklands. It was also hoped to acquire enough data to make inter regional comparisons of land-use development as well as attempt to determine, local, regional, anthropogenic or environmental causation for valley sedimentation (i.e. colluviation) on the chalklands of southern England.

Acknowledgements

The research presented in this thesis was inspired by the work of, and previously working with, Martin Bell. This research began at Ashcombe Bottom in 1984 prior to the receipt of a SERC studentship (8608067) in 1986. Six years of research, three excavations and sampling and analysis of over 15 other sites was only possible with the help and co-operation of number of friends. It was the encouragement of Rob Scaife and Richard Macphail that led to this research; Rob was invaluable in discussing, among many other things, his research on the vegetational history of the Isle of Wight. Anthony Lewison, provided initial enthusiastic encouragement.

In Sussex, the landowners of Ashcombe Bottom, Messrs C.J. and T. Rae, were gracious in allowing excavation and a temporary camp site of up to 20 volunteers on their land. A JCB from the Soil Survey of England and Wales was provided by Peter Bullock. Fieldwork, largely carried out through the aegis of the Lewes Archaeological Group, was particularly aided by Joy Ede, Louise Mount, David Gregory, Mick Brown and Paul Hill. Louise Mount and Rachael Seager Smith helped with other sampling in the Lewes area. The Sussex Archaeological Society have been particularly helpful, especially the Barbican House Museum curator, Fiona Marsden and librarian, Joyce Crow. East Sussex County Council provided a laptop computer for the project.

All of the work on the Isle of Wight was facilitated through the kind offices of the County Archaeological Unit, in particular David Tomalin. All the staff helped with finding soil samples from the archives, providing details from the SMR and assisting in the field; they were Rebecca Loader, Frank Basford and David Motkin. At Newbarn Down, the landowner, Chris Spence was so interested and helpful that it was surprising that only 70m of trenching was undertaken!

The excavations at Strawberry Hill were conducted under the aegis of Wessex Archaeology and fieldwork was funded by Wessex Water. The excavations were managed by Peter Cox. The small field team comprised Rachael Seager Smith, Hazel Riley, Gale Readman and Kath Buxton.

During the major excavations of the Dorchester by-pass Peter Woodward and Roland Smith were particularly helpful. Many of my colleagues at Wessex Archaeology have aided through long and stimulating discussions of the area.

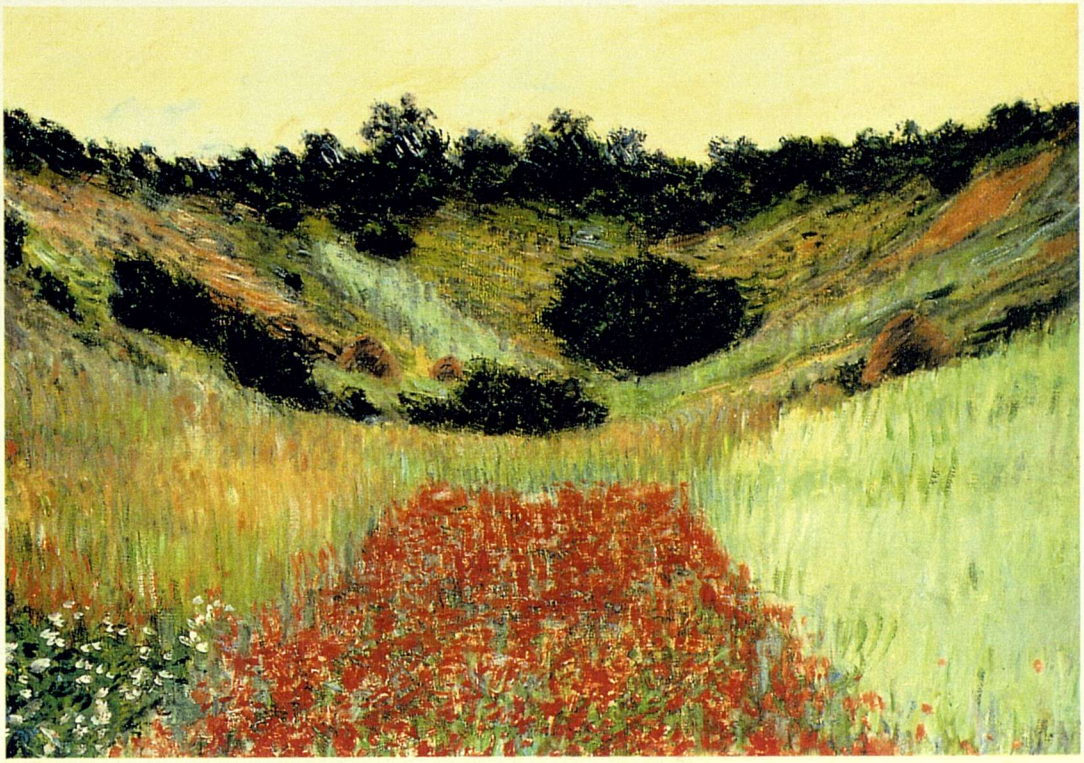
Throughout the analytical phase the molluscan laboratory work was undertaken in solitude, but some identifications were checked by Martin Bell, and fruitful discussions with both Martin and John Evans is acknowledged. Many of the Dorchester mollusc histogram roughouts and computer data entry was undertaken by Sarah Wyles. Stimulating discussions of sedimentation, erosion events and soil genesis were conducted on site and in seminar with John Boardman, Andy Moffat, Steve Staines and also Richard Macphail who provided the soil micromorphological information. The charcoals and battered carbonised plant remains from colluvium were identified by Joy Ede. Interpretation of the flint assemblages was only possible with discussions and advice from Julian Richards, John Schofield and Julie Gardiner, and that of much of the pottery after scrutiny of the material by Arthur ApSimon. Radiocarbon accelerator dates from Strawberry Hill were provided through David Jordan of the AML. Thanks are also owed to the specialists who provided contributions on analytical aspects which I did not feel competent to undertake myself. Portions of this thesis have been, or are to be, published and I have benefited from referees comments, in particular from Dr. John Evans and Professor John Coles.

The Trust for Wessex Archaeology, my employers since 1988, have been supportive in the completion of this thesis and in facilitating stimulating discussions among colleagues, in particular Ros Cleal, Sue Davies, Julie Gardiner, Frances Healy and Roly Smith. A special debt of gratitude is owed to Andrew Lawson, the Unit Director, for providing the support of Wessex Archaeology and allowing the use of figures from published and unpublished monographs. The pottery and flint illustrations from Ashcombe Bottom were drawn by Linda Coleman.

The department of Archaeology provided the initial forum for this research and I have benefited from discussion held within the Department with both staff and students; in particular Arthur ApSimon, my supervisor, and another palaeo-environmental archaeologist, Clive Gamble.

Finally, apart from the support and advice of my parents, three further people are owed a special thank you. Rob Scaife was invaluable in being a constant library of information and my wife Rosie Braithwaite provided continued support and read this thesis in its numerous forms as well as aiding with the preparation. Finally, I wish to thank Dr. Julie Gardiner for all her help, support and encouragment during the final preparation of this thesis.

MJA 1st May 1994



Claude Monet: Champ de coquelicots

This thesis is dedicated to the memory of two amateur archaeologists from Lewes:

Ted O'Shea (1910 - 1986)

and

Richard Lewis (1909 - 1990)

The land-use history of the southern English chalklands with an evaluation of the Beaker period using environmental data: colluvial deposits as environmental and cultural indicators

1994

by Michael John Allen

PART ONE

Research Background

Chapter One

Using Environmental Studies as an Archaeological Tool

"The wide world is all about you; you can fence yourself in, but you cannot forever fence it out."
Lord of the Rings, J.R.R. Tolkien

1.1 INTRODUCTION;- THE RESEARCH AIMS AND FRAMEWORK

This research aims to examine the settlement history and general land-use of the chalklands of southern Britain. The perspective adopted is an environmental one using the methods developed by Bell for dry valley investigations (Bell 1981a; 1983) and large scale land snail analysis. In this respect the research is largely based upon the foundation and potential of dry valley deposits as realised by Bell. The chalklands of southern Britain were chosen for this study because of the preservation of land Mollusca and the known presence of colluvium. The data from these are combined and integrated, where possible, with evidence for settlement, farming and use of the available landscape resources. It is hoped that the true integration of environmental studies with cultural questions can be achieved despite the pessimisms of some recent critiques (e.g. J. Thomas 1990).

1.2 MAJOR AIMS

1) to assess the value of colluvial and large scale molluscan analysis in the interpretation of land-use and settlement patterns

2) to assess whether the causation for valley sedimentation was primarily a result of anthropogenic (environmental possibilism) or climatic (climatic/environmental determinism) factors

3) to assess the human impact on the chalklands, and any *change* in land-use that can be specifically attributed to the Beaker period

4) to examine spatial variation in land-use patterns during the later Neolithic to earlier Bronze Age across southern Britain and especially examine the possibility of a dichotomy between south-east England and Wessex.

5) to provide a better archaeological and settlement perspective for the Beaker period and attempt to determine something of the nature of settlement and settlement patterns in the Beaker period.

1.3 SUBSIDIARY AIMS

1) to test the use, application and potential of magnetic susceptibility as a tool for palaeo-environmental interpretation as indicated by Allen and Macphail (1987) and Allen (1986a and 1988a).

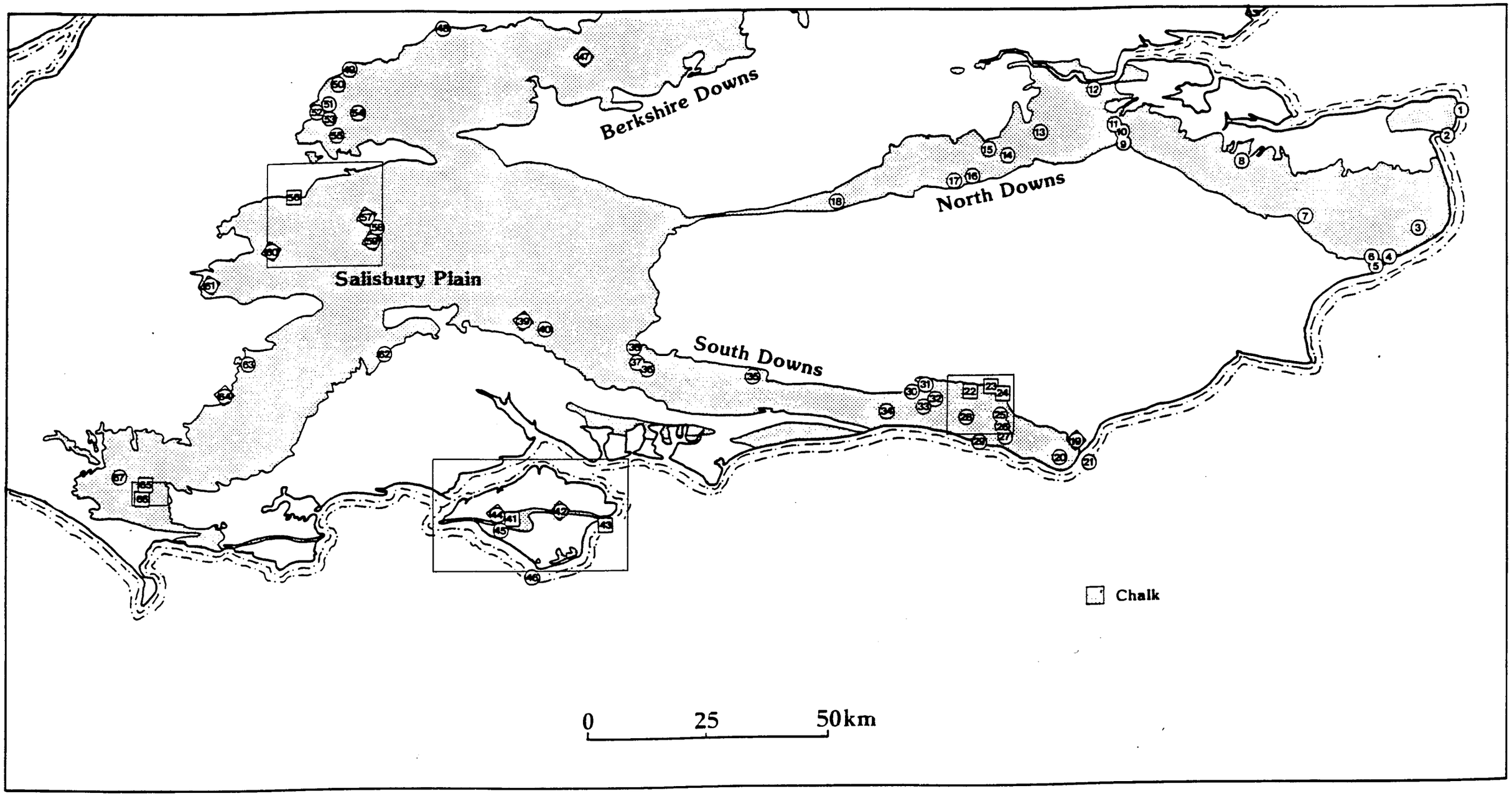
2) to assess the utility of molluscan analysis as a method of understanding the changing land-use of large landscapes, as opposed to individual sites.

1.4 THE SPATIAL FRAMEWORK

The spatial parameters of this study are defined geologically by the chalklands of southern England since these provide a number of geographical, historical and archaeological advantages. Four study areas were chosen (Fig. 1) in which detailed environmental investigations were conducted.

The downlands are one of the largest expanses of Cretaceous chalkland in north-west Europe. They extend through the counties of Dorset, Wiltshire, Berkshire, Hampshire, Isle of Wight, West Sussex, East Sussex, Surrey and Kent. The study areas were selected from the main chalk landscape units and are; the Lewes Area (Chapter 4) on the South Downs, the Isle of Wight (Chapter 5), Salisbury Plain (Chapter 6) and the Dorchester Environs (Chapter 7).

The dominant Soil Association of the South Downs and Dorset Downs is Andover 1 (Jarvis *et al.* 1984, 80-86; Findlay *et al.* 1984, 75-78), see table 1. Andover 1 Association soils are dominated by thin and variably flinty and chalky, silty brown rendzinas. These rendzinas are almost ubiquitous. Other chalk soils included in the Andover 1 Association are the grey rendzinas of the Upton Series and the brown calcareous earths of the Coombe and Panholes Series. Upton Series soils are shallow (less than 30cm deep), extremely calcareous and



Reported in this thesis

by or with the author

Figure 1. Location of main colluvial deposits studied on the chalk of southern Britain

silty, and occur on most valley sides and scarp slopes. By contrast Coombe Series soils occur locally in valley bottoms.

On the Isle of Wight and Salisbury Plain the dominant Soil Associations are the Icknield (Jarvis *et al.* 1984, 208-210; Findlay *et al.* 1984, 213-217) and Andover 1 Associations (Table 1). Icknield Series soils are typically shallow, stony, silty and humose rendzinas which occur on the higher ground and steep valley and scarp slopes. As with the South Downs and Dorset Downs, Upton Series (grey rendzinas) and Coombe Series (brown calcareous soils) occur on slopes and valley bottoms respectively. In all areas brown earths of the Andover 2 Association are highly localised occurring over Clay-with-flints. They are often argillic brown earths of the Charity and Garston Series, and paleo-argillic brown earths of the Carstens Series.

STUDY AREAS	SOIL SUBGROUP	MAJOR SOIL ASSOCIATIONS
South Downs		
Rolling hills with steep scarp to north, dry valleys and several north-south rivers.	Grey - brown rendzinas, Typical brown earths, Paleo-argillic brown earths	Andover 1-2, Upton 1, Coombe 1-2, Carstens, Marlow
Salisbury Plain		
Rolling hills within a a large plateau, bisected by major east-west river valleys and other north south rivers	Humic, grey and brown rendzinas Typical brown earths Paleo-argillic brown earths	Icknield, Andover1-2, Upton 1 Coombe 2 Carstens
Isle of Wight		
Rolling hills, largely in a narrow spine, with steep scarp to the north, and a broad central plateau	Humic, grey and brown rendzinas Paleo-argillic brown earths	Icknield, Andover1-2, Upton 1 Carstens
Dorset Downs		
Rolling hills, scarp runs in a north-east/ south-west arc.	Grey - brown rendzinas, Typical brown earths, Paleo-argillic brown earths	Andover 1-2, Upton 1, Coombe 1, Carstens, Sonning 1

Table 1. Summary of the topography and soils of the four study areas. Soil distribution from Jarvis *et al.* (1984) and Findlay *et al.* (1984).

[NOTE: major soil Soil Associations and soil series are given in appendix 1.]

The calcareous soils and sediments supported by the chalklands (Table 1) provide the potential for investigating landscape history through the analysis of preserved land mollusc shells (Evans 1972). Stratified deposits in dry valleys often contain land Mollusca thus providing a detailed record of the changing environment and land-use history of the late glacial and early post-glacial periods. This was demonstrated by Kerney in the early 1960s (Kerney 1963; Kerney *et al.* 1964). Later, Evans (1966) and Bell (1983) showed that analysis of colluvial deposits and molluscan sequences can illuminate the post-glacial human impact on the landscape.

The term 'colluvium' is used throughout this thesis in view of its currency over a number of years (Evans 1968; 1972; Bell 1981a; 1983; 1986; Allen 1984a; 1988a; 1991a; 1992a) and describes material that has moved downslope by gravity, usually lubricated by temporary flushes of water that is not in a permanent, well-defined channel.

A survey of studies of colluvial deposits, often associated with archaeological remains, shows they are widely distributed across the chalklands. It also reveals that over a third of the colluvial investigations have occurred within the last decade. The distribution of these studies is shown in figure 1 and details of each exposure, bibliographic data and analyses are summarised in table 4. The total records for colluvial studies in the chalklands of southern England is now greater than that for the entire country as recorded by Martin Bell in 1981.

Unfortunately pollen is poorly preserved in calcareous aerobic soils and deposits (cf. Dimbleby and Evans 1974), nevertheless palynological evidence is available from Scaife's pollen work on the Downs (1980a; 1987a) and from palynological studies in areas adjacent to the Downs (Waton 1982a; Scaife and Burrin 1983; Burrin and Scaife 1984).

Fortunately there is also a growing body of pedological and soil micromorphological data from this area, much of which is associated with closely dated buried soils or good chronological sedimentary sequences (see Macphail 1987a; 1990). The downlands therefore provide a framework of established data and the potential for further

integrated environmental study.

The area preserves not only environmental data, but also archaeological artifacts. The more robust artifacts such as flints survive in most contexts, but bone and pottery are more susceptible to chemical weathering, especially in acidic areas. The calcium carbonate content of many downland soils provides a chemically more stable micro-environment and artifacts are less susceptible to decay.

Chalklands have had a long history of antiquarian and archaeological investigation; perhaps because monuments (such as hillforts, barrows etc.) were clearly visible in the landscape and thus provided an initial focus of attention. Artifacts were easily recoverable from the ploughed downland. The wealthier and higher social classes in the 17th - 19th centuries had both the resources and time to dabble in archaeology. As a result of this, many local and county societies were founded and are among the earliest in Britain e.g.: Sussex (1842), Kent (1857), Eastbourne (1847) and Devizes, later Wiltshire (1853).

It may seem unnecessary to concentrate on the well documented and archaeologically explored chalk downlands, but even cursory examination of the archaeological record reveals gross anomalies and inadequacies in past settlement studies. This has recently been emphasised and somewhat redressed by the research of Bell (1981a; 1983), Smith (1984; 1985) and Allen (1983; 1988a). The chalk landscape should not, however, be seen as a peneplain in which archaeological preservation is relatively uniform, and from which archaeological recovery and investigation are consistent and representative. Most of our archaeological knowledge is derived from the chalk uplands, hill tops and slopes, which provide a specific landscape niche, for probably only a range of archaeological activities specific to them.

The valleys, whether dry or containing streams, often provide areas of superficial colluvial and alluvial deposits. Such deposits are often substantial (e.g. Kiln Combe (Bell 1983), Strawberry Hill (Section 6.2), the Ouse valley (Burrin and Scaife 1984) and Eastbourne Levels (Jennings and Smyth 1982)). They indicate considerable erosion within the valley catchment. Analysis of such deposits can elucidate

erosional and depositional conditions as well as providing palaeo-environmental data, all of which can be set in a chronological framework by the recovery and recording of datable archaeological artifacts. This in itself, allows a considerable body of information to be gained about the landscape upon which past communities were operating. Such deposits are not biased by culturally based activities usually associated with occupation areas. Such analysis, it is proposed, will better reflect local, rather than site specific, anthropogenic environments. However, perhaps the most significant attribute of extensive colluvial and alluvial deposits is their capacity to bury large areas of landscape, and thus potentially to preserve them, in a niche superficially devoid of ancient artifacts and monuments. It is suggested here that the apparent archaeological void, or anomaly, created in valley locations by colluvium is the result of the lack of archaeological investigation and methodology (Allen 1988a) and not of the absence of prehistoric activity in the valleys.

This lack of archaeological investigation is easy to explain. The valley floors contain little in the way of artifacts that can readily be collected, a striking contrast with the adjoining slopes where ploughing is constantly disturbing the thin soil veneer, providing a mechanism whereby artifacts are constantly brought to the surface from sub-soil features. Until the 1960s valley deposits were not commonly recognised as a geomorphological component of the Downs (compare Taylor (1966) with Kerney *et al.* 1964) and, if noticed, were often assumed to be Tertiary in date (Godwin 1967). Thus, work has been, and unfortunately still is, predominantly concentrated in the superficially obvious, and often largely destroyed, parts of the landscape. It has been demonstrated recently by Bell (1981a 1981b; 1983; 1986) and Allen (1983; 1988a; 1992a) that colluvial deposits not only contain environmental evidence, but also mask and contain archaeological material. The recognition of this fact throws doubt on much of the spatial distribution of settlement and land-use of the chalk landscape. The degree to which the valleys bias the archaeological record and their significance will be examined in this thesis.

Valley sediments thus allow the recovery of off-site environmental data which can be viewed in a temporal framework. Furthermore, analysis of

such sediments may reveal evidence of archaeological activities hidden from normal archaeological reconnaissance and not represented up to now in the archaeological record because of their topographical location.

1.5 THE CLIMATIC FRAMEWORK

The recognition and separation of anthropogenic and natural phenomena is a recurrent theme in the study of ancient human environments (Evans 1975, 113). Climatic change is one of the most commonly raised natural phenomena used in the explanation of cultural adaptation and activity. This is based on the assumption that "that the space-time coincidence of climatic change and economic change indicates a causal connection". Parry (1981, 3) however, has shown this assumption to be false. Godwin (1940; 1944; 1975) was inclined to see various vegetation changes of the later pollen zones, VIIb and VIII, (Sub-boreal to Sub-atlantic) as being a result of a decline in temperature, i.e. of climatic origin. But now, although it is accepted that some climatic changes occurred, the major vegetation changes recorded by Godwin are thought largely to be of anthropogenic origin (Evans 1975, 113). Climate has also often been seen as having a pivotal influence on valley sedimentation and has been argued by a many writers as a cause for increased alluvial and colluvial sedimentation.

In a pioneering environmental study completed over 30 years ago, Vita-Finzi argued that climate and climatic change was the fundamental influence in Mediterranean valley sedimentation (Vita-Finzi 1969). This led archaeologists such as Bintliff to follow this argument and reject human activity as a major factor in valley sedimentation in Southern Greece (Bintliff 1977; 1982), though he later admitted that failing to look for sediment data that *contradicted* Vita-Finzi's model was a poor substitute for trying to *test* the model independently (Bintliff 1992, 125). Similarly Potter (1976) argued that alluvial sequences in Britain were the result of climatic, rather than anthropogenic, factors and Gater (1979) suggested alluvial phases to be the result of post-Roman climatic change. Similar arguments have been put forward by soil geographers for colluvial deposits on the chalk (Canti 1983, 41).

Other writers have also indicated that climate played a significant rôle in colluviation. Although Kerney *et al.* (1964, 190) realised

land-use was the main causal factor for colluviation at Brook, Kent, they also suggested that the wetter climatic conditions that prevailed during the Sub-atlantic contributed to the acceleration of colluviation. More recently Evans and Jones (1979) hinted that the colluvial ditch fills at Mount Pleasant which occurred in the Iron Age and Roman periods occurred when precipitation was higher (Sub-atlantic).

The argument that climatic change played a fundamental rôle in colluviation was challenged by Evans (1972), and more recently by Bell (1982; 1985). Climate is undoubtedly a factor which affects colluvial process through its direct effect on precipitation, run-off, the indirect effect on vegetation and the extent and nature of ground cover. However, it does not necessarily follow that increasing incidence of heavy storms indicates an overall higher rainfall in relation to other climatic zones (Martin 1963) and Raikes (1967, 28).

Short-term climatic changes of thousands of years duration or less are clearly evident, particularly from the Late glacial cold stage and during the Holocene. Some of these basic climatic changes and accompanying vegetational and archaeological events are outlined in table 2 which is compiled from the zonation scheme defined by Godwin (1940), West (1975), Hibbert *et al.* (1971) and summarised by Evans (1975) and Bell and Walker (1992, 32), but based on detailed regional studies (e.g. Scaife 1980a; 1987b; 1988).

From about 5000 BP according to Bell and Walker (1992) or 4000 BC (Table 2) changes in forest and vegetation composition, which in earlier periods could be seen as an index of climatic change, are now "equally likely to reflect the activities of early farming communities" (Bell and Walker 1992, 71).

Climate during the Beaker period

The period in which this study concentrates falls in the Sub-boreal (Table 2). This is generally considered to be fairly dry and it is the succeeding period (the Sub-atlantic) that is "normally considered as a period of increased wetness (Table 2; Lamb 1977, 373) and has been regarded by some writers as the main period of colluvial deposition"

Climatic zone	Pollen zone Godwin/West	Archaeological period	Climate & vegetation	approx. date cal. BC/ *(uncal. bc)*
F L A N D R I A N				
			Deteriorating	
Sub-atlantic	VIII	Roman period Iron Age Late Bronze Age	Cold and wet, general deterioration. High rainfall. Decline of lime Increase of ash, birch and beech	
	Fl. III			1100BC *(950bc)*
			Stable	
		Middle Bronze Age Early Bronze Age Final Neolithic	Warm and dry, low rainfall wind-blown deposits. Woodland regeneration in southern England	
Sub-boreal	VIIb			2500BC *(2000bc)*
		Late Neolithic Middle Neolithic Early Neolithic	Declining warmth. Landnam and first agriculture Elm decline:- 3350BC/*(2300bc)*	
				4000BC *(3200bc)*
			Optimum	
Atlantic	Fl. II VIIa	Later Mesolithic	Climatic optimum, Warm and wet. Increase of 2°C, poly-climax forest. Increase of alder; some clearances	
				6000BC *(5500bc)*
			Ameliorating	
Boreal	VI V	Mesolithic	Continental climate, warm and dry. Asynchronous expansions of mixed oak forest with hazel and secessional from pine	
	Fl. I			*(7500bc)*
			Rapid Amelioration	
Pre-boreal	IV	Early Mesolithic	Sharp increase in warmth at 8300bc. Birch, juniper + pine woodland	
				(8300bc)
L A T E G L A C I A L				
Loch Lomond / Younger Dryas Stadial	III	Later Upper Palaeolithic	Sub-arctic climate Loch Lomond readvance Tundra	
				(9000bc)
Windermere (Allerød) Interstadial	II	Later Upper Palaeolithic	Interstadial, rapid amelioration. Birch, pine and tundra	
				(11000bc)
Late Devensian	I		Sub-arctic climate	

Table 2. Summary of climatic zonation, basic vegetational change and archaeological events for south-east and south central England.

(Bell 1981a, 398-400; Bradley 1978a, 123). Lamb (1977, 418) has even argued that climatic change resulted in a shift away from the chalk in the Bronze Age in the drier episodes (Sub-boreal) and re-settlement in the wetter Iron Age (Sub-atlantic).

The Sub-boreal did not witness any major environmental changes. However, subtle variation is recorded and some climatic vagaries, (e.g. Boardman and Robinson 1985) though not necessarily indicative of climatic change are recorded. Climatic vagaries, however, are fluctuations that may occur without any overall climatic change and will therefore, occur throughout periods of climatic stability.

Further it is demonstrable that human impact has had localised and fundamental effects from earliest prehistory (cf. Goudie 1986; Bell and Walker 1992; Bell 1983).

Climatic determinism versus environmental possibilism

The basis of this thesis is that the impact of human action is fundamental to landscape change and can be recorded via palaeo-environmental investigation. The activities of human populations, however unwittingly, mould, transform and change the parameters of their landscape in which they live. These activities hold primacy over change caused by purely natural phenomena. In other words, in the periods studied here, the human impact on the landscape is more fundamental than any caused by climatic change. Obviously climate provides major limitations for pedogenesis, vegetational succession and potential for crop husbandry, but it is ultimately human action, rather than climate or solely natural phenomena that provide *the* fundamental force in landscape change.

Although this perspective is not new (Bell 1981a), the nature of my research programme extends such work. It enables the examination of landscape change over time as well as over a considerable area. With a broad temporal and geographical coverage it is hoped to challenge the ideas of climatic or environmental determinism and investigate the parameters of environmental possibilism (cf. Bell and Walker 1992, 8): a view that environments limit, but do not necessarily cause, patterns of human behaviour (Hardesty 1977).

Although Bell refutes climatic change as the prime cause of colluviation and valley sedimentation (1981a; 1982; 1985) his conclusions were based on a relatively small area of the chalklands of southern England. His study was restricted to the Sussex Downs; a total distance between sites of *c.* 90km and covering a region of about 800km^2. My research builds upon Bell's hypothesis that climate was not the trigger of colluviation by examining a much larger and broader data-base of dated sequences. The research presented in this thesis encompasses most of the southern chalklands of England, spanning nearly 200km and covering an area of about 5,500km^2. The larger study area enables a better platform from which to review the chronological inception of colluviation and examine spatial uniformity or disparity of colluvial sequences through inter-regional comparison. The aims of examining land-use history on an inter-regional basis, to examine climatic and anthropogenic causes for colluviation required an investigation which covered the breadth of the southern chalklands. Previous researchers were only able to undertake three detailed dry valley studies (Bell 1981a) and three downland valley study area (Smith 1985). By comparison eight colluvial studies were undertaken during this research, some of which were in conjunction with work being undertaken by archaeological units in the area.

Challenging climatic determinism

The alternative deterministic view is by comparison simplistic claiming a single cultural response as a direct consequence of natural environmental change (e.g. Lamb 1968). This view that landscape and landscape change is a natural phenomenon, belies and belittles the intelligence and scale of the activities of prehistoric populations. It under-estimates the power of human action and agriculture to change landscapes despite the limited nature of topographical relief.

It is perhaps, therefore, climatic vagaries that are more significant in inducing colluviation. This is because the seasonal distribution of heavy storms is likely to have been affected by climatic vagary rather than climatic change (cf. Bell 1981a, 400; Boardman and Robinson 1985). But rather than assert the primacy of human action in landscape change I prefer to test the following proposition with my case studies. If climatic change is a prime factor in inducing accelerated erosion and

valley sedimentation then two research findings are expected;
1) the initiation of major colluviation events would be temporally clustered, and
2) that colluviation would be a spatially predictable consistent process over the chalklands of southern England, and that any variation could be accounted for by factors such as altitude, topography, vegetation, geology and pedology.

1.6 THE ARCHAEOLOGICAL FRAMEWORK: BEAKER SETTLEMENT

The Beaker period is an enigmatic one. First of all the term 'Beaker' derives from a specific ceramic vessel type, the single occurrence of which can classify an entire site as 'Beaker'. Whether this period embraces a new culture, population or fashion (Burgess and Shennan 1976) is not an issue here. At present just the nature and physical distribution of the evidence will be briefly discussed.

The distribution of Beaker pottery indicates extensive use of the chalklands (cf. Champion 1982; Ellison 1978; Clarke 1970). Funerary evidence is abundant, spot finds are numerous, but settlement and domestic activity are severely under represented. For example, in Sussex when Ellison reviewed the Bronze Age (1978) she recorded 28 funerary sites attributed to the Beaker period. In the same area only one settlement/domestic site could be located. The same holds true for both Kent and Surrey (Allen 1988a). In his review of Kent, Champion (1982) recorded 36 Beaker finds, the majority of which probably originate from funerary contexts as no settlement sites are known. Champion (1982, 34) states;

> "It is depressingly true that almost all the material of the Early Bronze Age comes from burials or stray finds"

Similarly in Surrey, 27 Beaker find spots are known, of which only two can be attributed to the downlands, the majority (24) are in the Thames basin. Needham (1987) interprets this as Beaker influence or infiltration directed along this riverine corridor. Once again no domestic sites are known, with the possible exception of an assemblage of Beaker pottery and a typical lithic collection recovered at Chalden, Carshalton (Russell 1982; pers. comm.).

Beaker studies have in the past been centred on material cultural rather than settlemnt and communities. For instance detailed analysis of Beaker grave types and goods, although interesting in their own right, do little to advance our knowledge of domestic Beaker life. Many pottery and find specialists have often been concerned with ceramic style, form and typology and cultural artifacts. Mercer's edited volume *Beakers in Britain and Europe* (1977) while containing papers on a number of 'Beaker sites' as well as valuable discussion on the 'Beaker culture', has only limited discussion about settlement. Harrison's *The Beaker Folk* (1980) discusses the available material evidence from western Europe. The predominantly ceramic and artifact based approach gives little idea of subsistence and settlement, the people as the publishers would imply, but does detail the cultural assemblage. Gibson's monographs (1982) are primarily concerned with ceramic assemblages as was Clarke (1970) in his *Corpus of Beaker Pottery.* One significant exception to this is Bradley's short paper entitled 'Colonization and land use in the Late Neolithic and Early Bronze Age' (1978b) in which he attempts to combine some environmental and cultural data from the period between the Middle Neolithic and the Middle Bronze Age.

The few domestic sites in southern Britain are regularly located in sheltered or lowland locations. Gwithian, Cornwall (Megaw *et al.* 1961; Megaw 1976) is situated on coastal dunes and Brean Down, Somerset (ApSimon *et al.* 1961; Bell 1990a) is also in a coastal location. Downton, near Salisbury (Rahtz 1962), lies just off the chalk on the gravels of a river terrace. On the downlands themselves, Belle Tout, Sussex (Bradley 1970), is located in a dry valley, but since discredited as a domestic site by its excavator (Bradley 1982).

Recent evidence in Sussex has shown potential settlements buried beneath colluvium in the base of dry valleys. The occurrence of a large unabraded assemblage of Beaker pottery beneath *c.* 2m of colluvium at Kiln Combe, which Bell (1983) interpreted as settlement, was originally viewed as an oddity. However, the recovery of another Beaker assemblage from Ashcombe Bottom (Allen 1984a & b; Section 4.2) as well as the recovery of Beaker sherds from several colluvial sequences has put Bell's finds into context. The recovery of new

Beaker finds by the writer during this research is worthy of comment. A number of Beaker finds have been recovered in valley sediments. At Ashcombe Bottom a Beaker assemblage was recovered while directing a dry valley research project. This led to the survey of other colluvial exposures in the area and the re-examination of valley entrenchment sites described by Toms (1926; 1927). A ditch exposed in the valley at Cuckoo Bottom was published by Allen and Fennemore (1984). This ditch formed a part of a valley entrenchment analogous to that at Belle Tout. Re-examination of the exposed section produced three decorated sherds of Beaker pottery where none had been found previously. At Houndean Bottom chance exposures of colluvium by tree felling and rabbit activity produced 2 flint flakes and several predominately grog tempered sherds which are probably Beaker. At Machine Bottom, Round-the-Down (Section 4.3), sherds of Beaker pottery were recovered from large lynchet colluvial sequences. Finally, at the colluvial sections at Cow Gap, where Bell had already recorded the occurrence of Beaker pottery (1981a, 102), two more small Beaker sherds were recovered.

The consistency of such findings, from limited fieldwork, suggests the possibility of large scale bias in the archaeological record. Valley located settlement and activity may be under represented while hilltop and slope located activity is predominant, due largely, I suspect, to the history of archaeological fieldwork. This bias will be examined in this thesis.

Since most Beaker settlements sites in southern Britain are probably located beneath colluvial deposits, the business of locating them for this research was both difficult and impractical. However,it was realised that a significant contribution to Beaker studies could be made by examining changes in land-use and economy with the arrival of Beaker ceramics and cultural attributes. An attempt therefore was made to examine a much wider chronological/temporal perspective with a view to understanding the *development* of the land-use of the chalklands, within which special attention would be paid to the Final Neolithic and Beaker periods (see Chapter 8). In undertaking this, some comment about whether the Beaker period represents significant cultural and economic change can be made from a purely environmental perspective.

1.7 THE CHRONOLOGICAL FRAMEWORK

The use of 'Beaker' as a cultural and chronological label has specific implications within the Final Neolithic and Early Bronze Age. The chronological and cultural labels used here are summarised in table 3 and relevant calibrated radiocarbon dates given.

Period/ Phase	Type of site	Ceramics	Examples of site	Date cal BC
				700?
Late Bronze Age	settlements, enclosures,		Winnall Down	
				1100
Middle Bronze Age	settlements, enclosures,	post Deverel-Rimbury and Deverel Rimbury		
				1400
Early Bronze Age	(2) - - - - - - - -	Biconical Urns		
	(1)	Food vessels Late Beakers	Easton Down	
				2000
Final Neolithic	palisade encls	Middle Beakers Early Beakers	Easton Down Mount Pleasant	
				2300
Late Neolithic	henges	Grooved Ware style	Durrington Walls Woodhenge Mount Pleasant Stonehenge	
				2800?
	ring ditches	Fengate Style Mortlake style	Oval barrows Maiden Castle	
				3300?
Middle Neolithic	cursuus chambered tombs causewayed enclosures	Ebbsfleet style decorated styles:	West Kennet	
				3700?
Early Neolithic	long barrows causewayed enclosures	plain shouldered bowls - Hembury style	Hambledon Hill Windmill Hill Maiden Castle	
				4000
Late Mesolithic	settlements	nil	Cherhill	

NOTE: "later Neolithic/Early Bronze Age" = Final Neolithic and Early Bronze Age (1)

Table 3. Basic chronology adopted throughout this thesis (derived from A.M. ApSimon unpub.)

1.8 SUMMARY

The research presented in this thesis is two tiered. Firstly, environmental archaeology will be used to answer archaeologically specific questions. This will be done by examining a case study of the evolution of the Beaker landscape and settlement patterns on the chalklands of southern England.

The second tier is concerned with interpretation. By developing general techniques to investigate the chalklands in prehistory it is hoped that the Final Neolithic/Early Bronze Age landscape can be examined for evidence of specific activities; e.g. burial, settlement and agriculture.

NOTE 1: radiocarbon dates

Throughout this thesis radiocarbon dates are quoted as calibrated dates BC and the date range presented encompasses two standard deviations, unless stated. Dates were calibrated using the University of Washington radiocarbon calibration progam (1987) and where radiocarbon determinations fell outside the calibration range (i.e. prior to *c.* 7210 cal BC; *c.* 8100 BP) dates are presented as uncalibrated BP.

NOTE 2: terminology

Throughout this thesis the term *colluvium* (i.e. hillwash) is used to refer to soil material that is moved downslope by gravity, usually lubricated by temporary flushes of water that is not in a permanent well-defined channel (see Chapter 2). The term *ploughwash* is employed specifically to give an indication that one of the major reasons or factors in the sediment deposition is thought to be cultivation, as inferred from molluscan or sediment analysis.

No.	SITE	AUTHOR	COMMENTS	ANALYSIS
KENT				
1	North Cliff, Broadstairs	Kerney 1965	Undated colluvium	Obs
2	Pegwell Bay	Weir *et al.* 1971 Kerney 1965 Pitcher *et al.* 1954	Colluvium over loess and chalk. Colluvium post-dates 5530-4470 BC (4170 ± 250bc) with Neolithic artifacts	M, P, A
3	Dour Valley	Osborne White 1928	Neolithic and Roman	Obs
4	Dover Hill, Folkestone	Kerney 1963	Undated colluvium	M
5	Castle Hill, Folkestone	Kerney 1963	Undated colluvium	M
6	Holywell Coombe	Kerney *et al.* 1980 Preece 1992	Complex colluvial sequence with Mesolithic Beaker and Roman	M, B
7	Devils Kneading-trough, Brook	Kerney *et al.* 1964 Barker *et al.* 1971	Colluvium initiated by clearance at 3613-2920 BC (2590 ± 105bc), Neolithic and Beaker artifacts	M, B
8	Champion Court Newnham	Worssam 1963	Bronze Age colluviation	Obs
9	Holborough	Kerney 1963	Undated colluvium	M
10	Halling Station	Kerney 1963 Dines *et al.* 1954	Undated colluvium	M, Obs
11	Upper Halling	Kerney 1963	Undated colluvium	M
12	Ebbsfleet Valley	Burchell & Piggott 1939. unpub papers in BM & BMNH Bell 1981a, 428	Mesolithic and later artifacts	A, Obs
13	Lullingstone	Cornwall 1958	14th century onwards	P
14	Cudham	Kerney & Carreck 1954	Undated colluvium	M

Table 4. List of the main documented colluvial deposits on the chalk of southern England. The location of these sites is shown in figure 1.

No.	SITE	AUTHOR	COMMENTS	ANALYSIS
15	Keston	Kerney & Carreck 1954	Undated colluvium	M
SURREY				
16	Oxted	Kerney 1963	Undated colluvium	M
17	Caterham Valley	Dines *et al.* 1933	Undated colluvium	Obs
18	Juniper Hall	Barrett & Chatfield 1978	Undated colluvium	M
SUSSEX				
19	Bourne Valley	Allen 1983; 1988a	Bronze Age, Roman and Medieval colluvium	M, P, A
20	Kiln Combe	Bell 1981a; 1983	Beaker to 15th century	M, P, A
21	Cow Gap	Kerney 1963 Bell 1981a	Beaker pottery at base	M, A
22	**Ashcombe Bottom**	This thesis Chapter 4	Late Neolithic colluvium Beaker activity	M, P, A
23	**Malling Hill**	This thesis Chapter 4	Neolithic pit sealed by Roman and later colluvium	M, A
24	**Round-the-Down**	This thesis Chapter 4	Late Neoltihic and Beaker to medieval	M, A
25	Asham	Williams 1971 Bell 1981a Ellis 1983; 1985; 1986	Late glacial, Neolithic Iron Age buried soil to medieval	M
26	Itford Bottom	Bell 1981a; 1983	Colluvium initiated by secondary clearance at 2470-1880 BC (1770 ± 120bc) BA to Roman	M, A
27	Snell's Pit	Bell 1981a	Prehistoric pottery	Obs
28	Balsdean	Osborne White 1924 Norris & Hockings 1953	Bronze Age artifacts	Obs
29	Newhaven	Bell 1976	Medieval	Obs
30	Devils Dyke	Ellis 1983; 1985; 1986	Iron Age colluvium beneath IA hillfort	M
31	Pyecombe	Osborne White 1924	Undated colluvium	Obs

Table 4 (cont.). List of the main documented colluvial deposits on the chalk of southern England.

No.	SITE	AUTHOR	COMMENTS	ANALYSIS
32	Sweetpatch Bottom	Hedges *et al.* 1992 Wilkinson pers. comm.	Colluviation initiated in Middle Bronze Age to Iron Age	M
33	Toadhole Bottom	Hedges *et al.* 1992 Wilkinson pers. comm	Colluviation initiated by late Neolithic	M
34	Old Shoreham	Osborne White 1924	Undated colluvium	Obs
35	Upwaltham	Bradley 1967	Undated colluvium	Obs
HAMPSHIRE				
36	Chalton	Bell 1981a; 1983	Bronze Age to recent	M, P, A
37	Bascombe	Bell 1981a; 1983	Iron Age to recent	M, P, A
38	Rake Bottom	Small 1958 Shakesby 1975 Gordon & Shakesby 1973	Undated colluvium	M
39	Compton	Allen, M.J. unpub	?Bronze Age	Obs, (m)
40	Owslebury	Collis 1968 Evans 1967	Iron Age artifacts	M, Obs
ISLE OF WIGHT				
41	**Newbarn Combe**	This thesis Chapter 5	Bronze Age and Roman artifacts	M, A
42	Duxmore Combe	Allen 1992a and unpub. data	Bronze Age onwards	M, A
43	**Limpet Run, Redcliff**	This thesis Chapter 5	Late Neolithic/EBA and Roman	M
44	Calbourne	Allen, M.J. unpub. data	Undated colluvium	Obs
45	Rock Roman Villa	Preece pers. comm. Tomalin pers. comm.	Roman	Obs (m)
46	Gore Cliff	Preece 1980b Preece 1987	Iron Age, early Roman and medieval colluvium	M
BERKSHIRE				
48	Uffington	Robinson pers. comm	later prehistoric	M, A
WILTSHIRE				
47	Littlecote	Allen, M.J. unpub. Wessex Archaeology 1990	Prehistoric	Obs (m)
49	Little Hinton	B.W. Sparks unpub. Bell 1981a	Undated colluvium	Obs

Table 4 (cont.). List of the main documented colluvial deposits on the chalk of southern England.

No.	SITE	AUTHOR	COMMENTS	ANALYSIS
50	Winterbourne	Evans 1972, 32	Iron Age pottery	Obs
51	Cherhill	Evans *et al.* 1978 Evans & Smith 1983	Post medieval	M
52	Calstone, Barn Combe	Wood & Whittington 1959	Upper levels Iron Age	Obs
53	Piggledene	Fowler 1963 Allen, M.J. unpub.	Prehistoric pottery	Obs
54	All Cannings Cross	Cunnington 1923	Colluviation during the Iron Age	Obs
55	**Strawberry Hill**	This thesis Chapter 6	Mesolithic to medieval	M, P, A
56	Figheldean	Allen & Wyles 1993	Late Neo/Early Bronze Age buried soil sealed by prehistoric colluvium	M, A
57	Durrington Walls	Wainwright and Longworth 1971	Post Beaker	M, B
58	Folly Bottom	Allen 1992a	?Prehistoric gravel fan	M, Obs
59	Codford	Allen in Barnes	Bronze Age colluvium	M, A,
60	Whitesheet	Allen 1992a; unpub.	post Iron Age colluvium	M
61	Downton	Rahtz 1962	Post Neolithic	Obs
67	Avebury	Evans *et al.* 1993	?Neolithic - Bronze Age colluvium in alluvium	M, P, A
DORSET				
62	Melbury Hill	Green 1991a	?Bronze Age colluvium	Obs
63	Hambledon	Bell and Allen 1985		M, A
64	**Fordington Bottom**	This thesis Chapter 7	Post Early Bronze Age sequences	M, P, A
65	**Middle Farm**	This thesis Chapter 7	post Beaker colluvium	M, A
66	Frampton	Green 1991b	Undated colluvium	Obs

KEY

M = molluscan analysis
B = biostratigraphy (e.g. pollen)
A = Archaeological investigation
(m) = mollusc analysis in progress
P = pedological analysis
Obs = observation

Table 4 (cont.). List of the main documented colluvial deposits on the chalk of southern England.

Chapter Two

Physical Processes and the Formation of the Archaeological Record

Both from the overviews of the prehistoric environment (cf. Macphail 1987a; Scaife 1987a; Allen 1988a) and from the previous chapter it is evident that the downlands have undergone major change in the last 7000 years. Major episodes of erosion and deposition have occurred which will have had a profound effect upon the archaeological data base. All too often archaeologists have viewed the landscape as a plate on which archaeological artifacts and 'sites' are located. Too little attention has been paid to the geomorphological parameter of the landscape itself. Geographical processes mould, alter, erode and obscure the landscape to such an extent that archaeological data no longer reflect real prehistoric settlement patterns. Many people have attempted to explain the mechanisms of landscape development and geomorphological processes. Relatively few have attempted to observe the possibility of geographical and landscape taphonomy as major agents in biasing artifact and site distributions in the lowland zone, and fewer still have attempted to explain its mechanics in this context. Mills (1985a and b) discusses the fact that the occurrence of colluvial deposits in the South of France obscure archaeological information, therefore distorting the archaeological record. This has been adequately demonstrated by Bell (1983), Smith (1984) and more specifically Allen (1988a). The landscape must not be viewed as a hypothetical peneplain, but as a dynamic complex geomorphological system. The following is a discussion of these complex processes of erosion and its effect upon archaeological sites and assemblages, largely based on field observations and records prior to 1986 and therefore includes information gleaned from Ashcombe Bottom (Section 4.2).

2.1 EROSION

The soils of the chalklands today are often shallow brown and humose rendzinas of the Andover and Icknield, with the thin grey rendzinas of the Upton Association in arable contexts. Deeper soils exist on the

tertiary cappings of Clay-with-flints and these are typical paleo-argillic brown earths of the Carstens Association (Table 1).

Rates of erosion have greatly increased as a result of the dramatic changes in agricultural practices on the downlands in the last decade. Field sizes have increased through the removal of hedgerows and lynchets and there is a recent trend towards double cropping and autumn sowing. Although erosion has existed on the Downs for several millennia, the consequence of more intensive and extensive agricultural practices has been a dramatic increase in the rate of erosional episodes and thus on net erosion. Soil erosion has recently become a much published topic within geography, largely because of its agricultural implications. Publications such as *Soil Erosion* (Kirkby and Morgan 1980), *Soil Erosion and Conservation* (Morgan 1979) as well as conference proceedings on soil erosion e.g. *SEESOIL* Vol. 3 (1986), are just a few examples of an extensive literature. More specifically however, Boardman has recently recorded and studied modern erosion from arable contexts on the Sussex Downs (1984a 1984b; 1985). His numerous erosion studies now enable the archaeological investigations of colluvium to be put into perspective. More significant is the recent publication of *Past and Present Soil Erosion* (Bell and Boardman 1992) which attempts to integrate information from both recent geographical and archaeological perspectives. Also the implications for artifact distribution and redistribution can be examined via erosion mechanics.

Erosional and depositional regimes within a landscape, or even a single valley, will vary over time. Fine grained sediments (i.e. silts and loams) will be gradually and rhythmically deposited while coarse grained sediments and localised gravel fans are deposited rapidly and infrequently. Their occurrence is dependent upon the specific nature of the surrounding landscape.

Of paramount importance to the erodibility of soils are their characteristics such as: its organic content, soil structure, porosity and texture etc. Therefore, there is a need to briefly examine both the causes and mechanics of erosion. Soils most at risk are those with a restricted clay content, i.e. less than 35% (R. Evans 1980) and the most erodible soil particles are those in the 10 - 30 micron range

(Morgan 1979) i.e. medium - coarse silt as defined by the British Standards Institution. By these criteria Downland soils are generally highly susceptible to erosion. They have poor soil aggregates and are characteristically silt rich, commonly containing as much as 60% (Hodgson 1967, 131) due to the inclusion of loess. Even on the Tertiary cappings of Clay-with-flints, where soil aggregates are more stable, the overall silt content is rarely below 40% (Avery *et al.* 1959; Hodgson *et al.* 1967; 1974) and clay content is rarely exceeds 30%. Here also, organic matter, which is a contributory factor to soil aggregate stability, is generally low. Soils with less than 2% organic carbon (i.e. 3.5% organic content) are considered erodible (Harrison Reed 1979; Morgan 1979). Downland soils of the Icknield and Andover Associations contain between 7% and 11% organic matter under natural vegetation but this is considerably reduced under cultivation, usually to less than 4% in Upton Association soils. None of the analyses by Moffat and Cope (1984) on chalkland soils showed organic carbon contents greater than 2.3%, while less than 10% of their entire analytical suite produced amounts in excess of 2.0%, with some dropping as low as 0.4%. When organic matter content falls below 2 - 3%, the basic maintenance of soil structure becomes a problem especially in silty soils (Bridges and Davidson 1982, 179). The lowering of the organic content as a consequence of arable activity has led to the collapse of many tilled soils (Harrison Reed 1983) thus raising awareness of the significant increase in erosion (Morgan 1979; *SEESOIL* Vol. 3 1986). Many downland soils tend to slake, i.e. soil crumbs disintegrate in water into discrete particles (Pitty 1978); this results in the formation of a relatively impermeable surface crust, reducing infiltration and leading to increased erosion.

There is a growing body of literature indicating that downland soils have been considerably modified by human activity. Evidence supports the hypothesis that thicker, less calcareous silty soils (i.e. typical brown earths and calcareous brown earths) existed over much of the rolling downland, with thinner calcareous soils on the slopes and gravel and head deposits in the valley bottoms (Limbrey 1975; 1978; Allen 1988a; Macphail 1987; Macphail and Scaife 1987; Staines 1991). Argillic and paleo-argillic brown earth soil aggregates are certainly more stable than those in thin calcareous soils (i.e. brown and grey

rendzinas) largely because they are more porous and contain higher organic matter contents. Argillic brown earths will resist slaking, but are susceptible to erosion by physical impact and transportation by rain drops (Imeson and Jungerius 1976). Such soils were, however, in early prehistory, protected from rainsplash and rain drop impact by the woodland canopy. Hence removal of the woodland was liable to result in soil erosion until a new equilibrium was met.

In order to discuss the implications of both erosion and deposition to the analysis of artifact distributions, it is necessary to outline the processes of erosion. For clarity, the erosional processes can be divided into two categories. Those resulting from frequent, small scale, erosion episodes which generally involve the removal and deposition of fines (clay to small stones), and those related to larger, infrequent, erosive events which may remove and deposit both larger volumes of material and larger inclusions i.e. gravels, stones and boulders (see Fig. 2).

Low energy, frequent events

Low energy erosive events are those which, in general, are frequent and occur regularly. It is these events that lead to colluvium being deposited and built up by gradual increments over many centuries, if not millennia, possibly on a seasonally basis under different land-use regimes (Imeson and Vis 1984). These are essentially natural processes but are greatly accelerated by anthropogenic effects such as tillage, where bare and broken ground is open to the elements and the activity of the biota (Dimbleby 1976).

The erosion of fines (silt and clays) involves processes of weathering which move material downslope under the force of gravity. These processes include agencies such as rainsplash, hillwash, soil creep, tillage and also soil movement resulting from earthworm action, burrowing insects and mammals as well as soil displacement by larger, hoofed, animals. These are continuous processes which result in small-scale downslope movement of soil particles and smaller stones of the type recorded since at least 1881 when Darwin wrote in his *Vegetable Mould and Earthworms*, that "...many branching valleys intersect most countries...and that earth is steadily travelling down both turf-

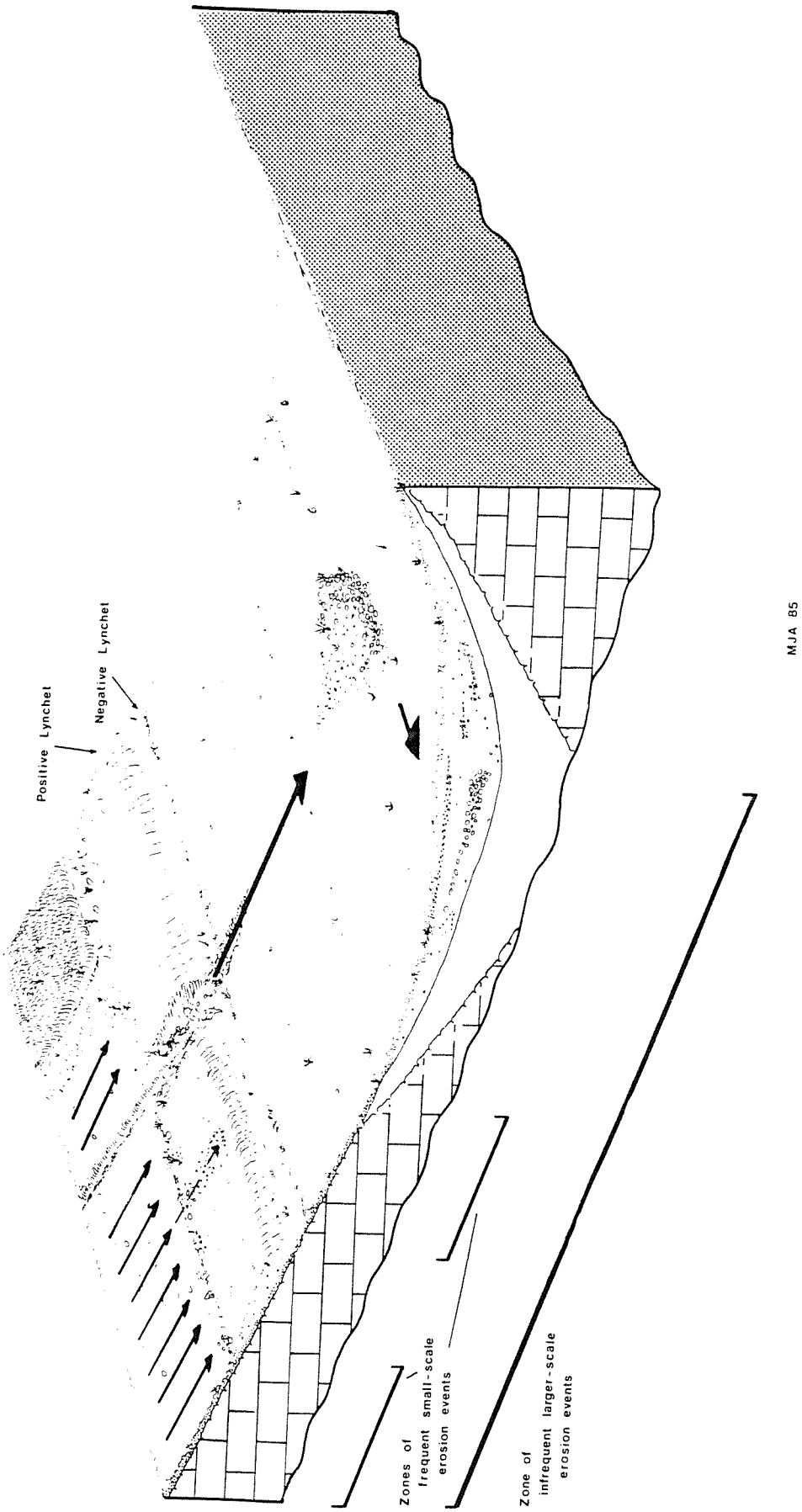


Figure 2. Hypothetical reconstruction of erosion regimes

covered sides of each valley...here a thick bed of alluvium will accumulate..." (Darwin 1881, 247).

Rainsplash is an important agent, even when overland flow of water occurs, since it is the kinetic energy of rain drop impact that enables the detachment of soil particles which can then be entrained (Kwaad 1977). When soil is subjected to either *intense* rainfall, where the rate of precipitation is greater than the rate of infiltration, or *prolonged* rainfall, where infiltration capacity is exceeded and the soil becomes saturated, then excess water will lead to overland flow. Once water has been mobilised in this fashion, processes of sheetwash, rilling and gullying may occur, depending upon the intensity of overland flow, degree and length of slope etc. The net result, however, is more severe erosion.

Sheetwash

Once overland flow occurs, water will wash off the soil surface in sheets, provided that surface morphology is not pre-sculptured into channels. Sheetwash will enable fine material to be transported in suspension once entrained, and coarser particles, including a high proportion of soil aggregates, to be moved downslope by the gravitational force of the flow. Smaller stones (i.e. chalk pieces up to an average diameter of 6mm) have also been observed to be moved downslope under these conditions. On the downlands, chalk pieces are frequently moved under these conditions in preference to flint. This is because chalk often occurs in smaller pieces than flint and has a lower specific gravity (2.17 for chalk, 2.63 for flint which is silica -SiO_2-). Although sheetwash is a fairly regular occurrence, its erosive effects on grassland are negligible, whilst on open tilled bare earth material is obviously more readily entrained and moved. Sheetwash will frequently lead to small braided water courses with no pronounced channels. When localised channelling does occur, the down cutting and removal of material results in the creation of networks of small rills. This is rare on grassland (Bennett 1939), but a regular occurrence on arable land.

Rilling

Rills are ephemeral features created by the channelling of overland

flow and are often destroyed by the next pluvial event and are obliterated by ploughing. The formation of rills (or gullies) is dependent upon a number of factors including soil type, slope, velocity and depth of water. Although rilling affects the same part of the slope as overland flow these processes can be distinguished by their relative erosive capabilities. The concentration of flow increases erosive power and hence rilling displays a greater capacity for soil removal and the movement of coarse components. Networks of rills, often only 3cm deep, have been observed in recent erosion events on the Sussex Downs (Boardman 1984a; 1984b). The deposition of this material often forms fans of soil material above which (i.e. higher up the slope) well sorted fans of the coarser fragments, (e.g. chalk pieces commonly *c.* 6mm - 14mm in diameter) tend to occur.

Higher energy, less frequent events

Generally, high energy events occur with less frequency than their low energy counterparts, and catastrophic events are rare. Boardman has recently postulated a regular cyclical occurrence pattern of 4 to 6 years for extensive modern rilling and gullying events on the Sussex Downs (Boardman pers. comm.).

Larger Rills

Rills are, by definition, ephemeral erosion features. Nevertheless they can be in excess of 150m long and 17cm deep (i.e. total soil depth on chalk). Larger rills have considerable erosive ability. Boardman, for example, has recorded figures of up to 1.89 tons of soil per hectare removed from arable fields as a result of rilling (1984a; 1984b). Deposition occurred as large fans individually constituting *c.* 0.26 tons of material (Boardman 1984a). These were often comprised of both fine and coarse components and included a number of large stones up to 20cm diameter. Occasionally individual flint nodules of 380cm^3, weighing approximately 1kg, were recorded (Boardman and Robinson 1985). Differential deposition is commonly noted; the larger stones and flints being deposited at the base of the slope whilst finer flint and chalk material may be transported another 500m and the silt and clay fraction often over 1km (Boardman and Robinson 1985).

Gullies

Once larger rills become permanent or semi-permanent features of the landscape they can be classified as gullies. As a consequence of being permanent, water is directly channelled into the gullies, the concentration of flow often stripping out all soil material. They will, therefore, produce exaggerated forms of rill erosion and deposition, and have been observed to exceed 200m in length and be in excess of 0.5m deep and 1.5m wide (Boardman pers. comm.), thus representing a linear swathe of total soil and stone removal across a field. They tend to be straight, taking the steepest and shortest route downslope, and often disregard minor morphological features of the landscape. Deposition at the base of the slope may cover many square metres and include large flints as well as fines.

Although slope is an important factor in all of the erosion regimes described above, Boardman (1984b) has recorded rilling and gullying on slopes as small as 4 degrees while the erosion of fines can occur on slopes as little as 2 degrees (Evans 1978; 69; Butzer 1974). Therefore, erosion must be considered as a factor in the re-distribution of archaeological material, even on minor slopes.

Archaeological Implications

Erosion processes on the downlands will have a serious effect upon the distribution of archaeological data. It is obvious that:

1) artifacts residing in the ploughzone will be affected
2) sites may be severely denuded/destroyed by erosion, and
3) that sites may also be preserved by deposition.

The implications of soil movement

Erosion of fine soil particles by sheetwash and rilling are frequent events that probably will not result in significant downslope movement of artifacts. Nevertheless, the regular removal of the silt, fine sand and very small stone fractions will result in an overall decrease in soil depth on the hill crest and slopes, and a gradual increase in soil depth in valley bottoms and the base of slopes. The effect will be to increase stoniness (i.e. stones per unit of soil) and thus artificially concentrate artifacts in areas of soil loss on the slopes and hilltops. Areas of deposition will see a relative reduction in artifact density

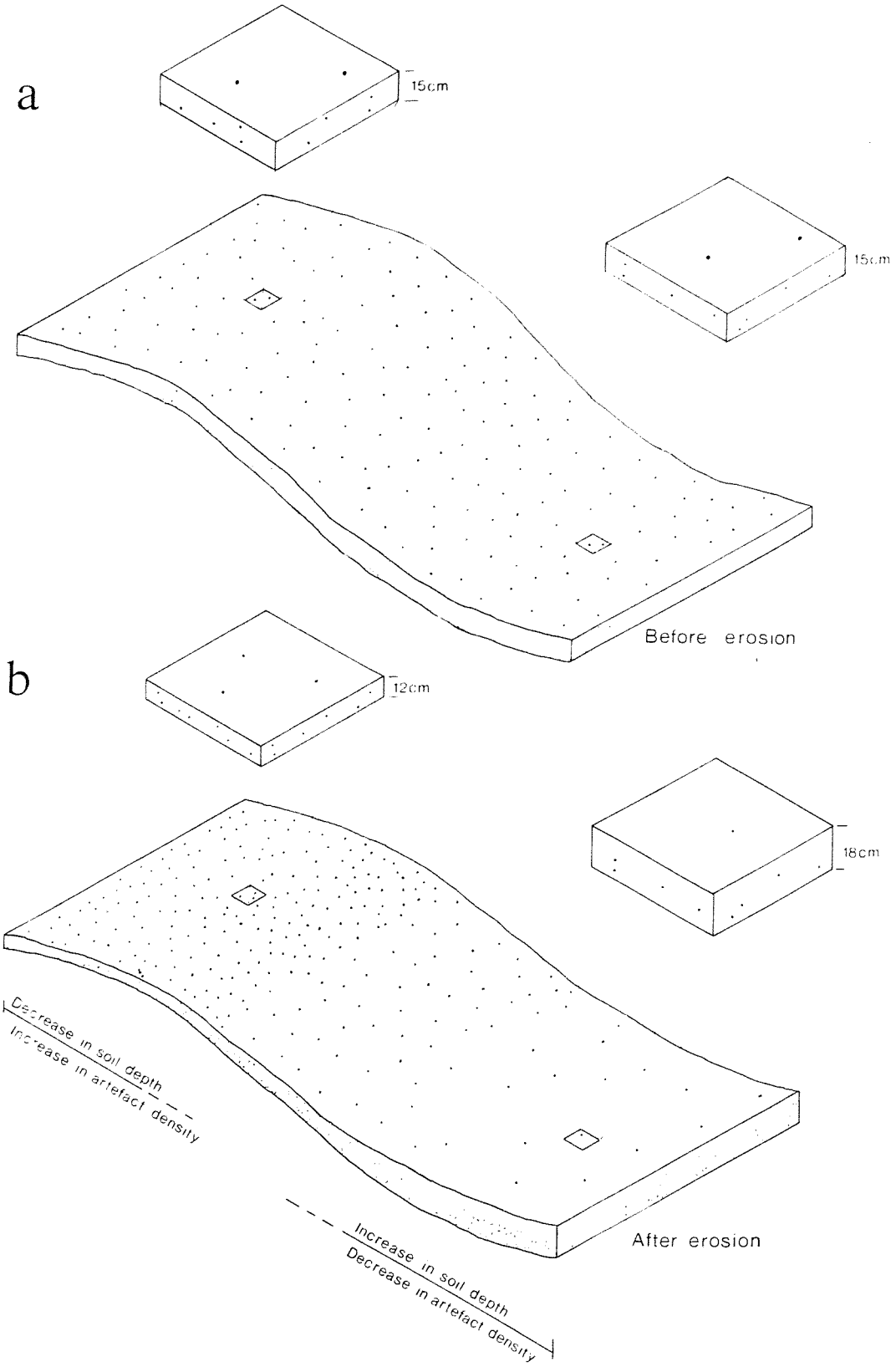


Figure 3. Soil depth and surface artifact density as a consequence of erosion.

and ultimately total burial. Increase in stoniness and artifact density will be reflected in the surface distributions (Fig. 3).

Artifact displacement

Under slightly more energetic erosion regimes, i.e. rilling, the movement of artifacts is certainly a possibility. Minor rilling will essentially affect only surface material, though some may be preferentially moved due to difference in bulk densities and specific gravity. My own empirical studies of natural and artifactual flints demonstrated that shape was also an important factor.

There is significant variation between the specific gravity of prehistoric pottery (ave. 1.93), flint (2.63) and chalk (*c.* 2.17) and their shape; i.e. flat versus spheres. From this it can be inferred that under low energy, 'fluvial' erosion (rilling) chalk will be preferentially eroded, not only because it displays a low specific gravity, but being very soft, it is able to weather into small, often very well rounded, pieces which may roll. Although prehistoric pottery (flint and grog, and flint tempered) produced the lowest specific gravity, its platy shape will not be transported as easily as chalk spheres, but its high surface area may facilitate movement by overland flow. Flint is the heaviest of these materials (specific gravity 2.63) and is, therefore, less likely to be transported under the fluvial conditions postulated. However, my experiments showed that in an assemblage of approximately equal proportions of marked natural and struck flint, those which were relatively thin with flat surfaces were preferentially transported downslope. It was found that 873 flints weighing between 5.2 and 22.4 grams, were spread over a 2m by 45m strip along an 11 degree slope. A trench was excavated parallel to this strip 10 metres downslope. After two small storm events, 87% of the marked flints recovered in the trap were thin and had flat surfaces, 94% in this class were blade artifacts!

After four years, over 60 flints of which over 80% were flakes and blades, had moved 50m downslope and were caught in a second trap. This indicates that downslope movement is possible over large distances. Over time a large proportion of the assemblage may be deposited at the foot of the slope and blanketed by finer wash. In real terms, whatever

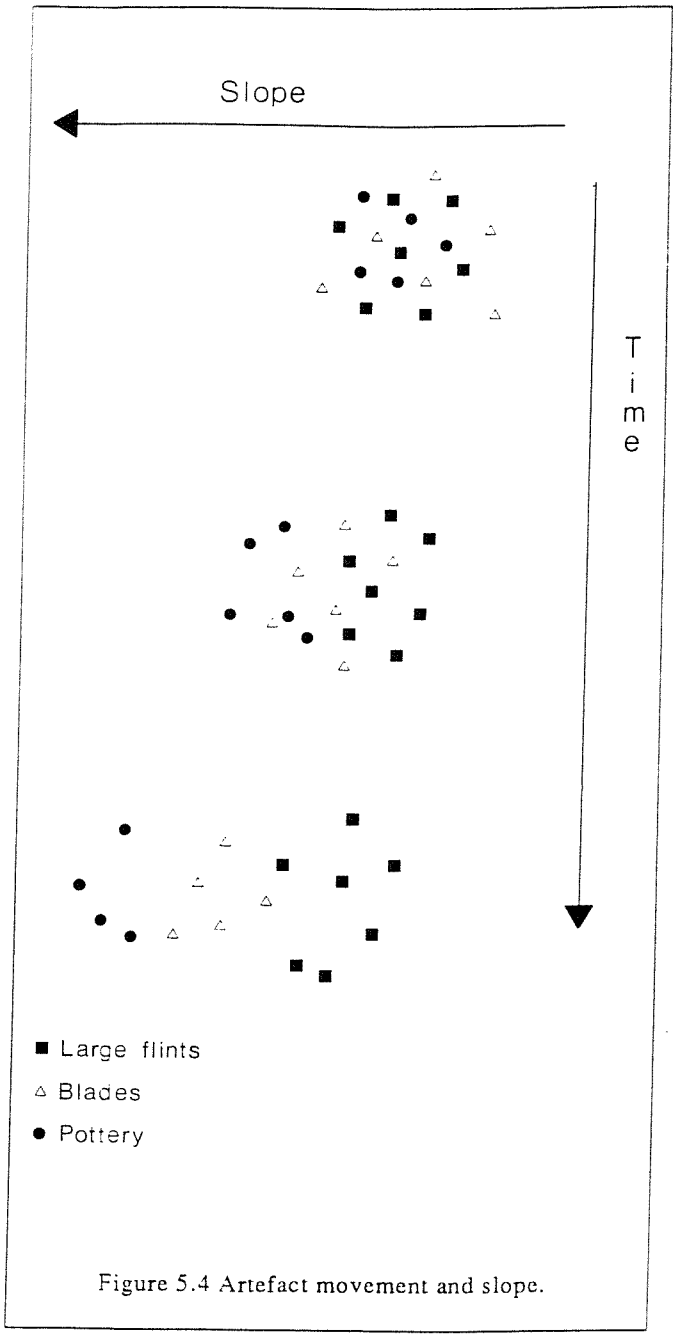


Figure 4. Artifact movement bias and slope.

the effects of this erosion are, it must be considered as a potentially serious distortant to artifact assemblage patterns.

It is evident that once fluvial energy is great enough to move small objects, pottery will display the greatest tendency to movement followed by small flint artifacts and more spherical flint artifacts (cores). This implies a 'winnowing' factor and that discrete artifact distributions have the potential to become 'blurred' by the preferential sorting of surface material (Fig. 4).

Modern erosion is obviously a factor that must be considered when analysing artifact distributions. Although modern erosion may be extreme, due to intensive and extensive agricultural practices, it is evident that colluviation has occurred on the downlands for at least four millennia (Chapter 8). Erosion processes operating today have probably been in existence continually, to a greater or lesser degree, throughout the period of most archaeological activity on the chalklands. Recent studies of valleys provide an archaeological dimension to these processes but also highlight other severe landscape biases.

Artifact removal

There can be no doubt that severe rilling and gullying can, and do, remove artifacts from the ploughzone. From recent examples of severe erosion on the Downs it would appear that these processes can also potentially damage well stratified sites. Concentrated channelling processes will indiscriminately remove a small percentage of the ploughsoil, including artifacts. However, as only a thin linear band of soil and artifacts is removed, this will only result in the general reduction of artifact numbers within the gullied or rilled area. Deposition on the other hand, may result in extreme sorting and redistribution of artifacts. However, artifacts are likely to be deposited at the base of the slope and this zone is also most likely to accumulate finer material. Burial of artifact scatters and redeposited artifacts may, therefore, occur comparatively rapidly. If this is the case, no severe distortion will be noticed from the observation of surface artifact scatters upslope, but the lower slopes may be totally obscured. This obviously has major implications when fans of material are not buried and do enter the ploughzone. Large rills can even make deep incisions in valley colluvium and lynchet deposits and hence even buried sites are not totally protected from erosion.

As the processes and examples discussed here are entirely theoretical, further examination is required of;

a) modern erosion events and artifact occurrence

and b) fieldwork data that can be compared with the hypothesis outlined above.

2.2 COLLUVIAL STUDIES

Contrary to statements made by both Taylor (1966) and Godwin (1967) that there was no evidence for soil erosion on the chalk Downs in the prehistoric and early historic periods, it is abundantly clear that colluvium is a major component of the downscape as shown by the major deposits at Pitstone, Buckinghamshire (Evans 1966; Evans and Valentine 1974), Brook, Kent (Kerney *et al.* 1964) and Pegwell Bay, Kent (Kerney 1965; Weir *et al.* 1971). More recently, investigations in dry valleys (Fig. 1) have produced evidence of an almost ubiquitous occurrence of post-glacial colluvium varying from 0.5m to in excess of 3.5m in depth.

More significantly, Bell (1983) and Allen (1988a) have demonstrated that such deposits are directly or indirectly, the result of human interference within the environment, rather than a purely natural or climatic phenomena.

Processes of colluviation have been addressed by soil scientists, geographers and archaeologists alike (Kwaad and Mücher 1977; 1979; Clark and Small 1982; Bell 1981b), all of whom have often placed emphasis on the agencies of soil creep, rainsplash and gravity. Although these are important agencies, I have argued that erosion may involve higher energy, more rapid processes such as sheetwash, rilling and gullying (Allen 1988a). This was demonstrated at Ashcombe Bottom where excavation revealed a Bronze Age gravel fan and a series of chalky lenses resulting from prehistoric rill erosion of arable land. A graphic modern analogy was provided for these prehistoric erosion events at Ashcombe Bottom when, only 10 weeks after excavation had been completed, a severe storm resulted in a large gravel fan and 17cm of fine sediments being deposited directly over the previously excavated area. These modern deposits, on investigation, provided exceptionally good analogies for the Bronze Age contexts excavated, only being separated in time and vertical distance. Burial of archaeological sites can therefore be either extremely rapid, or very gradual, but in both cases erosion is accelerated by anthropogenic activity, e.g. tillage.

How severe is erosion? (the modified landscape)

The erosion processes described here are only a selection of the those occurring within the comparatively simple ecological systems of the downlands. The landscape is a complex dynamic system of closely integrated processes which change over time in response to external and internal factors. Although we can isolate and monitor precisely those processes occurring today, it is more difficult to determine rates and frequencies of such processes in the past, not least because the data base from which to draw this information is so small. However, both artifacts within colluvium, and the nature of colluvium provide the basis for the interpretation of ancient erosion events. Only when more intensive and extensive studies of colluvial deposits have been instigated can we really attempt to construct competent models of the

true nature of artifact biasing processes in prehistory.

Sediments investigated at a number of sites have contained a vast quantity of identifiable and stratified archaeological artifacts (e.g. Fig. 5; Table 5). This indicates not only the occurrence of prehistoric erosion, but also the ancient erosion of prehistoric artifacts. However, L. Allen (1982), M. Allen (1988a) and Bell (1983) have demonstrated that these deposits are well stratified despite the variation of sedimentological processes involved. The artifact distributions provide a good chronological sequence and display only limited mixing. Although one might have expected biotic activity as well as erosive action to have disrupted and destroyed artifact chronology, it has been shown that these phenomena do not have a serious disruptive effect.

Environmental evidence in the form of Mollusca, soil micromorphology, granulometry and chemistry links the occurrence of the deposits and the artifactual evidence with land clearance and subsequent, large scale, cultivation practices. As these sediments are often appreciable, it is evident that the downlands are largely an anthropogenic landscape composed of essentially 'Man-made' soils. As stated above, the scale of sedimentation in dry valleys is highly variable and dependent upon many factors. At Kiln Combe, Sussex, (TV 573 965) nearly 3.0m of colluvium was revealed in a comparatively major, dip slope, dry valley (Bell 1981a; 1983), whilst at Strawberry Hill, Wiltshire (SU 996 528), a very minor scarp slope valley produced 3.3m of post-glacial colluvium (Section 6.2). In contrast the constricted valley at Ashcombe Bottom (TQ 380 106) produced only 1.2m of colluvium (Section 4.2) and a similar depth was revealed in the extremely broad Bourne Valley, Eastbourne (TV 600 994) (Allen 1983). Thus general valley morphology seems to bear no relation to the resultant deposits.

Careful examination of colluvial sediments combined with accurate three-dimensional recording of artifact location can enable the distinct, stratified artifact distributions produced in section (e.g. Bourne Valley; Fig. 5), to be integrated with the environmental evidence, thus providing an ideal situation in which to record off-site landscape studies. Although many dry valleys in southern Britain have

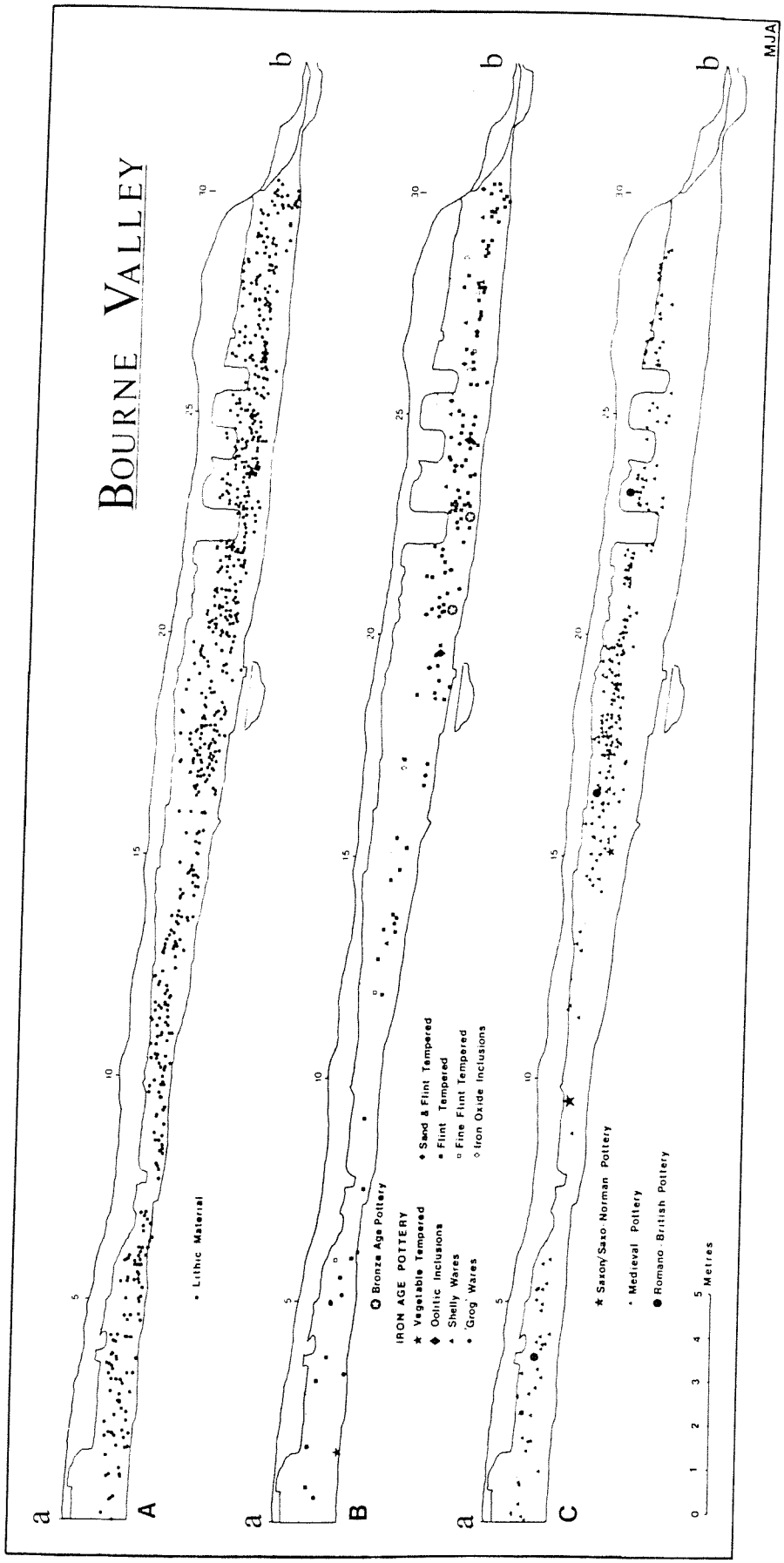


Figure 5. Artifact distribution at Bourne Valley, Eastbourne.

	A Estimated m^2 of colluvium in whole cross section	B Length of contributing slope in metres	A/B = Estimated depth of eroded soil in centimetres	TOTAL ARTIFACTS HAND-EXCAVATED	ARTIFACTS PER M^2 OF EXCAVATED SOIL	DATE OF EROSION
ASHCOMBE Valley TQ 380 106	24	500m	5cm	1911	138.1	Neolithic to modern
BOURNE VALLEY Lynchet TV 600 994	156	640m	24cm	*c.*10,000	256.4	Bronze Age to Saxon
KILN COMBE Valley TV 573 964	90	500m	18cm	3109	68.2	Beaker to Medieval
BISHOPSTONE Lynchet TQ 468 006	15.4	160m	10cm	1985	64.0	Neolithic to Saxon
ITFORD BOTTOM Valley TQ 441 049	59	1200m	12cm	2103	68.9	E. B. A. to Roman
CHALTON B Valley TQ 729 60	60	700m	9cm	3105	204.3	B.A./I.A. to modern
CHALTON A Valley SU 721 166	22.6	900m	2.5cm	366	114.3	Neolithic to modern
HAMBLEDON Lynchet ST 858 116	*c.* 30.6	500m	6cm	163	-	Prehist. to modern
HAMBLEDON Coombe ST 857 119	*c.* 137.6	680m	20cm	167	104.4	Iron Age to modern

Table 5. An attempt to quantify:
a) the extent of erosion represented by surviving colluvium, and
b) the numbers of archaeological artefacts in the excavated sections.
The final column provides a crude indication of the period over which the erosion occurred. (after Bell 1986 and Allen 1988a).

been shown to contain colluvium there are exceptions, notably the Seven Sisters, Sussex, and Stonehenge Bottom (Bell pers. comm.; Richards 1990, 210-211). Nevertheless, crude estimates based on drift geology, soil maps and fieldwork suggest that *c.* 16% of the chalk landscape may be blanketed by colluvium and a further *c.* 3% obscured by alluvial deposits. In total it is possible that *c.* 19% (i.e. one fifth) of the downland landscape previously available for occupation is now obscured and buried by geologically recent deposits. This alone is surprising and often not appreciated by those attempting to reconstruct settlement patterns, but is made more alarming when the archaeological examination of five dry valleys in Sussex produced evidence of four previously unrecorded settlements. Furthermore, recent excavations at Strawberry Hill, Wiltshire, Fordington Bottom, Dorset and Holy Well Combe, Kent, have also produced evidence alluding to settlement beneath colluvial deposits. In the Bourne Valley, Eastbourne, the density (Fig. 5) and size of Iron Age sherds was consistent with occupation in the immediate vicinity (Allen 1983). Kiln Combe, excavated by Bell, produced a Beaker occupation phase beneath 2.3m of colluvium as well as evidence of a 12th/14th century medieval farmstead under 0.4m of colluvium (Bell 1981a; 1982; Drewett 1982). Ashcombe Bottom, Sussex, produced a scatter of Beaker pottery associated with a buried soil which have been interpreted as indicative of occupation (Section 4.2; Allen 1984a; 1984b). In Wiltshire, recent excavations at Strawberry Hill (Section 6.2) revealed Late Bronze Age activity beneath 2.1m of colluvium and further, at the base of the valley, two ditches, as yet undated, beneath 3m of deposits.

The abundant occurrence of pottery in dry valley deposits does indicate fairly rapid erosion. Certainly at Kiln Combe and Bourne Valley, sherd size can be seen to increase with depth, indicating the rapid burial of material, while residual sherds are significantly weathered and reduced in size. On both of these sites up to 73% of the pottery of any one chronological period occurs within 25cm vertically of the basal example. The remaining 27% occur in the overlying 0.7m - 1.5m of colluvium. In each case less than 1% were present on the surface indicating that the ploughsoil on the slopes today contain few sherds of pottery of the type recovered in quantity within the colluvium.

None of these sites are detectable by normal archaeological reconnaissance, least of all by surface artifact scatters. Bell's excavations (Kiln Combe, Itford Bottom and Chalton) were conducted specifically in areas of known archaeology, whereas the excavations at the Bourne Valley, Ashcombe Bottom and Strawberry Hill, that I have undertaken, were conducted either due to the impending destruction of the site, or at a location predetermined by the necessity for vehicular access. In none of these valleys did the area of excavation exceed more than 0.0007% of the valley surface! This poses significant questions about our ability to reconstruct archaeological landscapes and identify the location of specific activities within them.

Severe erosion will, ultimately, obliterate the older and more ephemeral traces of evidence; this may aid the explanation of the paucity of Neolithic and Early Bronze Age domestic structures and sites in southern Britain. This hypothesis has often been favoured because of the abundance of artifacts and monuments in the hilltop zone. However, I would venture to postulate an alternative scenario. Foley suggests that settlements will, for ecological reasons, tend to be located within a particular part of the environment (1981a; 1981b). One can apply this generalisation to any environment and on the South Downs it might be particularly pertinent. If settlement was predominantly valley located at any time in prehistory for reasons of communication, sheltered location and suitable habitable terrain, then an entire suite of domestic evidence may remain unrecorded beneath colluvial or alluvial deposits (Allen 1988a; 1991a; Burrin and Scaife 1984; Scaife and Burrin 1992; Burrin 1985). Further, this phenomenon is not restricted to southern England, for Butzer (1974, 69) reports that "Bronze Age valley settlements were buried by as much as 1 - 2m of loessic soil wash" in Central Europe while Tolstoy and Fish (1975) have shown second millennium BC artifacts and structures were buried by colluviation in the basin of Mexico. The Mediterranean 'Younger Fills', which also bury archaeological evidence, have now been attributed to anthropogenic activity, as exemplified by Wagstaff's seminal paper (1981).

Colluvial deposits will, therefore, create apparent 'blanks' in the archaeological record, it is important that a true appreciation of

these 'blanks' or 'black holes' as Groube (1981) refers to them, is attempted. Blanks in the archaeological record may reflect a number of factors: lack of fieldwork, nature and quality of fieldwork, destruction of evidence (e.g. ploughing, industry, development, etc.) or evidence not available by surface examination (Hammond 1980). Young (1986) graphically demonstrates how the archaeological record in Weardale is biased by open pit coal mining and other environmental factors. Colluvium also creates archaeological 'blanks' and must be taken into consideration when examining any site distribution. Colluvial deposits though, are advantageous in that they may preserve relict landscapes.

Chapter Three

Research Strategy and Methodology

3.1 THEORY AND AIMS: towards a strategy of landscape study

Background and Bias

General interpretations of the Neolithic to Early Bronze Age land-use of the downlands in southern England are largely based on land snail evidence derived from archaeological sites (e.g. Evans 1971a; 1971b; 1975). The sample of sites is not without problems for environmental reconstruction. Most of the sites are Neolithic long barrows and many are situated in hilltop locations (e.g. Horslip, West Kennet, Waylands Smithy etc.) where the woodland or scrub may have been specifically cleared for the monument. If this is the case then analysis will show monument construction in cleared land, and may not reflect a wooded landscape in the immediate vicinity. Although this evidence is to a certain extent reinforced by the open country assemblages recovered from many occupation sites, settlement data are also biased: any settlement or occupation is by definition going to be predominantly 'open' in environmental terms. Thus to use these types of data perpetuates the problem of examining specific localised areas where the presence of the archaeological site is itself evidence of clearance. The acquisition of data primarily from archaeological sites must therefore be questioned. A picture compiled almost exclusively from this type of data may well be extensively biased. In order to confirm or refute the overall impression of any landscape history developed from these data it is necessary to integrate this information with a number of non-site based environmental sequences which do not contain intrinsic bias. These can be augmented with data from conventional sites, where the evidence of the environment of *pre*-settlement or *pre*-mortuary activity is probably most significant. This constitutes off-site data (Foley 1981b; it pertains to the land-use history *before* the location became a centre of human activity and thus before it was a 'site'.

Off-site data are imperative to this study and, on the chalklands they are largely derived from colluvial deposits. Alluvial sequences in

river valleys have also been shown to give excellent land-use records (Scaife and Burrin 1992), but their catchments are much wider than that of colluvial deposits and consequently their spatial resolution is not as high. But deposits are not always calcareous enough to preserve shells. They can also be extremely deep and thus present huge logistical problems of excavation and sampling. Where with both colluvial and alluvial sequences are statigraphically related (i.e. inter-digitated) there is often a greater opportunity for larger integrated interpretation of the land-use of wider areas (Bell and Allen 1985; Evans *et al.* 1993).

Research strategy

Two sets of criteria are required for the choice of study area. First, that there is sufficient environmental and archaeological information to address the questions posed in Chapter 1 (Section 1.3). Second, these data must be both available and readily accessible. For these reasons liaison with archaeological bodies active in the field, especially Wessex Archaeology and the Ancient Monuments Laboratory of the Historic Buildings and Monuments Commission, England, was a necessity. It was fortunate that a large number of excavations were being conducted on the Wessex chalklands, particularly around Dorchester, during this research. The research strategy devised was therefore not necessarily ideal, but like most research, one tempered by opportunity and practicality.

The study areas were chosen as they to contained a number of chronologically relevant excavated sites with suitable data for analysis. This was augmented by investigations of colluvial deposits, either by myself or by others. These data were supplemented in some areas with samples from previous excavations stored in museums or archaeological units. Usually these were confined to recent excavations, but in Sussex some analysis was undertaken of samples from 1950s excavations.

This opportunistic approach combined with carefully selected areas for dry valley excavations has resulted in an extensive database.

In order to examine change through both time and space it is necessary

to have a large suite of sites and samples which are both spatially and temporally diverse. Sinking trenches into valley deposits to attempt to locate Beaker evidence associated with molluscan assemblages is impractical as is the idea that the study of colluvial deposits alone can provide a large enough database for inter regional comparison. Such exercises are costly, labour intensive and time consuming. The cost of fieldwork is beyond the financial commitment of the SERC, and such work could only be contemplated if either sufficient money were available for fieldwork and staff wages, or if a sufficiently large body of amateur or student archaeologists could be employed. Multiple fieldwork exercises and subsequent analysis would also have to be employed. For these reasons colluvial studies were augmented by a series of mollusc analyses from relevant and dated horizons from conventional archaeological sites.

3.2 FIELDWORK METHODOLOGY; the investigation of colluvial deposits

The excavation of colluvial deposits in dry valleys and footslope locations provides a broader off-site landscape, rather than a purely site-based, approach to environmental studies. However, it must be emphasised that the nature of colluvial deposits implies erosion as a result of human activity, particularly cultivation. As a result of such studies, detailed and dated palaeo-environmental sequences, are obtained which relate to a larger area than that of just a settlement site alone; the colluvial deposits provide a sample of information from the whole catchment (Allen 1983).

Naturally occurring sections

In some cases colluvial deposits were exposed in natural cliff sections (Limpet Run, Isle of Wight - Section 5.3) or quarry faces (Grey Pit and Malling Hill, Sussex - Sections 4.3 and 4.5). In these cases, the sections were cleaned prior to detailed description and drawing. The sections were then photographed, described, sampled and the location of any artifacts were recorded. The procedures adopted for these studies were the same as those employed during full-scale excavations.

Excavated sections

Where colluvial deposits were not available in cliff or quarry

sections, dry valley and footslope deposits were excavated and recorded using standard techniques principally developed by Bell (1977, 252-257; 1981a; 1983) but with modifications (Allen 1983; 1984a; 1988a). Where excavation was possible the sediments were sectioned with a machine-cut trench, usually perpendicular to the axis of the slope. One face was straightened and cleaned prior to recording and hand excavation. In each case the overall valley profile was levelled and the sediment sequence drawn at a scale of 1:20.

The observation of long machine-cut sections enabled a comprehensive understanding of the stratigraphy, especially upslope where it often differed considerably from that in the valley bottom. Horizons were more easily differentiated and recognised when viewed in long section rather than limited test pits. The sections were allowed to weather and observations of differential drying and moisture retention often led to layers showing up which were not visible, or readily observable, when the sections were first cut.

Representative and deeper portions of the section, usually where the stratigraphy was most complete, were targeted for more careful, excavation and sampling. Detailed drawings were made of these sections; usually at the larger scale of 1:10 with the aid of a drawing frame divided into 10cm squares. In this way the location, shape, orientation, size and lithology of every stone larger than *c.* 1cm could be recorded. These selected portions of the stratigraphy were hand excavated and the location of every artifact recorded with at least two (but usually three) co-ordinates to within 1cm. This information, when projected onto the stratigraphy, provides artifact distributions which can be used as a basic chronological framework while also indicating layers of significant human activity or occupation.

The colluvial sediments were photographed and detailed sedimentological and pedological descriptions were made of representative sections to both characterise the deposits and aid field interpretations of their origin, deposition and pedological history. Descriptions follow the terminology outlined in Hodgson (1976) except where excavations were not conducted under the direct supervision of the writer (e.g. excavations conducted by Wessex Archaeology around Dorchester: Middle

Farm, section 7.2; Fordington Bottom, section 7.3) or where inaccesiblity hindered detailed recording (e.g. Grey Pit, Lewes, section 4.3 and Limpet Run, Isle of Wight, section 5.3). Moist soil colours were recorded in the field using a Munsell colour chart. A general account and summary descriptions of the basic sequence of layers is given in the body of the thesis and are summaries of the field descriptions with field interpretations and observations. The more detailed pedological field descriptions will be found in appendices 2 - 4. The tripartite classification of ditches (primary, secondary and tertiary) used in all descriptions is that outlined by Evans (1972, 321-328), Limbrey (1975, 290-300) and Bell (1990b).

Soil classification throughout this thesis follows the basic Soil Survey classification (Table 6) as detailed by Avery (1980; 1990) and mapped in southern England by Jarvis *et al.* 1984 (Sheet 6; South East England) and Findlay *et al.* 1984 (Sheet 5; South West England). The Soil Associations are given in appendix 1.

SOIL CLASSIFICATION

Major soil group	soil group	soil subgroup
3 Lithomorphic (A/C) soils	**3.4** *Rendzinas*	
		3.41 *Humic rendzinas*
		3.42 *Grey rendzinas*
		3.43 *Brown rendzinas*
		3.44 *Colluvial rendzinas*
		3.45 *Gleyic rendzinas*
5 Brown soils	**5.1** *Brown calcareous (calcaric) earths*	
		5.11 *Typical brown calcareous earths*
		5.14 *Colluvial brown calcareous earths*
	5.4 *Brown earths* (sensu stricto)	
		5.41 *Typical brown earths*
		5.47 *Colluvial brown earths*
	5.7 *Argillic brown earths* (Luvic brown soils)	
		5.71 *Typical argillic brown earths* (Typical luvic brown soils)
	5.8 *Paleo-argillic brown earths* (Peloluvic brown soils)	
		5.81 *Typical paleo-argillic brown earths* (Peloluvic brown soils)

Table 6. Soil Survey of England and Wales soil classification used throughout this thesis, after Avery 1980; 1990)

Where cold stage melt-water deposits were encountered beneath colluvium, they were not hand excavated, though some were sectioned by machine trenching and occasional spot samples were taken. In all cases cold stage deposits or periglacial solifluction (melt-water) deposits, were chalk-rich Coombe Rock (or Coombe Deposits) which varied from silty calcareous marls to coarsely cemented medium to large chalk pieces within a calcareous mud matrix.

Sampling colluvial sections for environmental evidence

Sampling, primarily for land Mollusca, was concentrated within the carefully hand excavated sections, but samples were taken from other areas to complement the main sequence. Columns of contiguous samples were taken and care was exercised not to cross obvious horizon boundaries. In most cases sufficient material was taken to allow 2kg of air-dried soil to be analysed and a sub-sample removed for magnetic susceptibility. In addition to molluscan and magnetic susceptibility samples, large bulk samples were taken from suitable horizons for plant macrofossils, charcoal and radiocarbon dating. Such contexts were rare.

Samples for soil micromorphology were taken, using standard Kubiena or soil monolith tins, from key horizons in three of the valley sections excavated. In two cases (Ashcombe Bottom and Strawberry Hill) analyses were undertaken and results provided by Dr. R. Macphail. Although samples were taken from Newbarn Combe, Isle of Wight, it has so far not been possible to find funds to impregnate and cut the samples.

A series of nine samples were taken for amino acid analysis by Dr. J. Beavis of Bournemouth University from the excavations at Strawberry Hill in 1988. Unfortunately the results of his analysis are still not available.

Where additional sampling or sieving programmes were employed they are detailed in the relevant excavation report (e.g. Ashcombe Bottom; Chapter 4).

In addition to samples taken through stratified colluvial deposits, they were also taken from a number of conventional archaeological excavations. Buried soil horizons and old land surfaces are

notoriously scarce so that most samples were taken from ditch sequences which at least provide some temporal component. Occasionally samples taken by previous workers were also analysed (e.g. Two-barrows in Dorset and many of the Isle of Wight barrows). Although this is less satisfactory, the general level of information obtained was good.

Site based sampling

Investigations were undertaken in several areas thought likely to contain colluvial deposits. The importance of these locations and the significance of colluvial deposits was impressed upon the archaeological teams and resulted in valley sections being included within the research design or fieldwork strategy. In these cases sampling was undertaken for palaeo-environmental information by the writer, while excavation and artifact recovery, although largely determined by myself, was undertaken by the archaeological field teams. This was the case with the Middle Farm colluvial sequence on the Dorchester by-pass. The likelihood of colluvial deposits on the northern slopes of Strawberry Hill was brought to the attention of the archaeologists and subsequently led, to fieldwork, under my direction.

Artifact distributions

Distributions of datable artifacts provide the basic chronological framework for the sediment accumulations (Bell 1981a, 392-394). Bell (1983) and Allen (1983) have demonstrated that the vertical distributions of artifacts are meaningful. Moreover, at the Bourne Valley, Sussex it has been demonstrated that they do relate to the date of sediment deposition (*op cit.*). Distributions have also been shown to be statistically significant by the application of Least-Squares regression analysis to the two dimensional array of artifacts by both L. Allen (1982) and M. Allen (1982). Concentrations of artifacts within single layers, or discrete horizons, may be take to indicate either erosion of an artifact-rich horizon immediately upslope, or evidence for the presence of a more-or-less *in situ* activity; such as flint knapping.

Dating the sequences

The main dating method was based on the distribution of artifacts. However, mollusc zonation (Kerney 1977; Burleigh and Kerney 1982) was

useful where diagnostic artifacts were absent. In one case (Strawberry Hill) radiocarbon determinations from the Oxford AMS system were provided though the auspices of D. Jordan at the Ancient Monuments Laboratory, English Heritage. Archaeomagnetic dating has been shown to be relatively successful at providing crude chronological trends for sediment accumulation (Allen 1983). These have been confirmed by using dating by more conventional sources such as artifact distributions (Allen 1983), and where not sought during this research.

3.3 LABORATORY AND ANALYTICAL TECHNIQUES

Land Mollusca

The main method of palaeo-environmental interpretation was based on the analysis of land Mollusca. Indeed one of the reasons for choosing and confining the study area to the chalklands was to ensure that a consistent and comparable interpretative technique could be applied to the whole area. The methods adopted were those pioneered by Dr. J.G. Evans (1967; 1971; 1972) and now widely used in archaeology for land-use interpretation (e.g. Thomas 1982; Bell 1990a and Evans 1975; 1991 etc). These methods are outlined by Evans (1972, 41-45) and described by Allen (1989a; 1990b).

Methods

A pre-weighed, air-dried, soil sample was soaked and disaggregated in a bucket of water and gently agitated to facilitate the break down of the soil. Any floating shells were decanted on to a 0.5mm sieve before 30% hydrogen peroxide (H_2O_2) solution (100 volume) was added to the remaining soil and water to break down the more resistant soil crumbs and free any remaining shell fragments. Again any floating shells were decanted onto a 0.5mm sieve and oven dried. The remaining mineralogenic residue was washed through a nest of sieves of 5.6mm, 2mm, 1mm and 0.5mm mesh aperture, and oven dried. Once dried, each residue fraction was decanted into labelled containers (either glass tubes or plastic bags) before sorting and extraction. Apical and diagnostic shell fragments were extracted under a stereo-binocular microscope usually at x10 magnification. On completion of extraction the weight of each residue fraction was recorded and calculated as a percentage of the initial sample weight, which, when compared with the

number of molluscs per kilogram, provided a crude index of the extent of weathering and the speed of sedimentation (particularly in ditches). This gives some indication of the suitability of conditions for mollusc habitation. Identifications, usually at x10 to x30 magnification, were made using standard reference works (*viz.* Evans 1972; Cameron and Redfern 1976; Kerney and Cameron 1979) and by comparison with the writer's own reference collection. Occasionally identifications via the presence or absence of hair pits, protoconch scars or reticulations required higher magnification. The detection of these shell micro-sculpture features (cf. Preece 1981) was often facilitated by strong low level directional lighting. In rare instances it was necessary to have particular specimens checked and this was kindly done by Martin Bell, John Evans and Richard Preece. Occasionally the shells were obscured by a secondary calcareous concretions making identification impossible to species level. In these cases the shells were cleaned prior to identification using a technique described elsewhere (Allen 1986b).

Sample size

Evans has suggested that the minimum number of shells to establish the local environment of a site is about 100, but ideally, to provide a more representative portion of the palaeofauna, counts of between 150 and 200 shells are required (1972, 82-83). Because of the low numbers of shells sometimes recovered, particularly from the oldest contexts, a sample size of 2kg, rather than 1kg recommended by Evans, was often used in this work. It is difficult to ascertain the number of shells before processing and some deposits can be deceptive; the weakly calcareous, clay rich and flinty colluvial deposits at Middle Farm thought by John Evans likely to contain very few shells proved to be rich with over 600 shells per kilogram. The richness of samples is therefore, not always immediately obvious in the field. On occasion large numbers of shells were recovered from these large 2kg samples (e.g. Greyhound Yard; 2996 shells). Attempts to sub-sample extracted shells using standard sample dividers proved unsatisfactory since the static electricity acquired by the shell fragments resulted in many of them cling to the sides of the sample divider and subsequent analyses of the fractions showed them to be far from representative of the whole.

Presentation of results

The results of mollusc analyses are presented in tables where mollusc nomenclature follows Waldén (1976) for the terrestrial species and Kerney (1976a) for any fresh-brackish water species. The tables are supplemented with diagrammatic representation of the results in which histograms of relative, and occasionally absolute, abundance are plotted. The diagrams are arranged so that in general the shade-loving species (i.e. woodland group) are on the left side, catholic species in the centre and open country species on the right, with *Helix aspersa* and the Introduced Helicellids in chronological order (Kerney 1966; 1977). In every case, where *Cecilioides acicula* is plotted, it is included on the extreme right of the histogram and is recorded as a percentage over and above the rest of the assemblage as it is a species that can burrow to nearly 2m and thus is palaeo-ecologically insignificant, although its occurrence does give some limited indication of potential disturbance. Summary graphs are included on the right hand side of most diagrams to emphasise the changes between the proportions of the broad ecological groups as defined by Evans (1972). The use of these groups is advantageous as the summary diagrams can be compared directly with his and those of other workers.

Super-abundance

In some assemblages super-abundance of an individual species (often *Pupilla muscorum* or the Vallonias) can occur. As the representation of such assemblages by percentage abundance obscures and detracts from the relative and absolute trends within the remaining assemblage (Thomas 1985) alternative forms are sought. This usually involves the construction of absolute frequencies and occasionally the necessity to remove a super-abundant species from the analysis to observe trends in the remaining species. Although assemblages are generally depicted as percentage frequencies due to the convenience of this format, often absolute frequency histograms are constructed and referred to, but remain within the archive. This process enables any underlying patterns within the assemblage as a whole, rather than of individual species, to be detected whilst presenting results in a uniform and comparable diagrammatic form.

Comparative methodology

No single approach is widely used in interpreting mollusc assemblages. In recent years more attention has been paid to the taphonomy of the assemblages (Cameron 1978; Carter 1987; 1990; Thomas 1985), representation and indicator species (Thomas 1985) as well as autecological and synecological approaches (Cameron and Morgan-Huws 1975; Cameron 1973; Thomas 1985; Evans and Williams 1991). It is the subtle combination of a number of methodological and ecological approaches together with an awareness of ecology, faunal communities and site/assemblage taphonomy that enables detailed interpretations of land-use to be made.

Ecological interpretation

The interpretation of assemblages is based upon the comparison of faunas or species from archaeological deposits with those of known habitats and distributions. This relies, to a large extent, upon fluctuations in major ecological groupings originally defined by Sparks (1961) as wetland, woodland, catholic and open country, and later modified (Kerney 1963; Kerney *et al.* 1964; Kerney *et al.* 1980) and revised by Evans (1972). This autecological basis used for the composition of the groups is largely derived from the work of Boycott (1934) and Ellis (1969). Summary interpretation is, therefore, by autecological analysis.

Although the ecological groups, i.e. shade-loving, catholic (sometimes referred to as intermediate) and open country species, follow those given by Evans (1972) and were used for the production of the summary graphs, it should be appreciated that in practice interpretation is more complex and sophisticated. Using this autecological approach catholic species, which often comprise a substantial proportion of any assemblage, are given little interpretative significance. In reality this group contains a number of 'indicator species' such as *Pomatias elegans* which, for instance, has been used by Thomas (1982; 1985). A synecological approach, that is using the analysis of communities and associations in an attempt to match the species compositions of ancient and modern faunas, which was pioneered by Favre (1927) enables interpretive use of many 'redundant' species within the catholic group. In this way it is possible, as Thomas has formally suggested (1985,

142), to assign the various species to their 'exclusive' ecological groups, assess the ecological balance and, with reference to synecological studies, re-assign the catholic elements according to their defined ecological tolerances. This is possible particularly in view of some of the more recent association analyses that have been undertaken in Britain (e.g. Chappell *et al.* 1971; Cameron 1973; Cameron and Morgan-Huws 1975; Evans and Jones 1973). Such studies have shown that many of those species conventionally listed as shade-loving are also common in chalk grassland succession habitats (e.g. Cameron and Morgan-Huws 1975). Other species may be particularly troglophile in their preferences (Evans and Jones 1973) and thus their occurrence in the ditch fill rubbles may reflect this micro-habitat rather than that surrounding the ditch. It is therefore a combination of autecological analysis, synecological (association) analysis and indicator species that are required in interpretation.

Taphonomy

Beyond an understanding of mollusc ecology it is imperative that the taphonomy of any archaeological assemblage is considered. It is for this reason that detailed field descriptions are vital in order to understand and interpret buried faunas (Cameron 1978). Some of the fundamental concepts of assemblage formation (taphonomy), particularly in buried soils, have been tackled by Evans (1972) and Thomas (1985) and subsequently by Carter (1987; 1990). Their work has demonstrated the limitations of ecological interpretation within soils and mollusc sequences. This is not the place to detail those researches but simply to note that their work is of paramount importance to the interpretation of land-use history, as Carter elegantly demonstrates (1990, 505-506). Among these studies, buried soils have undoubtedly received most attention. Ironically it is those contexts that Evans (1972, 207-228) originally thought to be the most informative, that now seem to have the most limitations as a result of potential and differential shell destruction by biotic activity. It is therefore deposits which accumulate over time, for example colluvium and ditch fills, that may contain more representative collections of the original fauna. Indeed Carter concludes "If land snails are to contribute to our understanding of past environmental change, then it is colluvial and alluvial sediments (with their own limitations and complexities)

which offer better prospects for future research" (Carter 1990, 506). The taphonomy of these assemblages is largely determined by the processes of sedimentation. Analyses detailed in the previous chapter, together with that of the specific study areas will enable some information on these limitations and complexities to be elucidated. Ultimately, however, the aim here is not to concentrate specifically on assemblage taphonomy, but attempt to use the assemblages to interpret the land-use history.

Species diversity

Diversity lies at the root of some of the most fundamental questions in theoretical and applied ecology (Magurran 1988) and can provide a guide to understanding the structural complexity and maturity of a faunal group/community or its habitat. For this reason it can be an asset in molluscan analysis. In recent studies species abundance data have been presented as diversity indices (Pielou 1975) and have been applied to both archaeological insect assemblages (cf. Kenward 1978), and more recently land snail assemblages, as an interpretative tool for understanding assemblage complexity and divergence from true populations (Evans and Smith 1983, 102). Diversity indexes seek, by using comparatively simple mathematical calculations, to characterise the complex nature of a community by a single number. This facilitates comparison between assemblages as well as aiding the interpretation of faunal complexity and maturity. Although species diversity is one of the central themes of ecology, how it is measured is still a cause of considerable debate. In characterising a community or sample, diversity indices are relatively weighted to give evenness or species richness. The two diversity indices employed in molluscan analysis are both based on proportional abundances of species (as opposed to species richness or abundance) which seek to crystallise richness and evenness into a single figure rather than measure them independently as separate diversity indices. Another advantage of indices from this category is that no assumptions are made of the species distributions.

Care must be exercised in using these indices (Magurran 1988; Thomas and Foin 1982) particularly within subfossil assemblages where taphonomic factors may result in the group of shells not being strictly representative of the living mollusc community (cf. Evans 1972, 20 fig.

6). Within this study these indices are used as a contributing factor in interpretation and often highlight specific areas within any sequence. They provide an additional commentary on the data rather than an exclusive alternative to other approaches. Species diversities are presented in the mollusc tables, however, although species diversity curves have been drawn for most sequences these remain in archive. They have not been plotted in all the diagrams produced within this research. One diversity index was calculated using a Basic programme reading a Dbase 3+ file at Wessex Archaeology. The programme was originally written by D. Maguire for Dr. M. Bell (Bell and Shackleton 1982) and has been modified with the aid of P. Williams at Wessex Archaeology. The methods adopted are derived from information theory (Magurran 1988, 34) and are based upon proportional abundances of species.

Shannon Index (H'). This index assumes that individuals are randomly sampled from an 'indefinitely large' population (Pielou 1975). It is ideal for molluscan assemblages as it estimates the diversity of the unsampled, as well as the sampled, portion of the community. It takes into account the number of species and proportions of those species and views the evenness of the distribution of species present. It is not however, affected by total population which is why it is particularly applicable to subfossil assemblages where completeness of the assemblage cannot be guaranteed.

$$H' = -\Sigma p_i \ln p_i$$

where H' = index of diversity
p_i = proportion of individuals found in the ith species
ln = log to the base e

The Brillouin index (*HB*) is closely related to the Shannon index and as it takes account of total populations (unlike the Shannon function) as well as the numbers of species and individuals. However, it was not used within this research largely due to the complexity of calculation (Magurran 1988) and the difficulties of writing and running an appropriate programme to undertake factorial calculation. Nevertheless, the significance of the combination of the two indices is that they

provide some measure of the completeness of the sample and therefore it is possible to say something of the assemblage taphonomy. The closer *HB* is to *H'*, the more representative the subfossil assemblage is of the fauna from which it derives, providing that sample size is constant to within a few kilograms (Evans and Smith 1983, 102). In some cases the *value* of the difference between *H'* and *HB* is of ecological significance, particularly when it is applied to long continuous sequences of mollusc assemblages (e.g. colluvium) where it is a sensitive indicator of taphonomic change (Evans and Williams 1991). This is particularly important in colluvial sequences. If assemblages can be seen to be close to 'complete' or can be paralleled to those from ditch or buried soils then it is possible, if not likely, that they are more or less representative of death assemblages.

A number of other statistical techniques have been applied to land Mollusca including both arithmetic and logarithmic correlation coefficients, allometric coefficients and sample *t*-tests (Thomas 1978; 1985). Williams and Milles have demonstrated the potential of rank order curves (1987) while Evans and Williams (1991) used a whole series of statistical techniques including the Simpson-Yule index (*D*), Berger-Parker index (*d*) and Fisher's Alpha index (Southwood 1978; Poole 1974; Pielou 1975) to provide data to create CLUSTAN groups for the entire M3 mollusc data base (Evans and Williams 1991). Other indexes have been advocated by Gordon and Ellis (1985), namely the probability of non-lethal interspecific encounters (D2) and the ratio of interspecific to intraspecific competition (D4) (Hurlbert 1971; Goodman 1975) which have been employed by Entwistle (e.g. 1990a). While these analytical and statistical approaches are appreciated, the main thrust of this work was one of land-use history and landscape appraisal, and thus only the more established mathematical techniques were employed. However, the mollusc identifications are held on a single data-base and can be interrogated using other statistical appraisals (cf. Shennan 1988) at some future date. Where the Shannon Index has been calculated it is presented in the mollusc tables (e.g. Malling Hill; Table 20).

Sediment analyses

Magnetic susceptibility as a potential palaeo-environmental determinant

Magnetic susceptibility (X_0) is a parameter which expresses the ratio between the magnetisation induced in a sample and the magnetising field (detailed definitions are given in Thompson *et al.* 1975 and Oldfield *et al.* 1978). Magnetic susceptibility *enhancement* is due to the conversion of iron oxides in the soil from weakly ferro-magnetic forms (e.g. hematite αFe_2O_3) to strongly magnetic forms such as goethite and maghemite (γ Fe_2O_3) which have a strong positively aligned moment if placed in a magnetic field (Longworth and Tite 1977) and are capable of retaining remanence when removed from that field. This process may be the result of pedogenic processes (see below) or burning (Clark 1983).

Magnetic susceptibility is enhanced through burning and since this is replicable in the laboratory (le Borgne 1955; 1960) the mechanisms are fairly well understood. Biological and chemical activity within soils produces 'pedogenic enhancement' through the oxidation/reduction process affecting iron as a result of organic activity. This leads to higher magnetic susceptibility in A horizons compared with subsoils. Although the mechanisms of 'pedogenic enhancement' are less well understood (Limbrey 1975, 325), both fire and biological activity result in varying oxidation/reduction conditions which lead to enhancement and thus they are the same process mineralogenically. The fact that topsoils are enhanced compared with subsoils (Stott and Douglas 1982; Oldfield 1982; Peart 1982) provides a method for detecting topsoil components in colluvial deposits and buried soil horizons, which may be heavily truncated. Analysis of magnetic susceptibility levels in conjunction with studies of soil micromorphology have heightened our understanding of the processes of magnetic susceptibility enhancement as well as enabling better palaeo-environmental interpretations to be made (Allen and Macphail 1985; 1987). For instance, analysis of soils from the Hazleton long cairn (Gloucestershire), Seaford Head hillfort (Sussex) and Uscio, (Liguria), Italy, all situated on different limestone lithologies, produced complex and superficially anomalous susceptibility readings. Taphonomic and post-burial processes were shown to have altered magnetic susceptibility levels from the original levels. It was

concluded that complex pedogenic histories may result in enhancement via:

i) incorporation of organic rich A horizon soil through tree-throw
ii) clay illuviation from surface horizons, and
iii) hydromorphism.

Burial creates anaerobic conditions and results in iron mobilisation, via hydromorphism and redox changes, and thus also creates enhanced magnetic susceptibility. The incorporation of fine charred organic matter also results in enhanced magnetic susceptibility. Where the soil conditions remained aerobic, the magnetic susceptibility levels seem to be preserved. Magnetic susceptibility was heightened by complex pedogenic histories and the inclusions of weathered pedorelicts (fragments of ancient relict soil) observed in the microfabrics. Allen and Macphail (1987) were also able to detect a variation in magnetic susceptibility of arable soils in different periods, which was attributed to the reduction of earthworms in the Neolithic period caused by tillage, thus reducing organic matter and mixing.

Magnetic measurement is familiar to archaeologists as a method of geophysical prospecting, where a variety of instruments are used to read variations in the magnetic field of surface and buried soils. Magnetic susceptibility has been used to detect burning episodes attributed to human action. However, geographers have demonstrated its use in lacustrine sediments as a palaeo-environmental indicator, allowing distinctions to be made between sediments derived from different ecological and vegetational regimes, i.e. woodland, grassland and arable (Dearing *et al.* 1981; Oldfield *et al.* 1978; 1985). They have also been able to discern whether sediments are largely comprised of topsoil or subsoil components. The possibility that such interpretive statements may also be made of terrestrial sequences has been explored by Allen (1983; 1986a; 1988a) and Allen and Macphail (1985; 1987). An attempt has therefore been made here to apply this technique to colluvial sediments.

A suite of 105 samples from colluvium in the Bourne Valley indicated that the sequence consists of topsoil rather than subsoil components (Allen 1983). Furthermore it was suggested that the topsoil values

were comparable to those of arable soils. This hypothesis was substantiated by micromorphological, sedimentological and molluscan analyses enabling the suggestion that the deposits represented a truncated lynchet (Allen 1983) in an 'alluvial edge' location (cf. Bell 1981b, 76). Magnetic susceptibility values for the buried soil, which displayed typical grassland characteristics (heavily worm sorted with open grassland molluscs *Trichia hispida*, *Helicella itala*, and Vallonias (see Allen 1990c), were almost identical to the present day magnetic susceptibility values from grassland in the same location.

Over 2000 magnetic susceptibility measurements from modern environments seem to indicate that on the chalklands, which have 'low background magnetic susceptibility', differential enhancement occurred as a result of the varying vegetational and pedogenic regimes. Woodlands in general seem to produce higher magnetic susceptibility values than secondary woodland or scrub, which in turn produce higher values than grassland, arable soils and subsoils respectively (Fig. 6).

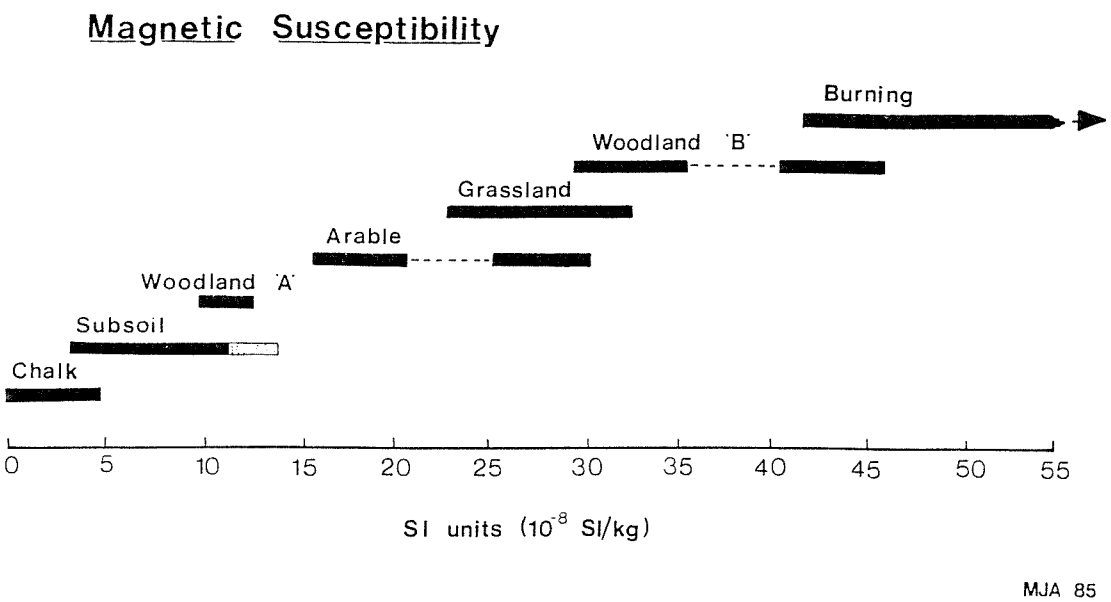


Figure 6. Summary diagram of magnetic susceptibility variation under modern chalkland regimes. (Compiled from *c.* 2000 readings). NOTE; --- indicate no measurements recorded across this range and stipples indicate few measurements recorded.

I have already identified magnetic susceptibility as a potential palaeo-environmental indicator in colluvial soils (Allen 1983; 1986a; 1988a; 1990a; Allen and Macphail 1985; 1987). The technique is particularly applicable to soils and deposits on a chalk lithology as there is very little background susceptibility within the chalk (Tite 1972). It has been demonstrated by many workers that concentrations of iron oxides in different chalk soils vary greatly (e.g. Tite 1972; Longworth and Tite 1977; Tite and Mullins 1971) thus improving the possibility of detecting magnetic susceptibility enhancements. Comparison of the results with other analytical and descriptive techniques can augment our understanding of some pedological and sedimentological processes and in so doing increase our interpretive resolution of the land-use history via magnetic susceptibility studies. Therefore, simple measurements were made from a number of sites in conjunction with many mollusc samples with a view to building up a database, rather than attempting to develop the techniques of magnetic susceptibility measurement and recording.

The aim of the application of magnetic susceptibility in conjunction with mollusc analysis was to highlight areas within the sequence which could be examined in the light of higher or lower readings. A second aim was the detection of hiatuses and the presence of topsoil or subsoil material within colluvial sequences.

Where magnetic susceptibility was conducted, the results are either presented in a separate table (e.g. Ashcombe Bottom, Table 14) or where sub-samples of the mollusc samples were measured, the results are given in the mollusc tables (e.g. Dorchester, Middle Farm, Table 38).

Method

One of the major advantages of magnetic susceptibility measurement is that it is quick and easy to record and, apart from the easily operated equipment, no special laboratory facilities are required. The process involves sieving air dried soil through a 2mm mesh aperture sieve to remove any stones and provide some uniformity between samples. Then 100g air dried soil samples (<2mm) are placed in a MS 1B sensor coil calibrated for 100g and slowly drawn up the coil and the highest susceptibility reading is recorded from a digital display of a

Bartington MS2 meter. Although there are more sophisticated magnetic susceptibility measurements (e.g. Longworth and Tite 1977), these require complex, and time consuming, laboratory preparations and equipment which detract from the simplicity of this method.

Soil Micromorphology

Within the study of colluvial deposits the origin and nature of the sediments and the recognition of true buried soil horizons (palaeosols) is important. So too, is the recognition of redeposited soil fabrics that have undergone pedogenesis as a result of stabilisation. The only method that can, with certainty, distinguish the presence of *in situ* soil development or pedogenesis is soil micromorphology, the microscopic examination of physical soil characteristics in thin section, (Dalrymple 1958; Valentine 1973; Valentine and Dalrymple 1976). Such analyses were beyond the scope of this work and were not considered a priority within this research despite their obvious potential. Nevertheless, samples for soil micromorphological analysis were taken from all colluvial deposits and I have been fortunate in that analyses have been carried out by Dr. R. Macphail on two of the major colluvial sequences within this study. Where soil micromorphological analysis was not conducted the presence of palaeosols and *in situ* pedogenesis was inferred from field observations. In particular darker, probably more humic, horizons with stone-free and stony lenses have been interpreted as evidence of buried soils with earthworm sorting; however this can be misleading as the micromorphological studies at Strawberry Hill demonstrated (Chapter 6).

Soil micromorphological analysis of colluvial deposits in Europe by Mücher (1974) and Kwaad and Mücher (1979) has enabled the differentiation between soil and sediment to be made. Moreover, they have been able to isolate cultivation episodes as well as elucidate complex land-use history by analysis of clay and mineralogenic coatings. Although Kwaad and Mücher showed the potential for palaeo-environmental investigations of colluvium via microfabric analysis (1978), little work has been undertaken on colluvial deposits in England. Macphail has provided some information from limited studies on the colluvial sequences at Chalton (Macphail 1981; 1983) and the Bourne Valley, where he showed secondary chalky infills within the

colluvium related to the Iron Age and Roman cultivation (Macphail *et al.* 1987) demonstrated the usefulness of employing this technique on fine grained calcareous colluvial sediments. Fisher and Macphail (1985, 93) have recently illustrated the importance of microfabric analysis in providing "accurate information about past environments and anthropogenic activity" and Hall's (1987) micromorphological analysis of modern arable and colluvial contexts enabled him to identify specific erosion fabrics which may be directly recognisable in ancient colluvial sections. From this brief evaluation it is clear that the potential of soil micromorphological studies has not yet been fully realised. If we are to attempt to understand the processes of colluviation and use the deposits to evaluate the palaeo-landscape and past land-use history then this technique must be applied more extensively to such deposits.

Other Laboratory techniques

A number of other detailed sedimentological techniques such as granulometery (particle size analysis), organic matter and soil reaction (pH) were conducted in previous studies of colluvium and hillwash to assist in the description, quantification and characterisation of various horizons (Allen 1983; Bell 1981a). It was demonstrated that such techniques were of limited use in the establishment of the environmental conditions under which various layers had accumulated and in elucidating the agencies responsible for their deposition. As such analyse were not always effective and are time-consuming to conduct (Allen 1983) they were not pursued here. The techniques detailed earlier were considered more effective in both the interpretative results they can generate and in the deployment of research time.

PART TWO

Landscape Studies

"It is perhaps a more fortunate destiny to have a taste for collecting shells than to be born a millionaire. Although neither is to be despised, it is always a better policy to learn an interest than to make a thousand pounds; for the money will soon be spent, or perhaps you may feel no joy spending it: but the interest remains imperishable and ever new."

Robert Louis Stevenson
Lay Morals

Chapter Four

Studies on the Lewes Downs

4.1 INTRODUCTION TO THE LEWES DOWNS

Lewes has been the home of a number of antiquarians as well as the head-quarters since 1842 of the Sussex Archaeological Society, one of the first county societies in the country. It is no wonder that the Downland around Lewes (Fig. 7) has been the focus of a number of antiquarian studies. A combination of antiquarian, amateur and professional archaeologists have been based in the area resulting in a comparatively well studied chalk landscape. The wealth of archaeological knowledge of the downland is therefore largely a product of the long and continued study it has received. The archaeological record includes Neolithic causewayed enclosures, long barrows and Bronze Age barrow cemeteries as well as a number of key environmental studies. The wealth of archaeological interest in the area makes it an attractive one to study, as the investigation of colluvial deposits will not only provide an invaluable set of environmental data, but also act to test the representative nature of the 'known' archaeological landscape.

Archaeology of the Lewes Area

The northern part of the study area is divided naturally into two main topographical blocks separated by the river Ouse (see below). To the west is the Neolithic causewayed enclosure at Offham (Drewett 1977), the later Bronze Age settlement on Plumpton Plain, TQ 362 122 (Toms 1927; Holleyman and Curwen 1935). Various intensive fieldwalking surveys conducted by Joyce Biggar (Biggar 1975; 1978; 1980) have produced Neolithic/Bronze Age to Romano-British settlements at Balmer, Houndean and Buckland Bank (Fig. 8). To the east, most of the studies were concentrated on the chalk downland of Malling-Cliffe-Caburn which is particularly rich in archaeological sites (Fig. 20). These include the unexcavated long barrow on Cliffe Hill (Toms 1922), probably more accurately classified as an oval barrow (Drewett 1978), Final Neolithic and Bronze Age artifact scatters at Glynde (Biggar 1984), Early Bronze Age activity at Oxteddle Bottom (Curwen 1954, 157), a number of Bronze

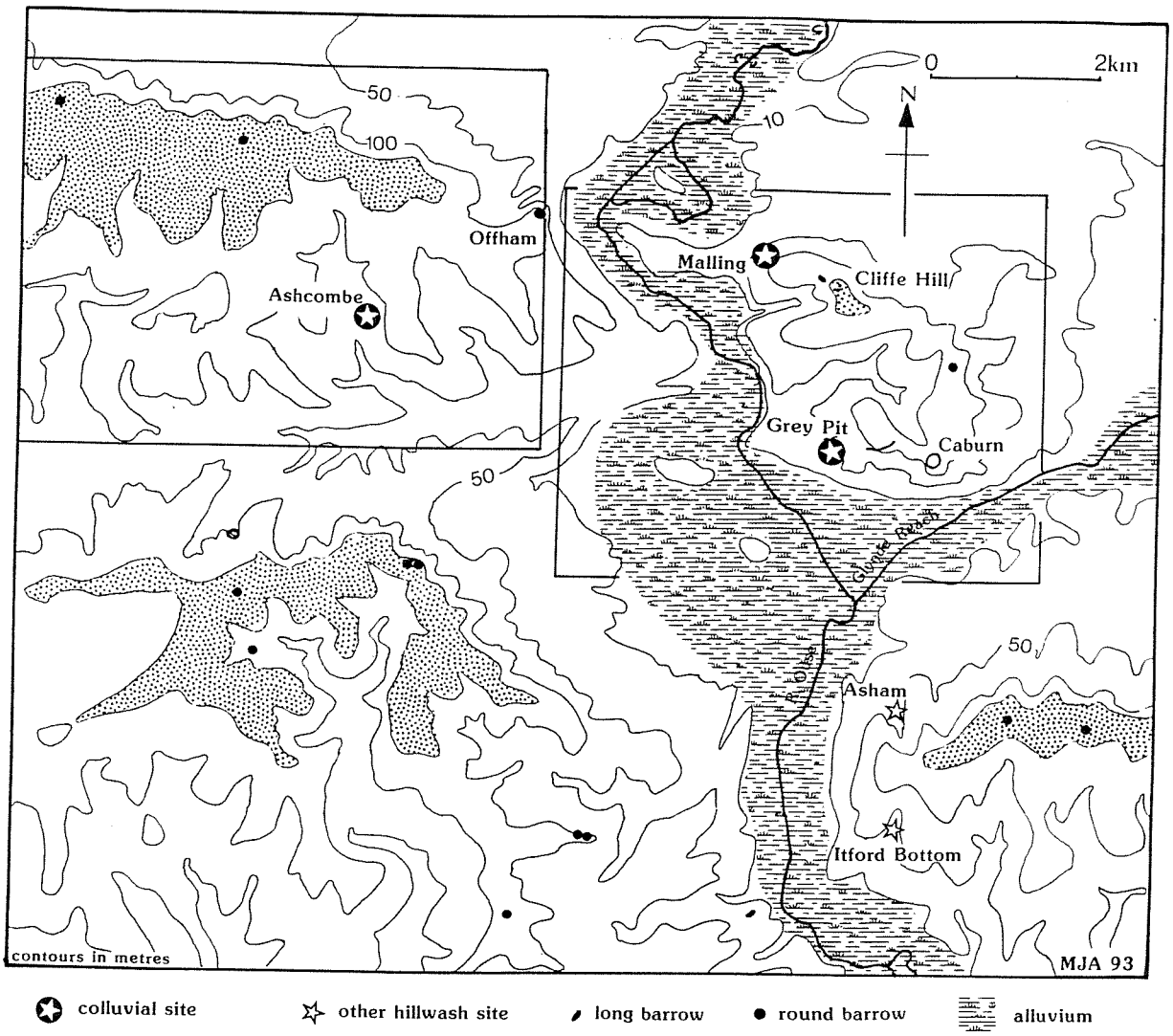


Figure 7. Study area around Lewes showing areas of detailed study.

Age barrow cemeteries, the Iron Age hillfort and earthworks of Mount Caburn (Curwen and Curwen 1927; Pitt-Rivers 1881; Wilson 1939) and Ranscombe Camp, TQ 441 091 (Burstow and Holleyman 1964) respectively, a Romano-British farmstead at Ranscombe (Bedwin 1978) and the Anglo-Saxon cemetery at South Malling, TQ 425 110 (Norris 1956). Key environmental studies have been conducted in the area within the past two decades. The Ouse valley itself has been the centre of a number of palynological investigations. Ann Thorley's work in the Vale of the Brooks produced two detailed pollen diagrams (Thorley 1971; 1981)

spanning the seventh to second millennium BC, limited work at Wellingham (TQ 431 131) to the east of Offham produced evidence of cereals in the Neolithic (Wing 1980), and more recently Scaife and Burrin's work at Sharpsbridge (8km to the north) provide not only detailed diagrams but more direct archaeological interpretations (1983). This area was also within one of Martin Bell's study areas (1981a), and colluvial deposits at Itford Bottom, beneath the known Bronze Age settlement of Itford Hill (Burstow and Holleyman 1957) were investigated (Bell 1981a; 1983). Earlier investigations at Asham by Evans and Williams (Williams 1971) were followed by detailed molluscan analysis of the late glacial and post glacial colluvial sequence by Caroline Ellis (1985; 1986). All of these studies provide long stratigraphic sequences and are augmented by Thomas' molluscan analysis from the ditches of the Neolithic causewayed enclosure at Offham (Thomas 1977a; 1982). This array of recent palaeo-environmental studies provided a sound background, for more detailed investigation of land-use and human settlement on a geographic, rather than site or biogeographical perspective. The discovery of a Beaker site during the recent excavations at Ashcombe Bottom (section 4.2), which produced both artifactual and environmental evidence, adds important information of the Final Neolithic to Early Bronze Age periods complementing much of the known archaeology of the area.

Geology and Topography

The chalk around Lewes is a part of the South Downs and forms a classic chalk escarpment, bisected at Lewes by the the Ouse and Glynde Reach waterways. To the west of the river Ouse, the escarpment comprises a scarp slope with a number of small nivation hollows and combes, and a broad gently undulating dip slope plateau. The dip slope plateau is divided by a major east-west orientated valley, presumably a Pleistocene river course, which meets the Ouse valley at the Vale of the Brooks. The plateau is incised with a number of dry valleys whose systems generally run north-south. This is mirrored to the west by the Downs of Beddingham Hill and Firle Beacon. To the north of the Glynde Reach is a small block of downland cut off from the escarpment by the two rivers. This small outlier, is a continuation of the escarpment to the west of the river Ouse. The deeply incised Pleistocene valleys of the Ouse and Glynde Reach have left steep sides to the south and west,

while the escarpment retains its steep scarp to the north. Only to the east, from South Malling, is access to this downland easy. Its highest point is attained at Mount Caburn at 149m OD.

The River Ouse bisects the escarpment at Lewes, with steep relict cliffs to the west immediately below Offham causewayed enclosure, and with a gently shelving terrace at South Malling to the east. At the confluence of the Glynde Reach and the Ouse, the valley opens out into a broad floodplain, about 3km wide, known as the Vale of the Brooks, in which are situated two relict meander cores; Upper and Lower Rise. To the south of the Vale of the Brooks the valley is deeply incised and filled with alluvium up to 20m thick (Jones 1971).

Most of the downland is covered with thin rendzinas of the Icknield Series and Andover Series, but when ploughed form thin brown and grey rendzinas typical of the Upton 1 Association.

Geology

Geologically the area is simple; to the north of the escarpment lie the Wealden Series comprising the Upper Greensand, and Wealden Clays. The Upper Greensand forms a bench along the northern escarpment. The scarp slope is of Lower and Middle Chalk, while the gentle dip slope plateau is comprised of Middle and Upper Chalk. Clay-with-flints is extremely localised, and in the main, absent from this area.

The Study areas

Three colluvial sequences were examined within the area; two of them in quarry faces. The principle investigations were centred at Ashcombe Bottom where detailed excavation was conducted. The site, lies about 2km south-west of Offham and well within the escarpment. The aim was to produce a well dated colluvial sequence and to enhance the environmental picture provided by the analyses at Offham (Drewett 1977). All other investigations were centred on the Malling-Cliffe-Caburn downland. A colluvial footslope deposit at Ranscombe was examined (section 4.3), immediately beneath the excavated barrow of Round-the-Down from which a mollusc sequence was analysed (section 4.4). The final colluvial deposit was on the west of this down at Malling where a large lynchet sequence was examined (section 4.5).

The combination of the recent investigations in close proximity should aid the evaluation of the more general picture provided by the palynological investigations. The aim here is therefore one of refining the mosaic of land-use and determining the representative nature of the known archaeology.

4.2 EXCAVATIONS AT ASHCOMBE BOTTOM

The main investigations in the Lewes area were conducted on the downlands immediately to the west of Lewes. The dip slope of the Downs here contains a number of narrow and deeply incised dry valleys that follow a gently wandering course southwards, the heads of the dry valleys often being steep 'bowls' behind the escarpment. Ashcombe Bottom is no exception. It is situated between the valleys of Houndean Bottom and Cuckoo Bottom to the east and Buckland Hole to the west. The area was chosen for a number of topographical and archaeological reasons. The valley is typical of the area, distinctly asymmetrical. Archaeologically the area is relatively well studied. Extensive fieldwalking had been conducted in and around the valleys to the east and west by Joyce Biggar (Biggar 1975; 1978; 1980, and see below) and recent excavations of the Neolithic causewayed enclosure at Offham in 1976 were only *c.* 2km to the north (Drewett 1977). Molluscan analysis by Thomas (1977a) from the causewayed enclosure was particularly significant. It was therefore hoped that a long history of sedimentation, and thus land-use, could be examined.

Local Topography and Geology

The area comprises Upper Chalk with few localised patches of Clay-with-flints and Reading and Woolwich Beds on the higher chalk ridges, mainly along the escarpment and prominent ridges such as Balmer Down. The area supports mainly brown rendzinas of the Andover Series with grey rendzinas (Upton Series) on the scarp slopes and localised typical paleo-argillic brown earths of the Carstens Series and typical argillic brown earths of the Charity Series over Clay-with-flints, Reading and Woolwich Beds. The downland is gently undulating with incised meandering valley systems running approximately north-south. A series of almost parallel valleys all enter the large east-west valley along which the A27 runs. The valleys were all recorded as containing

alluvium (IGS 1974), but this has recently been revised to chalky Head deposits (IGS 1984). To the north of escarpment lies the Cretaceous Wealden Series, and to the south, more extensive chalk plains.

Archaeological background

The block of downland to the west of Lewes and north of the A27 (i.e. main east-west valley from Brighton to Lewes) is the location of a number of important archaeological investigations and archaeological sites (Fig. 8). The only Early Neolithic site is the causewayed enclosure at Offham, excavated by Drewett in 1976 (Drewett 1977). Other Neolithic finds and sites in the area are based on spot finds and the relatively large-scale fieldwalking programme conducted by Joyce Biggar which extended from Balmer Huff and Buckland Bank in the west to

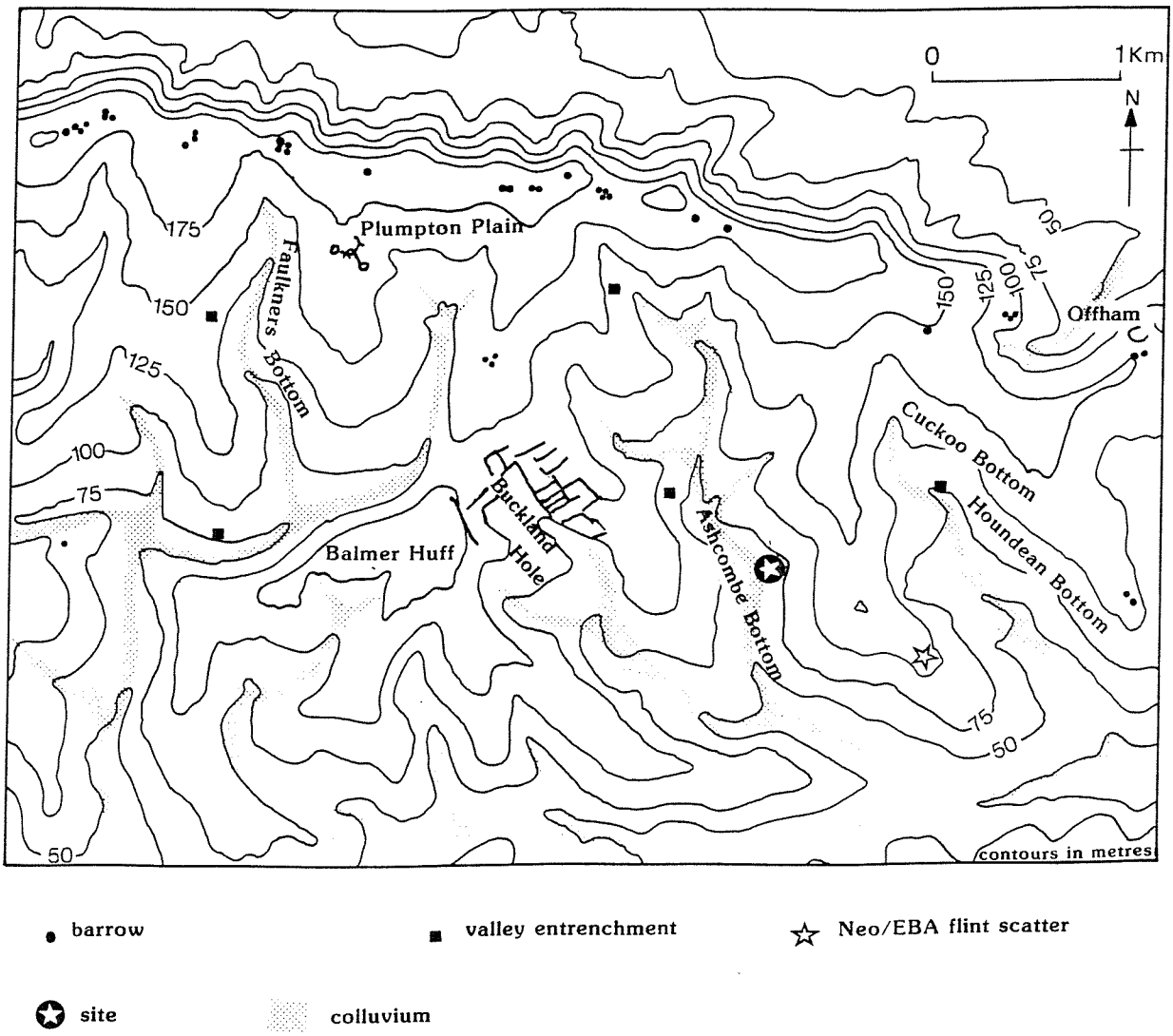


Figure 8. Geomorphology of Ashcombe Bottom and the surrounding Downs.

Houndean Bottom/Cuckoo Bottom in the east (Biggar 1973; 1975; 1978; 1980). A single Neolithic flint axe was found on Balmer Down overlooking Ashcombe Bottom (Evans 1897). Fieldwork on the land on the opposite side of Ashcombe Bottom, above the confluence of Ashcombe Bottom and Buckland Hole (TQ 399 099), produced a large lithic assemblage including several partially polished axes and scrapers of Neolithic/Early Bronze Age character (Drewett in Biggar 1978, 147) and thought to indicate a settlement (Biggar 1978, 145). Of particular interest was a rare flint burnisher of the type Curwen described as 'blunted axe-like implements' (Curwen 1939) which Gardiner states is significant in view of the typically unremarkable nature of the remaining flint scatter (Gardiner 1988, 172).

A number of valley 'entrenchments' are recorded by Toms from the area; these are undated but most are assumed to be prehistoric possibly Final Neolithic or Early Bronze Age. They are very similar to the enclosure at Belle Tout (Toms 1912; Bradley 1970; 1982) which is undoubtedly dated to the Beaker period. Several are recorded in the immediate vicinity on the local 6 inch to the mile OS map in Lewes Museum (Barbican House) by Toms himself, one of which is a part of the famous Bronze Age site at Plumpton Plain. Other 'entrenchments', usually simple rectangular enclosures, are recorded at: Horseshoe Plantation (TQ 358 111) where a small enclosure located on the western slopes of Faulkner's Bottom produced Bronze Age and Beaker pottery (Toms 1927, 187); to the east of Mary's Farm (TQ 352 107) a small enclosure is situated on the valley floor below the confluence of Faulkner's Bottom and Moustone valley; a small remarkably rectilinear earthwork lies at the head of Ashcombe Bottom (TQ 368 113) on a small patch of loess or Clay-with-flints at the 'point ... between the brow of Ashcombe Bottom and the crest of the ridge which separate Ashcombe Bottom from Broad Shackles' (Toms 1927, 193); another large valley entrenchment is located on the western side of Ashcombe Bottom (TQ 375 109) only 650m up-valley from the excavations; and an entrenchment at Cuckoo Bottom straddles the valley floor (Toms 1926). One of the ditches forming a part of the enclosure was examined in 1983 (Allen and Fennemore 1984), subsequently both comb-impressed Beaker and collared urn have been recovered from other sections.

Beaker pottery has been recorded from two of the entrenchments discussed earlier as well as from Plumpton Plain (Toms 1927, 183) and Offham (Drewett 1977). From the causewayed enclosure a total of 48 sherds probably all from the same vessel (Drewett 1977, 218) were recovered from the same layer. They had stamped comb impressions (*op. cit.* fig. 11 nos 21 & 22), typical of late Beakers of Clarke's (1970) Wessex/Middle Rhine style.

Apart from Biggar's fieldwork, Early Bronze Age material has been recorded from Cuckoo Bottom. Fragments of a Secondary Series Collared Urn (Longworth 1970; 1984), stylistically fairly late in Burgess' series (1986), were recovered from shallow colluvial deposits on the valley floor (Allen 1989b; 1989c). A single small fragment of collared urn was also recovered at Offham (Drewett 1977, fig. 11 no. 13). A number of Late Bronze Age/Early Iron Age sites were located by Biggar's work (1973; 1975; 1978; 1980) as well as evidence of extensive rural Roman activity.

Ashcombe Bottom

The valley itself originates just to the west of a small outcrop of Clay-with-flints at Blackcap. The head of the valley is less than 150m from the escarpment. Initially the incised valley runs in a south-easterly direction where it is joined by two minor 'tributaries' from the north. After about 1km, it turns due south and becomes V-shaped with a very narrow valley floor. The valley meanders southwards for another 2km before it meets the Buckland Hole valley. At this confluence the broad valley floor opens out to Ashcombe Farm and then into the major east-west valley through the Downs. The main valley of Ashcombe Bottom is characterised by its almost parallel sides and narrow floor.

The soils within the valleys are generally typical brown earths and colluvial brown earths with brown to grey rendzinas on the chalk slopes and hilltops and thicker brown earths and paleo-argillic brown earths (Luvic soils) over the Clay-with-flints. Occasional local patches of coarse silty (possibly loessic) brown earths are recorded (Moffat pers. comm.) and these were noted as almost always occurring on small benches on the valley side. Highly localised non-calcareous loessic deposits

occur along the western side of Ashcombe Bottom and are known in Buckland Hole (Allcroft 1924, 111; West pers. comm.). Relatively large patches of Clay-with-flints exist locally, the most extensive being on Balmer Down where augering showed they are up to 73cm deep.

No flint mines are known on this block of chalkland.

Excavations

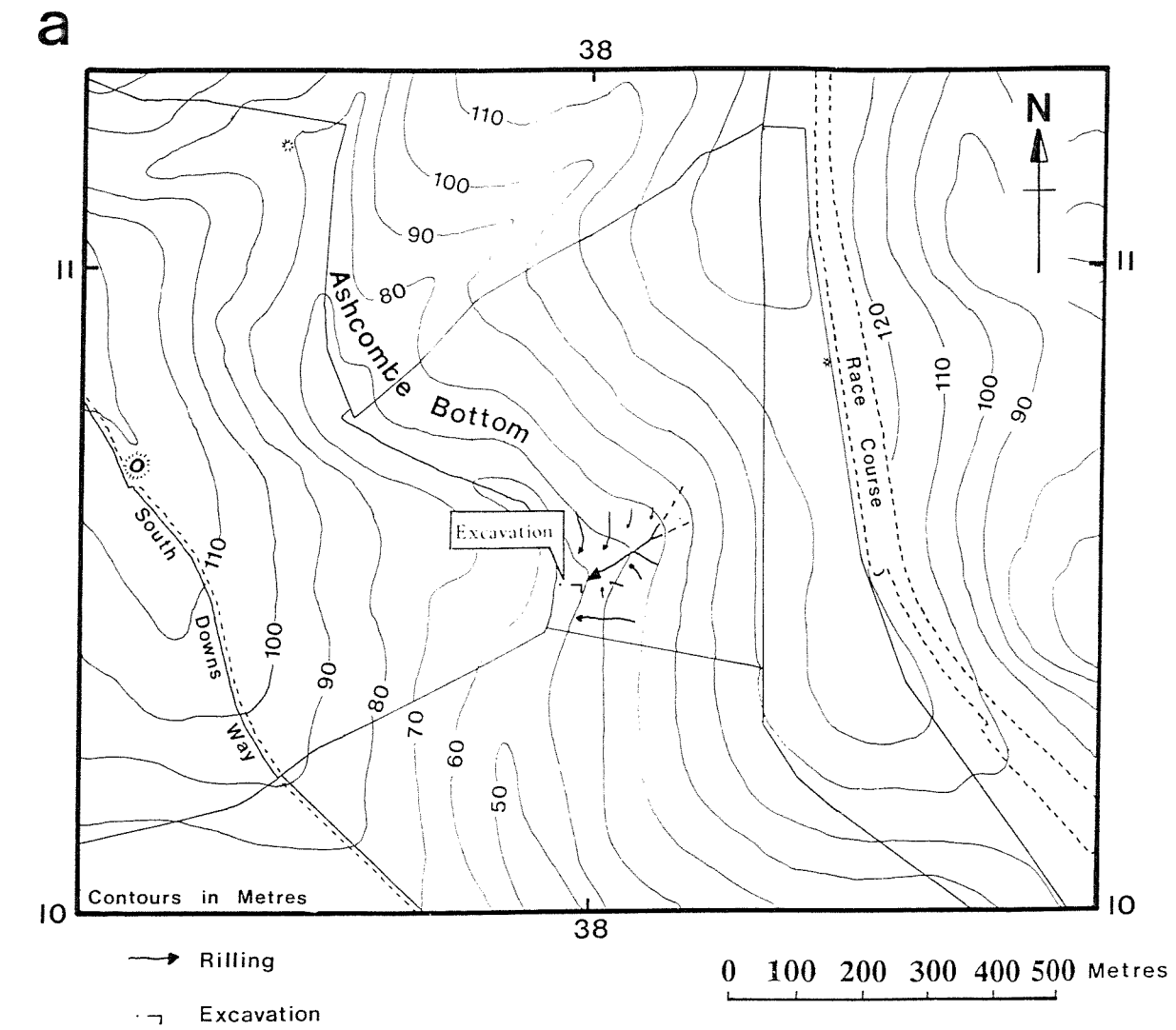
Unfortunately little archaeological consideration was allowed for the final location of the trenches due to the over-riding necessity to leave vehicular access for the farmer, Mr. C.J. Rae. The excavation was arranged in a L-shaped fashion such that it could section the 'confluence' of two dry valleys thus enabling the study of sediments from the valley sides as well as those moved laterally down the minor valley ('Ashcombe Minor') axis.

The excavations were situated about 2.5km from the head of the valley at a point where the valley is orientated north-south, just to the south of a sharp meander on the valley's course at which point there is a relict river cliff on the eastern side and a slipoff slope on the west. The valley floor widens at this point where a small dry valley enters Ashcombe Bottom from the east (Fig. 8 and 9). The valley floor of Ashcombe Bottom is a very shallow gradient (less than 4°) where as the minor valley to the east is comparatively steep (greater than 18°) and thus feeds sediments into the main valley at this point.

Excavations were conducted in summer 1984, but apart from short interim reports (Allen 1984a; 1984b) post excavation analysis was not conducted until 1986-92.

Two trenches were opened; one major L-shaped trench was cut on the east side of the valley floor (trench 1). The main wing (0 - 20m) would examine sediment moving down the axis of the minor valley and the that perpendicular to it (20 - 35m) would examine valley-side sediment movement of the smaller valley (see Fig. 9). A small 3m long trench (trench 2) was situated on the western slope for comparison.

Both trenches were 2m wide, the major excavations excavated using a JCB



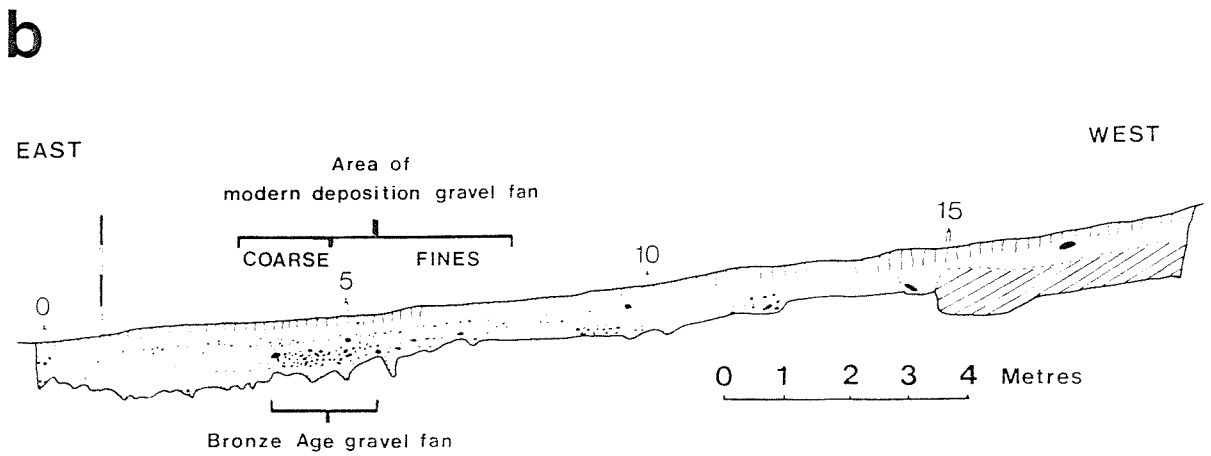


Figure 9. Ashcombe Bottom; locations of trenches and valley profiles.

provided by the Soil Survey of England and Wales, and the smaller trench was entirely excavated by hand. The northern and eastern faces were cleaned and an adjoining section 75cm wide hand excavated to recover artifacts to date the stratigraphy.

In addition to the standard excavation techniques employed (Chapter 3; 3.2) more detailed artifact recovery and large scale bulk sampling was undertaken. The two major operations were a dry sieving programme and on site flotation.

Dry sieving programme

The entire colluvial sediment in trench 1 below the modern soil horizons was dry sieved through 10mm and 5mm mesh sieves, with the exception of the block which was used for flotation; see below. The aim was to recover any artifacts missed during manual excavation and evaluate the recovery rate of artifacts by trowelling especially as nearly all personnel were inexperienced. It was encouraging to note that few finds were found during dry sieving (less than 1.8%) of the total assemblage. This indicates a high recovery rate.

Flotation programme

A relatively large scale on-site flotation regime was employed in an attempt to recover carbonised seeds, grains and charcoals from the colluvium to aid the interpretation of the land-use in prehistory. A 1.5 metre block of sediment between 1.0 and 2.5m was hand excavated and processed in entirety. It was divided into three 50cm sections and was sampled in eight 10cm spits. A total of 24 samples in excess of 1300 litres of soil was processed.

Stratigraphy

The excavations revealed relatively shallow deposits (up to 1.5m) and mixing by earthworms and other soil fauna was noted through most of the sequence. This was not a serious problem as mollusc shells were not on the whole present. It is because of this latter fact that a heavier reliance is laid on the soil analysis, particularly information from magnetic susceptibility and soil micromorphology; the latter provided by Richard Macphail. Detailed soil descriptions of the major layers given in appendix 2.1.

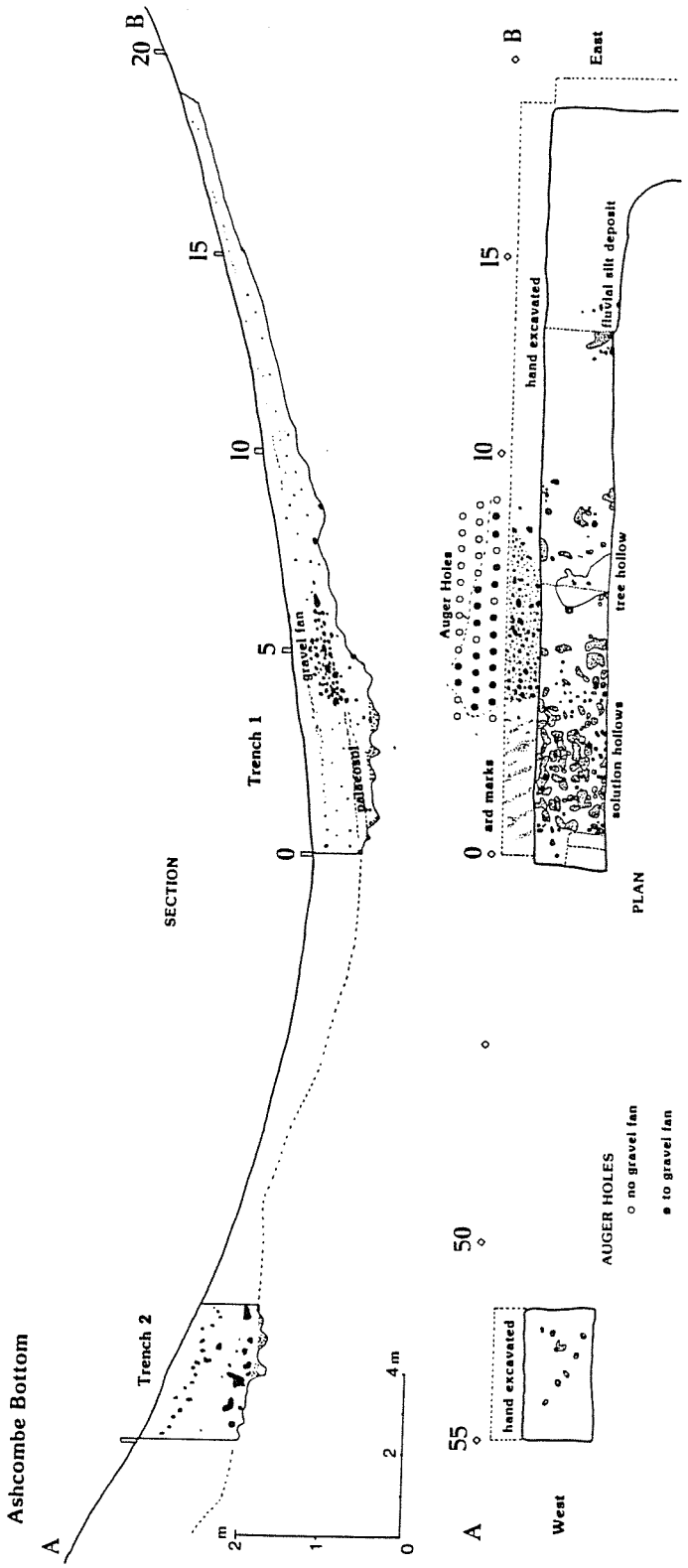


Figure 10. Summary section and plan of the excavation showing section drawing of the fluvial silts and plan of the gravel fan.

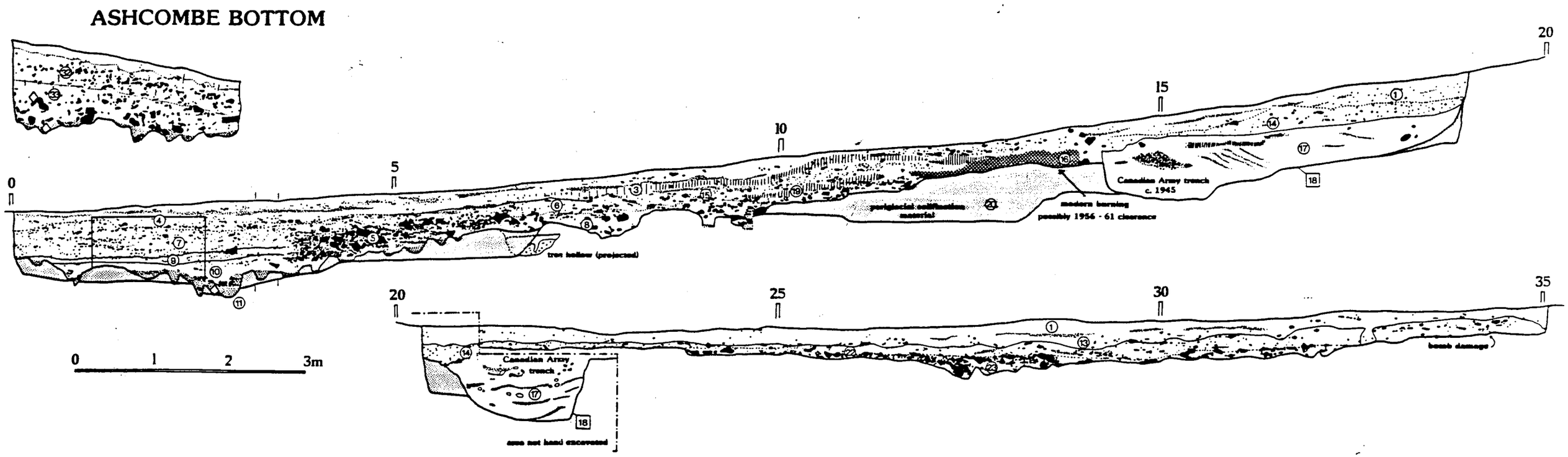


Figure 11. Cross-profiles of the valley deposits at Ascombe Bottom

Trench 1; 0 - 20m

The section produced only *c.* 1.5m of sediment in the centre of the valley. Nearly all the colluvial deposits were de-calcified or only weakly calcareous and thus molluscan evidence was limited or non-existent. A number of deposits were, however, investigated and ranged from prehistoric colluvium to recent (post 1945) military activity which is only dealt with briefly.

Layer 20: The base of the trenches exposed periglacial soliflution material (Fig. 10 & 11) which was variable and consisted of subangular and subrounded large to medium chalk pieces cemented into a very pale brown (10YR 8/3) calcareous matrix. Large wholly cortical flint nodules were abundant in local patches. The surface was pitted with hollows which were absent upslope but more frequent and larger in the valley centre (Fig. 10) which contained a relict early Holocene palaeosol (layer 11).

This Pleistocene chalk deposit is impermeable; water will stand many hours on the exposed surface thus the potential for lateral subsurface water flow is high.

Layer 21: Within the periglacial material, and at a point where it had been sectioned by machine, a localised patch of very pale brown (10YR 7/4) fluvial, laminated sandy silts was noted beneath *c.* 45cm of calcareous periglacial solifluction material. It was located in the centre of the trench at about 12.8m (Fig. 10). The localised patch was only 70cm across.

Layer 11: Within solution hollows and depressions in the periglacial solifluction deposits a relict and reddish deposit occurred which is probably the basal horizon of a severely truncated early Holocene soil. It was a strong - dark brown to reddish brown (7.5YR 4/6 - 7.5YR 3/4 to 5YR 4/4) clay/silty clay, strong well developed structure with few very small chalk pieces and localised patches of flints and devoid of artifacts. Most solution hollows are devoid of stones though some (e.g. 0.8m) contain a mass of medium angular flints. This layer shows some clay coating on inter-ped surfaces (hand lens), possibly indicating large quantities of illuvial soil, which shrinks markedly on drying. It is probably the truncated Bt horizon of a mature typical argillic (Luvic) brown earth. Some ancient and modern worm activity noted well into

solution hollows, other faunal activity includes millipedes and *C. acicula*. Earthworm burrows noted with organic staining, some occupied at present.

This deposit occurred in the valley bottom and on the western valley side (trench 2). On the western side the layer was distinctly more silty (possibly sandy). Illuviated clay on inter-ped voids was not noticed in the field with a hand lens. The higher silt content probably being attributable to the overlying loessic colluvium (layer 32 and 33).

The formation of a mature argillic brown earth suggests a long period of stability and soil formation during the early Holocene which soil has subsequently been truncated.

Tree hollow: In the centre of the machine-cut trench and cut into the periglacial deposits at *c.* 6.4m was an feature 1.1m wide and at least 1.4m across with an irregular outline (Fig. 10 and 12). It did not lie wholly within the trench and augering determined it to be broadly crescentic.

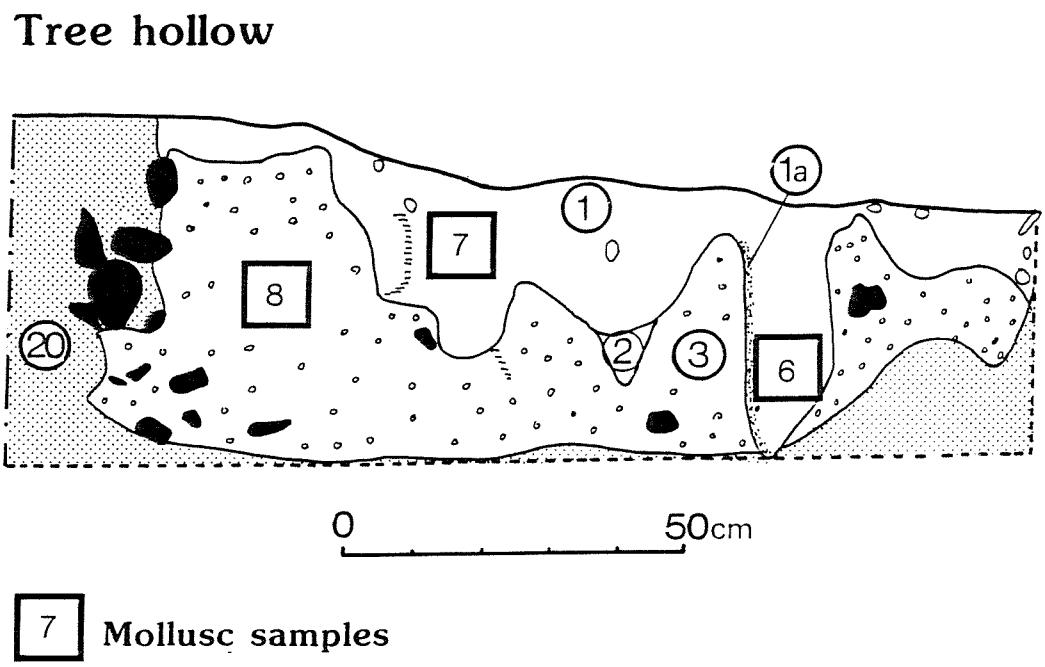


Figure 12. Section drawing of the tree hollow.

It contained three layers; the basal (layer 3) was a yellowish brown (10YR 5/6) highly calcareous silty clay loam with abundant small rounded to

subangular chalk pieces and rare medium flints, overlying the periglacial material. The upper surface of layer 3 had a highly irregular profile and a number of round vertical (probably root) hollows. The base of one of these contained a highly calcareous silty clay loam (layer 2) with abundant small rounded chalk pieces, but the main upper fill (layer 1) comprised a dark brown (7.5Y 4/4) silty clay with rare small subangular flints, rare small chalk pieces with medium blocky structure 0.5% fine very fine macropores and 2% medium macropores. It was not obviously calcareous. Against the edges of one of the cylindrical hollows and at the boundary between layers 1 and 3 (Fig. 12) a concentration of fine chalky particulate material occurred (layer 1a).

The feature, which is thought to be a tree hollow contained, a number of artifacts; the lower layer (layer 3) produced a single flake and a burnt flint while the upper horizon was more productive. It produced one core trimming flake, three secondary flakes, four tertiary flakes and a burnt flint. None of the material was diagnostic.

The prehistoric colluvial sequence

The main prehistoric sequence occurred on the valley floor and comprised the deepest sedimentary sequence between 0m and 6m.

Layer 10: Occurs only in the centre of the valley (0.6m to 4.1m) overlying the periglacial solifluction deposits and pockets of argillic soil and was both abutted and overlain by the flint lens (layer 5). This colluvium was only 34cm deep and was a dark yellowish brown (10YR 4/6 to 10YR 4/4 with depth) weakly calcareous silty clay/silty clay loam with few subrounded small to medium chalk pieces, rare angular flint. Earthworm channels present though presumed ancient. Sharp undulating boundary. It is pre Beaker to Late Neolithic and contained little artifactual material.

Layer 9: Sealing the early colluvium was a putative prehistoric old land surface *c.* 10cm thick, only fully recognised and recorded after the section had been allowed to weather for two weeks. It was a dark yellowish brown (10YR 3/6) silty clay loam, almost stone-free (only 1% stones) with small localised exceptions where stone abundance of subangular chalk pieces may be up to 20% (abundant). Weaker structure than the overlying colluvium.

Surface shows as a clear slightly wavy boundary possibly suggestive of prehistoric cultivation ard marks. Detailed excavation of its surface showed up to 14 parallel grooves over 1.5m (Fig. 13), which can be paralleled with those recorded by Bell at Kiln Combe (Bell 1981a, 120, fig. 12) and are similar to those recovered at Brean Down (Bell 1990a, figs 19 & 22).

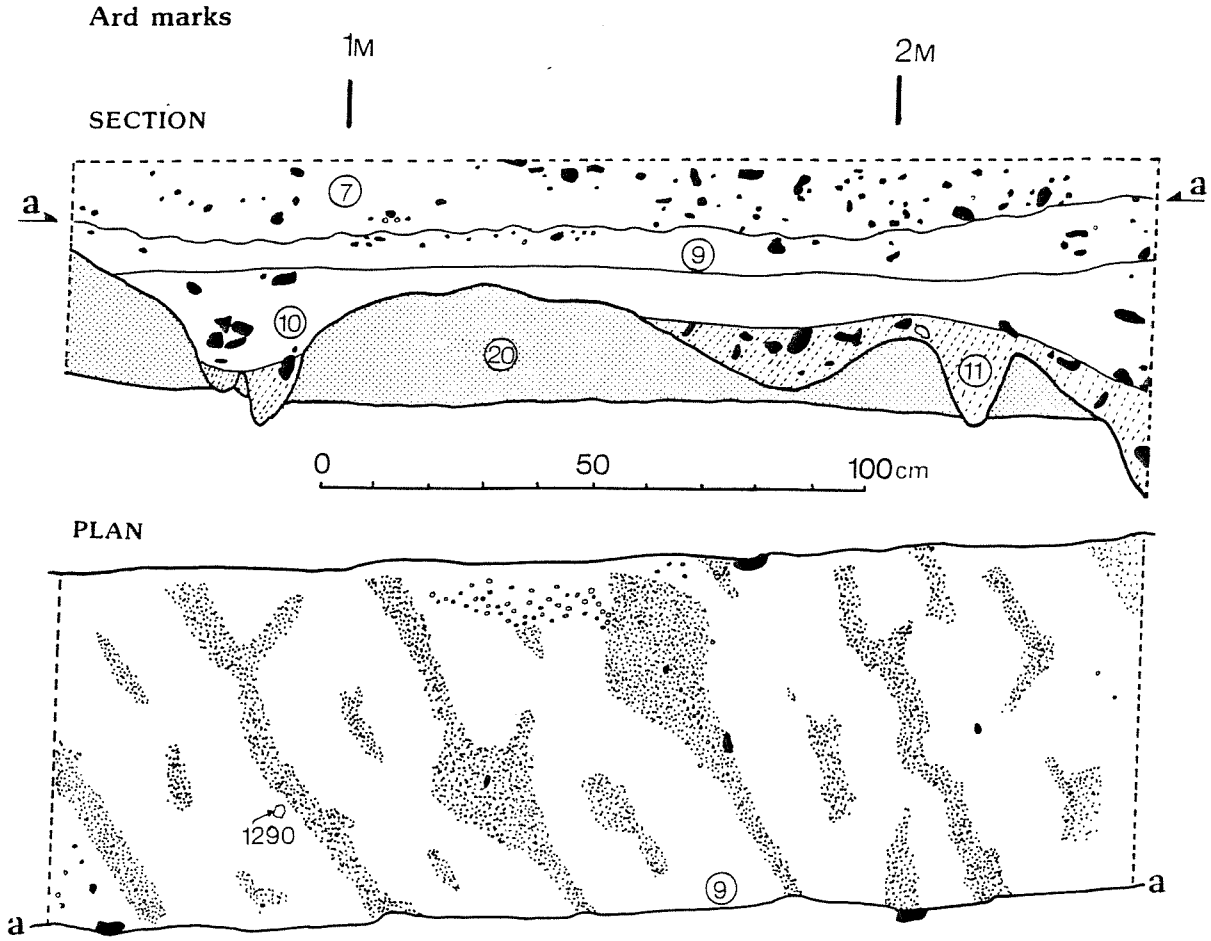


Figure 13. Plan and section of the ard marks at Ashcombe Bottom.

The buried soil was eroded upslope and ended abruptly where it met the flinty horizon (layer 5). It produced very few artifacts but did include abraded sherds of Beaker pottery.

Layer 8: Silty clay loam with reddish silty clay loam at base overlying paleo-argillic horizon. Few medium to large flints; many of which are nodular. Non-calcareous and occupying hollows and a possible small ditch

recorded as feature 3. This layer survived beneath the upslope end of the gravel fan (layer 5) and extended for nearly 6m and contained flint artifacts and Beaker pottery.

The relationship between this layer and earlier colluvium and buried soil is not known and was removed by the deposition of the flinty horizon. It contained Beaker pottery and a number of flint artifacts and is, therefore, probably contemporary with, or slightly later than, the buried soil.

Layer 7: Overlying the buried soil, and restricted to the centre of the valley downslope from the gravel fan was the main prehistoric colluvial layer which survived up to 52cm thick and abuts the gravel fan. Its chronological relationship with the gravel fan is uncertain; it may be earlier than the gravel fan and the rest of the unit upslope having been eroded, or could be broadly contemporary and represent the fine-grained material from the same erosion event.

It was a dark yellowish brown (10YR 4/4) silty clay loam with common medium and small flints and rare large flints. Localised lenses of abundant subangular and subrounded chalk pieces occurred (probably rill erosion) in an essentially uncalcareous colluvium, clear wavy boundary.

Essentially colluvial horizon containing Beaker - Iron Age pottery, flint flakes abundant.

Layer 7a: At the base of the main colluvium a localised and intermittent chalky lens; possibly a result of rill erosion or possibly an earthworm sorted horizon, clear wavy boundary.

Layer 5: The gravel fan occurs at 3.7m to 6.7m and comprises 50-70% total stone abundance with abundant very large wholly cortical flint nodules, angular flints, right through to the small stone category, rare medium rounded chalk pieces.

The layer is discontinuous as cannot be seen on opposite section (Fig. 10) and is probably the result of gully erosion resulting in a gravel fan, possible a single event. Stone orientation measurements on 178 clasts

showed a preferential dip of *c.* 59° and strike of 87° confirming this hypothesis and indicating erosion predominantly from Ashcombe Minor. The deposition of this layer was probably responsible for the truncation of a number of the horizons described above.

It is typical of material washed from fields and deposited in 'alluvial fans', observed by Boardman (pers. comm.) to occur usually in Autumn - January when arable fields bare and the winter crop has not come up.

In the centre of the valley these deposits were sealed by modern (probably post 1945) deposits comprising a buried soil (layer 4), chalky lenses (layer 2) and the brown earth soil (layer 1). These are summarised below with the other 'modern' deposits.

The modern sequence

The remaining sequence can be attributed almost entirely to this century. Nevertheless, it is significant as documented events can be tied to recorded features and deposits. This is particularly important with regard to the onset of clearance and tillage.

Layer 19: The earliest of the recent deposits was a discrete humic horizon up to 15cm thick and only 1.8m long; typical of a grassland soil. Weakly calcareous and well worm worked, with few medium flints; not dissimilar to layer 3, but with more flints and less calcareous. It overlay layer 8 and is assumed to be the pre 1945 land surface

Feature 18 and fill 17

Feature 18: Cut into the periglacial solifluction deposits at the east end of the trench (14.3m to 19m) was a feature 4.6m long, at least 0.8m deep. It is probably a Canadian Army trench; they occupied the valley between 1941 - 48 and used it for training (C. Rae pers. comm.). A number of smaller army scoops were found in the north-south trench (20-30m).

Layer 17: Fill of Canadian Army trench mainly comprised coarse chalk rubble and calcareous material (periglacial solifluction material), but with a series of discrete dump lines and occasional thin soil lenses following tip lines. The whole feature was rapidly backfilled, mainly with the chalk which was dug out of the trench. A small number of

artifacts including Beaker pottery and cartridge cases were recovered.

layer 16: A very dark brown (10YR 2/2) layer with abundant medium and large to small charcoal pieces contains burnt branches and roots and also unburnt and rooting roots (charcoal includes *Pomoidea* and *Crataegus*). Flint pieces in this layer show very little sign of burning. Beneath the charcoal rich layer and in small discrete patches were thin lenses of reddened soil obviously from burning. This is adjacent to the army trench and lies directly on top of the periglacial chalky deposits.

It probably dates to either shrub clearance in the valley by the Canadian army or the bulldozing and burning of shrubs (brambles and shrubs etc) in 1956-61 by Mr. T. Rae (C. Rae pers. comm.).

Layer 15: Overlying the charcoal rich layer and the pre 1945 soil was a highly calcareous silty clay loam with common small and very small chalk pieces and few medium flints, flecks of charcoal and occasional iron objects noted. Further downslope this horizon merges in to layer 6.

Layer 6: Mixed colluvial layer; silty loam colluvium occasional medium and rare large flints, rare small chalk pieces. Some charcoal pieces noted. This merges with layer 15 upslope and abuts gravel fan downslope. There is some uncertainty as to the date of this horizon as it may represent an older, later prehistoric, colluvial unit.

Layer 4: This buried soil horizon occurs in the centre of the valley, it was probably inundated relatively slowly allowing some mixing unlike layers 19 and 3 which were rapidly sealed. It comprised a very dark greyish brown (10YR 3/2) humic silt loam with coarse well formed fine crumbly prismatic peds, rare very small chalk pieces, rare medium angular flint pieces and occasional rare flecks of charcoal. It contained many fine fibrous rootlets, 0.2% fine and medium macropores, 0.5% medium to coarse macropores and earthworm channels are obvious, slightly calcareous. macropores rare but present, mole/small mammalian activity present, gradual wavy boundary.

This is a buried soil horizon, probably the 1945/1961 surface on the valley floor. It only occurs on the valley floor, elsewhere the soil

horizons were obviously rapidly buried and preserved.

Layer 3: Discrete dark brown (10YR 3/3) almost stone-free and humic horizon up to 14cm thick; typical of a grassland soil. Weakly calcareous and well worm worked. This was rapidly sealed and overlies the more mixed buried soil, layer 4. It occurs at 6m and extends upslope to nearly 14m. It is probably the 1961 soil horizon which was rapidly sealed by earth-moving after the clearance and burning in 1956,

Layer 14: At the eastern end of the trench adjacent to the cultivated field a calcareous colluvium up to 20cm thick occurred. Dark brown (10YR 3/3) light silty clay loam, calcareous common small chalk pieces, many medium flint pieces. Very fine fibrous roots common. Weakly formed blocky structure, earthworm activity noticeable. Small mammal activity also noticed 0.5% medium macropores 0.1% fine micropores.

This colluvial layer is superficially similar to that seen further down the valley section but more calcareous and was noted to contain *T. hispida*, *T. striolata*, *Vallonia* sp. and apical fragments of *H. aspersa*. This layer seals the 1945 Canadian Army trench and is particularly important as it probably relates to the first tillage of the adjacent field in 1961.

Layer 13: Overlying the calcareous colluvium, and also largely colluvial in origin, was a greyish brown (10YR 5/2) calcareous rendzina soil material, up to 25cm thick with small crumb structure, many small chalk pieces, few medium chalk pieces, rare medium flint pieces, abrupt wavy boundary.

Layer 12: In a shallow depression in the 1961 buried soil (layer 3) a calcareous silty loam, light in colour with few stones; rare small chalk pieces and few medium flints occurred. Probably recent (post 1961) fine-grained material washed out of Ashcombe Minor.

Layer 2: A number of intermittent lenses of abundant small and very small rounded and subrounded chalk pieces in a dark brown (10YR 3/3) silty loam occur under the present topsoil. They are thickest (up to 4cm) in the centre of the valley where they also contain rare medium flints, total

stones *c.* 20% and have fine angular and subangular blocky peds, sharp wavy boundary medium flints. Stones c. 20%. It seals the 1945/61 buried soil horizons.

These horizons probably represents chalk wash deposits, the majority probably result from erosion following *c.* 1961 (the first ploughing of adjacent field).

Layer 1: The present day soil in the centre of the valley was a dark brown (10YR 3/3) weakly to fairly calcareous soil (colluvial brown earth) varying between 11 and 25cm deep supporting grassland vegetation, obviously humic, stone-free and heavily worm sorted with medium to coarse granular peds and many many roots, abrupt wavy boundary.

Trench 1; 20 - 35m

The north - south wing of trench 1 produced only shallow deposits. These never exceeded 70cm and were mainly post-Roman. The modern rendzina soil (layers 1 & 13) occurred along the entire length of the trench. The calcareous colluvium (layer 14) was restricted to the northern end and overlay the Canadian army trench.

Layer 22: Colluvial layer; brown (10YR 4/3) silty loam, common medium and few large flints, few to common small chalk pieces, occurred along most of the trench (23.8 - 35m). It was particularly badly disturbed by animal burrows and a 4.5 inch white phosphorous bomb to the south. It produced a relatively large quantity of medieval pottery at its southern end.

Layer 23: In the deepest part of the section a dark greyish brown (10YR 4/2) silty clay loam overlay the periglacial solifluction material. Common medium to large flints; many of which are nodular. Weakly or non-calcareous. The layer probably represents a gully at *c.* 27.4m which is mainly filled with large flint nodules; some of the smaller flints derived from Clay-with-flint deposits upslope. Prehistoric pottery present.

Trench 2

A small trench (52 - 57m) was situated on the short western slope of the valley. It was located just above a break in slope (Figs 9 and 10) and produced a completely different sequence, quite untypical of

the Downs. De-turfing at the base of the slope (45 - 50m) showed a similar sediment to that in the main excavation (trench 1). Excavation beyond deturfing was not undertaken. The deposits exceeded 1m and were deeper *upslope* but only two colluvial units were recognised

The loessic colluvial horizons overlay the paleo-argillic soil and periglacial solifluction deposits as described above. The surface of the chalky melt-water deposits was similar to that in the centre of the valley; a number of solution hollows and depressions occurred which contained the relict paleo-argillic soil.

Layer 33: Lower loessic colluvium. Yellowish brown (10YR 5/4 to 10YR 5/6) silty clay loam possibly with a loessic component, common large flint stones completely cortical. The main differentiation between this and layer 32 is the presence of more flint pieces and the greater clay (fine silt) component, the latter possibly illuvial from above horizon. No micropores observed but presumably present. Some flint pieces boulder size. Boundary sharp wavy. Archaeological finds restricted to flints.

Layer 32: Upper loessic colluvium. Dark yellowish brown (10YR 4/4 to 10YR 3/4) silt loam - loamy sandy silt. Texture quite coarse silt (some sand) possibly aeolian/loessic. Common medium angular flints, weak structure. Non calcareous, no chalk pieces, stoniness 1-2%. This sediment is much lighter in colour. Densely packed very friable sediment, loessic component; possibly slaking. Boundary gradual-diffuse and wavy. Archaeological activity - pottery scarce, possibly due to acidity of soil/sediment, small pieces of Iron Age pottery and 1 large piece of Belgic pottery. Flint flakes however abundant including retouched pieces.

Layer 31: Topsoil. Dark brown (10YR 3/3) modern humic loam soil supporting grass, bracken fern (*Pteridium*) and nettle vegetation. Bracken fern predominant - stand height 3ft. Cow parsley also noted. Medium rhizomes abundant (ferns), horizon essentially stone and artifact free, clear wavy boundary.

Artifact distributions

As a 75cm wide strip along the entire open trenches was excavated, a relatively high number of artifacts were recorded. A total of 1606 finds were recovered (Table 7) of which over 300 were post-medieval; most being associated with the 1945 use of the valley and included a number of bullets, cartridge cases, shrapnel and an exploded 4.5 inch white phosphorous bomb! Nevertheless, the distribution of material was relatively discrete and informative, and enabled some units to be re-assessed. The distributions discussed below are limited to the datable pand diagnostic artifacts (e.g. pottery and 1945 militeria) and the flints.

The shallower deposits in the north-south orientated trench (20-35m) produced little in the way of prehistoric pottery; only two sherds of Late Neolithic pottery were recovered; both in layer 22. This layer also produced Iron Age to Roman sherds. Although medieval sherds were also recovered from this layer at around 34m, they are though to be intrusive due to both animal activity and possible dispersal by the 4.5 inch white phosphorous bomb.

In order to aid the analysis of the finds and their distribution the entire data-base was computerised and each artifact type given a unique typecode following the system used by Martin Bell (1981). The database was sorted by typecode to enable the dispersed data to be grouped and the distributions of artifact types to be plotted (Figs 14, 15 and 16).

Pottery

A total of 124 sherds of pottery were recovered of which 70% (83 sherds) were prehistoric.

Late Neolithic sherds (type code 67)

Nearly all the Late Neolithic pottery came from the main trench between 0m and 8m (Fig. 14) and none was recovered from trench 2. Seven of these 21 sherds were from earliest colluvial horizon (layer 10). Single sherds were recovered from the buried soil (layer 9) and the valley-side colluvium upslope (layer 8). Apart from two sherds in the the colluvium at 20 - 35m, the remaining material was from the upper part of the gravel fan (layer 5) and the fine-grained colluvium

Artifact type	Typecodes	No.	% of total	% of pottery	% of prehist
FLINTS					
Flakes	203-205	911	56.7	-	86.3
Cores	201	5	0.3	-	0.4
Blades	207	20	1.2	-	1.9
Tools	211-235	21	1.3	-	2.0
Retouched	247-248	23	1.4	-	2.2
POTTERY (P67 - P125)					
Late Neolithic	67	21	1.3	27.6	2.0
Beaker/EBA	66, 81-86	56	3.4	73.7	5.3
Iron Age	73 & 78	6	0.4	7.9	0.6
Romano-British	91, 94 & 100	4	0.2	5.2	0.4
Medieval	111, 116	10	0.6	13.2	0.9
Post Medieval	113	2	0.1	2.6	0.2
Post Victorian	122-125	7	0.4	9.2	0.7
OTHER OBJECTS					
Clay pipe	20-21	7	0.4	-	-
Glass	25-34	62	3.8	-	-
Cob	44	2	0.1	-	-
Bone	50	1	0.06	-	-
Burnt flint	55	108	6.7	-	-
GEOLOGICAL					
Iron pyrites/Iron	35	17	1.1	-	-
Beach pebbles	37	9	0.6	-	-
Sandstone	39	7	0.4	-	-
Calcite	40	2	0.1	-	-
Slate/shale	41	1	0.06	-	-
Coal/coke	42	2	0.1	-	-
METAL OBJECTS (M1-M19)					
Iron nails etc	2-6	12	0.7	-	-
Cartridges etc	10-15	64	4.0	-	-
Shrapnel	1, 16-19	112	7.0	-	-
PLANT REMAINS					
Charcoal & seeds	51, 52	26	1.6	-	-
MOLLUSCS					
Oyster	45	5	0.3	-	-
Winkle	46	1	0.06	-	-
Land snails	48, 49	2	0.1	-	-
TOTALS		**1606**			
non artifactual	38	281	17.5		
no artifacts	00	26	1.6		
Total records		1913			

Table 7. The numbers and proportions of artifact types from trenches 1 and 2 at Ashcombe Bottom.

associated with it (layer 7). The sherds in both of these layers although not appreciably smaller, were more worn and abraded.

Beaker

All the Beaker pottery (56 sherds) was recovered from the main trench (0-20m) and no sherds were recovered from trench 2 or the shallower colluvial deposits (20-35m). The lower colluvium (layer 10) which produced a number of Late Neolithic sherds was devoid of Beaker material. Apart from three sherds in the buried soil (layer 9), and ten sherds in the valley-side colluvium (layer 8) the majority of the Beaker pottery was from the upper part of the gravel fan and and its associated fine-grained colluvium (Fig. 14).

It seems likely that the sherds in the buried soil and possibly the valley-side colluvium arrived in the valley soon after their deposition, the majority were probably eroded from Ashcombe Minor. The fact that sherds of probably the same vessel were recovered from both the colluvium on the valley side (layer 8) and the gravel fan, may indicate that these two layers not significantly different in age.

Food vessel and Bronze Age

Only three sherds of Food Vessel were recognised, but their distribution is not dissimilar to that of the Beaker material; one sherd was in the buried soil, and the other two from the gravel fan and fine-grained colluvium. A single undiagnostic Bronze Age sherd was also recovered from the gravel fan.

Iron Age

Few Iron Age sherds were found but they were widespread; three from the upper colluvium (layer 32) in trench 2, two from 0-20m and one from 20-35m. All the Iron Age pottery was higher up the colluvial sequence than the Bronze Age and Beaker sherds.

1945 artifacts

The various fragments of bomb and military miscellanea were mainly distributed immediately downslope and adjacent to the Canadian Army trench and were almost wholly confined to layers 15, 3 and 4; i.e. the modern buried soils and recent mixed colluvium. Little material

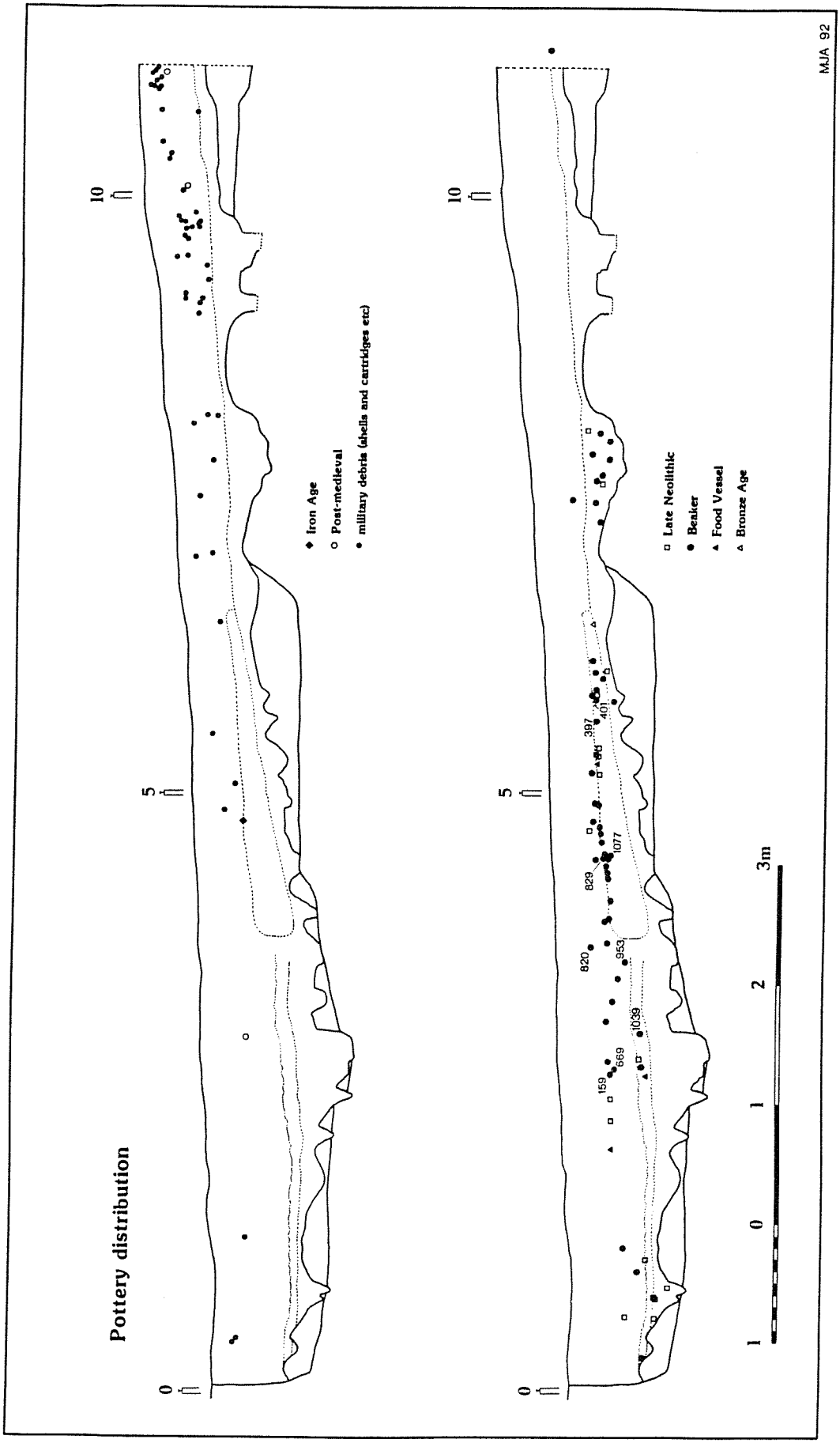


Figure 14. Distribution of pottery in trench 1 (0 - 11m)

occurred elsewhere, and was always in the upper horizons (e.g. layer 13) with the exception of the white phosphorus bomb which penetrated the topsoil to the periglacial material.

Flints

There is no differentiation between the distributions of primary, secondary and tertiary flakes. In the main section of trench 1 the flint was generally distributed through the early colluvium, the buried soil and the valley-side colluvium, with obvious blanks beneath, and within, the main gravel fan. Flints were concentrated in the upper horizon on the gravel fan and occur in vague lines through the fine-grained colluvium (Fig. 15); this may be due to erosion onto the valley floor or earthworm working. What is however evident is that these have probably been washed down from Ashcombe Minor, though the numbers and density probably suggest from a major concentration not far away.

Tools and retouched pieces

The distribution of the tools was very informative. None were recovered from the early colluvium and a relatively high number were distributed through the buried soil and valley-side colluvium; these two contexts accounted for 13 of the 28 pieces. The remainder were almost exclusively distributed in a narrow band above the gravel fan.

In trench 2 the flints were spread throughout the colluvium with the exception of the basal most portion of the lower colluvium (layer 33); see figure 16. No real differentiation could be detected between the distributions of the two colluvial units except that all but three of the ten tools were recovered from the the lower colluvium.

The artifacts

Pottery

The pottery assemblage comprised 124 three-dimensionally recorded sherds and a further 5 unstratified (prehistoric) sherds. The majority of the assemblage was prehistoric and is dealt with in more detail. The fabric divisions adopted were based on those used by Martin Bell for his dry valley investigations in Sussex. The fabric numbers are typecodes used in computerised sorting of the assemblages. Most of the pottery (53%) was Beaker.

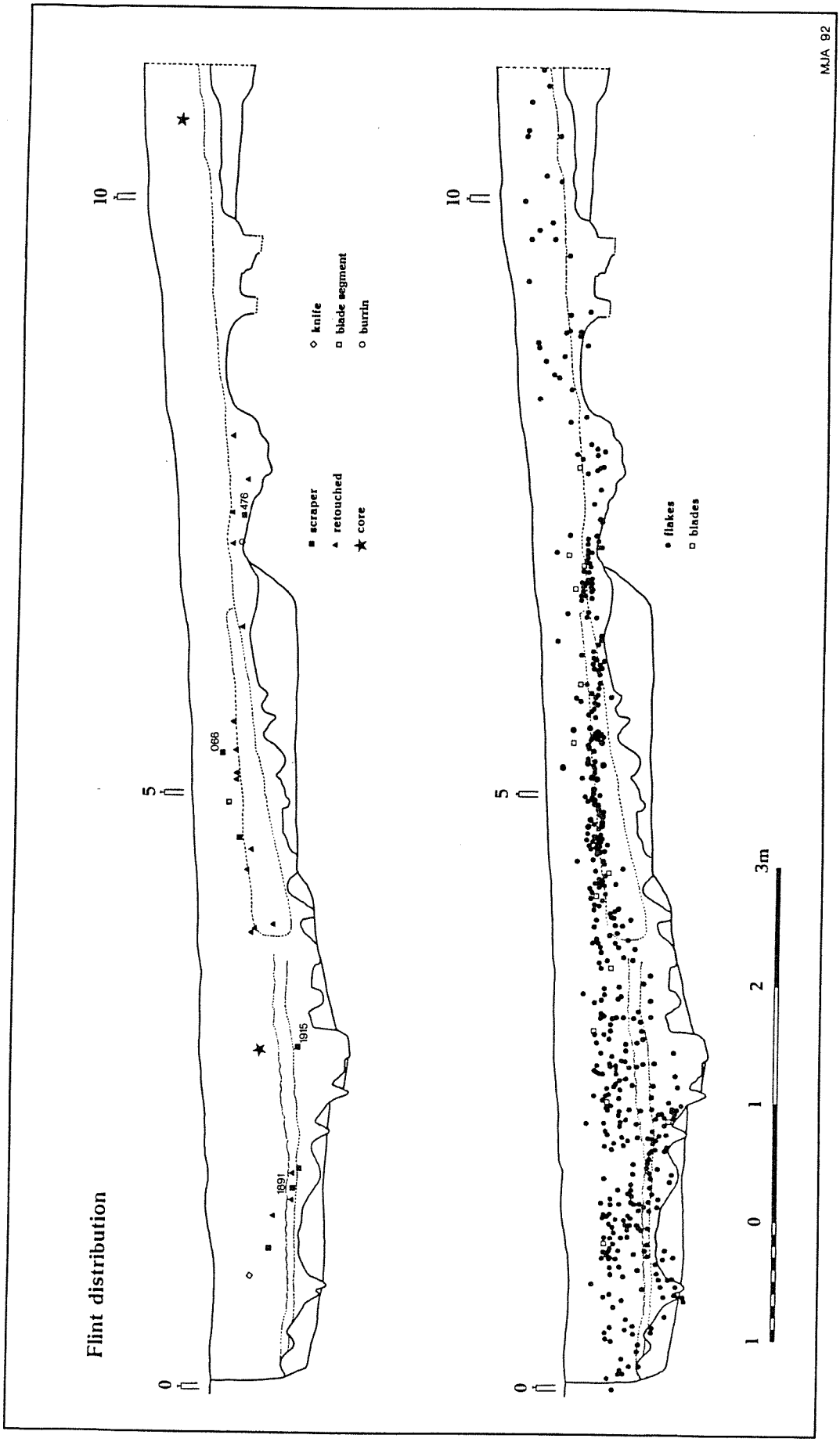


Figure 15. Distribution of flint artifacts in trench 1 (0 - 11m)

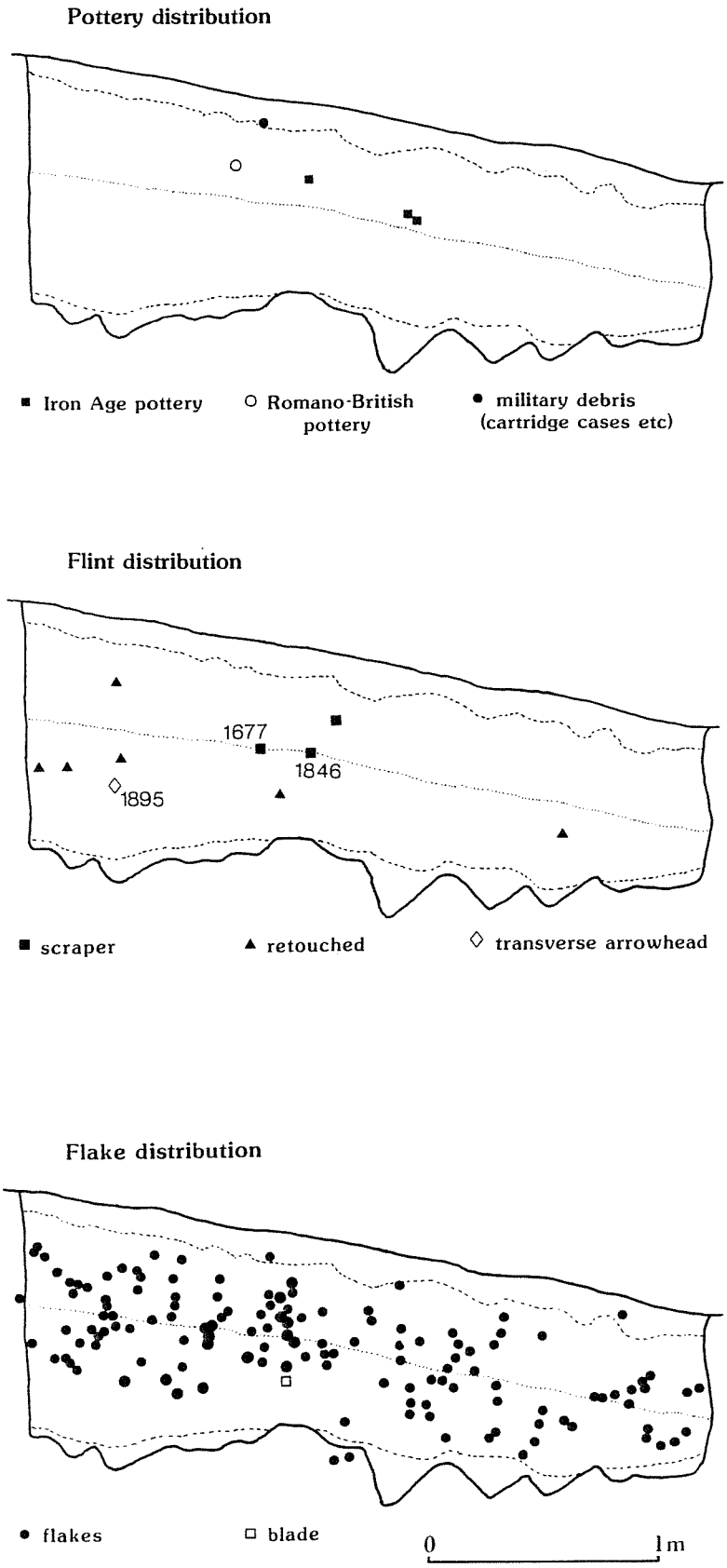


Figure 16. Distribution of artifacts in trench 2

Late Neolithic; fabric 67

A total of 21 sherds were categorised as having very abundant small to medium flints with occasional organic tempering. The sherds had a predominately leather brown to dark brick-red surface colour which was often smoothed, although angular calcined flint protruded through the surface. None of the sherds were decorated, but one simple rim (no. 378) was recovered.

No forms could be distinguished, but this fabric compares well with Drewett's Neolithic Fabric I (Drewett 1980) which is the most common in Sussex, although generally considered earlier Neolithic (Drewett 1980, 27). None of the material compared well with the supposedly later Neolithic assemblage at Playden (Cleal 1982), nevertheless, it was similar to some of the Peterborough wares in Wessex (Cleal pers. comm.). It is tentatively suggested that these sherds are later Neolithic, especially in view of the total absence of any flint artifacts which could be ascribed to the earlier Neolithic.

Beaker

A total of 56 sherds, divided into five predominantly soapy, grog-tempered fabrics, were identified as Beaker and represent at least 26 separate vessels (Table 8). The Beaker assemblage was relatively small but represents 74% of the pottery from the site, and over 55% of the Beaker sherds were decorated. The assemblages include four unstratified sherds.

Fabric 1 (typecode 83): Grog and flint tempered; grog tempered with frequent medium calcined flint tempering, generally oxidised and reddish brown colour often with a slightly redder exterior surface (pssibly slip) occasionally with a grey core. Vessels are fine and thin walled 3 - 4.5mm thick. 69% were decorated and this group included three sherds of 'domestic' Beaker (*viz.* Gibson 1982; Apsimon pers. comm.).

Fabric 2 (typecode 81): Grog tempered with flint inclusions; grog tempered with sparse fine flint inclusions and a number of fine to medium voids. Completely oxidised and varying from salmon pink to orange/buff in colour and a number had a red 'sealing wax' coloured

surface described by Clarke (1970, 86). Vessels are fine but vary from thin walled to thicker vessels (3.5 - 6.5mm). 58% were decorated.

Fabric 3 (typecode 84): Grog tempered with sand and rounded voids, rare small calcined flint inclusions. Sherds are a red brown colour, generally well fired and thicker than most up to 6mm.

Fabric 4 (typecode 82): Sandy wares with grog tempering; medium sand and grogs. Mainly undecorated, but small sherds (av. wt. 1.5g), colour reddish brown to orange.

Fabric 6 (typecode 86): Very soapy (grog tempered) with small clasts of iron oxide, one sherd only reddish brown in colour

Fabric	typecode	sherds	wt.	identified vessels
1	83	13	49	5
2	81	33	97	11
3	84	3	4	2
4	82	6	9	1
6	86	1	2	1
TOTAL		56	161	20 (+6)

Table 8. Beaker pottery; numbers of sherds, vessels and fabrics

Forms, decoration and affinities

The assemblage includes 36 sherds of fine Bell Beaker and four 'domestic' Beaker forms (the latter identified by ApSimon). Of the 56 sherds 16 remain un-attributed, but are most likely to be Bell Beakers. Although mean sherd size was small (2.9g), nearly the entire assemblage can be defined as representing Clarke's (1970) Southern Developed and Wessex/Middle Rhine forms which belong to the Middle and Late Styles as defined by Case (1977). The assemblage as whole is predominantly Late Beaker. The main diagnostic feature of the assemblage - comb impressed decoration, is typical of Beaker pottery and a number of motifs and arrangements were recognised.

No vessel was well enough represented nor sherds large enough to give any real indication of vessel form. Some individual sherds indicate that square-sectioned flat rims on distinctly angled necks (no. 401), flat, comb-decorated bases (Fig. 17) and usually sharp carinations (no. 669) all occurred within the group.

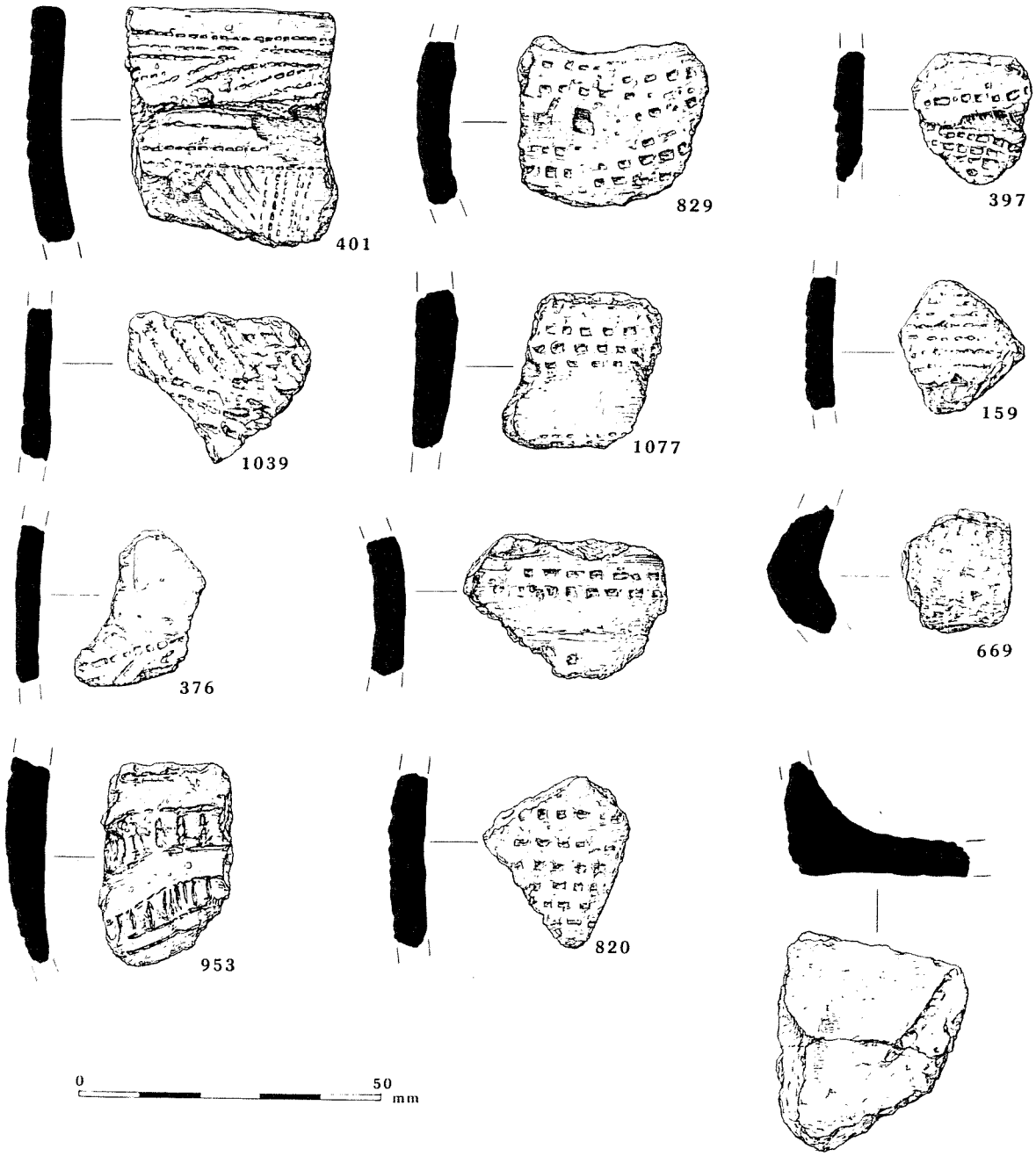


Figure 17. Beaker and Early Bronze Age pottery from Ashcombe Bottom.

The comb impressed wares included a number of vessels with bands of coarse rectangular parallel comb impressions separated by undecorated zones (see Fig. 17, nos 820, 829, -, and 1077) and can be paralleled by a number from Kiln Combe found beneath two metres of colluvium (Bell 1983). Other more sophisticated motifs are represented by crosses (no. 597) and complicated lozenge and triangular motifs and borders (no. 401) depicted with a very fine-toothed comb and more typical of the Southern Developed Beakers. As mentioned above, decoration was not confined to the walls of the vessel, a single line of comb impression on the base of vessel was also noted.

A small number of sherds were incised rather than comb decorated, and these included lozenge and ladder decoration of the Wessex/Middle Rhine group (e.g. 953) and were typically 'sealing wax' red in colour. They do however, continue into the Late Beaker as Case's Later Beaker Style (1977, 72).

The assemblage is most closely paralleled with the later elements at Kiln Combe (Bell 1981a) especially sherds 2708, 2905, 2748, 2883 and 2737 (Bell 1983a, 128, fig. 7), and very little of the Ashcombe material compares with Belle Tout. The latter Beaker assemblage consists largely of East Anglian forms of Case's Middle Style (Ellison 1980). The recently published assemblage from the barrow at Pyecombe (Butler 1991), is also predominantly East Anglian forms but more typically Late Beaker, and thus in theory more compatible with Ashcombe Bottom. On examination, apart from fabric types, decoration and assemblage composition are not really compatible.

The soft soapy fabrics were fired at low temperatures and the relatively low number of sherds surviving in the colluvium indicates that they must have been derived extremely locally. The assemblage of *c.* 20 vessels, is probably derived from a Beaker settlement site in the immediate vicinity.

Food Vessel

One distinct fabric was recognised by Arthur ApSimon as probably Food Vessels. The fabric was soapy (grog tempered like the Beaker material) with large platy voids, grog and occasional flint inclusions. There were only three sherds of this group, two of which may have belonged to the same vessel, but none were decorated or diagnostic.

Undiagnostic Bronze Age

A single undecorated, but large sherd (wt. 29g) was heavily tempered with large and medium calcined flints which stood up to 1.4mm proud of the worn surface (see Allen 1984a, fig. 9, no. 375).

Iron Age

The Iron Age assemblage was limited to only six sherds. Two fabrics were represented (black sandy burnished wares and black sand and flint

tempered wares), and both common in the area. A bead rim (no. 452) is typical of Caburn saucepan pottery.

Roman

The small Roman assemblage included the locally common East Sussex ware (Green 1977) and colour-coated sandy wares. Their presence here is indicative of no more than manuring, however, the decorated fragment of box-flue tile may indicate more substantial remains within the area.

Medieval

Medieval pottery includes forms and fabrics typical of the 12th/13th century in Eastbourne (nos 1200, 1349; Lawrence Stevens pers. comm.) and seven sherds of local 13th/14th century material from the Ringmer kilns (Hadfield 1981). The latter included applied thumbed straps.

Post-Medieval

A small number of early post medieval green glazed, 'Victorian' willow pattern and 1940's cream ware was recovered. Some of this assemblage can be attributed to the army occupation of the valley.

The flint assemblage

Although it is difficult to ascertain to what extent we are dealing with contemporary assemblages (cf. Bell 1983, 129), detailed analysis of the flint was undertaken. First of all the limited ceramic assemblages indicate that the flints are likely to be restricted to the Late Neolithic, Final Neolithic and Early Bronze Age, and secondly, it was hoped that detailed analysis might enable the detection of distinct groups within the assemblage as a whole.

The assemblage was recorded broadly following the criteria adopted by Schofield for his research (1988). A number of attributes were recorded for each individually numbered piece. These were principally artifact type (i.e. flake, blade, core, tool etc) and dimensions (length x breadth). The level of core-reduction was indicated by the proportions of primary, secondary and tertiary flakes, the measurements of which provide some indication of knapping technology.

Most of the flint assemblages discussed below were made up of the

three-dimensionally recorded artifacts (see Table 9), augmented by a small number of tools and other pieces that were recovered from the spoil heap of the machine dug trench, and from trench 2 prior to detailed recording and excavation of the section. These latter pieces are not included in the overall statistics.

Source of the flint

Four (possibly five) distinctly different, but probably local, sources of flints were determined by examination of patination and cortical condition. Despite the fact that four different sources were being exploited, the majority (over 87%) were probably derived from non-calcareous soils; brown earths and paleo-argillic brown earths and loessic soils.

Non-calcareous soils: these flints varied from grey and dark grey to fawn, and were without patina and very 'fresh' in appearance, with a clean, light brown cortex. These are typical of flints from soils which are not highly calcareous, but are distinctly different from flints originating from Tertiary Clay-with-flint deposits. These probably derive from sandy/loessic soils as seen in trench 2 and are recorded locally (Wooldridge and Linton 1933), but also possibly from thicker, non-calcareous soils such as brown earths which may occur over the chalk or over Clay-with-flints. This represented 88% of the assemblage.

Chalk: these flints were typically patinated, being white to bluish white or blue in colour, similar to those on the thin chalk rendzina soils at the south eastern end of the valley. Despite the large area of typical chalk rendzina soils in the area today only 11.3% of the assemblage was represented by this group.

Periglacial: five very worn, frost shattered creamy coloured flakes were recovered. Similar coloured flints were noted in the periglacial coombe deposits. These flakes represented only 0.5% of the assemblage.

Clay-with-flints: four slightly stained and browner flints were recovered. These can be paralleled with flint from tertiary Clay-with-flint outcrops on the crest of the Downs (e.g. Blackcap). Clay-with-

flint deposits are fairly extensive locally and it is therefore, rather surprising that more of the flint assemblages could not be assigned to this group which represents only 0.4% of the total.

Most of the flint was nodular but some frost fractures were noticed on a small percentage of the pieces examined indicating that local flint lumps may also have been used. Some reworking of flint pieces in antiquity was noticed.

	No.	%
Flakes	899	91.7
Core trimming flakes	12	1.2
Cores	5 (1)	0.5
Blades	20	2.0
Retouched pieces	23	2.3
Tools	21 (4)	2.1
Total	980	
% flakes	93	

Table 9. Flint assemblage from hand excavation.

Technology

Flakes: The 931 waste flakes and blades were measured for length and breadth and the results for primary, secondary and tertiary flakes plotted on individual scatter diagrams (Fig. 18a, b, & c). This aids comparison with other Neolithic and Early Bronze Age assemblages from Windmill Hill and West Kennet Avenue (Smith 1965), Durrington Walls (Wainwright and Longworth 1971), Broome Heath (Wainwright 1972) and locally Bishopstone (Bell 1977), Alfriston (Drewett 1975a), Offham (in Drewett 1977) and Bell Tout (Bradley 1970).

A high proportion of the flakes were tertiary and secondary flakes (Tables 9 and 10) indicating that basic flint preparation was being undertaken elsewhere but that final manufacture may have been occurring locally. The flake and blade assemblage showed very few blade-like flakes (i.e. with a breadth:length ratio of less than 2:5). The scattergram shows some affinities with that of the earlier Neolithic assemblage at Bishopstone (Bell 1977, 22), but the retouch and tool assemblage is significantly different. The length:breadth ratios were found to be more comparable with the later Neolithic assemblages at Durrington Walls and West Kennet Avenue and the Beaker assemblages at West Kennet Avenue and Belle Tout, than those from earlier Neolithic assemblages at Bishopstone, Alfriston, Windmill Hill and Broome Heath.

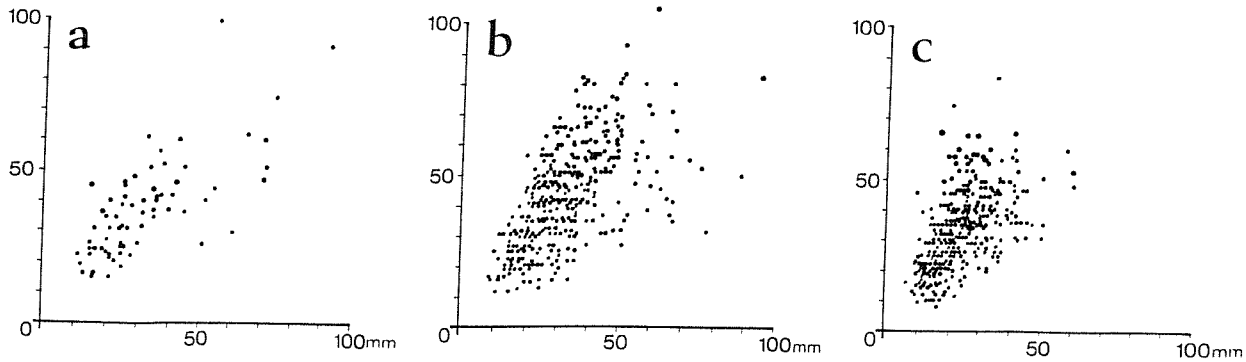


Figure 18. Flint scattergrams a) primary flakes b) secondary flakes c) tertiary flakes and blades.

The Ashcombe assemblage produced a number of smaller flakes (that Smith notes were not recorded at Windmill Hill) which may indicate local knapping or trimming, or may be a function of more careful excavation and recovery techniques. The flake assemblage may represent the waste material of both a later Neolithic industry and a Beaker one (see discussion).

Flakes	No.	%
Primary	79	8.7
Secondary	401	44.0
Tertiary	416	45.7
From core tools	3	0.3
Core trimming flakes	12	1.3
Total	911	

Table 10. Composition of the flake assemblage

Cores

The positions of 5 cores were recorded, a sixth was unstratified but from trench 2. Most of the cores were large, being discarded well before they were exhausted. Only one core was systematically well reduced (Fig. 19). All the cores were systematically flaked from one, two or three platforms and large broad flakes detached.

Blades

A relatively small proportion of blades, or blade-like flakes were recovered. They were largely single ridged with no retouch.

Retouched and Tool assemblage

The 44 retouched pieces were dominated by scrapers (11); a series of other tool types occurs in low occurrences (Table 11).

Transverse arrowhead

A single broken probable transeverse arrowhead (chisel type cf. Green 1980; 1984) with retouching along the straight distal edge. Bulb removed (Fig. 19, no. 1895).

Knife

A parallel sided flake with retouch along one edge (Fig. 19).

Blade segment

A small thin segment 19mm x 14mm may be a part of a composite tool; i.e. sickle (not illustrated).

Scrapers

Eleven scrapers were recorded during hand excavation and a further four were recovered from the lower contexts of trench 2, but are not precisely located.

Side scraper. A parallel-sided tertiary flake, modified with retouching for 62mm, was recovered from trench 2. There is no attempt to retouch the distal end (Fig. 19). This scraper is more typical of Late Neolithic assemblages and parallels can be seen at Durrington Walls (Wainwright and Longworth 1971, 166 e.g. F129).

Convex scrapers. The nine recorded and five unstratified convex scrapers were on flakes usually with dipping distal ends and with the bulbar end intact. All scrapers were neatly retouched at distal end, and were on unridged or weakly ridged flakes, some were just lightly retouched primary flakes (Fig. 19, no. 1915). They were of generally small dimensions, mean size 34 x 28 x 7mm with retouching predominantly at 60° - 70° and typically Beaker in character. The assemblage mainly comprised small horseshoe/discoidal (Fig. 19, nos 066, 424, 476, 635, 1677) or thumbnail pieces (Fig. 19, nos 1211, 1803, 1915) but included one end scraper (Fig 19, no. 1846) and parallels can be seen at Kiln Combe (see Healy in Bell 1983 mf. 7-9), Malborough Downs (Harding 1992)

and Belle Toute (Bradley 1970).

Only four of the convex scrapers were not consistent with the Beaker assemblage; all were unstratified and from trench 2. These were all larger, with coarser flaked-retouch and steeper scraping edges (up to 85°). This small group is more typical of Neolithic rather than Beaker assemblages.

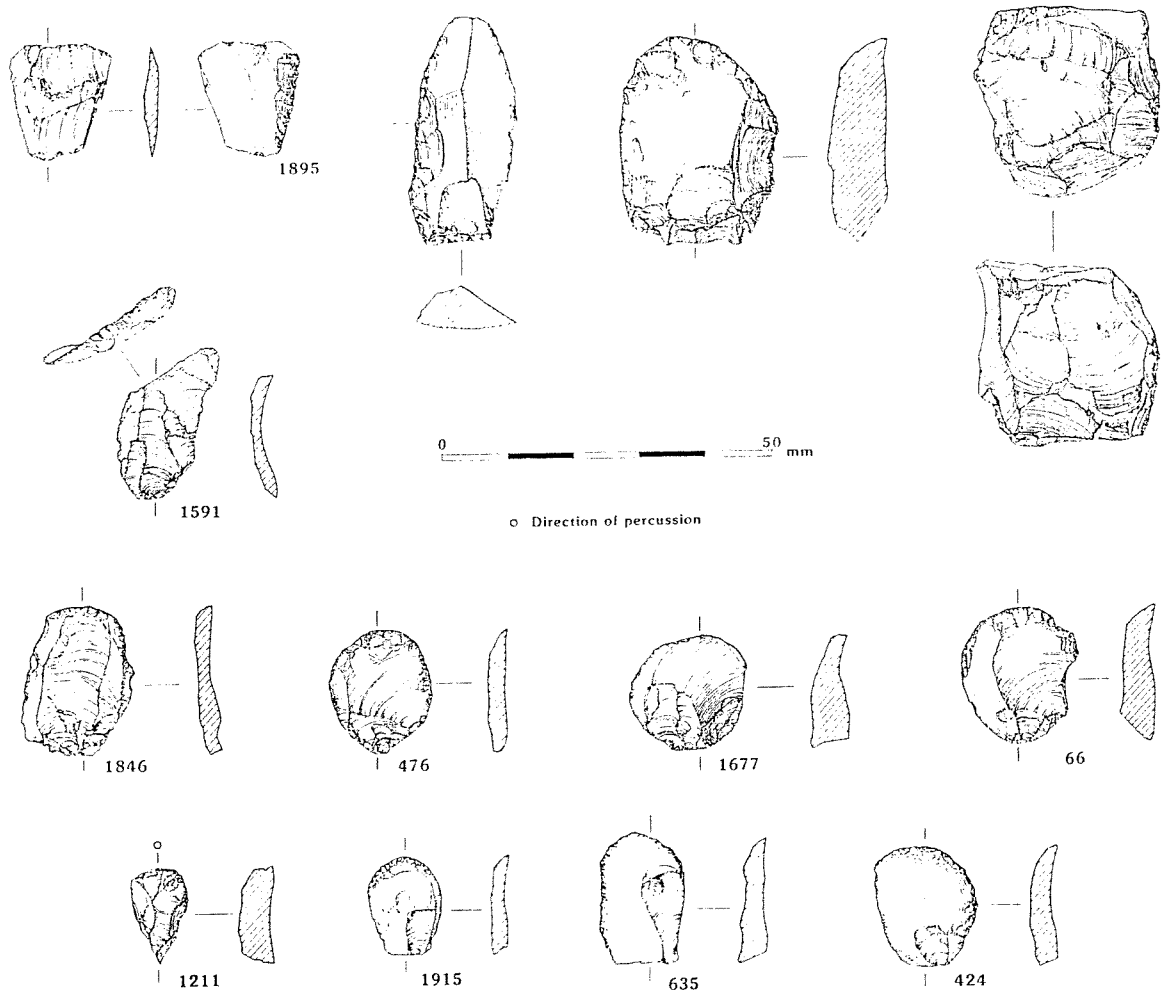


Figure 19. Flint implements from Ashcombe Bottom.

Hollow scrapers. Two hollow scrapers were recovered; one scraper (Fig. 19, no. 1591) also had a notch. A single hollow-end scraper was on a broad flake with a deeply recessed small scraping 'notch' only 8mm across. Both pieces are not out of place in Beaker assemblages.

Piercers

Two piercers, both parallel-sided non-cortical flakes.

Notched pieces

Four notched pieces on flakes, all with small recesses of relatively steep retouch.

Other retouched pieces

Twenty three other pieces displayed limited edge retouch on simple secondary or tertiary core flakes.

Hammerstones

A small number of cores (2) and other larger flint waste flakes (2) were utilised as hammerstones or striking implements.

Cores	5	
Blades/blade-like flakes	20	
Scrapers	11	(4)
Notched pieces	4	
Knives	1	
Piercers (awl/burin)	2	
Transverse arrowhead	1	
Blade segment	1	
Serrated piece	1	
Other retouched pieces	23	
Total	69	
% of assemblage	7.0	

Table 11. Composition of the flint tool assemblage.

Discussion

The assemblage contains a major element which is characteristically Beaker: small scrapers and notched pieces. Most of the tool types can be attributed to Late Neolithic-Early Bronze Age if not actually paralleled in Beaker assemblages. Transverse arrowheads are current from the mid-third millennium to second millennium BC and are known from Beaker contexts (Green 1980) including the Sussex Downs (Gardner 1988) ~~at Plantation Farm (Clark et al. 1933, fig. 2.37)~~ and Belle Tout (Bradley 1970, fig. 15.38). Transverse (chisel type) arrowheads occur in Beaker, as well as Late Neolithic, associations but are most common in Final Neolithic assemblages (Green 1980; 1984).

Apart from this distinctly Beaker group, another subtly different

typological assemblage was recognised primarily from the waste flakes. It comprised broader short squat flakes: some core tool flakes and larger scrapers. Most of this assemblage was confined to trench 2 or the lower portions of trench 1. This group is more characteristic of Late Neolithic assemblages such as Durrington and Windmill Hill, rather than Beaker groups.

The only distinction that could be made between proposed typological variation and source of the raw material was in the broader squat flakes and blades attributed to the Neolithic assemblage. These were wholly from the the non-calcareous soils. The 'Beaker' attributed group, was a mixture.

A large proportion of the assemblage is waste with few primary flakes and a low proportion of mis-hits. The quality of the flint is generally good. The blade frequency is low, the proportions of scrapers to retouched pieces is high and the main flake/core size is generally large. This correlates with Schofield's (1988) local source of flint and home range activities which exhibits high frequencies of retouch (7%), high proportions of tools (4-5%) and the reliance on specific tool types (scrapers) suggests the concentration and maintenance of domestic activity (see Schofield 1986; 1988).

Charcoal

A number of pieces of charcoal were recorded during the excavation and further charcoals were recovered from wet sieving of the infill of the tree hollow (layer 3). The following report is based on the identifications of the charcoal made by Joy Ede.

The charcoal survived as small fragmentary pieces and identification was not possible on almost half of the pieces submitted. Charcoal recovered during hand excavation included *Quercus* (6 pieces), cf. *Corylus* (2 pieces), *Pinus* (2 pieces), *Prunus* cf. *avium* (1 piece), *Prunus* (1 piece) and Pomoidea cf. *Crataegus* (2 pieces).

Tree hollow

Charcoal from the bulk flotation of tree hollow layer 3 produced seven pieces of *Pinus*, four fragments of cf. *Pinus* and one piece of *Quercus*.

Carbonised seeds

Despite the large scale flotation programme involving the processing of in excess of 1300 litres of soil, only a single seed was retrieved. A single grain of *Hordeum* sp. (barley) was recovered from sample 3.2 of the general flotation program (layer 7).

The land-use history; Molluscan evidence

Two columns of samples were taken from the main colluvium. The first at 3.20 - 3.50m by Dr. Caroline Ellis, who was undertaking research into molluscan sequences in colluvium in East Sussex (Ellis 1986). A second series was taken by Dr. S. Carter at 2.60 - 3.00m, who was undertaking research into the taphonomy of molluscan assemblages and in particular the species and age variation of Mollusca from with soil aggregates and inter-aggregate areas (Carter 1987; 1990). Nineteen samples were taken at 1cm intervals through the sequence and from an area of 40cm^2 through the prehistoric buried soil and the sediments immediately above and below it. Unfortunately the weakly calcareous nature of the main deposits did not facilitate shell preservation. In both cases only fragments of *Pomatias elegans* and the occasional, probably intrusive, shell were recorded.

A series of spot samples were taken from the tree hollow (Fig. 12) and analysed by the writer. The basal layer was a dark brown, humic, while the upper layer was light in colour and highly calcareous. The molluscan assemblages however, apart from those from the basal layer, were depauperate; even when the two samples from layer 1 are amalgamated they only totalled 23 shells (Table 12).

layer 3

The sample from the main fill produced an assemblage dominated by shade-loving species and was taxonomically rich. It was dominated by *Carychium tridentatum* with *Discus rotundatus*, *Oxychilus cellarius* and *Vitrea contracta*. The presence of *Abida secale*, *Ena montana* and *Macrogastra rolphii* is significant. This represents a fauna of a mature, probably deciduous woodland.

The presence of the locally rare species *Abida secale* and *E. montana* is significant; *Abida* is common in open colluvial habitats but has not

\ Sample	8	6	9	13	9+13
\ Context	3	1a	1	1	1
\ wt (g)	1280	718	1725	*c*100	1825
MOLLUSCA					
Pomatias elegans (Müller)	7	+	2	+	2
Carychium tridentatum (Risso)	48	1	1	2	3
Cochlicopa spp.	-	1	-	-	-
Abida secale (Draparnaud)	3	-	-	-	-
Pupilla muscorum (Linnaeus)	-	-	1	1	2
Vallonia costata (Müller)	4	1	-	-	-
Acanthinula aculeata (Müller)	-	1	-	-	-
Ena montana (Draparnaud)	1	-	-	-	-
Ena obscura (Müller)	2	1	-	-	-
Punctum pygmaeum (Draparnaud)	1	2	-	-	-
Discus rotundatus (Müller)	15	1	3	2	5
Vitrina pellucida (Müller)	1	-	-	-	-
Vitrea crystallina (Müller)	1	1	-	-	-
Vitrea contracta (Westerlund)	10	-	-	1	1
Nesovitrea hammonis (Ström)	2	-	-	-	-
Aegopinella pura (Alder)	2	-	-	-	-
Aegopinella nitidula (Draparnaud)	5	1	2	-	2
Oxychilus cellarius (Müller)	14	-	-	-	-
Limacidae	3	1	-	-	-
Cecilioides acicula (Müller)	2	7	-	8	8
Cochlodina laminata (Montagu)	2	-	-	1	1
Macrogastra rolphii (Turton)	5	-	-	-	-
Clausilia bidentata (Ström)	3	1	2	1	3
Trichia striolata (C. Pfeiffer)	1	-	-	-	-
Trichia hispida (Linnaeus)	5	2	3	1	4
Helicigona lapicida (Linnaeus)	-	+	-	-	-
Cepaea/Arianta spp.	2	+	-	-	-
Taxa	22	12	7	7	9
Shannon Index (*H'*)	2.39	2.44	1.87	1.89	2.08
TOTAL	**137**	**14**	**14**	**9**	**23**

Table 12. Ashcombe Bottom: land Mollusca from the tree hollow

successfully colonised secondary habitats created by human activity; *Ena* although relatively rare is surprisingly common in Neolithic and Bronze Age contexts (Evans 1972, 165) and Kerney (1968) has argued for its demise since the Sub-boreal due to its intolerance to a lack of summer warmth. The presence of *Pomatias elegans* certainly indicates that this is unlikely to be prior to *c.* 6000 bc i.e. Boreal (Kerney 1966, 5).

layer 1a

The sample from this layer only produced 12 shells. They were mainly shade-loving species but there is some indication of a change in the composition of the shade-loving group.

layer 1

The few shells recovered from layer one still indicate generally shady conditions.

Unfortunately, apart from the evidence of a rich mature, probably Sub-boreal woodland, from the base of the tree hollow, the remaining assemblages do not allow detailed interpretation except that they do not indicate open country conditions.

Soils: magnetic susceptibility and micromorphology

Due to the lack of molluscan remains, and impoverished pollen preservation (Scaife pers. comm.), detailed soil micromorphology was the most important palaeo-environmental study. Information from soil analysis has been provided by Richard Macphail and this report is largely drawn from his published reports in which he drew from the Ashcombe data; *viz.* Macphail 1992; Courty *et al.* 1989; Macphail *et al.* 1990. Magnetic susceptibility was conducted by the writer.

Magnetic Susceptibility

A programme of magnetic susceptibility analysis was conducted to aid in the characterisation of the deposits and interpretation of the soil and sedimentological history (cf. Allen and Macphail 1987; Chapter 3, p.57). Several columns of samples were taken through key points in the stratigraphy and duplicate samples were taken to test the replication of magnetic susceptibility results. The results are presented in table 13 and all results are expressed in SI units x 10^{-8} Kg/SI.

The calcareous parent material, periglacial marl and fluvial silts (layers 20 and 21 respectively) both gave reading below 5 and agrees with previous work (Fig. 6). This provides a good base for magnetic susceptibility studies as all higher readings are the result of *enhancement* rather than the input of eroded natural.

Although the magnetic susceptibility results displayed considerable variation and significant enhancement was detected in burnt areas (Table 13 and archive) the variation within the prehistoric sequences was limited. All the modern buried soils and recent colluvium were significantly enhanced, probably as a result of active pedogenic

processes and the inclusions of many burnt soil fabrics from the shrub clearance between 1956-61.

The paleo-argillic soils (layer 11) were high (43 - 59), probably as a result of their higher clay content (cf. Oades and Townsend 1963) and high illuviated clay (see below).

The overlying colluvium was relatively low (ave. 31) which may indicate that it was not derived from paleo-argillic soils but from less clay rich and enhanced soils. If so then severe truncation of the paleo-argillic soils had occurred upslope prior to initial colluviation recorded here. Slight enhancement is seen in the buried soil, but the later colluvium and modern sequence is considerably enhanced.

Depth	Samples	layer	Description	MS1	MS2	Ave
Trench 2 at 54.30m						
0-15cm	17, 18	31	Topsoil	19	23	21.0
30-45cm	19, 20	32	Upper colluvium	16	16	16.0
60-75cm	21, 22	33	Lower colluvium	12	12	12.0
80-95cm	23, 24	33	Lower colluvium	21	19	20.0
95cm +	25, 26	11	Paleo-argillic	22	26	24.0
100cm +	27	20	Periglacial	5	-	5.0
Trench 2 at 53.10m						
0 -10cm	28	31	Topsoil	20	-	20.0
30-45cm	29	32	Upper colluvium	17	-	17.0
55-70cm	30	33	Lower colluvium	13	-	13.0
90-115cm	31	11	Paleo-argillic	25	-	25.0
Trench 1 at 2.00m						
0 -10cm	32, 33	1	Topsoil	68	63	65.5
10-20cm	34, 35	2	Wash	62	63	62.5
20-30cm	36, 37	4	Modern buried soil	45	52	48.5
30-45cm	38, 39	7	Fine-grained coll.	35	49	42.0
60-70cm	40, 41	9	Buried soil	32	32	32.0
70-80cm	42, 43	10	Lower colluvium	28	28	28.0
80-90cm	44, 45	10	Lower colluvium	31	36	33.5
95cm +	63	11	Paleo-argillic	43	-	43.0
100cm +	62	11	Paleo-argillic	59	-	59.0
Trench 1						
	10	21	Fluvial periglacial	4	-	4.0
	48, 49	13	Recent coll/topsoil	72	73	72.5
	50, 51	14	Recent colluvium	73	71	72.0
	53, 54	22	Calcareous coll.	72	71	71.5
56-61cm	46, 47	16	Charcoal/burnt	310	316	313.0

Magnetic susceptibility is recorded in SI units x 10^{-8} SI/Kg.

Table 13. Ashcombe Bottom: magnetic susceptibility data.

In trench 2, all the susceptibility levels are suppressed, including the modern soil profile. The level of iron is probably considerably lower. Although consistent results were recorded no significant trend can be detected. The initial loessic colluvium records higher magnetic susceptibility, probably due to increased fragments of the relict argillic soil. Susceptibility increases in the upper sequence, but to what extent this is a result of coarse modern rooting enabling enhanced topsoil material to be incorporated is unknown.

Soil Micromorphology

A series of undisturbed soil samples (cf. Courty *et al.* 1989, 40-43) were taken from key horizons and submitted to Richard Macphail for analysis. Questions addressed of the samples were primarily ones of identification of past soil regimes and detection of processes relating human activity (Courty *et al.* 1989; Davidson *et al.* 1992). The locations of the samples are given below in table 14. Soil micromorphological analysis was undertaken by Richard Macphail and the following descriptions and analysis are drawn largely from his reports (Macphail 1992 and Macphail *et al.* 1990).

Sample	RIM Code[1]	Layer	Description
11*	C	12	Fluvial periglacail sand
14*	B	11	Paleo-argillic soil @ 2.65m
15*	A	11	Paleo-argillic soil @ 55.00m
55*	G	7-9-10	Buried soil and colluvium
61*	D	33	Lower loessic colluvium
52	E	7-9	Upper boundary (ard marks) of buried soil
56	F	11	Base of Bt horizon (paleo-argillic soil)

[1] Richard Macphail laboratory notation * = analysed samples

Table 14. Location and description of undisturbed (micromorphology) soil samples

<u>Summary descriptions of soil micromorphological slides</u>

information from R.I. Macphail

Sample C: Layer 12 - periglacial fluvial sand

Lamina bedded coarse silt and fine sand size quartz, and fine sand fragments; weak micritic cementation (see Macphail 1992, fig. 18.2).

Sample B; Layer 11 in trench 1 - paleo-argillic soil
Highly porous Bt horizon comprising biologically worked silt and clay soil, with coarse porosity infilled and coated by multiphase compound textural features; early to mid holocene typical argillic brown earth, disrupted by clearance (see Macphail 1992, fig. 18.3).

Within the highly porous horizon voids were seen to be infilled with partially manganese stained (previously ?humic) silty clay soil coated by at least 2 phases of microlaminated dusty and silty clay coatings (see Macphail 1992, fig. 18.4). Two periods of soil disturbance (possibly Early and Late Neolithic) are represented.

Sample A; Layer 11 in trench 2 - paleo-argillic soil
Highly porous Bt horizon of biologically worked silt and clay soil as in sample B above, but more dense and clay rich. Coarse porosity infilled and coated by multiphase compound textural features; early to mid holocene typical argillic brown earth, disrupted by clearance.

Sample G; Layer 9 - prehistoric buried soil
Accretionary soil with a dense silt loam, compact fabric with dense packing of fine structures (see Macphail 1992, fig. 18.6) and contains common coarse rounded fragments of eroded argillic soil (Bt) cover (Macphail 1992 plate 4; Macphail *et al.* 1990 plate 11), and slaked material (probably surface crust). Few dusty coatings and infills occur, but many weak intercalations (see Macphail *et al.* 1990, plate 12) are present within prisms. Dense prismatic structures are juxtaposed to open areas with finer ped structure. Porosity increases upwards, towards the colluvial soil surface scored by ard marks.

A number of pedofeatures were recorded. These include unworked ped formed in silt loam colluvium - and an open porosity of fine peds created by cultivation and the resulting enhanced biological activity. A probable crust fragment of surface slaked soil comprises dusty clay and silty soil elements and contains vesicles (circular voids) and coarse and fine charcoal (see Macphail 1992, fig. 18.6; Macphail *et al.* 1990, plates 1 and 2). Also noted were parallel-sided straight edged planar voids (shear planes) produced by tillage implement (ard) impact (see Macphail *et al.* 1990, plate 3).

UNIVERSITY OF SOUTHAMPTON LIBRARY

Sample D; Layer 33 - lower loessic colluvium
Compacted silty colluvium, a mixture of decalcified subsoil (Bt) material and silty (loess cover) soil (see Courty *et al.* 1989, fig. 7.5d); this horizon also contains ferruginised root fragments and a large fragment (0.5cm long) of ferrgunised straw-like material, as possible evidence of ploughing in of chaff and possible manuring (see Macphail 1992 fig. 18.7).

Soil microphological analysis (largely from Macphail 1992)
Parent material
The basic parent material is chalky periglacial deposits, Coombe Rock (layer 20), but at one location a Late Devensian deposit (layer 21; sample C) of finely bedded, water lain, fine sand-size round chalk and silt-size quartz occurred. Soil micromorphology showed the chalk clasts to have been weathered and that some micritic (i.e. calcite crystals <10um; Courty *et al.* 1989, 175) cementation had taken place (Macphail 1992).
Paleo-argillic soil: layer 11
Both trench 1 (sample B) on the east side of the valley floor, and trench 2 on the west side of the valley (sample A; Fig 11), revealed decalcified silty clay-infilled solution hollows which had been preserved in hollows in the Coombe Rock as a truncated palaeosol. These are identified as severely truncated Bt horizons of an argillic brown earth.

Microfabric studies revealed the abundance of micropores; the soils having a spongy fabric with many closed vughs (Macphail 1992, fig. 18.3). The soils are made up of discrete patches of silt/silt loam and clay, with void infills and coatings of clay through to fine silt. Flint and other residual siliceous material are also present. Sample B (trench 1) is dominated by a clay fabric and contains obvious fragments of highly birefringent fine clay coatings (papules: Bullock and Murphy 1979), clearly indicating an original typical argillic brown earth (Avery 1980; Typical Luvic Brown Soil, Avery 1990) character (Bt horizon) for this soil. The silty soil fragments only contain about 30-40% reddish brown fine material. In contrast, sample A, contains less in the way of clay rich fragmented Bt horizon material. Rather, the fabric is dominated by a brown to yellowish brown silt loam, the

porosity within which is coated and infilled by dusty to impure clay. Very coarse textural features with compound layering are present, and may include fine organic matter. Much of the fabric has been affected by both black ferro-manganese impregnation and reddish ferruginous impregnation, whereas some of the loamy material may be dark because it may be residual of Ah horizon. *In situ* ferruginised roots are present in both samples.

Sample A is much more porous than sample B, and most pores have textural coatings (Macphail 1992, fig. 18.4). The microfabrics of the truncated palaeosols are interpreted as being those of an early to mid-Holocene decalcified argillic brown earth which had formed in loess (cf. Weir *et al.* 1971), calcareous fluvial deposits and Coombe Rock, but which had been totally disrupted by tree-throw or clearance activity (cf. Macphail and Goldberg 1990). Decalcification of chalky material seems to have been the main origin of the clay in the subsoil Bt horizon (samples A and B), with probable additions of clay through weathering and particle translocation from the loessic upper stratum. Certainly the soil on the east side of the valley (sample B) is more clay rich, even though the colluvium above is remarkably silty and acid and probably represents a residual deposit of locally reworked loess.

Within the subsoil hollows examined, however, the last most important process was the complex deposition of textural features (see Macphail 1992, figs 18.3 and 18.4). These have been perforated by fine rooting, and in places disturbed/eroded, and new coatings have accumulated (Macphail 1992, fig. 18.4). In the first instance, these textural features could be ascribed to loose soil washing in through time into the hollows, whereas fine rooting and minor disturbance of the textural features may relate to the re-establishment of woodland.

Buried soil: Layer 9 - Typical (colluvial) brown earth
The buried soil overlay colluvium and contained ard marks scored into its surface. Some 10cm of this horizon was examined in sample G, and a number of microfeatures relating to the effects of cultivation noted (Macphail *et al.* 1990). The sample contained a variety of included soil fragments (Mücher 1974), many of which appear to be sharp-edge ones eroded from the clay rich Bt horizon of the early to mid Holocene

palaeosol (Macphail 1992, figs 18.3 and 18.5).

Another ubiquitous soil fragment type is more dusty brown in colour with many very fine birefringent clay fragments. It sometimes contains fine charred organic matter, coarse wood charcoal and a vesicular porosity (Macphail 1992, fig. 18.6). The last is indicative of trapped air in a water saturated soil. These dusty brown soil inclusions may originate from the surface crusts (Boiffin and Bresson 1987), perhaps formed in ard furrows, which were reworked/eroded into the plough soil. Dark rounded soil fragments, which are poorly birefringent and red under oblique incident light, are pieces of burned soil. Their presence, along side charcoal in the crust fragments, could testify to arable agriculture employing burning.

Thus, the Beaker palaeosol contains relict fragments of the clay-rich truncated argillic brown earth, loessic Bt, and cultivation crust and burned soil, with charred organic matter and charcoal inclusions.
Many coarse peds had been broken up presumably by ard impact, and biological activity had been encouraged (Macphail *et al.* 1990, plate 11), but not enough to strongly rework the soil. Hence colluvial accumulation appears to have been rapid. Ard ploughing may only rework the upper 6cm of the soil (Gebhardt 1990), so the presence of cultivation features throughout the 10cm thick sample of the buried ploughsoil, indicated phases of accumulation at the same time as cultivation took place.

Loessic colluvium: Layer 33
Further silty and 'loessic' colluvium was examined in sample D, from trench 2 on the west side of the valley.

The colluvium has a compact fabric (see Macphail 1992, fig. 18.7), perhaps brought about by aggregate sorting (Dexter 1976, 1979), in which weak intercalations had formed possibly as the result of 'internal slaking' (Jongerius 1970, 1983). Perhaps because the soil surface was often sealed by crusts, there were only infrequent patches of soil that had dusty clay void coatings (mostly noted in sample D), that were more likely to be the result of more open porosity and surface slaking.

In this layer especially, other soil fragments could originate from weaker silty Bt horizon material formed more directly from loess, and occur as weakly integrated inclusions, perhaps indicating a local source for some of the colluvium on the west side of the valley. A fragment of 0.5cm long ferruginised straw-like material (Macphail 1992, fig. 18.7) occurred, which in addition to ferruginised root fragments, may indicate the ploughing in of chaff(?) and possible manuring.

Discussion: the history of land-use and soil development

The combination of the field records, artifacts and analytical work (molluscan analysis, magnetic susceptibility and soil micromorphology) enable a detailed picture of the land-use history to be portrayed.

Early post glacial

The late Devensian periglacial solifluction material (Coombe Rock) was fairly typical of southern Britain, but the record of fluvial sands and silts (layer 21) within the Coombe Rock matrix provide an insight into the fluvial components of deposition.

Early Holocene

The pitted nature of the Coombe Rock surface indicates *in situ* weathering by solution. The distribution of the these features (Fig 10) might also indicate areas of most severe solution (i.e. the valley floor) or suggest that the Coombe Rock surface has been truncated on the eastern slope. Solution was partially due to the formation of a de-calcified paleo-argillic brown earth (alifsol). The presence of illuviated clay and rubified colour indicate that this was a mature, well developed soil and suggests a long period of stability. The soil probably supported an early post glacial woodland.

The fact that this soil was only preserved in the small hollows and undulations in the Coombe Rock is a testimony to severe truncation of most of the (paleo-)argillic brown earth profile. The date of this truncation cannot be determined at Ashcombe Bottom, but may belong to the earlier Neolithic in view of the long history of subsequent erosion events. It is likely that such severe truncation and soil disruption was caused by clearance (cf. Dimbleby 1976; Butzer 1982) and localised clearance has been recorded at this date at Offham (Thomas 1977a).

A hiatus in the soil/sediment record was created by the truncation of this palaeosol, and is succeeded in the valley bottom by the probable (re-) establishment of woodland following earlier localised clearance. This re-establishment of woodland is evidenced by the large pine tree hollow which must be post Boreal (post 6,00 bc) in date (from the molluscan fauna), and which contains a calcareous brown earth type soil rather than the clay rich reddish (rubified) non-calcareous argillic brown earths which it is suggested that it succeeds. This woodland re-establishment is also supported by textural features such as root perforations through the relict argillic brown earth. The tree hollow also contained burnt flint and a number of undiagnostic flakes.

If primary clearance of the valley floor was of an earlier Neolithic date and possibly broadly contemporary with clearance at Offham, and this was followed by woodland regeneration, then this follows the pattern of Neolithic land-use as recorded from molluscan evidence across Sussex (Thomas 1982; Allen 1988a).

Truncation of the early Holocene (paleo-)argillic brown earth in the valley seems to have been completed by the later neolithic erosion which led to the deposition of the 30cm thick lower colluvium (layer 10). This colluvium seals the 'Sub-boreal' treehole, and may relate to renewed clearance (and possible cultivation) in the Late Neolithic which induced soil erosion (Allen 1984a). The tree hollow does not indicate that the tree was toppled (cf. Macphail 1986, fig. 2) and the typical asymmetrical fills of tree-throw hollows were not recorded (Macphail 1987b; Macphail and Goldberg 1990) despite its typically crescentic plan. This later phase of soil instability could be the source of the last phase of compound, dusty to silty, textural features that characterise the soil porosity of relict argillic brown earth (see Macphail 1992, fig. 18.4). Although no direct human activity is discernible associated with this, the presence of pottery and flint flakes may suggest activities such as localised occupation and possibly cultivation. These episodes, however, post-date the activity at Offham.

The Late Neolithic pottery and relatively large flint assemblages are typically domestic, but no structures or features were recorded associated with them. The flint assemblage on the western slope cannot

have travelled more than *c.* 30m due to the local topography, and the pottery and flints in the valley bottom are also presumably only derived from Ashcombe Minor. This indicates small scale activity on both eastern and western slopes of the valley. Late Neolithic evidence is especially scarce in Sussex (cf. Drewett 1978; 1980) and the larger assemblages have been recovered from Bullock Down (Drewett 1982; Holgate 1988) and areas off the chalk such as Playden (Cleal 1982) and Westhampnett in West Sussex (Allen pers. obs.). A mosaic of soils existed in the valley, as brown earths are evidenced in the valley bottom, loessic colluvium on the western slopes and probably relict argillic brown earths and other brown earths higher up the eastern slopes in Ashcombe Minor.

Final Neolithic and Beaker

The buried soil in the centre of the valley is formed in colluvium and seems to have recorded both primary, putative earlier Neolithic clearance and Late Neolithic clearance of secondary woodland. But the preservation of the soil itself indicates some local cessation in erosion at least, and limited soil formation, possibly in a grassland. The buried soil is thought to be Beaker in age although only a few sherds of pottery were found in it.

Agriculture

Cultivation of the soil is certainly indicated by the series of parallel ard marks scored into its surface (Fig. 13) and the analytical evidence. Soil micromorphology indicates that the soil was mixed by cultivation which may have induced both surface sealing and compaction of the plough soil. This in turn made the colluvium itself potentially erodible on a site where surface water flow could concentrate. Here, therefore cultivation can be seen at least on the valley floor and the eastern slopes.

Slaking of the ard furrows resulted in surface crust formation. Soil mixing by ard cultivation was seen to have broken and incorporated these crusts, enabled aggregate sorting and led to 'internal slaking'. The incorporation of organic matter and manuring, as indicated by the ploughing in of chaff, the ferruginised root channels, and straw (sample D), all relate to the Late Neolithic and Beaker periods. The

presence of charcoal and burned soil fragments may represent localised or burning of other waste products associated with settlement.

Soil erosion continued into the Bronze Age and was marked by a high energy erosion gravel fan. It has been postulated that this might relate to erosion in the autumn, after harvest, when the fields are dry and bare and highly susceptible to run-off erosion caused by the first winter storms (Allen 1988a, 82; cf. Stammers and Boardman 1984; Boardman and Robinson 1985; Allen 1992a). As these events have been shown largely to be the product of autumn sowing at present, it is possible that this was practised in the Early Bronze Age. This is discussed further by Allen (1988a, 82).

The overall soil erosion would certainly effect the location and nature of cultivation and cereals. I have previously calculated an average minimum depth of soil erosion for the valley at 5cm (Table 5), but soil micromorphology demonstrates that colluvium included both relict clay Bt and loessic Bt fragments (Macphail 1992 fig. 18.5), implying both deeper erosion and probable soil loss down valley.

Settlement

The upper portion of the fan contained most of the Beaker pottery and associated flint artifacts. The non-funerary context and domestic nature of both the pottery (cf. Gibson 1982) and flint assemblages indicate the erosion of a fairly extensive Beaker site in Ashcombe Minor. The fact that at least 26 Beaker vessels were represented is indicative of settlement and occupation in the vicinity rather than purely the erosion of manuring debris and is supported by the contemporary flint industry consisiting mainly of small scappers just as at Belle Tout (Bradely 1982, 64). Changes in slope morphology make it unlikley that this quantity of material could not have eroded from much more than *c.* 100m upslope. The fact that this assemblage indicates a settlement is particularly significant as apart from Belle Tout and Kiln Combe (both valley located) no other Beaker settlement sites have yet been fully recorded in the county.

The settlement is likely to have been located in the small valley overlooking the major route-way of Ashcombe Bottom where, evidently,

the valley bottom was tilled. The site is likely to have been buried by only shallow deposits of colluvium, but has been eroded by Bronze Age to recent (1984) erosion (Allen 1988a; 1991a).

Although approximately 29 Beaker sites are known in Sussex, most have funerary associations (Ellison 1978) and only two have been recognised as occupation sites. They are Belle Tout (Bradley 1970; 1982) and Kiln Combe (Bell 1983) with which this site has most cultural affinities. Apart from these three sites, only one other has yielded 'domestic' Beaker; the Pyecombe barrow (Butler 1991). The quantity of Beaker pottery in secondary contexts from this barrow was surprisingly high and limited fieldwork (cf. Allen 1991c) indicated settlement very close by in the valley.

Summary of chronological events

1. Devensian deposition of Coombe Rock in the valley bottom and Late Devensian periglacial activity and fluvial silts.

2. Early Holocene woodland and development of solution hollows and an argillic brown earth and localised re-deposition of loess.

3. Earlier Neolithic localised primary clearance and disruption of woodland argillic brown earths, paralleled by localised small scale clearances at Offam (Thomas 1977a).

4. Sub-boreal woodland regeneration.

5. Late Neolithic secondary clearance (and possibly cultivation), local activity and flint napping, soil truncation and deposition of lower colluvium. Possibly grassland in valley.

6. Beaker buried soil, occupation in Ashcombe Minor, cultivation of the valley floor, erosion and colluviation.

7. Early Bronze Age cultivation and high energy deposition of erosive gravel fan and associated fine-grained colluvium

8. Continued limited erosion

Conclusions

The presence of a long history of inferred Neolithic activity provides supplementary knowledge to our scant information of the area (see Section 4.6)

Evidence for Beaker settlement and the direct evidence (ard marks) as well as analytical (soil micromorphology) evidence of agriculture is also unprecedented in the county. The main conclusions, however, are about the land-use history.

Earlier Neolithic activity resulted in the initial disruption and truncation of thick argillic brown earths on the valley sides and valley bottom.
Later Neolithic activity seems to have been more continuous and possibly associated with larger clearances.

Farming of the valley and valley sides occurred in the Beaker period and was associated with a local settlement.

In the Early Bronze Age more intensive farming resulted in higher energy erosion events.

4.3 INVESTIGATIONS AT GREY PIT, ROUND-THE-DOWN

Attention was drawn to the potential of stratified colluvial deposits near Ranscombe by Osborne White's (1926) detailed description of *c.* 3m of colluvium which contained pottery and Mollusca. He identified an exposure of colluvium and had the Mollusca identified. He writes:-

> "On the high road from Lewes to Beddingham, the opening out of the double bend about half a mile west of Ranscombe has exposed 10 or 12ft of indistinctly bedded grey rubbly marl, of Recent Age, resting on Combe Rock (p. 71). The context of these two deposits is plainly marked by a change of colour, and by a seam of calcined flints at the base of the Recent wash, which also contains similar flints, occasional flint flakes, small bits of rough pottery a few shells of edible oyster and many terrestrial gasteropds [sic], irregularly distributed throughout. In a small collection of land-shells

from this deposit, Mr. A.S. Kennard identified:-

Limax arborum Bouch. Chant.	*Helicella itala* (Linn.)
Polita pura (Ald.)	*Helix nemoralis* Linn.
Arion sp.	*Cochlicopa lubrica* (Müll.)
Vallonia costata (Müll)	*Pupilla muscorum* (Linn.)
Hygromia hispida (Linn.)	*Carychium minimum* Müll.
" *striolata* (Pfr)	

"This deposit", says Mr. Kennard, "is certainly pre-Roman, and is probably of Bronze Age data"."

A footslope colluvial deposit was exposed in the eastern section of the chalk quarry, known as Grey Pit, 400m to the east of Machine Bottom and less than 200m downslope of the Round-the-Down ridge (Fig. 20). The quarry was extended between 1975 and 1983 exposing a colluvial sequence on its eastern edge. The section was recorded initially in 1980 and 1982 and further detail added when sampling was undertaken in March 1986. Subsequent further extension of the quarry has now removed the colluvial footslope deposits. The colluvium was sampled for Mollusca, but due to inaccessibility of the section in the quarry face, no detailed recording or cleaning was undertaken. Consequently relatively few artifacts were recovered.

In the immediate vicinity upslope are the Bronze Age barrow on Round-the-Down (Section 4.4), the Iron Age and Romano-British cross-dyke, formerly thought to be an early Iron Age hillfort, at Ranscombe Camp, and Caburn hillfort (Fig. 20). About 100m immediately downslope is the Ranscombe Romano-British farmstead excavated by Bedwin (1978). The main downland here supports grey rendzinas of the Upton Series, but is fringed by deeper soils (typical calcareous or colluvial brown earths) of the Coombe 2 Association.

The site

The exposed section was recorded over a total length of 76.4m, and attained a maximum depth of 1.68m at the top of a 12m quarry face. The recording of this section was not as detailed as others reported in this thesis due to the difficulty of gaining access to the face. It was also due to this difficulty that the samples were not taken through the maximum depth of the deposits. A portion of the section *c.* 5m wide was crudely cleaned and drawn (Fig. 21).

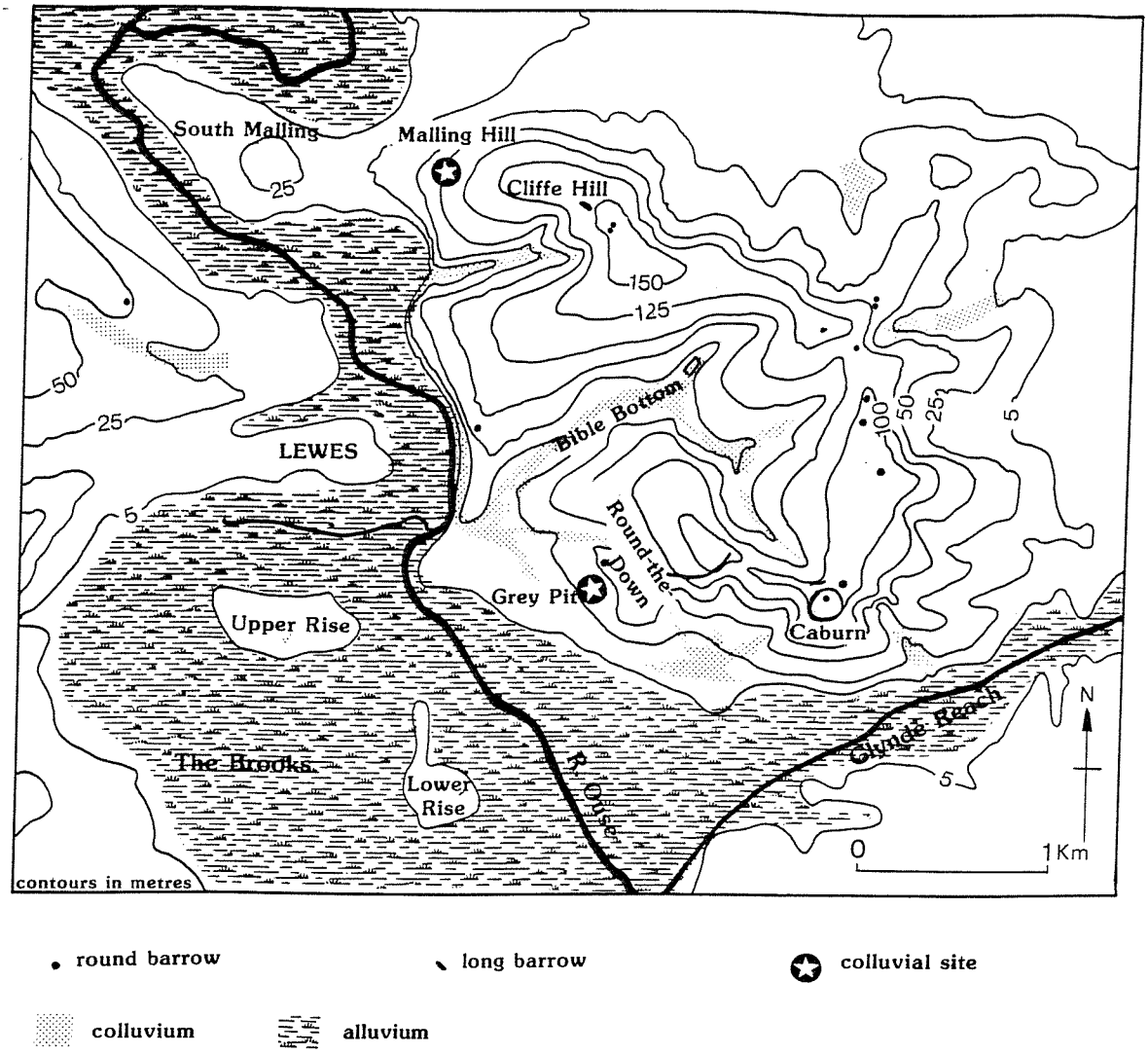


Figure 20. The Caburn Downs, showing the topography and location of Grey Pit, Round-the-Down and Malling Hill.

The Stratigraphy

The deposits lay at the break of slope at the foot of Round-the-Down, the earlier deposits were at the immediate break, and the later colluvium slightly further downslope as a result of the change in slope morphology caused by previous deposition (Fig. 21). Full descriptions are given in appendix 2.2.

Layer 9. The natural chalk was loose, crumbly and highly frost shattered along most of the section. A number of marcasite and iron pyrites stains were present. Towards the top of the slope, the chalk was more solid and less fractured. The chalk was obscured at the southern portion of the slope by modern dumping.

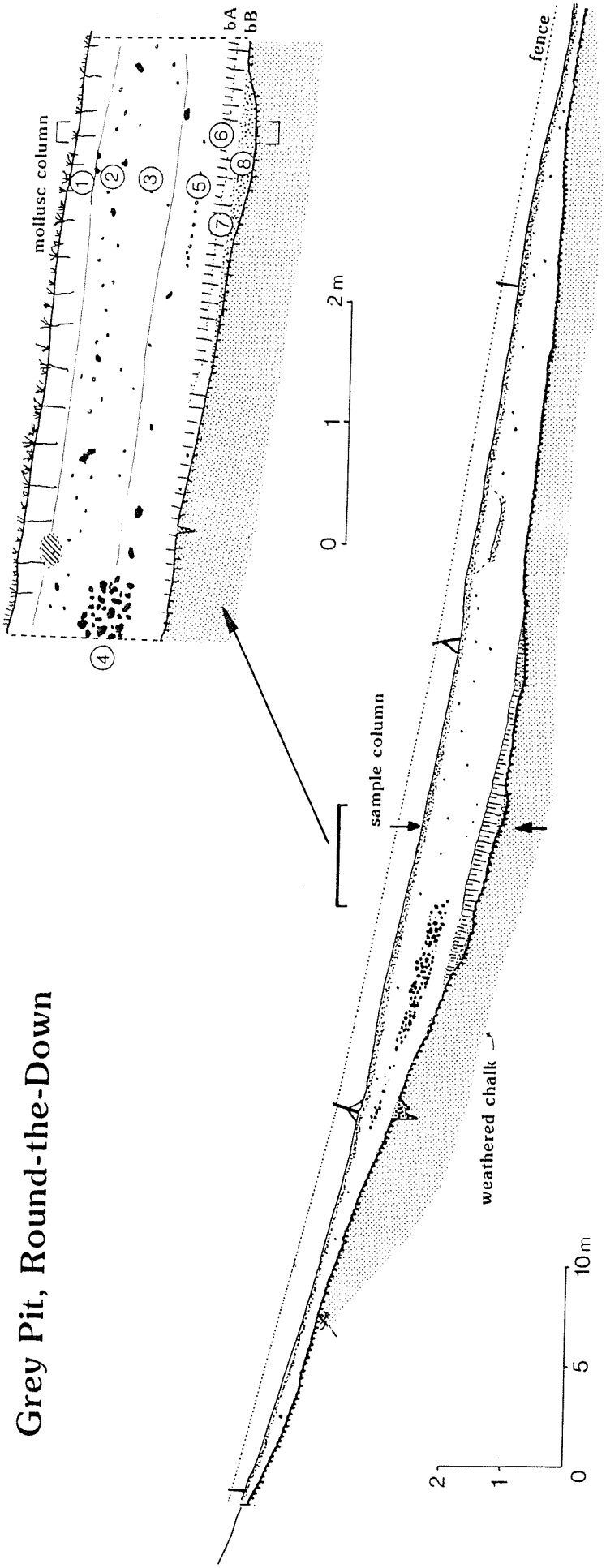


Figure 21. General section of the Grey Pit colluvium and showing detail of sample column location.

Layer 8. A series of gentle undulations in the weathered chalk at the elbow of the footslope deposits contained a mixed dark humic silty clay loam. Rare chalk pieces and occasional flint were noticed; occasional mottles of deep reddish brown were also recorded. The layer was very crumbly (well worm worked), discontinuous and was sampled as a single unit. No artifacts were recovered, but a small parallel sided blade was recovered from the mollusc sample.

Layer 7. This layer was a dark silty clay, which was comparatively stone-free, but contained a few very small and small chalk pieces which extended for about 7.3m and has been interpreted in the field as a bB soil horizon. It had a sharp boundary at its base indicating possible truncation of the lower horizons before soil formation. On site macroscopic examination (with the use of a field microscope), showed signs of earthworm working and distinct worm casts.

Layer 6. A stone-free 10cm thick horizon of dark silt loam. It was patchy in its distribution and was thought in the field to represent the turf or worm worked horizon of the buried soil. The possibility that this is stone-free transported soil material cannot be discounted (compare with similar deposits at Strawberry Hill - Chapter 6).

Layer 5. A silty clay, calcareous, lighter in colour with many small rounded chalk pieces and occasional flints, but graded to a distinctly less stony and darker colour (possibly more humic) at its base.

Layer 4. A lens of medium to large flints with patches of chalk rubble. The lens is distinctly 'bullnosed' in section (Fig. 21) and trailed off upslope over a total length of about 8m. Although when first observed in 1982 it was thought to be a bank, augering could not locate the deposit more than 2.1m from the exposed section. This is thought to be a gravel fan, but no detailed recording was possible in section. The layer was not sampled.

Layer 3. An unsorted highly calcareous yeollowish brown silty clay colluvium with many small and very small rounded chalk pieces, rare flints.

Layer 2. A highly calcareous silt loam, almost white in places, displaying pseudomycelium. This was almost stone-free and highly reminiscent of deposits around Dorchester which have been interpreted as being of aeolian origin (see Chapter 7). In many ways it was similar to the ditch fills (layer 4) to the west of Lewes at Cuckoo Bottom (Allen and Fennemore 1984). Particle size analysis conducted on a sample from this horizon showed that over 76% was coarse silt and thus, as with the deposits at Cuckoo Bottom, may indicate an aeolian component. A number of sand sized glauconitic fragments were recognised (Macphail pers. obs.) A number of root or earthworm channels containing more humic material were noticed. Due to the density of these features only the basal portion of this layer was sampled due to the high possibility of contamination from above.

Layer 1. A colluvail rendzina (Avery 1990, 157) almost stone-free, though obviously calcareous supporting coarse tuffocky grass along the quarry edge.

Artifacts

Only rapid and cursory examination of the colluvium for artifacts was possible. Collection was biased towards pottery sherds in the hope that enough could be acquired to date the sequence. The exact location was not recorded for any of the artifacts, instead they were located by layer only. A number of finds (including a possible copper alloy object) were noticed in the section but were out of reach. Although the distribution of pottery types throughout the sequence is real the absolute numbers of artifacts is undoubtedly biased towards the basal horizons (Table 15). It is unlikely that this is a true representation of the artifact density as these basal horizons were searched more thoroughly. Nevertheless, the fact that layers 6 and 7 might represent buried soils and old land surfaces, may to some extent account for the higher numbers of artifacts recovered.

Pottery

A total of 26 sherds were recovered of which nearly 40% were from layers 6 and 7 for the reasons discussed above; and the majority were Beaker or Early Bronze Age (Table 15).

Beaker and Early Bronze Age

A relatively high number of sherds of grog-tempered Beaker pottery recovered; totalling 15 sherds. Three distinct fabrics and forms could be recognised.

Fabric 1. Soapy, grog tempered with occasional medium sized (up to 1.8mm) calcined flint inclusions. They were entirely oxidised and sherds were 4 - 5mm thick. Two vessels forms were present. Most of the sherds were comb-decorated with simple bands of sharply incised rectangular impressions, all from the same or similar vessels of Clarke's (1970) Wessex-Middle Rhine style. Three sherds had a darker red (almost sealing wax) coloration on the external surface and were decorated with shallower and finer comb impressions in possible lozenge and ladder decorations typical of Clarke's (1970) late Southern Developed forms. All sherds are Middle and Late Beakers.

Fabric 2. Grog tempered with coarser flint inclusions (up to 3.6mm) and often with thicker sherds (5-6mm) with a reduced core. One sherd was decorated with rustications. These sherds are typical of late Domestic Beakers (ApSimon pers. comm.).

Fabric 3. Soapy with fine, sparse flint tempering and some grog tempering. Only one sherd was represented and is probably Food Vessel (ApSimon pers. comm.)

All of the Beaker domestic sherds and the single sherd of Food Vessel came from the stone-free, possible turf (layer 6). Most (6 of 8) of the comb decorated Beaker sherds (fabric 1) also came from layer 6; their mean sherd weight was 3.9g. The four sherds that came from the underlying layer (layer 6) seemed more abraded, and one (Fig. 22) was so badly worn that the comb decoration was only just discernible. The mean sherd size was consistently smaller at only 2.4g. As no difference in decorative style or form could be detected it is assumed that these may have been worm-worked deeper into the soil profile after being resident on the surface for a longer time.

No Beaker or Early Bronze Age pottery was recovered in the overlying horizons.

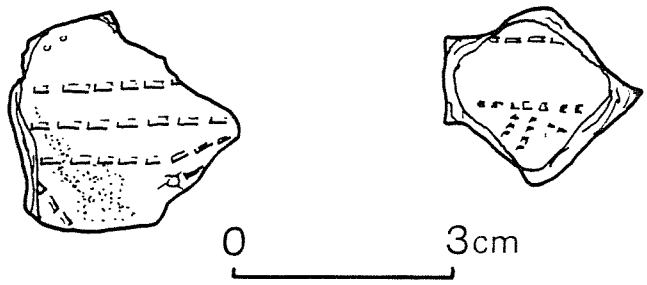


Figure 22. Beaker sherds from the Grey Pit colluvium.

Bronze Age

Only four sherds of undiagnostic Bronze Age pottery were recovered; three from layer 5 and one from layer 3. All were of broadly the same fabric.

Fabric 4. The fabric was of tempered with calcined flint which was liberally spread throughout the fabric, up to 10% vegetable or calcium carbonate tempering was evident in the form of voids. Some fine sand seemed to be present also. All the sherds were relatively thick, *c.* 10mm with reduced cores and orange to orangy/red exteriors. One showed crude thin vertical incisions.

Iron Age

Six sherds of Iron Age pottery were recovered. They were all recovered from layer 5 and fall into two groups.

Fabric 5. Fine flint tempered with iron oxide inclusions which seem to match Hamilton's Fabric 3b (Hamilton 1977, 90). This fabric has a distinctly East Sussex distribution and belong to Cunliffe's early Iron Age Kimmeridge/Caburn style group (Cunliffe 1978).

Fabric 6. Hard, dark grey fabric with very dark sand sized inclusions and occasional calcined flint with a dark grey to black smooth surface. This equates well with Hamilton's Iron Age fabric 3c (Hamilton 1977, 90). Only two sherds belonged to this group, one of which had a bead rim and may indicate that it is a saucepan pot typical of those found at Caburn (Curwen and Curwen 1927; Hawkes 1939a).

Roman

Only two sherds of Roman pottery were recovered; both from layer 3, though there was evidently more in the section. All three belong to East Sussex Ware (Green 1977) which was the most common fabric from the excavations at the bottom of Ranscombe Hill (Green 1978). Both sherds had slight decoration; grooves or banding and are more typical of Roman than of Iron Age forms.

Medieval

Three small sherds of well fired thin walled (*c.* 5mm) sandy pottery were recovered from layer 2. These are all typical of medieval fabrics in the area and possibly originate from the 13th/14th century kilns at Barnett's Mead Ringmer (Hadfield 1981).

	Layer								
Pottery	8	7	6	5	4	3	2	1	Total
Medieval	-	-	-	-	-	-	3	-	3
Roman	-	-	-	-	-	2	-	-	2
Iron Age	-	-	-	6	-	-	-	-	6
Bronze Age	-	-	-	3	-	1	-	-	4
Food Vessel	-	-	1	-	-	-	-	-	1
Domestic Beaker	-	-	2	-	-	-	-	-	2
Combed Beaker	-	2	6	-	-	-	-	-	8
Total	0	2	9	9	0	3	3	0	26

Table 15. Pottery recovered from cleaning the Grey Pit quarry section.

Copper Alloy

A single copper alloy object could be seen within layer 6 but it could not be reached and thus was described *in situ* with the use of a 420mm camera lens. It could be seen as both a stain in the soil and as a distinct band of copper alloy a couple of millimetres diameter about 2 - 3cm long. Whether this was a simple rod, an awl or even a dagger, could not be discerned. A visit several months later, with a ladder over 40 foot long, enabled the general location to be precariously reached but the object could not be found. A rapid metal detector survey of the quarry floor could not find any such object and the site foreman had no record of any such find.

Flints

Only seven flints were recovered. All were well patinated, undiagnostic secondary flakes. One was recovered from layer 8 and the others were randomly recovered from the colluvial and buried soil deposits. Most came from the lower layers for the reasons given above.

Artifact Distribution

From the distribution and occurrence of artifacts some general statements of the date of the various units can be made. These may be refined by the molluscan analysis below. The basal horizon (layer 8) remains undated, but the surface at least of the overlying buried soil horizon (layers 6 and 7) is probably of Beaker date. The size and nature of the sherds indicates activity, possibly settlement, in the vicinity, but not necessarily *in situ*. There is no evidence of major colluviation in the Bronze Age. The main colluvial deposits (layers 3 and 5) seem to belong to the Iron Age and Roman periods and the thin highly calcareous upper colluvial layer (layer 2), which is much thicker and more extensive downslope (Fig. 21), is of medieval or post medieval date.

Charcoal

Fragments of charcoal were not noticed in section, but were recovered from the mollusc samples. They were particularly abundant in sample 3 from the top of layer 6. Most of the fragments were too small to be identified. Nevertheless, those that were identified by Joy Ede are presented in table 16 below.

	Layer						
Species	8	7	6	5	3	2	1
Crataegus (hawthorn)				*		*	
Corylus (hazel)			*				
Quercus (oak)	*	*	**		*		
Fraxinus (ash)		*	**				
Pinus (pine)	*						
Unident fragments	*	*	**	*		*	

* = present ** = many small fragments

Table 16. Charcoal identifications from the Grey Pit colluvium.

Mollusc sequence

A single column of thirteen samples was taken through the colluvium. This was not taken at the deepest nor most representative portion of the section due to difficulties of access to the section. The column, however, did sample all but one of the main units recorded.

The mollusc diagram (Fig. 23) is discussed by layer for convenience as zoning the sequence is too complex. The basal sample is particularly interesting; it produced a predominantly shade-loving assemblage with a number of significant species. The dominant species were *Carychium tridentatum*, *Discus rotundatus* and *Trichia striolata*, but with *Vertigo pusilla*, *Ena montana*, *Acicula fusca* and *Zonitoides excavatus*. The latter species was kindly checked by the late Maureen Girling. The presence of *E. montana*, *Vertigo pusilla*, *A. fusca* and *Zonitoides excavatus* (Table 17) which are all extinct in the area today, and rarely occur in later prehistoric contexts suggest that this deposit may be of considerable age, possibly Atlantic or even Boreal. It represents a fauna of mature deciduous woodland with a dense carpet of leaf litter. The gentle undulations in which the deposit occurred may be relict tree-throw hollows. *Vertigo pusilla*, which has rarely been recorded in Sussex, was found at Asham, by Caroline Ellis (1986), in a buried soil beneath colluvium of Atlantic age.

The base of the putative buried soil (layer 7), although still largely dominated by shade-loving species, reveals a distinctly different shade-loving assemblage. Although many species increase numerically, their relative representation is reduced by the overall increase in shell numbers. The Zonitids, particularly *Vitrea* and *Aegopinella* are important. *Zonitoides excavatus*, *E. montana* and *V. pusilla* are still present. This assemblage is still indicative of a shady woodland, but just what these changes mean in terms of habitat change is not immediately obvious. A slight increase in open country species and of *Pomatias elegans* may indicate some local disturbance on the forest floor. The abrupt boundary between layer 7 and the dark crumbly humic material beneath (Appendix 2.2) may indicate truncation and a hiatus and thus represent potentially a considerable time lapse between the two assemblages (cf. Carter 1990).

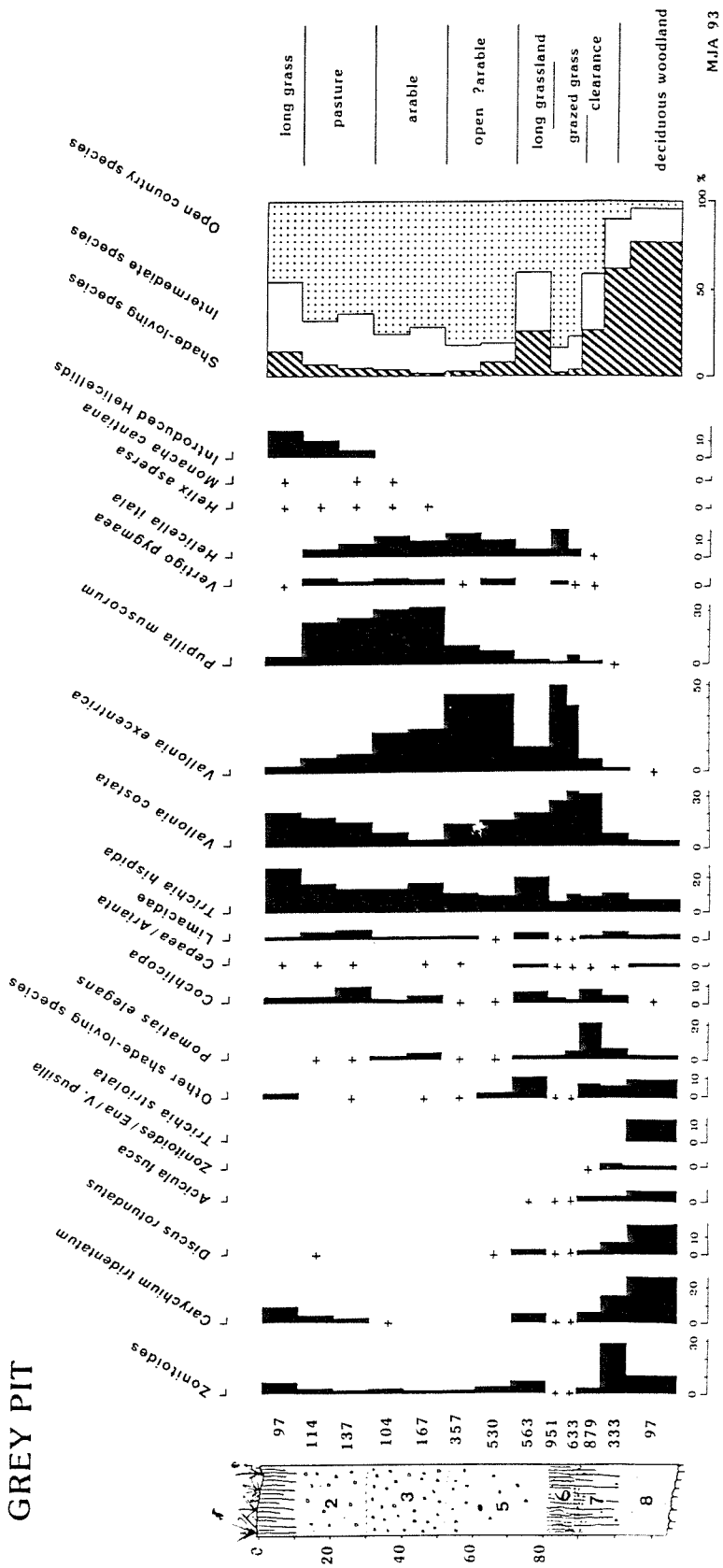


Figure 23. Mollusc histogram from the Grey Pit colluvium.

In the upper portion of the same layer there is a reduction in all shade-loving elements, *Pomatias elegans* is significant, and open country species, particularly the pioneering Vallonia, *V. costata*, increase. This is undoubtedly evidence of woodland clearance and localised disturbed ground (*Pomatias elegans*). In the stone-free horizon (layer 6) the trend continues, but *P. elegans* is no longer a significant component. The domination of *Vallonia excentrica*, *Vallonia costata* and *Helicella itala* indicate a short, possibly trampled or grazed, dry grassland. This would seem therefore to confirm the field interpretation of a turf horizon, and indeed shell numbers increase to over 1000 per kilogram. Many of the shade-loving species never return.

The base of the main colluvial units (layer 5) showed, surprisingly, an increase in the shade-loving group and also of *Trichia hispida* at the expense of most of the open country species. The increase of *Carychium tridentatum* and *Punctum pygmaeum* is more likely to represent longer grass and reduction of grazing or occupation pressure than woodland regeneration. Subsequently these disappear and open dry downland, probably tilled is evidenced by the high numbers of *V. excentrica* and the presence of *H. itala*. This is reminiscent of many colluvial and lynchet mollusc faunas (cf. Bell 1983). Layer 3, which is stratigraphically separated from layer 5 upslope by the gravel lens, shows a change in the composition of the open country fauna. *Pupilla muscorum's* abundance at the expense of *V. excentrica* might normally be seen to indicate grassland condition (cf. Evans and Williams 1991), however, the re-emergence of *P. elegans* indicates disturbance more concomitant with tillage. On balance this probably indicates tillage; the change in the molluscan fauna may reflect a change between Iron Age and Roman tillage practices. The specific habitat changes cannot, however, be discerned.

The highly calcareous and extremely silty horizon (layer 1) shows a similar mollusc assemblage, changes are minor, though probably significant. *P. muscorum* is still dominant, and the Vallonias display an elegant antipathetic behaviour; *V. excentrica* declining with the expansion of *V. costata*. Also present is *C. tridentatum* and the Introduced Helicellids. These assemblages represent a more stable dry grassland. The base of the modern soil profile shows open conditions,

\ Sample	1	2	3	4	5	6	7	8	9	10	11	12	13
\ Context	8	¦---7---¦		¦---6---¦		¦------5-----¦			¦---3---¦		¦---2---¦		1
\ Depth (cm)	102-	95-	89-	85-	80-	70-	60-	50-	40-	30-	20-	10-	0-
\	116	102	95	89	85	80	70	60	50	40	30	20	10
\ Wt (g)	1500	1500	1000	869	942	1000	1000	1000	1000	1000	1000	1000	1000
MOLLUSCA													
Pomatias elegans (Müller)	2	26	161	27	16	9	+	5	7	2	1	+	-
Acicula fusca (Montagu)	5	11	21	3	12	2	-	-	-	-	-	-	-
Carychium tridentatum (Risso)	24	49	53	2	1	30	-	-	-	1	3	4	9
Cochlicopa lubrica (Müller)	-	1	5	3	1	2	-	-	-	-	-	-	-
Cochlicopa lubricella (Porro)	-	3	3	3	9	7	-	1	1	-	5	1	2
Cochlicopa spp.	1	9	19	8	23	26	3	2	4	2	7	2	1
Vertigo pygmaea (Draparnaud)	-	-	2	9	18	-	18	4	5	2	3	4	1
Vertigo pusilla (Müller)	1	2	-	-	-	-	-	-	-	-	-	-	-
Pupilla muscorum (Linnaeus)	-	-	13	29	31	17	43	38	59	32	36	27	5
Vallonia costata (Müller)	3	23	261	197	249	103	79	45	7	8	18	19	19
Vallonia excentrica Sterki	1	9	79	239	476	86	236	160	45	24	15	10	4
Acanthinula aculeata (Müller)	-	4	42	2	2	17	4	2	-	-	-	-	2
Ena montana (Draparnaud)	+	3	2	-	-	-	-	-	-	-	-	-	-
Ena obscura (Müller)	3	2	4	+	-	8	2	-	-	-	-	-	-
Punctum pygmaeum (Draparnaud)	-	8	14	4	3	27	2	-	-	-	-	1	1
Discus rotundatus (Müller)	16	22	18	4	2	16	7	-	-	-	-	+	-
Vitrina pellucida (Müller)	-	3	2	-	-	6	3	1	-	-	-	-	-
Vitrea crystallina (Müller)	-	6	4	-	-	-	-	-	-	-	-	-	-
Vitrea contracta (Westerlund)	3	36	28	5	4	17	9	1	-	2	2	1	1
Nesovitrea hammonis (Ström)	-	6	2	1	3	-	1	-	2	-	1	-	-
Aegopinella pura (Alder)	-	11	8	1	2	3	2	3	1	1	-	2	2
Aegopinella nitidula (Draparnaud)	4	30	25	2	1	13	6	1	-	-	-	-	-
Oxychilus draparnaudi (Beck)	-	-	-	-	-	-	-	-	-	-	-	-	3
Oxychilus cellarius (Müller)	2	-	-	-	-	4	2	1	-	-	-	-	-
Zonitiodes excavatus (Alder)	1	4	2	-	-	-	-	-	-	-	-	-	-
Limacidae	3	14	17	9	7	21	4	7	4	2	8	6	4
Euconulus fulvus (Müller)	1	3	-	-	-	-	-	-	-	-	-	-	-
Cecilioides acicula (Müller)	-	-	-	-	-	3	34	85	167	68	45	18	5
Cochlodina laminata (Montagu)	2	1	2	-	-	3	1	-	-	-	-	-	-
Clausilia bidentata (Ström)	3	2	5	1	1	2	2	1	+	-	1	-	-
Candidula intersecta (Poiret)	-	-	-	-	-	-	-	-	-	-	3	4	7
Candidula gigaxii (L. Pffeiffer)	-	-	-	-	-	-	-	-	-	-	1	2	3
Cernuella virgata (da Costa)	-	-	-	-	-	-	-	-	-	-	3	4	4
Helicella itala (Linnaeus)	-	-	8	16	24	21	64	45	16	12	9	6	-
Cochlicella acuta (Müller)	-	-	-	-	-	-	-	-	-	-	-	1	1
Monacha cantiana (Montagu)	-	-	-	-	-	-	-	-	-	1	1	-	1
Trichia striolata (C. Pfeiffer)	12	4	-	-	-	-	-	-	-	-	-	-	-
Trichia hispida (Linnaeus)	7	36	77	62	24	111	51	40	31	15	19	19	25
Arianta arbustorum (Linnaeus)	1	1	+	-	-	-	-	-	-	-	-	-	-
Helicigona lapicida (Linnaeus)	+	+	-	+	-	-	1	-	-	-	-	-	-
Cepaea nemoralis (Linnaeus)	-	-	-	-	-	3	-	-	-	-	-	-	-
Cepaea hortensis (Müller)	-	-	-	-	1	1	-	-	-	-	-	-	-
Cepaea/Arianta spp.	2	2	+	-	4	8	-	+	1	-	1	+	1
Helix aspersa (Müller)	-	-	-	-	-	-	-	-	+	+	+	1	1
Taxa	21	29	27	21	22	25	21	16	12	13	18	17	20
Shannon Index (*H'*)	2.52	2.87	2.39	1.81	1.60	2.59	1.87	1.75	1.87	1.94	2.36	2.35	2.46
TOTAL	**97**	**323**	**879**	**633**	**951**	**563**	**530**	**357**	**167**	**104**	**137**	**114**	**97**

Table 17. Land Mollusca from the Grey Pit colluvium.

but the increase in *C. tridentatum* and the Zonitids indicate longer, ungrazed grassland. The presence of *Cochlicella acuta* which has a broadly maritime distribution is noteworthy.

Discussion

There can be no doubt that this compressed colluvial sequence is of major importance. It can, in part, be paralleled with the more extensive analysis of deeper deposits conducted by Ellis (1986) at Asham only 2.2km to the south; again on a slope overlooking the River Ouse. The mature woodland identified at the base of the sequence may be of Atlantic age (i.e. Mesolithic or earlier Neolithic); and is possibly represented by the charcoal of oak and pine. A change in the woodland, probably dating to the Neolithic, can be seen from the mollusc assemblages. Limited local disturbances might have created slightly more open woodland, this might be represented by the presence of hazel in the charcoal record. The buried soil seems to have survived to a total depth of about 20cm, but is distinctly less calcareous and more humic than the present day rendzinas. This may represent a compressed, or truncated, typical or calcareous brown earth. Certainly the interpretation of a grassland turf seen in the section is supported by the molluscs and by the fact that the majority of the pottery seems to have come from this layer. The number of Late Beaker sherds indicates occupation within the immediate vicinity. Certainly the density recovered is greater than that from Ashcombe Bottom (section 4.2) where intensive excavation was conducted, but the mean sherd size here is appreciably smaller.

The colluvium overlies this surface with a sharp boundary which may indicate loss of former soil, or colluvial, horizons. Indeed the lack of Bronze Age pottery is perhaps surprisingly in view of the barrow immediately upslope, and the number of sherds recovered in the vicinity from fieldwalking (Knight-Farr pers. comm.). The main colluvial episodes seem to have occurred after a period of longer grassland and dates to the Iron Age. Tillage of the local slopes is likely, and was probably associated with the hillfort at Caburn and the local dykes at Ranscombe Camp.

Roman tillage was probably associated with the adjacent farmstead, and

pottery recovered from the section matches that from the excavations (cf. Green in Bedwin 1978). The fact that the mollusc assemblages indicate a possible change in tillage or farming practices is particularly interesting. This may indicate a real change in the local inhabitants and farming methods; a break between the native Iron Age population and that of Romanised influence. The medieval deposits are more extensive downslope from the location analysed. Although the molluscs suggest open grassland and pasture, the aeolian nature of the sediments indicate that the silts had blown off fields locally. The presence of a number of fragments of glauconite in the sediments may suggest that the greensand bench downslope was being cultivated.

Summary

Three significant points can be made from this analysis:

1) The identification of two former deciduous woodland mollusc faunas
2) The presence of Beaker occupation in the vicinity, and
3) Possible differences between Iron Age and Roman cultivation practices.

4.4 THE ROUND-THE-DOWN BARROW

Over ten years after excavations had been conducted, the site of the excavated Bronze Age round barrow (Fig. 20) was re-visited to obtain samples for mollusc analysis from the ditch in 1985. The barrow lies on a small low ridge and is separated from the main downland of Ranscombe-Caburn by the head of the Machine Botton dry valley (Fig. 20) The Middle Chalk of the area supports grey rendzinas of the Upton 1 association.

Samples of the recent (post 1975) fills from the excavated ditches were also sampled as a part of programme of assessing modern sedimentation regimes and associated mollusc faunas (Allen 1988b, 286-7). Sampling was undertaken by the writer with the aid of Louise Mount and Paul Hill. A series of five spot samples were taken from the cleaned face of the ditch section in the north east quadrant (Fig. 24). During excavation in 1973-4 a number of caches of land snails were found and collected. These were also identified (Table 18) and any soil and smaller shells carefully washed from them and also identified. This

information is dealt with separately.

The V-shaped ditch produced a typical tripartite infill sequence (Fig. 24). The basal chalk rubble primary fill probably accumulated over *c.* 20 years (cf. Crabtree 1990; Bell 1990b) and thus the associated mollusc assemblages probably represent the pre-barrow environment and that contemporary with its construction and initial use. No buried soils were observed within the ditch sequence.

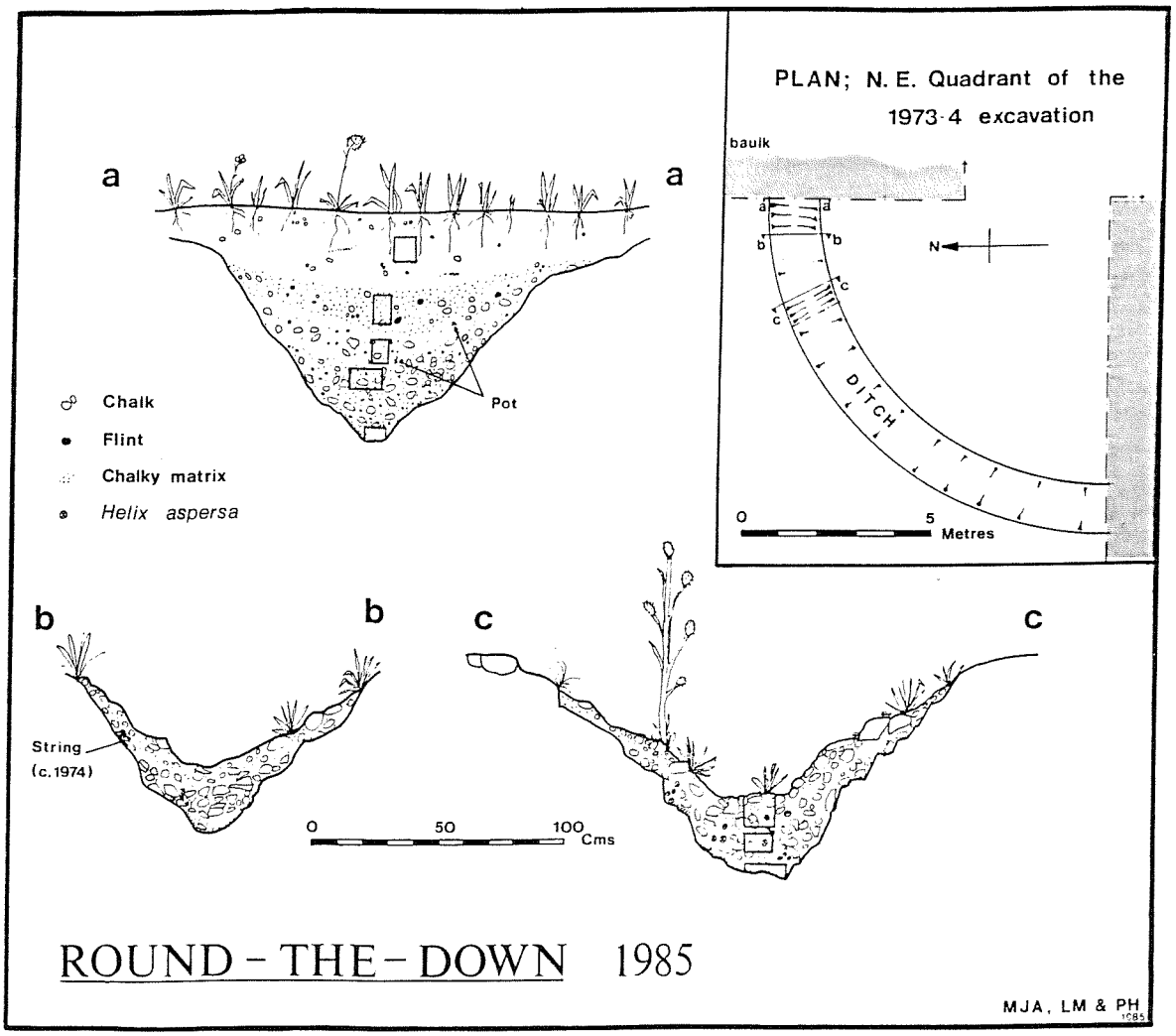


Figure 24. Section of the sampled ditch and plan of the NE quadrant.

Stratigraphy

0 - 33cm Modern brown rendzina. Humic silty loam with weak medium granular structure blocky peds, many fine and medium fiborous roots. Rare small and medium sub-

rounded chalk pieces, 2% medium - small macropores and larger voids, much biotic activity. Tertiary fill.

33 - 46cm Silty loam, common and medium fleshy and fine fibrous roots, frequent small and very small chalk pieces, rare large sub-angular chalk pieces. *Helicella itala* noted. Stabilisation horizon.

46 - 65cm Calcareous silty clay loam with few to common medium sub-angular chalk pieces common fine fibrous roots. Secondary fill.

65 - 92cm Chalky calcareous primary fill with common to abundant small and medium angular chalk pieces and some large angular chalk blocks in a calcareous silt matrix.

92 - 99cm Stone-free calcareous chalk mud. Primary wash.

The Mollusca

Shell preservation was good and reasonable numbers of molluscs were recovered even from the coarse primary fill (Table 18). What is of particular interest here is the rich assemblages with consistently high species diversity indexes.

The basal assemblage from the chalk mud and primary fills are significant in that up to 85% belong to Evans' (1972, 194-196) shade-loving group (Fig. 25). The assemblages are characterised by an abundance of *Carychium tridentatum* together with the predatory Zonitids which are commonly associated with decaying plant matter beneath leaf litter on a deciduous woodland floor. The relatively high proportion of Vallonias (12%) however, together with *Vitrea contracta* may indicate long mesic grassland as argued by Allen (1991b) for ditch assemblages at Barton, Bedfordshire. Certainly many of these shade-loving species have been recorded in chalk grassland succession communities (Cameron and Morgan-Huws 1975). The presence of a shady woodland habitat is nevertheless confirmed by the record of *Acicula fusca* which is a specifically woodland species. It inhabits mature, undisturbed woodland ecosystems and is considered an anthropophobe and is therefore

relatively rare in Neolithic and post-Neolithic contexts (Evans 1972, 135). Both the upper primary fill and lower secondary fills produced predominantly shade-loving species which is unusual. *Carychium* is still dominant but the increase in *Discus rotundatus*, *Acicula fusca* and the Zonitids, particularly *Aegopinella nitidula* and *Oxychilus cellarius*, and the presence of *Balaea perversa* which lives on tree trunks, indicate that shrubs and perhaps even woodland conditions had been re-established, or that much of this assemblage is derived from lower (older) horizons in the adjacent woodland soils. If this represents regeneration then this may be either the encroachment of the former woodland, or the later stages of a hawthorn sere vegetation community. Whatever the precise nature of this more shady vegetation,

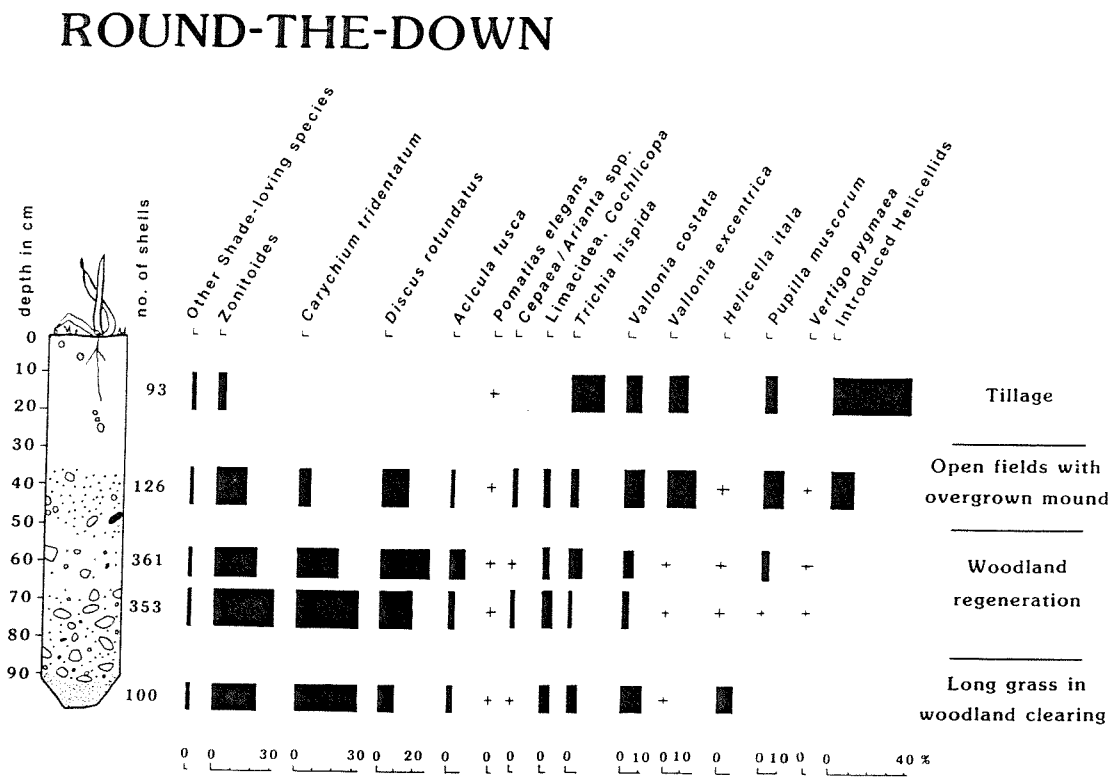


Figure 25. Mollusc histogram from Round-the-Down.

it is clear that these conditions were prolonged. Surprisingly despite the evident human activity, the anthropophobe *A. fusca* is still present. The only open country species present in any significance is *Pupilla muscorum* which probably exploited the bare earth habitats

created by the weathering sides of the ditch itself.

It is only in the tertiary fills that open country species become established in any way, but even here a surprisingly high shade-loving element is still in existence. Although the open country species present (*Vallonia costata*, *Vallonia excentrica* and *Pupilla muscorum*) together with *Trichia hispida* are typical of short grassland or even arable contexts, such environments are shunned by *Discus* and Zonitids which occur in relatively high numbers. It is possible therefore, that the assemblages relate to two very localised environments; an arable environment around the barrow, and taller herbaceous vegetation and hawthorn shrubs on the mound. As this assemblage included a number of Introduced Helicellids (Table 18) it indicates a medieval or later date (Kerney 1966; 1977). More typical xerophilous conditions finally prevailed very late in the monument's history. The base of the modern rendzina produced assemblages dominated by open country species and typical of open dry downland and arable activity. One of the Introduced Helicellids, *Cochlicella acuta*, has a maritime distribution (Kerney 1976b), but does occur inland (Ellis 1951) and is I have observed it as colonies in a number of locations in the Lewes area today.

Hand picked shells

Usually only the larger specimens are collected by manual recovery and these are not useful for palaeo-environmental interpretation. Careful cleaning and removal of the soil within the larger shells can sometimes provide an indication of the other smaller species with which it was associated (Table 18). During excavation a number of large caches of shells were recovered in the ditch. They were carefully excavated as it was thought that as they were from the lower fills, they may have constituted a part of the Bronze Age diet. However, identification revealed the most common species (of which one cache included 499 specimens) was the large garden snail, *Helix aspersa*, which it is believed did not exist in this country prior to the Roman period (Kerney 1966; 1977). A high proportion of snails were adult and detailed examination of every complete shell showed no evidence of apertural damage common when extracting the snail for consumption. The most likely explanation for the large collections of this species is

						Hand collected shells									
\ Sample/Quadrant	4	5	6	7	8	NEQ	NEQ	NEQ	SEQ	SEQ	NEQ	NWQ	SEQ	SWQ	SWQ
\ Context	4	3	2	2a	1	4		3		2a	2				1b
\ Depth (cm)	92-99	67-77	56-64	35-45	10-20										
\ Wt (g)	1500	1500	1000	1000	1000										
MOLLUSCA															
Pomatias elegans (Müller)	+	2	+	1	1	-	-	32	4	-	11	-	22	-	-
Acicula fusca (Montagu)	3	9	27	2	-	-	-	-	-	-	-	-	-	-	-
Carychium tridentatum (Risso)	19	91	66	9	-	-	-	1	-	-	-	-	1	-	-
Carychium spp.	14	24	4	-	-	-	-	-	-	-	-	-	-	-	-
Oxyloma/Succinea spp.	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Cochlicopa lubrica (Müller)	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-
Cochlicopa lubricella (Porro)	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Cochlicopa spp.	2	7	8	1	-	-	-	2	-	-	4	-	1	-	-
Vertigo pygmaea (Draparnaud)	-	1	3	1	-	-	-	-	-	-	-	-	-	-	-
Vertigo moulinsiana (Dupuy)	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Pupilla muscorum (Linnaeus)	-	1	15	12	6	-	-	-	-	-	3	-	-	-	-
Vallonia costata (Müller)	11	10	22	13	7	-	-	-	-	-	17	-	-	-	-
Vallonia excentrica Sterki	1	2	3	19	9	-	-	1	-	1	4	-	-	-	-
Acanthinula aculeata (Müller)	-	5	3	-	-	-	-	-	-	-	-	-	-	-	-
Ena obscura (Müller)	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Punctum pygmaeum (Draparnaud)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discus rotundatus (Müller)	8	60	91	17	-	-	-	3	-	2	10	-	1	-	-
Vitrina pellucida (Müller)	1	-	-	1	2	-	-	-	-	-	-	-	-	-	-
Vitrea crystallina (Müller)	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Vitrea contracta (Westerlund)	20	67	52	17	-	-	-	-	-	-	1	-	1	-	-
Nesovitrea hammonis (Ström)	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-
Aegopinella pura (Alder)	2	9	5	-	-	-	-	1	-	-	-	-	-	-	-
Aegopinella nitidula (Draparnaud)	-	17	15	3	-	-	-	-	-	-	-	-	-	-	-
Oxychilus draparnaudi (Beck)	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-
Oxychilus cellarius (Müller)	1	16	5	-	-	1	-	5	-	3	-	-	2	-	-
Limacidae	1	10	4	3	-	-	-	-	-	1	1	-	-	1	-
Euconulus fulvus (Müller)	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Cecilioides acicula (Müller)	3	6	58	234	108	9	-	-	-	4	40	-	1	-	-
Cochlodina laminata (Montagu)	-	-	-	+	-	-	-	4	-	-	-	-	+	-	-
Clausilia bidentata (Ström)	+	1	1	-	-	-	-	-	-	-	-	-	-	-	-
Balaea perversa (Linnaeus)	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Candidula intersecta (Poiret)	-	-	-	7	22	1	-	4	-	-	-	-	1	-	1
Candidula gigaxii (L. Pfeiffer)	-	-	-	7	3	-	-	-	-	-	1	-	-	-	-
Cernuella virgata (da Costa)	-	-	-	2	6	-	-	-	-	-	4	1	-	-	2
Helicella itala (Linnaeus)	8	4	1	2	-	3	-	5	-	1	10	-	-	12	1
Cochlicella acuta (Müller)	-	-	-	-	17	-	-	-	-	-	-	-	-	-	-
Trichia hispida (Linnaeus)	6	8	26	6	16	-	-	-	-	-	2	-	-	-	-
Helicellids	-	-	-	-	-	1	-	4	-	-	-	-	-	-	-
Arianta arbustorum (Linnaeus)	+	-	-	-	-	-	-	-	1	2	2	-	-	-	-
Helicigona lapicida (Linnaeus)	-	+	+	+	-	-	-	1	-	-	-	-	-	-	-
Cepaea nemoralis (Linnaeus)	-	-	-	-	-	+	2	18	4	15	36	2	11	5	-
Cepaea hrotensis (Linnaeus)	-	-	-	-	-	-	1	8	-	1	2	-	2	-	-
Cepaea/Arianta spp.	1	6	5	2	-	-	-	8	-	-	-	-	4	-	-
Helix aspersa (Müller)	-	-	-	+	+	40	-	+	-	-	499	-	-	5	2
Taxa	16	21	23	20	11	5	2	16	4	9	14	2	10	4	4
Shannon Index (*H'*)	2.31	2.32	2.35	2.57	2.10	-	-	-	-	-	-	-	-	-	-
TOTAL	**100**	**353**	**361**	**126**	**93**	**46**	**3**	**100**	**10**	**27**	**608**	**3**	**46**	**23**	**6**

Table 18. Round-the-Down land Mollusca (including hand picked shells and shells washed from them).

that they were hibernating in the loose rock rubble. They are known to have gregarious habits and hibernate for six months of the year, often in groups in which individuals often affix themselves to each other. That large numbers did not survive can be attributed to the species' susceptibility to winter frosts (i.e. a death assemblage). Indeed during sampling in March 1985 clusters of hibernating and dead *Helix aspersa* were seen in the thin chalk rubble layers that had accumulated since the excavations were completed ten years earlier.

Discussion

The assemblages from the barrow are atypical in the prolonged predominance of shady, albeit local, habitats. It is evident that despite molluscan evidence indicating localised clearance at Offham in the late fourth millennium BC and more extensively in the later Neolithic (Thomas 1977a) and open conditions prevailing at the foot of Round-the-Down in the Early Bronze Age (Allen forthcoming a), there seems to have been little clearance of the primary woodland, on Round-the-Down itself, in the earlier Bronze Age. This does however agree with the broader picture of the area suggested by Thorley (1971; 1981) from a pollen sequence in the Vale of the Brooks where woodland is indicated until the Middle Bronze Age. The barrow was constructed in a recently cleared woodland within an area of tall grass, but it is also evident that the woodland may not have been extensive, for the foot of the Down was probably already cleared at this time. The clearance at Round-the-Down may have been specifically for the construction of the barrow and its associated activities and was only localised. The rapid colonisation of the ditch occurred probably within about 20 years. The high numbers of woodland species indicates that suitable habitats cannot have been very far from the barrow and the general lack of colonisation by open country species may indicate that there were few habitats locally from which they could have originated. Even a relatively small clearance here would result in the ridge being a prominent visible feature and thus the barrow seen from a number of vantage points, both from above (Caburn) and below (Ouse Valley). It is also clear that after construction the monument was not tended as the white chalk mound was very soon allowed to become an overgrown morass, and probably remained as such through most of prehistory. No episodes of temporary clearance associated with secondary activity were

recorded as have been demonstrated elsewhere (e.g. Buckskin, Hampshire; Allen *et al.* forthcoming), but here this may have been a failing of the sampling strategy adopted.

Although Round-the-Down itself does not seem to have been tilled, nor even extensively cleared for rough grazing throughout prehistory, this is not the case for the surrounding downland (Allen forthcoming a). Certainly both the Iron Age earthworks at Ranscombe and Caburn were constructed in open short downland probably with some bracken locally (Dimbleby 1985). Tillage of the slopes adjacent to and beneath Round-the-Down is evidenced in the ploughwash recorded in the north face of the Grey Pit quarry section (see Section 4.3 above) to the east and in the dry valley immediately to the west of the barrow (Fig. 20 and Allen forthcoming a). In both cases colluvium as a result of tillage is of Early to Middle Bronze Age date. It is certainly unusual that Round-the-Down, an area of apparently prime agricultural land, does not seem to have been exploited as such in prehistory despite the fact that most of the surrounding land was. Perhaps one can venture to say the the ridge was designated for other activities, one of which may have been the burial of the dead and other activities.

4.5 INVESTIGATIONS AT MALLING HILL (TQ 4232 1108)

A complex section of lynchets and deposits is exposed in a small post-war quarry on the western edge of Malling Hill (Fig. 20). The chalk pit is quarried into Middle Chalk and bisects a major plateau-edge lynchet feature. The site has been the subject of a number of visits and investigation by the writer (between 1977 and 1988), and Sarah Clark (1988) and observations by Courty *et al.* (1989, fig. 7.5c).

The quarry was visited over a period of two decades and a number of artifacts recovered from both the colluvial scree and the exposed face. Initially artifacts were recovered indiscriminately but after 1977 a crude record of the location of all artifacts was made. In 1986 the whole of the northern section of the quarry was cleaned, the location of artifacts recorded, and the section drawn (Fig. 26) prior to sampling for land Mollusca. The aim of this work was to date the colluvial sequences and place them within a broader framework.

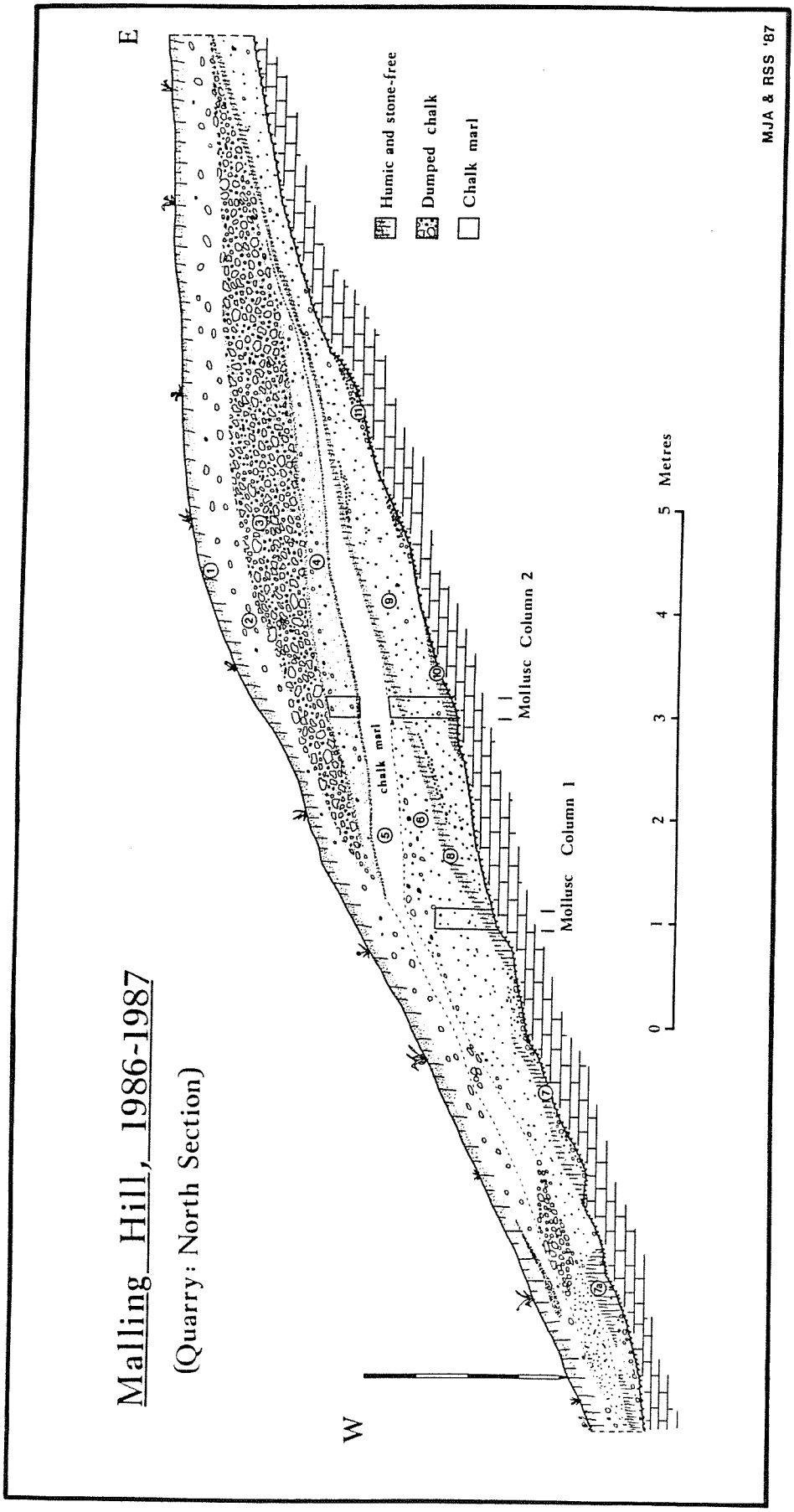


Figure 26. Section of the Malling Hill deposits (note: ranging pole is marked in 0.5m intervals).

Archaeological background

There have been a number of significant archaeological discoveries within the immediate vicinity of the chalk pit and on the north-western side of Malling Hill. A large Saxon cemetery at South Malling lies to the west on the low spur overlooking the River Ouse. Twenty skeletons were found in 1830 with swords, spear heads, knives, shield bosses, iron buckles, i.e. normal Saxon accoutrements (Norris 1956, 11). Further discoveries of Saxon brooches and burials in the vicinity are reported by Norris to the Sussex Archaeological Society's research committee (*Sussex Notes & Queries* 14, 67 & 214) and published (Norris 1956). A mass grave of 13 murdered male victims was recovered in 1973 immediately adjacent to the quarry pit section studied here (Lewis 1973; O'Shea 1974). A radiocarbon date of 1010 BP ± 80 (cal AD 979 - 1151 one sigma) was obtained from one of the skeletons (HAR- unpub. information from Sussex Archaeological Society). A number of other Saxon artifacts have been recovered from Malling Hill including a shield stud and small long brooch (information from F. Marsden).

Immediately to the north of the chalk pit is a reasonably well defined prehistoric field system (Fig. 20), the systematic fieldwalking of which (1983-1987) produced predominantly Iron Age and Roman pottery, with small quantities of Bronze Age pottery and flints (O'Shea 1983; Gregory 1984; 1985). A number of Romano-British finds are known from the area, many associated with the Saxon cemetery (Norris *op. cit.*), but also include the catch-plate of an early Romano-British brooch and two coins: a Late Iron Age potin and an early Roman Dupondius (information from F. Marsden). The area is also rich in prehistoric activity including a Neolithic long barrow and a number of Bronze Age barrows (see Fig. 20). Bronze Age socketed axes have also been recovered from the Down. Lewis (1973) records an Early Neolithic flint assemblage from limited excavations possibly associated with an unconfirmed, and therefore doubtful, causewayed enclosure (cf. Drewett 1975a, 139)

The stratigraphy (described and sampled 17/4/86)

The colluvial sequence comprises a series of lynchets which form the lower edge of the prehistoric field systems (Fig. 20 and 26) beneath which runs a well defined track (hollow way). The chalk surface dips

at about 16° and is interrupted by a series of stepped ledges, probably former negative lynchets.

Pit

The edge of a small, steep sided pit (not illustrated) was noticed in section in 1976-7; only a thin slice of the fill remained and even this was almost totally eroded away later in 1977. The pit was filled with a dark soil with few chalk pieces. This feature produced three sherds of Peterborough style pottery (identified by P.L. Drewett and A.M. ApSimon).

The colluvial sequence (Full descriptions are given in appendix 2.3)

Context 11: A highly calcareous lens of small and medium rounded chalk pieces in a silty loam; it immediately overlies the chalk in two of the negative lynchet steps on the upslope side and probably represents weathering or physical destruction of the chalk.

Context 10: Stone-free, humic silty clay with very rare small chalk pieces; relict old land surface. This horizon is discontinuous and seems to be preserved in the small localised negative lynchet platforms.

Context 9: A yellowish brown calcareous silty clay loam with many sub-angular small and medium chalk pieces comprises the first low lynchet accumulation.

Context 8: Dark greyish brown highly calcareous humic stone-free silt loam overlying a weathered stony horizon seals the lynchet and probably represent stabilisation and limited *in situ* soil formation and worm sorting. This certainly gave the impression in field of being a buried soil or turf line.

Context 7: This stone-free horizon has the same physical characteristics of context 8 and may represent its continuation.

Context 6: Light brownish grey highly calcareous silty clay with common small and medium chalk pieces. It displays pseudomycelium (Evans 1972, 398). This is colluvial material and forms an extension

of the former low lynchet (context 9), creating a broad platform. It could not be discerned in the field whether this was deliberately dumped to create a larger boundary, which would explain the preservation of the buried sil horizon (context 8), or is a result of colluviation.

Context 5: Chalk rubble and silty marl not dissimilar from periglacial Coombe Deposit. This has probably been dumped either to create a larger boundary or as a result of digging upslope. No evidence of the latter could be seen in the immediate area.

Context 4: Yellowish brown silty clay with many medium and large chalk pieces which seems to be a mixture of soil material and chalk.

Context 3: Large angular chalk rubble with little matrix; an enigmatic layer which probably represents chalk excavated from further upslope, possibly even a man-made strip lynchet.

Context 2: Greyish brown silty clay loam with common medium chalk fragments. Is the base of the present rendzina soil profile.

Context 1: Brown/colluvial rendzina with many medium chalk pieces and stone-free humic turf supported short-turfed species rich grassland.

The horizons primarily examined during all field visits were the colluvial layers of the lynchets (contexts 6 and 9). These seem to be largely a result of colluviation and contrast to the overlying layers which largely give the impression of being deliberately dumped.

Artifacts

A number of artifacts recovered from the section and the scree by both the author and Clark (1988) are detailed here, but the precise location of only relatively few are known (Table 19). Nevertheless some crude chronology is indicated by the distribution of these finds.

Pottery

A total of 81 sherds were recovered from 1977 - 1986 and further seven were added to this total by Clark's (1988) investigations (Table 19).

Neolithic: All three sherds were recovered from the shallow pit which was possibly truncated, and certainly sealed, by the colluvial sequence. They seem to belong to the same vessel; the sherds were a deep brown colour and the fabric was largely of calcined flint inclusions in a weakly fired matrix with some evidence of either organic or calcareous conclusions. Under a hand lens some sand grains and few chalk pieces were observed. This probably equates with Drewett's fabric I (1980, 24) which is of local manufacture and common on chalk sites. Three rows of crude stab impressions were visible on one of the sherds. All the sherds were gently curved and one (Fig. 27) had a return possibly indicating that it had broken along an undecorated 'carination'. The vessel therefore seems to have been a small round-based open bowl typical of the Late Neolithic Peterborough tradition (ApSimon pers. comm.) for which parallels can be seen at Alfriston (Drewett 1975a), Selmeston (Drewett 1975b) and Offham (Drewett 1977).

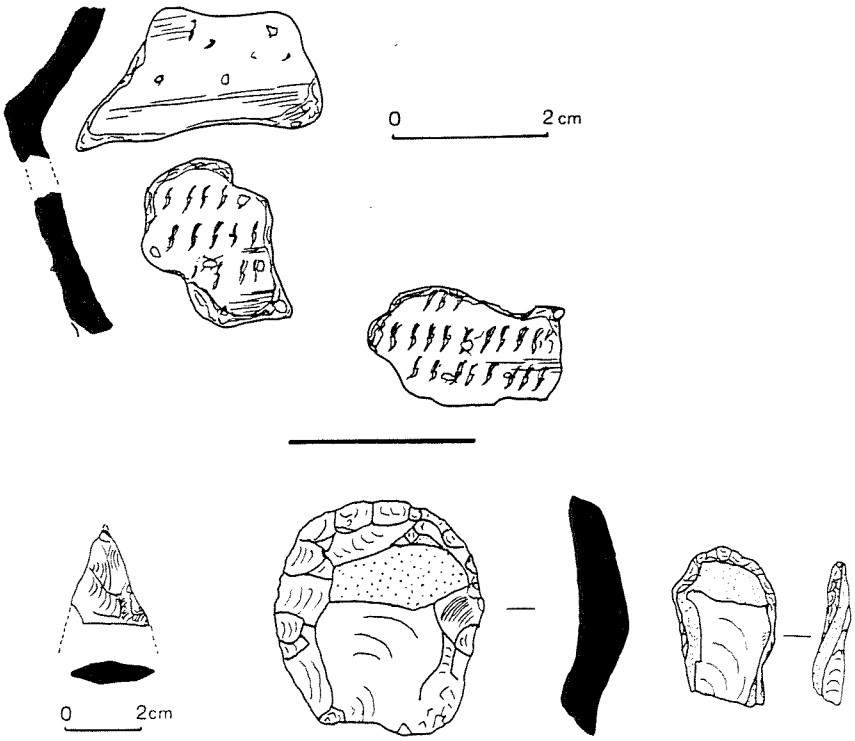


Figure 27. Peterborough ware from the pit and flint artifacts from the colluvium.

Iron Age: Three sherds of hard, silky grog tempered wares were recovered. These are paralleled with Hamilton's Bishopstone fabric 5 and are distinctive of the latest pre-Roman Iron Age in East Sussex (Hamilton 1977, 99), though its production continues throughout the 1st century AD (Green 1977, 155). One sherd examined by Sue Hamilton was thought to be comparable with the late Iron Age sherds from Bishopstone (Clark 1988) and thus probably dates from *c.* 30 BC to 70 AD. It may be significant that most of these sherds were recovered from context 9; the lower lynchet build-up.

The majority of the sherds (60%) were fine flint tempered with iron oxide (possibly pisolithic) inclusions which Hamilton describes as 'burnished wares with sand and iron oxide inclusions' (1977, 90). These probably belong to Hamilton's Bishopstone fabric 3b which has a distinctive East Sussex distribution associated with Cunliffe's early Iron Age Kimmeridge/Caburn style group (Cunliffe 1978). Those sherds examined by Sue Hamilton (Clark 1988) probably belong to the earlier period (Hamilton pers. comm.) i.e. 900 - 700 BC. Few of these sherds were provenanced, though the majority, like the grog tempered wares above, come from the earlier lynchet deposits (context 9).

Iron Age/Romano-British: A number of sherds (24) belong to the amorphous East Sussex Ware (Green 1977) of the late Iron Age and Romano-British periods. None of the sherds were particularly diagnostic, but a number had slight finger grooves which might indicate that these are hand-made vessels that had been wheel finished. These would be more typical of Romano-British forms (e.g. Green 1977, sherds 2, 15). It may be significant that most of the provenanced sherds from Malling were from the later lynchet deposit (context 6).

Roman: A single sherd of a Roman fine ware was recovered by Clark (1988) and has been identified by Rudling as a part of a flagon. This sherd also came from context 9.

Anglo-Saxon: Two small, but unabraded, sherds of dark, undecorated grass/vegetable tempered pottery with some multi-coloured flint and coarse sand inclusions were recovered from the main body of the lynchet (context 6 or 9). This seems to be similar to the pottery recovered

from the 5th century cemetery at South Malling (Norris 1956; Bell 1978, 46) and paralleled with the Anglo-Saxon fabric 2 from Bishopstone (Bell 1977).

Medieval: Two sherds of well-fired sandy fabric are typical of the 13th/14th century material from kilns at Barnett's Mead, Ringmer (Hadfield 1981). These were recovered from low down in the subsoil (context 2), above the dumped chalk (context 3).

	Context							
Pottery	Pit	10	9	6	(6/9)	2	unstrat	Total
Medieval	-	-	-	-	-	2	-	2
Anglo-Saxon	-	-	-	-	2	-	-	2
Fine Roman	-	-	-	1	-	-	-	1
E. Sx. Ware	-	1	1	9	-	-	14	24
Fabric 3b	-	-	8	4	2	-	39	53
Grog IA	-	-	2	-	-	-	1	3
Peterborough	3	-	-	-	-	-	-	3
Total	3	1	11	14	4	2	54	88

Table 19. Artifacts recovered by cleaning the section at Malling Hill.

Flints

A number of flints were recovered from the section, 72 of which were recorded. The majority were flakes (60) of which 90% were secondary flakes, but 8 retouched flakes and 4 tools were also found. These included a small discoidal scraper and small horseshoe scraper both of which are more typical of Beaker or Early Bronze Age assemblages. A larger, bullnose scraper was recovered from context 7 more typical of cruder mature Bronze Age assemblages. A single, unpatinated arrowhead was recovered from the scree. It was a straight sided triangular piece which had been broken at both base and tip. Fine pressure, or soft hammer flaking occurred almost perpendicular to the edges. It is possible that this was once a barb-and-tanged arrowhead, typical of the Early Bronze Age, that had been snapped in antiquity.

The flint assemblage is amorphous but does indicate the presence of Bronze Age activity in the vicinity which is paralleled by Gregory's (pers. comm.) finds from fieldwalking in the vicinity.

Artifact distributions

Although relatively few artifacts are directly located it is evident that the pit remnant observed in 1976-7 was Neolithic while the remaining sequence is considerably later. The initial low lynchet (context 9) contains the majority of the later Iron Age pottery while it was from the subsequent deposit that most of Romano-British pottery was derived. The provenance of the two Anglo-Saxon sherds is not certain, but they were recovered from the colluvium and are more likely to have originated from the later (context 6) accumulation. No material was recovered from the dumped horizons, but the two sherds of medieval pottery were recovered low down in the subsoil (context 2). This might suggest that the formal dumping of material (contexts 3 - 5) was post-Roman and prior to the 13th-14th century; i.e. Saxon.

Mollusca

Two spot samples were taken from the shallow pit which produced Peterborough Ware and from the immediately overlying colluvium in 1983. These samples were augmented by a series of twelve samples through the the main lynchet deposits (Fig. 26).

The pit produced a rich assemblage of Mollusca (Fig. 28 and Table 20) dominated by shade-loving species (74%). *Carychium tridentatum*, *Discus rotundatus* and the Zonitidae were dominant; the only other numerous species was *Pupilla muscorum*, which accounted for nearly the entire open country element of the assemblage. Of particular note is *Acicula fusca* which Evans (1972, 135) states is anthropophobic and is a species common in rich woodland, being uncommon on post Neolithic sites. It is rare locally (Kerney 1976b), but has been recorded at Round-the-Down in both the Bronze Age barrow and the colluvial sequence. The assemblage includes the rupestral species *Acanthinula aculeata* and Clausiliidae, and is undoubtedly one of shaded, probably deciduous, woodland with some opening of the canopy indicated by *P. muscorum*. This limited disturbance might account for the presence *Pomatias elegans*, but which may, however, been living in the loose soil fill of the pit itself.

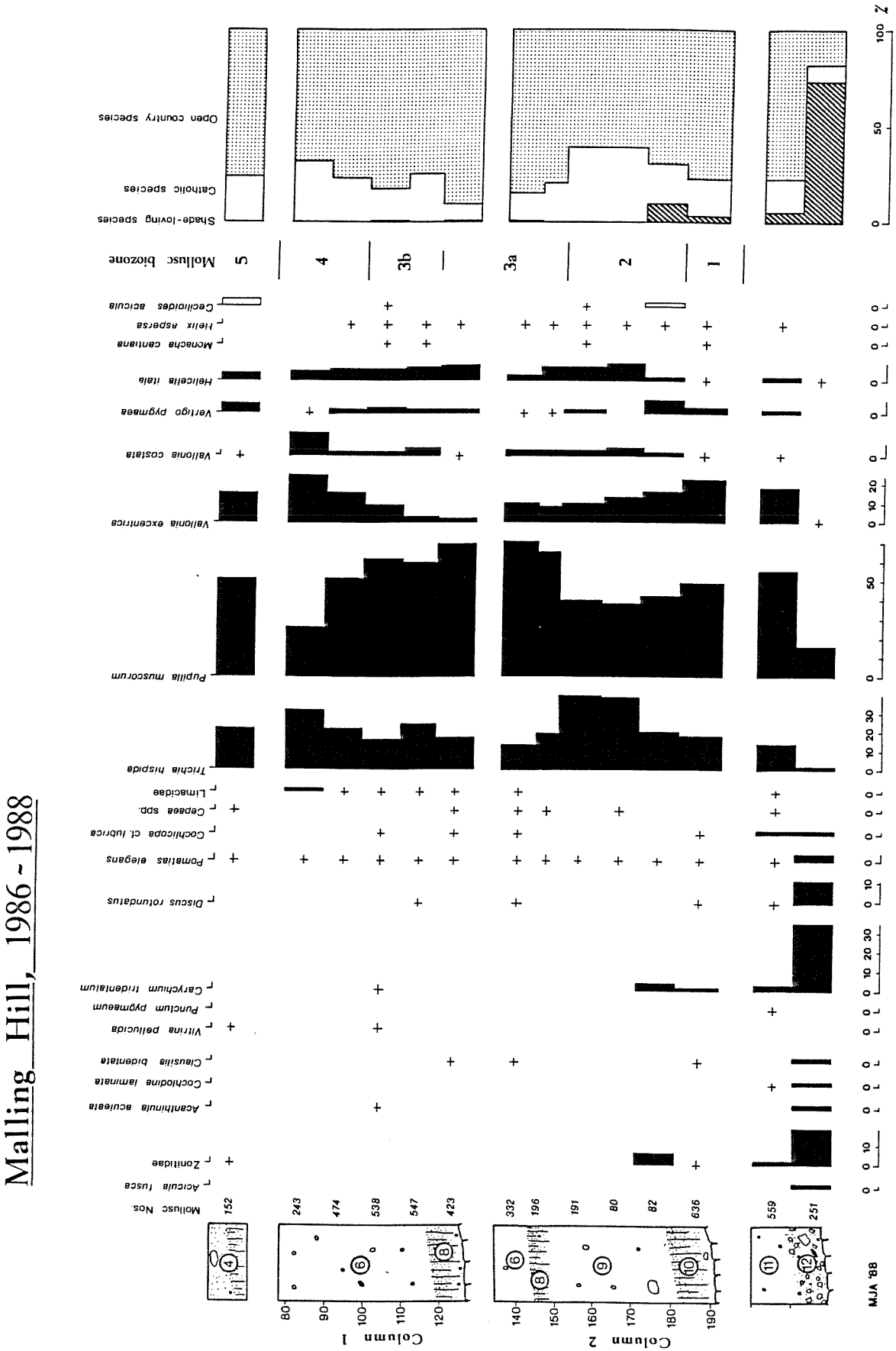


Figure 28. Mollusc histogram from the Malling Hill colluvium

\ Sample	14	13	6	7	8	9	10	11	1	2	3	4	5	12
\ Context	12	11	10	9	9	9	8	6	8	6	6	6	6	4
\ Wt (g)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
MOLLUSCA														
Pomatias elegans (Müller)	9	3	2	1	+	+	+	2	+	2	+	+	+	1
Acicula fusca (Montagu)	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Carychium tridentatum (Risso)	87	4	6	3	-	-	-	-	-	-	-	-	-	-
Carychium spp.	-	10	4	-	-	-	-	-	-	-	0	-	-	-
Cochlicopa lubrica (Müller)	6	1	3	-	-	-	-	1	-	-	-	-	-	-
Cochlicopa spp.	-	8	4	-	-	-	-	1	2	-	1	-	-	-
Vertigo pygmaea (Draparnaud)	-	12	21	3	-	4	2	3	8	6	10	9	-	7
Vertigo cf. *pygmaea*	-	-	-	3	-	-	-	-	-	5	6	4	1	-
Pupilla muscorum (Linnaeus)	41	308	313	34	30	77	127	233	290	324	329	242	63	78
Vallonia costata (Müller)	-	5	8	2	2	4	3	6	2	22	13	11	29	1
Vallonia excentrica Sterki	3	101	142	13	10	20	15	32	9	16	51	71	59	23
Acanthinula aculeata (Müller)	5	-	-	-	-	-	-	-	-	-	1	-	-	-
Punctum pygmaeum (Draparnaud)	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Discus rotundatus (Müller)	30	+	+	-	-	-	-	+	-	+	-	-	-	-
Vitrina pellucida (Müller)	-	-	-	-	-	-	-	-	-	-	2	-	-	1
Vitrea crystallina (Müller)	11	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitrea contracta (Westerlund)	6	-	2	-	-	-	-	-	-	-	-	-	-	-
Aegopinella pura (Alder)	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Aegopinella nitidula (Draparnaud)	15	5	4	4	-	-	-	-	-	-	-	-	-	-
Oxychilus cellarius (Müller)	4	5	2	1	-	-	-	-	-	-	-	-	-	1
Limacidae	-	1	-	-	-	-	-	1	2	1	1	2	4	-
Cecilioides acicula (Müller)	-	-	-	2	-	2	-	-	-	-	1	-	-	6
Cochlodina laminata (Montagu)	5	1	-	-	-	-	-	-	-	-	-	-	-	-
Clausilia bidentata (Ström)	5	-	1	-	-	-	-	1	2	-	-	-	-	-
Helicella itala (Linnaeus)	2	11	7	2	7	11	11	9	35	36	34	30	12	6
Monacha cantiana (Montagu)	-	-	1	-	-	1	-	-	-	1	2	-	-	-
Trichia hispida (Linnaeus)	5	80	116	16	30	74	37	43	71	134	88	105	75	33
Cepaea nemoralis (Linnaeus)	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Cepaea spp.	-	2	-	-	1	-	1	+	1	-	-	-	-	1
Helix aspersa (Müller)	-	+	+	+	+	+	+	+	1	+	+	+	-	-
Taxa	17	17	16	11	8	9	9	13	12	11	12	9	8	11
Shannon Index (*H'*)	2.15	1.49	1.45	1.77	1.36	1.32	1.09	1.05	1.05	1.20	1.27	1.36	1.55	1.39
TOTAL	**241**	**560**	**636**	**82**	**80**	**191**	**196**	**332**	**423**	**547**	**536**	**474**	**243**	**152**

Table 20. Land Mollusca from the Malling Hill colluvium.

What is most striking about this assemblage is its contrast with the all those from the overlying deposits. A number of species in the pit do not occur in the colluvial deposits; *Acicula fusca*, *Vitrina crystallina* and *Aegopinella pura*. The severity and marked nature of this change certainly indicates truncation of the pit and a hiatus within the sequence.

The colluvial deposits are characterised by open country species with a dominance of *Pupilla* with *Trichia hispida* and *Vallonia excentrica*; shade-loving species never accounting for more than 10% and more

usually representing less than 1%. These are undoubtedly assemblages of very open dry downland. Fluctuations within the assemblages indicate subtle, but significant changes within the local environment and five site mollusc zones were detected in this sequence.

Zone 1) The basal samples of colluvium are dominated by *Pupilla* with both *Vallonia excentrica* and *Trichia hispida* each representing 10-20%. As *Pupilla* is a species of short grassland and localised patches of earth bare of vegetation these assemblages probably indicate a short-turfed, grazed, grass downland environment. The more humic buried soil (context 10) shows a significant increase in shell numbers typical of stabilisation horizons. The colluvium overlying this layer produced a similar assemblage indicating the erosion of this context upslope.

Zone 2) The assemblages from the main body of the initial lynchet showed a general decline in *V. excentrica* with a significant increase in *T. hispida* and a minor rise in *H. itala*. This assemblage is paralleled by a number of colluvial deposits, many from Sussex (Bishopstone, Thomas 1977b; Kiln Combe, Bell 1983 and Round-the-Down) and as such indicates local arable environs and confirms the ploughwash nature of the deposits and the lynchet itself.

Zone 3a) Sealing the lynchet is a humic horizon in which not only are there changes in the mollusc assemblages, but an increase in mollusc numbers which coincides with, and confirms the presence of a buried soil. The histogram (Fig. 28) shows assemblages comparable with those described in mollusc zone 1, and thus there is a return to stable, short-turfed, probably grazed grassland locally. The lynchet was under grass and soil accumulation ceased temporarily. Whether this was due to the colonisation by vegetation preventing further accumulation, a general reduction in erosion or the cessation of cultivation upslope is not determined.

Zone 3b) The lynchet/terrace deposit (context 6) on the downward edge of the earlier lynchet produced similar assemblages but showed an overall decline in *Pupilla* and a marginal rise in *V. excentrica*. Although these assemblages resemble those from short-turfed grassland there is some ambiguity as to the origin of the deposits as it was not

certain in the field if they were deliberately dumped or were a result of erosion.

Zone 4) At the upper portion of this lynchet sequence, *T. hispida V. excentrica* and *V. costata* all increase and *Pupilla* decline along with overall shell numbers. This probably represents another localised episode of tillage.
Zone 5) The latest deposits sampled show a return to the open grassland type assemblages seen in mollusc zones 1 and 3.

The chalk marl (context 5) was analysed by Clark and produced relatively high numbers of shells which indicated open Holocene environments of arable or grassland contexts described above. The occurrence throughout the colluvium of two species, *Helix aspersa* and *Monacha cantiana*, both of which are considered to be Roman Introductions (Kerney 1966), certainly confirms the chronological evidence suggested by the pottery.

It is certainly evident that well-established open conditions had prevailed for a considerable time as the assemblages were virtually devoid of shade-loving species and represented both specialised and mature faunas. Short-turfed, presumably grazed grassland is seen through most of the sequence. Although this is only interrupted by limited periods of local tillage this may be due to the highly localised nature of the grassland being predominately confined to the lynchet and boundary itself. Certainly the assemblages recorded in the sequence equate well with the modern faunas of short downland turf locally.

Discussion

The presence of Neolithic activity, evidenced by the pit, and its associated environmental evidence indicating deciduous woodland with only a limited clearance or glade, is of particular interest. There is little other Neolithic activity on this block of downland and this was, until this discovery, confined to the long barrow, probably more correctly described as an oval barrow (Drewett 1978), on Cliffe Hill (Fig. 20). Whether this discovery can add to the debate on the presence of a causewayed enclosure on Malling Hill (Lewis 1973; Drewett

1975a, 139) is uncertain, but causewayed enclosures overlooking the Ouse from both east and west aspects is a possibility. Molluscan analysis from other Neolithic sites for example, Bishopstone (O'Conner 1977), Alfriston (Thomas 1975) and more locally Offham (Thomas 1977a), also indicate an element of woodland clearance. There is thus evidence of woodland clearance of the downland in the vicinity at *c.* 3200 - 2900 BC, and this date would fit well with the Peterborough pottery recovered. "The evidence for Neolithic settlement sites in Sussex is still very scanty" (Drewett 1978, 23) and this evidence can do little to further this, except to add a potential site. The environmental evidence, however, is perhaps of more significance and is discussed later.

Although residual flint artifacts were found within the lynchets and scree, no deposits could be assigned to the Bronze Age or earlier Iron Age despite evidence for such activity upslope (O'Shea 1983; Gregory 1985). The series of stepped, negative lynchets terraced into the chalk slope may however, be a testimony to Bronze Age tillage. The severe hiatus in the sequence and removal of all pre-Roman colluvium, deprives us of, potentially, a considerable portion of early deposits. If such deposits did ever exist they are probably located further down slope. It is possible that a more complete sequence of deposits survive in The Coombe; a large incised dry valley to the south.

It is evident that there are two main phases and causes of debris accumulation. The first being a typical lynchet formation and the second being one of deliberate dumping of material, probably during Saxon times. The lynchet formation can be attributed to late Iron Age/Romano-British tillage of the western slopes of Malling Hill, following a period of pasture, and creating a low lynchet on the downslope edge of the field. Subsequent establishment of a short grass turf over the lynchet does not necessarily imply the cessation of tillage; just the stabilisation of a grassy field boundary. A second stage of accumulation on the southern edge of the low lynchet created a broad platform or terrace. As the origin of this feature has not been determined (it might represent later colluvium, or may have been deliberately deposited) it is difficult to interpret the molluscan assemblage fully except to say that it was derived from a grazed

downland environment.

Evidence for later Iron Age and Roman agriculture accords with Gregory's evidence from the ploughed-out field systems upslope to the south and east which indicates Iron Age systems on the hill top and brow and Roman fields on the slopes (Gregory 1985). Occupation during the later Iron Age and Roman period is well attested in the area (Fig. 20) and a small Romano-British farmstead excavated on the southern side of this downland (Bedwin 1978), produced a similar, though obviously much larger, assemblage of pottery (Green 1978).

The second main formation of this sequence is a result of deliberately dumped material. The chalk marl was probably quarried from upslope, though the surprising number of shells in this (Clark 1988) indicates that it was not freshly excavated. After a minor lacuna and temporary stabilisation (grass) a major deposit of chalk rubble was added. This considerably enlarged this boundary. In fact at its greatest height most of the sequence (1.4m of 2.0m) was deliberately created making a sizeable boundary bank which runs along the break in slope. This seems to have occurred in the post-Roman period prior to the 13th-14th century during which period there is a known major 5th century Saxon cemetery at South Malling. These deposits may therefore represent the enlargement of a pre-existing field boundary. It is relatively common for Saxon boundaries to reflect boundaries of Iron Age or Roman date (Bell 1978, 68; Bonney 1972). The boundary bank defines the edge of the Malling Hill below which the present day trackway runs. Its location and size make it a formidable feature which is readily observable from the opposite side of the Ouse valley. What precisely it delineates or demarks remains, unfortunately, obscure but if it is related to the large and complex royal Saxon estates in the area, the documentary evidence might help resolve this mystery.

Summary

It is unfortunate that such a dramatic lynchet section does not contain more information of the prehistoric land-use of the western side of Malling Hill to complement the work from Round-the-Down. Evidence for both Neolithic occupation and environment is a significant contribution to studies of this period in Sussex. The section itself records

evidence for Iron Age and Bronze Age field systems which were enlarged to form a boundary bank in the Saxon period.

4.6 SUMMARY; THE LEWES DOWNS

Prior to the research conducted and presented in this chapter Drewett (1978, 28) had stated that "very little ... demonstrably Late Neolithic is known from Sussex" let alone the areas studied here (Figs 7 and 20). Gardiner's research, however, revealed that large Late Neolithic/Early Bronze Age flint scatters did exist. Even within the Lewes area large assemblages were recovered from Balmer and Houndean (Biggar 1978; 1980), though by comparison with adjacent areas the amount of flintwork was sparse (Gardiner 1988, fig. 9.10). However, she did acknowledge that on the Lewes downland "major flint scatters are again located on the upper slopes and at the heads of dry valleys" (*op. cit.* 1988, 432). This is amplified and augmented by the 100% recovery rate of Late Neolithic artifacts from the three colluvial deposits examined in the Lewes area as a part of this research.

Only eleven of the *c.* 350 flint assemblages examined in Gardiner's research seemed to contain a clear Beaker element (Gardiner 1988, 440 - table 9.4). Of these three occur within 3km of each other in the Brighton area (namely East Hill, Saddlescombe; Newtimber Hill and West Laine, Hove). The list of surface flint scatters (Gardiner *op. cit.*, table 9.4) contains no "Beaker" sites in the Lewes-Eastbourne area and confirms Gardiner's hypothesis that such assemblages will be under represented on the chalk of the downland (*op. cit.*, 444). Two Beaker artifact assemblages were recovered beneath colluvium during the research described here (Ashcombe Bottom - Section 4.2 and Grey Pit - Section 4.3) and a further by Bell (1983) at kiln Combe.

All four of the studies detailed here (Ashcombe Bottom - Section 4.2; Grey Pit - Section 4.3; Round-the-Down - Section 4.4; and Malling Hill - Section 4.5) produced evidence of later and Final Neolithic activity (Table 21); all were associated with well stratified environmental data for the history of the local land-use. Indeed at Ashcombe Bottom (section 4.2) and Malling Hill (section 4.5), the discovery of Neolithic features and pottery show that such sites are more widespread

than perceived in many recent publications (cf. Drewett *et al.* 1988) and the recent discovery of a Neolithic henge monument to the north of Brighton confirms this.

The addition of these four sites is significant in that they were found by fairly simple, but detailed, investigations which did not include the normal reconnaissance method of fieldwalking, used to great effect elsewhere e.g. Bullock Down (Drewett 1982). This amplifies the arguments made in this thesis (Chapters 2 and 8) and published (Allen 1988a; 1991a) that surface reconnaissance can produce major biases in the data set retrieved and thus flaw the final interpretation of the history past human activity within that area.

	Late Neo		Final Neolithic				E. Bronze Age		
Pottery	P		MB		DB		LB	FV	
Flint	b		oa			s		bta	
Houndean	X	-	-	-	-	-	-	-	-
Malling Hill	-	X	-	-	-	-	-	-	X
Ashcombe	-	X	X	X	-	X	X	X	-
Grey Pit	-	-	X	-	X	-	X	-	-
Glynde	-	-	X	-	X	-	X	-	-
Round-t-Down	-	-	X	-	?	X	X	-	X
Offham	-	-	-	-	-	-	X	-	-

NOTE: flint was not collected at Grey Pit or Glynde

P = Peterborough; MB = Middle Beaker; LB = Late Beaker; DB = Domestic Beaker; FV = Food Vessel; b = burnisher; oa = oblique arrowhead; s = scrapers; bta = barb-and-tanged arrow.

Table 21. Occurrence of Final Neolithic and Early Bronze Age artifacts.

Initial clearance of the wildwood?

The lack of any direct evidence for Mesolithic human activity and the distinct absence of any significant, anthropogenically induced, changes in the vegetation in the major pollen diagrams from Sharpsbridge

(Scaife and Burrin 1983) and Lewes (Thorley 1981), limit any interpretation of local activity in the Mesolithic. Both Thorley (1981) and Scaife and Burrin (1983) infer small localised clearances, and Thorley interprets the occurrence of *Pteridium* (Vale of Brooks) in particular as being directly a result of human activity by burning vegetation. Indeed Thorley's evidence need not invoke anthropogenic activity for the occurrence of *Pteridium* as a result of clearance, as it will grow on acidic or loessic soils and is known to have survived at Ranscombe on the slopes of the Caburn in the Iron Age (Dimbleby 1985 and Scaife pers. comm.). It is still growing on the western slope of Ashcombe Bottom today (see Section 4.2 p00). If however, Thorley is correct and this does indicate Mesolithic activity, it is noticeable that at Sharpsbridge, Scaife and Burrin (1983) do not have any comparable evidence, and state that if 'Mesolithic activity represents the movements of essentially mobile hunting and gathering peoples, then these archaeological records may represent only transitory settlement sites. In consequence, little if any record of their activities might be expected in the pollen record' (*op. cit.*, 9). The woodland seems to have a relatively high pine component, which is surprising in view of the difficulty in growing pine on the chalklands today. This is due to its tendency to suffer from chlorosis, a condition arising from its inability to obtain sufficient magnesium in the presence of calcium carbonate. Pine, however, is recorded from the Vale of the Brooks existing from well before 5300 BC and into the Middle Bronze Age (*c.* 1450 BC). Pine charcoal has been dated from a tree hollow at Itford Bottom to 6770 ± 85 BP (BM-1544, Bell 1983) and further pine charcoal was recovered from the tree hollow at Ashcombe Bottom (Section 4.2) which pre-dates the Late Neolithic erosion. The presence of pine supports the view that more extensive thicker and loessic soils survived on the chalk up to the Bronze Age. The loamy (silty) nature of such soils would make them both highly fertile and ideal for cultivation, but also highly susceptible to erosion upon devegetation and cultivation.

Limited small scale farming communities

Known activity for the Early and Middle Neolithic is restricted to the monumental site at Offham, which existed in a very localised clearance, and the possible settlement site at Houndean (Biggar 1978; Gardiner

1988). Such small scale temporary Neolithic vegetation clearance is also recorded by Thorley (1981) from pollen records from the Vale of the Brooks in the Ouse Valley. Further down the Ouse Valley early woodland (Mesolithic - Neolithic) woodland is evidenced by the long molluscan sequence at Asham (Ellis 1986). At Bishopstone, Early Neolithic pottery and flint assemblages (despite the late radiocarbon date of 3360 - 2920 cal BC; HAR-1662 4460 ± 70 BP) were associated with both carbonised plant remains (*Hordeum vulgare* - barley, *Triticum dicoccum* - emmer wheat and *Chenopodium album* - fat hen; Arthur in Bell 1977) and molluscan evidence for localised woodland clearance (O'Conner in Bell 1977).

Despite extensive fieldwalking programmes by Biggar at Houndean and Glynde (1978; 1983), and detailed augering, profiling and other investigations for this thesis, no further detail can be added to the picture of localised clearings and limited small scale farming.

Woodland to grassland or cutting down trees

Evidence of large scale clearances and more extensive tillage seems to coincide with the end of 'the domination of the economic system by fortified settlement enclosures' ... and a ... 'rapid change in pottery styles, tool types' (Drewett *et al.* 1988, 63) and burial monuments around 3000 BC i.e. the Late Neolithic.

The Late Neolithic pit at Malling Hill and flint assemblage from Lewis's adjacent excavations (Section 4.6) indicates activity associated with clearance, but the extent or nature of that clearance was not established. At Ashcombe Bottom, by contrast, devegetation and possibly tillage of much of the eastern slope of valley, at least, led to colluviation and truncation of the former brown earth soils. Confirmation of cereal growth in this specific area is provided by the discovery of Neolithic cereal pollen in the analysis of the alluvial sediments in the Ouse Valley at Wellingham, between Offham and Malling Hill (Wing 1980). Here therefore, is tentative evidence of the clearance of larger areas for farming and settlement. Such evidence is also indicated by the later larger scale, more permanent clearance at Offham (Thomas 1982). Larger, open agricultural settlements are indicated at Houndean (Biggar 1978) and Bullock Down (Holgate 1988),

but not confirmed by either excavation or the recovery of supporting environmental data.

The clearance of larger tracts of land and occupation of the region by more established farming communities is therefore indicated. This pattern can perhaps be further deduced from the quantities of later Neolithic pottery sherds present in the upper fills of a number of earlier monuments, such as the Peterborough Ware in secondary contexts at both Combe Hill and Whitehawk.

Early Farming Communities

The arrival of farming and the rich fertile, though fragile, soils gave rise to a rapid expansion in open downland and cultivation in the Final Neolithic period. Although Thorley contends that the Downs around Lewes were well wooded until *c.* 1450 BC (Middle Bronze Age), the evidence from Ashcombe Bottom, Grey Pit and Round-the-Down indicate the presence of large established farms with local settlements in the Final Neolithic and Early Bronze Age. It is evident from these three areas alone that woodland clearance was more extensive. Thorley's work largely indicates alder carr and hazel (possibly *Myrica gale* bog myrtle) on the valley floodplain, and woodland elements in the surrounding area. The arboreal pollen in the Lewes I and Lewes II diagrams is evidently over represented as a result of differential dispersal of pollen (Tauber 1965; 1967; Edwards 1982) especially within alluvial catchments (Burrin and Scaife 1984). Such biases are extreme on woodland edges and hazel, for instance, may be over represented by as much as 500%.

The molluscan evidence and dated colluvial sequences from Ashcombe, Grey Pit, Itford, and Asham, indicated that fairly large tracts of downland were deforested. The settlements that accompany these farms are, at present, few; but the records of Beaker settlements at Ashcombe (Section 4.2), Kiln Combe (Bell 1983) and Belle Tout (Bradley 1970; 1982), which comprise nearly all the known settlements of this period on the chalk of Sussex, are all valley bottom located (Allen 1988, 84).

Food Vessels are rare in Sussex and the main example cited in Sussex is from Belle Tout (Bradley 1970; Drewett *op. cit.*) although a single rim

sherd of a Food Vessel was found in the primary ditch silts of Wolstonbury 'henge' (Curwen 1930; Drewett *et al.* 1988). Both of these sites are enclosed sites either 'ritual' (Drewett *op. cit.*) or agricultural. The recovery of Food Vessel sherds from Ashcombe (an unenclosed site) indicates over simplicity in the interpretation of too little data.

Farming estates

Extensive colluviation is seen following the Beaker activity at both Ashcombe and Grey Pit, probably indicating the establishment of larger farms. Although some of these may have been accompanied by areas of more formalised field systems, such as those at Buckland Hole (Fig. 8), colluviation was still widespread. Following large scale deforestation and initial farming in the Final Neolithic, large blocks of land were regularly tilled in planned and regulated field systems. This coincides with the establishment of larger congregated settlements such as Plumpton Plain, Itford and Black Patch; their genesis being largely rooted in the economic and landscape changes induced in the Final Neolithic.

Chapter Five

Studies on the Isle of Wight

5.1 INTRODUCTION TO THE ISLE OF WIGHT STUDY AREA

The archaeology of the Isle of Wight is somewhat complex, but the detailed survey of its archaeology published as *The Vectis Report* (Basford 1980) provides an admirable review. The aim here is, not to reproduce or summarise that data but, to highlight one or two points relevant to the present study. In *The Vectis Report* Tomalin was able to explore the basis of Neolithic and Bronze Age communities on the Island. He also posed questions and addressed the future potential of archaeological research and endeavour on the Island (Tomalin 1980a; 1980b). The fieldwork and analysis conducted on the Island for this study aimed to address some of those problems as well as contribute to the broader issues of this research.

Tomalin noted discrete clusters of barrows at the heads of chalkland combes while at Gore Down, Bonchurch and Apesdown possible evidence of Beaker settlements was found at the mouth of the combes (Tomalin 1980b, 18). These data are largely in accordance with my own research elsewhere in the chalklands of southern Britain (Allen 1984a; 1988a; 1991a). Furthermore, Tomalin suggested that the relationship between barrows, forest clearance and human activity on the valley floor should be actively explored. Areas of study proposed by Tomalin were the nucleated barrow cemeteries on Newbarn Down (Gallibury) and Middle West Down both of which occur at the head of chalk combes. Because of the recovery of Early/Middle Neolithic pottery from buried soils associated with Bronze Age barrows on Week Down, and the significant pollen spectra recovered by Scaife from other barrows (1980a; 1980b; 1984), Tomalin suggested (1980a, 17) that a reappraisal of the value of buried soils beneath round barrows was needed. Fieldwork and analyses were undertaken by the writer to examine these archaeologically orientated research topics. The principal aim was to study the relationship between combe-clustered barrow cemeteries and use of the adjacent landscape, particularly the valley floors.

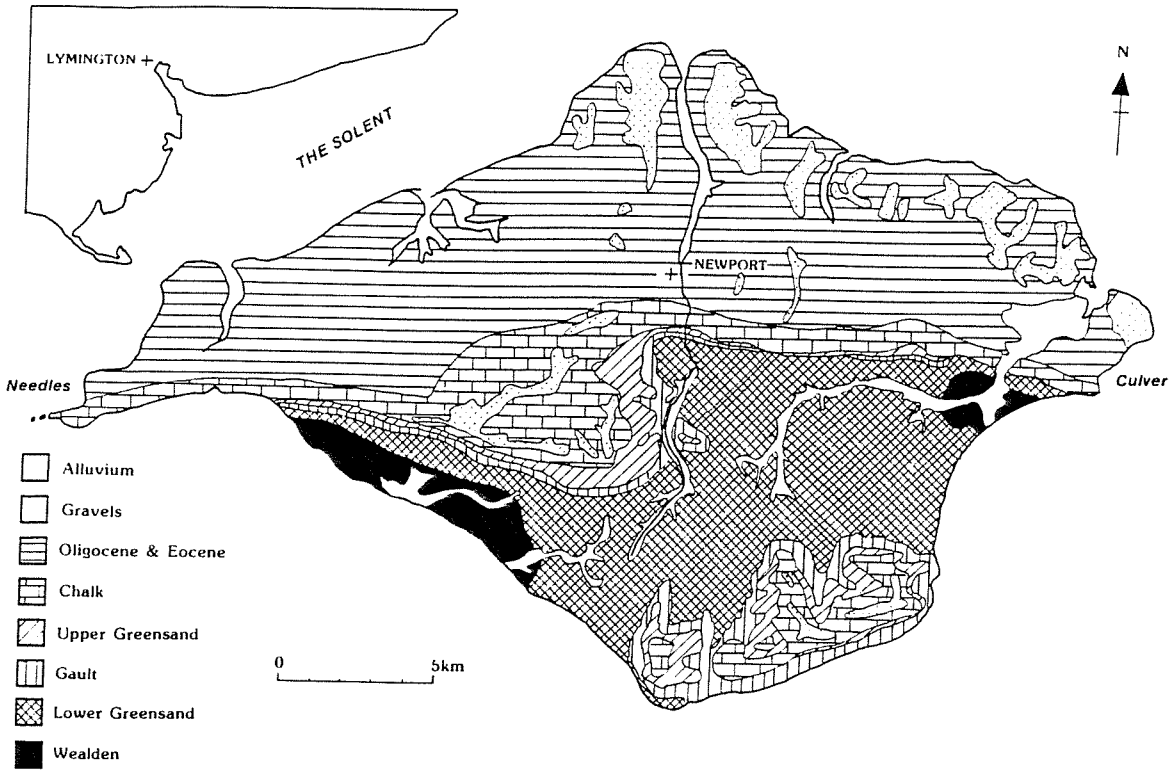
These intriguing archaeological investigations were coupled with results and recommendations from major palynological investigations conducted on the Island by Scaife (1980a; 1980b; 1987b). His detailed work from the peat sequences at Gatcombe Withy Bed, Borthwood, Bohemia, Ninham and Munsley together with soil pollen from Newbarn (Gallibury) and Apes Down provide a regional pollen assemblage zonation and background vegetational history (Scaife 1980a; 1987b). This provides the basis for further environmental archaeological research on the Isle of Wight. There is little other relevant regional environmental work. Few detailed molluscan studies have been undertaken. They consist of studies conducted by Sparks on the Arreton Down barrow (Sparks 1960), and by Richard Preece on a medieval colluvial sequence at Gore Cliff (Preece 1980b; 1987), mid-later Neolithic deposit at Undercliff (Preece 1986) and early post glacial tufas at Totland Bay (Preece 1979).

The recent survey and atlas of modern land mollusc distributions on the Island by Preece (1980a) makes further palaeo-molluscan investigations more significant, and enables specific habitat or ecological changes and trends to be mapped and recorded.

Geology and Topography (Fig. 29)

Topographically the Isle of Wight was inviting because of the numerous chalk combes that dissected both northern and southern slopes of the main chalk ridge (see below), many of which, as already alluded to, have been the subject of archaeological investigation.

Geologically the Isle of Wight is the southern part of the Hampshire Basin (Osborne White 1921; Melville and Freshney 1982) and comprises two principal parts; the Cretaceous and Lower Tertiary (Eocene and Oligocene) geologies (Fig. 29). The overall topography of the Island is a product of the varying nature of its component lithologies and also the effects of folding in the Alpine orogeny. This episode created two major folds, the Sandown and Brighstone anticlines, which upturned the chalk and other Cretaceous strata into a belt running the full length of Island from the Needles in the west to Culver Cliff in the east, which forms the dominant topography of the Island (Fig. 29). This chalk cuesta, called the Central Downs, is an extension of the Purbeck Hills and forms the 'backbone' of the Island (Osborne White



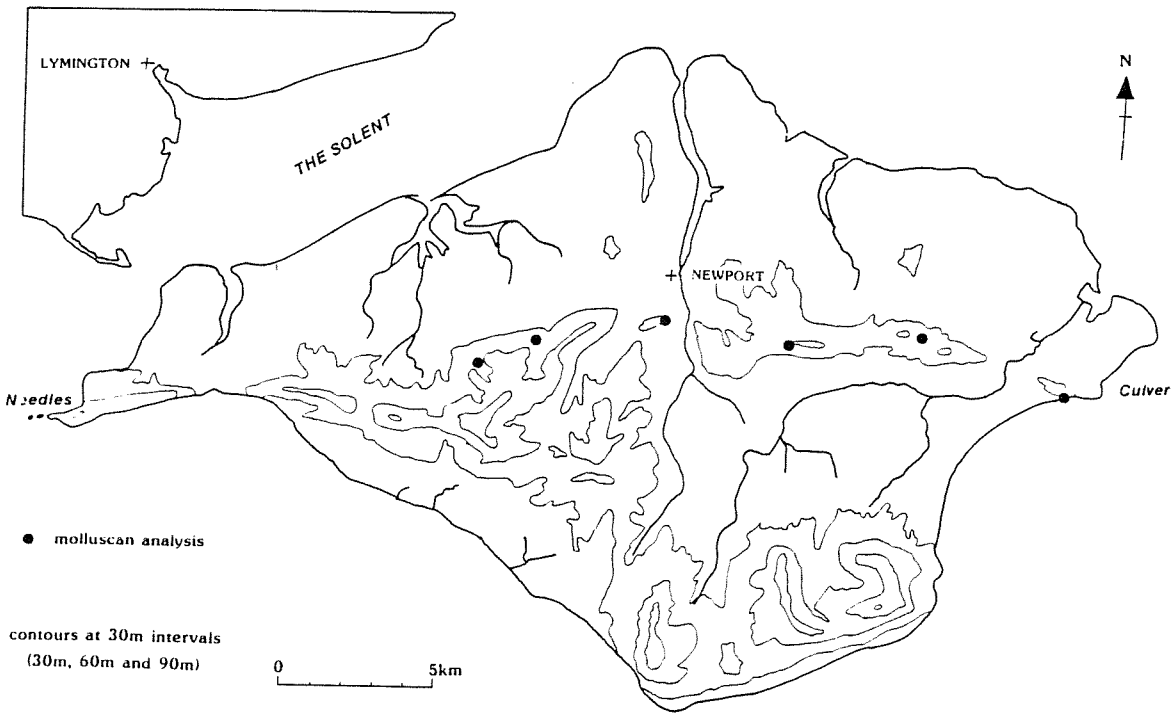


Figure 29. Geology and topography of the Isle of Wight.

1921). The narrow median ridge in the east with its relatively steep north-facing dip slope contrasts with the wide valley-incised chalk plateau and gentler dip slope of the chalk plateau in the centre of the Island.

To the north of the chalk ridge are deposits of Eocene and Oligocene age. These are a very complex series of geologies comprised of clays, sands and limestone of marine, brackish and freshwater origin. They give rise to an uneven, low relief landscape. In the south of the Island the strata are more varied and comprise Cretaceous geologies typically of the Greensand and Wessex Series. These strata give rise to a number of topographical landforms from the undulating countryside of the Lower Greensand, prominent relief features attributable to the Upper Greensand and low relief features of the Atherfield and Wealden Clays and marls. The southern-most portion of the Island comprises a large chalk outlier forming a ridge of higher land immediately north of Ventnor and is the highest point on the Island at 223m OD.

Topography of the Downs (Fig. 29)

The chalk cuesta forms the main outcrop and provides the dominant topography of the Island. The intensive folding of the chalk has resulted in nearly vertical strata and the formation of an atypical escarpment which cannot be directly paralleled with the text-book examples of the North and South Downs. The median ridge can be divided into three parts; those of West, Central and East Wight. A further block of chalk downland occurs in the south of the Island around Ventnor.

In the areas of gently dipping to horizontal strata between Mottistone and Carisbrooke a plateau over 5km wide exists, incised by many combes forming a complex dendritic pattern. This area generally supports brown rendzinas (Andover Series) in the north and grey rendzinas (Upton Series) to the south. The higher ridges of this area are predominantly covered with superficial deposits of Clay-with-flints (Geological Survey Memoirs 18) and support argillic and paleo-argillic brown earths of the Carstens Association. Where the strata dip more steeply, as in east and west Wight, a thin sinuous ridge, usually no more than 1km wide, exists and forms the cliffs at the Culver and the Needles

respectively. This ridge in west Wight to the Needles supports typical (humic) rendzinas of the Icknield Series, where as in east Wight to Culver they support grey rendzinas of the Upton Series. These steeper Downs do not have as many incised valleys, but do contain a number of smaller, simple, combes and possible nivation hollows.

Sites studied (Fig. 30)

The principal area investigated on the Isle of Wight was at Newbarn Combe, south of Newbarn (Gallibury) Down, Calbourne, where Tomalin had already excavated a barrow on Newbarn Down (Tomalin 1979; 1980b) and investigated a flint scatter at the northern end of the valley itself. The area was one specifically targeted by Tomalin for further research (Tomalin 1980b, 27). A moderately large scale dry valley excavation was undertaken (Section 5.2) at the head of the valley. Elsewhere on the Island other studies undertaken were confined to molluscan analysis. Principal among these was an investigation of the colluvial sequence at the Limpet Run, Redcliff (Section 5.3) at the top of the cliff, and adjacent to the Neolithic and Early Bronze Age settlement at Redcliff excavated by Tomalin in 1976 and 1977. Other work concentrated on the analyses of archived soil samples from a number of barrow excavations conducted by the Isle of Wight Archaeological Committee between 1976 and 1980. These included stratified sequences from the barrows excavated at Mount Joy (Section 5.5) and more limited evidence from Gallibury and Apes Down and two barrows on Ashey Down excavated by Drewett in 1969 (Drewett 1970). These shorter mollusc reports are archived at the Isle of Wight Archaeological Centre. During the period of this research, two other relevant investigations were undertaken by IWAC. Salvage work on Arreton Down on the barrow known as Michael Moorey's Hump was conducted and limited mollusc analysis undertaken by Timmins as an undergraduate project (Timmins 1991); further samples from this site were also analysed by the writer (Section 5.4). Larger scale rescue work within Duxmore Combe, East Wight, led to detailed investigations of the colluvial deposits and molluscan sequences, largely as result of my previous research on similar deposits on the Island. The preliminary results of the Duxmore excavations are briefly reported by Allen (1992a) and full unpublished report archived at the Isle of Wight Archaeological centre.

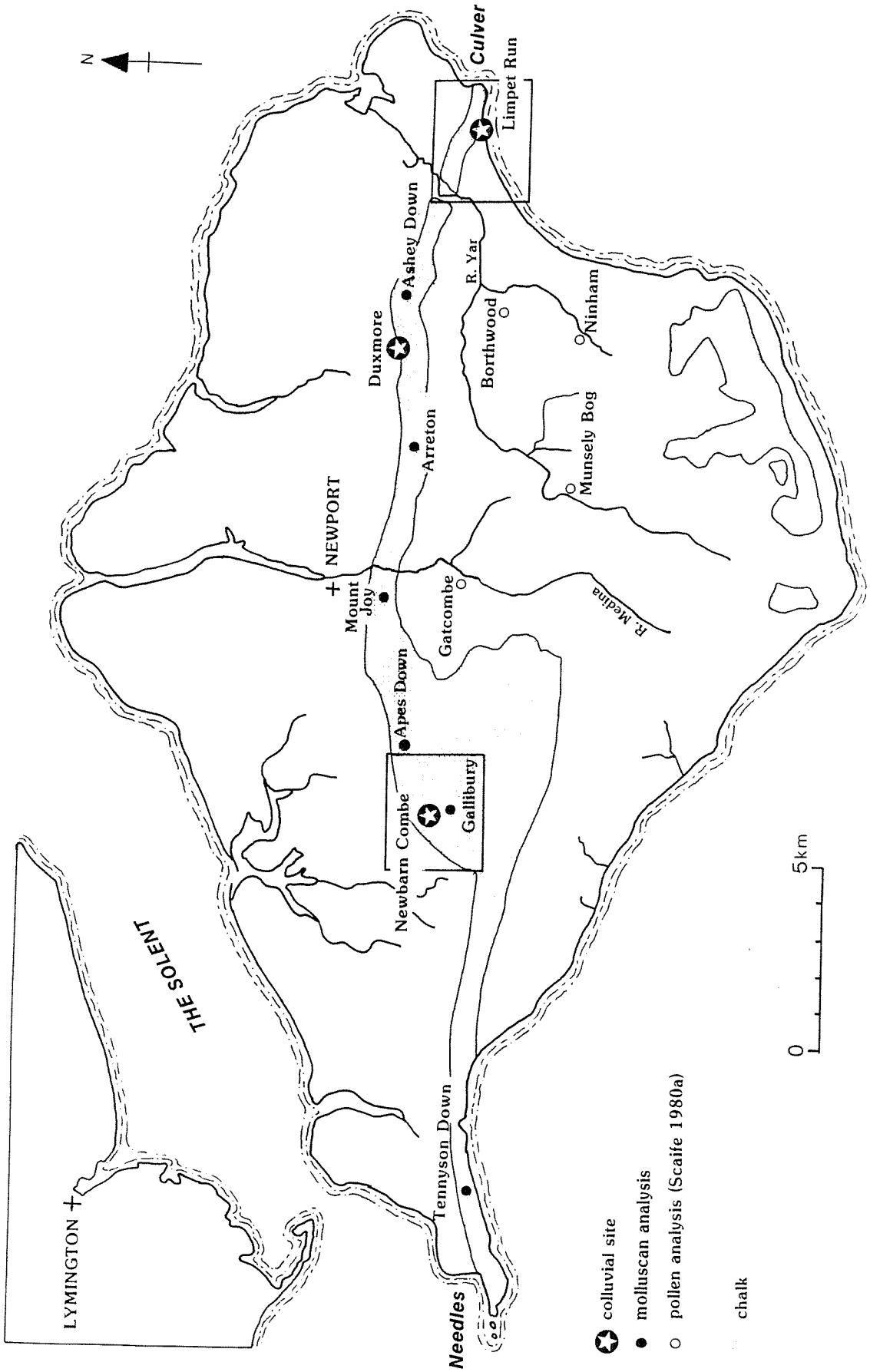


Figure 30. Isle of Wight showing the location of the study areas and sites selected for analysis.

The *Vectis Report* (Basford 1980, 79), as the following work will demonstrate, severely under-estimates the rôle of valley deposits and stratified land mollusc sequences in the understanding of the land-use history and also in the study and recognition of prehistoric settlement patterns, land-use and past environments.

5.2 INVESTIGATIONS IN NEWBARN COMBE (SZ 4355 8618)

The main investigations on the Isle of Wight carried out for this research were centred on the southern end of the Newbarn Combe dry valley at Little Down where excavations were conducted in the floor and side of the valley specifically for this research. The valley is situated in the northern edge of the median chalk ridge within the parish of Calbourne. This area was chosen for detailed investigation for a number of topographical and archaeological reasons. The valley itself is a classic large dry valley over 1600m long with a flat valley floor and asymmetrical profile. Archaeologically, Newbarn Combe was a most suitable location for investigation because of the Early Bronze Age activity in the vicinity which itself has been the centre of research and excavation by the Isle of Wight Archaeological Committee. The southern end of the valley was intensively fieldwalked by David Tomalin and Claire Halpin in 1978 and they recovered a large scatter of typical later Neolithic and Bronze Age flint artifacts (Basford 1980; Tomalin and Basford pers. comm.). Furthermore, at the head of the valley is Gallibury Down, upon which is located the ceramically-rich, Bronze Age barrow (formerly called Newbarn) excavated by Tomalin in 1978 (Tomalin 1979). Finally, and by no means least, there was the known enthusiasm for archaeology of Chris Spence, the landowner.

Location, Geology and Topography

The area immediately around Newbarn Combe, in West Wight, occupies one of the higher parts of the Sandown anticline at its widest point (4km). It attains a height of 214m at Brighstone Down. The Upper Chalk dip slope, into which Newbarn Combe is cut, is heavily capped with Clay-with-flints along the ridge from Brighstone Down and Gallibury to Bowcombe Down. The mouth of Newbarn Combe opens on to flat low-lying Oligocene and Eocene lithologies comprising Reading Beds, London Clays and Bagshot Beds. The plateau slope, leading up to Brighstone Ridge,

consists of Middle and Lower Chalk and the much of the Middle Chalk here is capped with Tertiary Clay-with-flint deposits (BGS Map 334, 335) which Osborne White also records on "the Middle Chalk outlier of Newbarn Down" (1921, 150). South of the ridge the Middle Chalk forms a broad plateau which leads towards the scarp. The Middle and Lower Chalk scarp slope descends onto an Upper Greensand Series bench which gives way to the Gault, Sandrock, Ferruginous Sands, and Atherfield Clays of the Lower Greensand Series and completes the cuesta formation.

The Upper Chalk dip slope of the median ridge is cut by a number of simple but large north-south orientated dry valleys, while the Middle and Lower Chalk plateau on the south side of the ridge is scoured by a complex pattern of dendritic dry valleys converging on Roughridge Bottom. The dip slope valleys run directly towards the ridge and only when they approach the steeper slopes do they deviate from a "single stream" valley and divide into a number of tributaries. Between Carisbrooke and Calbourne two such impressive valleys can be seen. The first is Apesdown; a very steep sided, broad bottomed valley and the second is a smaller valley at Ashengrove. Further to the west is the Newbarn Combe valley itself with Newbarn Farm at its mouth. These valleys contrast markedly with the some of the sharply incised dip-slope valleys in East Wight. Eagle Head Combe, for instance, is a deep sharply incised short valley, and Duxmore Combe whilst also being quite steep sided is less than 600m long.

Archaeological background

The area around Newbarn Combe, particularly that of Newbarn Down, Gallibury Down and the northern end of Newbarn Combe itself, has been the subject of a fairly extensive study by the Isle of Wight Archaeological Committee. Fieldwalking, aerial photograph transplots and excavation have been conducted within an area of approximately 3.4km^2 (Fig. 31). It was hoped that the investigation of the dry valley deposits would provide a palaeo-environmental context for these sites in particular.

Incidental evidence of Neolithic activity in the vicinity of Newbarn Combe (Fig. 31) takes the form of isolated finds of at least five Neolithic flint axes and a scraper (Basford 1980). Although there are

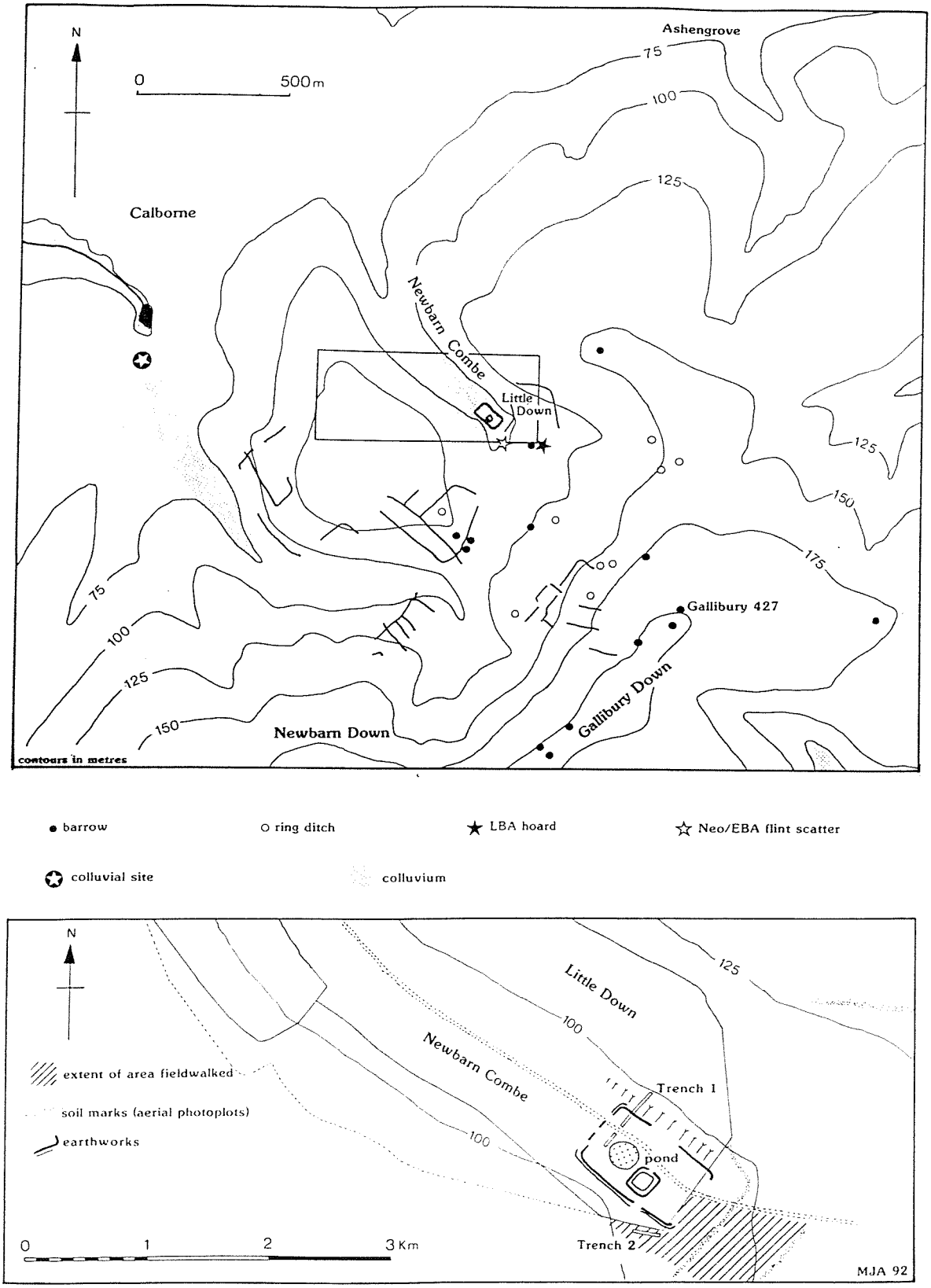


Figure 31. Geomorphology and archaeology of Newbarn Combe and surrounding Downs.

known Neolithic occupation sites and funerary monuments on the Island, none are within the prescribed study area. There is however, a plethora of Bronze Age barrows (Fig. 31 and Basford 1980, map 6). Further, as Tomalin has noted (1980b), there are a number of combe-head barrow cemeteries on the Island and the cluster of barrows on Gallibury Down sit at the head of the Newbarn Combe valley. Of particular note are Gallibury Hump and the Gallibury barrow excavated by Tomalin (IWAC 427) both of which are located on a false-crest, and can be seen on the horizon from the floor of Newbarn Combe. Beaker material has recently been found during the excavation from two barrows in the area; Gallibury (Tomalin 1975; 1979; 1983) and Apes Down (Tomalin unpub. MS and pers. comm.) and a number of Early Bronze Age cremation urns have been recovered from the chalk plateau. The Gallibury barrow produced a series of Early Bronze Age vessels including an Armorican vase (Tomalin 1988). Of greater importance to the dry valley investigations detailed here is the extensive flint scatter, presumed Early Bronze Age, recovered by fieldwalking from the head of the Newbarn Combe valley.

Newbarn Combe

The head of the valley lies immediately south of Gallibury at *c.* 100m OD and forms a relatively shallow sided bowl with the three minor valleys descending from Gallibury Down. The slope of the valley bottom decreases northwards to a fairly constant 6° and then about 3° as three minor valleys meet and enter Newbarn Combe. The valley floor continues at a shallow 1° slope until its mouth at Newbarn Farm where the chalk meets the open 'coastal plain'. The valley is almost parallel sided and typically asymmetrical, with its western slope rising steeply at 15° to 150m OD whilst the longer eastern slope rises at only 8° degrees. Several large lynchets were observed in the heavily grazed grassland on the western slope, and a series of ploughed-out lynchets could be seen on the northern end of the valley.

At Little Down itself two earthworks survive. The first, a rectilinear medieval valley entrenchment (IWAC 413) 90m by 50m was sectioned by Stone in 1910 (Stone 1912, 67-68) and sectioned again by the investigations conducted here. A second, smaller and undated square earthwork enclosure (20m x 20m) lies within the valley entrenchment at its southern end.

Excavations

Two trenches were cut near the head of the valley just below the point of bifurcation. Trench 1 comprised two sections (Fig. 32) cut near the head of the valley at *c.* 93m OD. It was placed so that the trench ran down the west valley side sectioning both the observed lynchet on the western slope and the rectilinear valley entrenchment (trench 1b). A gap was left for the modern trackway, and trenching continued across the valley floor (trench 1a) just to the north of both the dew pond and the internal square earthwork enclosure. A second trench (trench 2) was located in the arable field at the southern end of the valley floor and at the base of the eastern-most of the trio of minor valleys at the head of the Combe. This trench was adjacent to the flint scatter surveyed and fieldwalked by the Isle of Wight Archaeological Committee in 1978.

Both trenches were approximately 2m wide and excavated using a JCB. In each case the northern most face was cleaned and recorded. Special care was made to locate artifacts, but unfortunately, few artifacts were recovered during this process. Within each trench, areas were selected for hand excavation specifically to recover artifacts and thus enable the sequences to be dated. In all cases, an adjoining section 50cm wide was hand excavated and the location of every artifact recorded to within 1cm using two co-ordinates. Detailed soil descriptions were recorded at key points and are presented in appendix 3.1.

Trench 1

Two locations within the 45m long trench were selected for hand excavation. The main area was a 2m long section located in the centre of the valley (trench 1a) where the stratigraphic sequence was at its deepest (nearly 3m) and most complete. The second location was a 7.5m section across the bank and ditch of the valley entrenchment with an aim of providing more secure evidence for Stone's postulated medieval date for the rectilinear enclosure (Stone 1912).

A total of 2.7m of post-glacial deposits were revealed in the centre of the valley floor. Many of the layers recognised were only encountered here and thinned out as the trench sectioned the west valley side. The

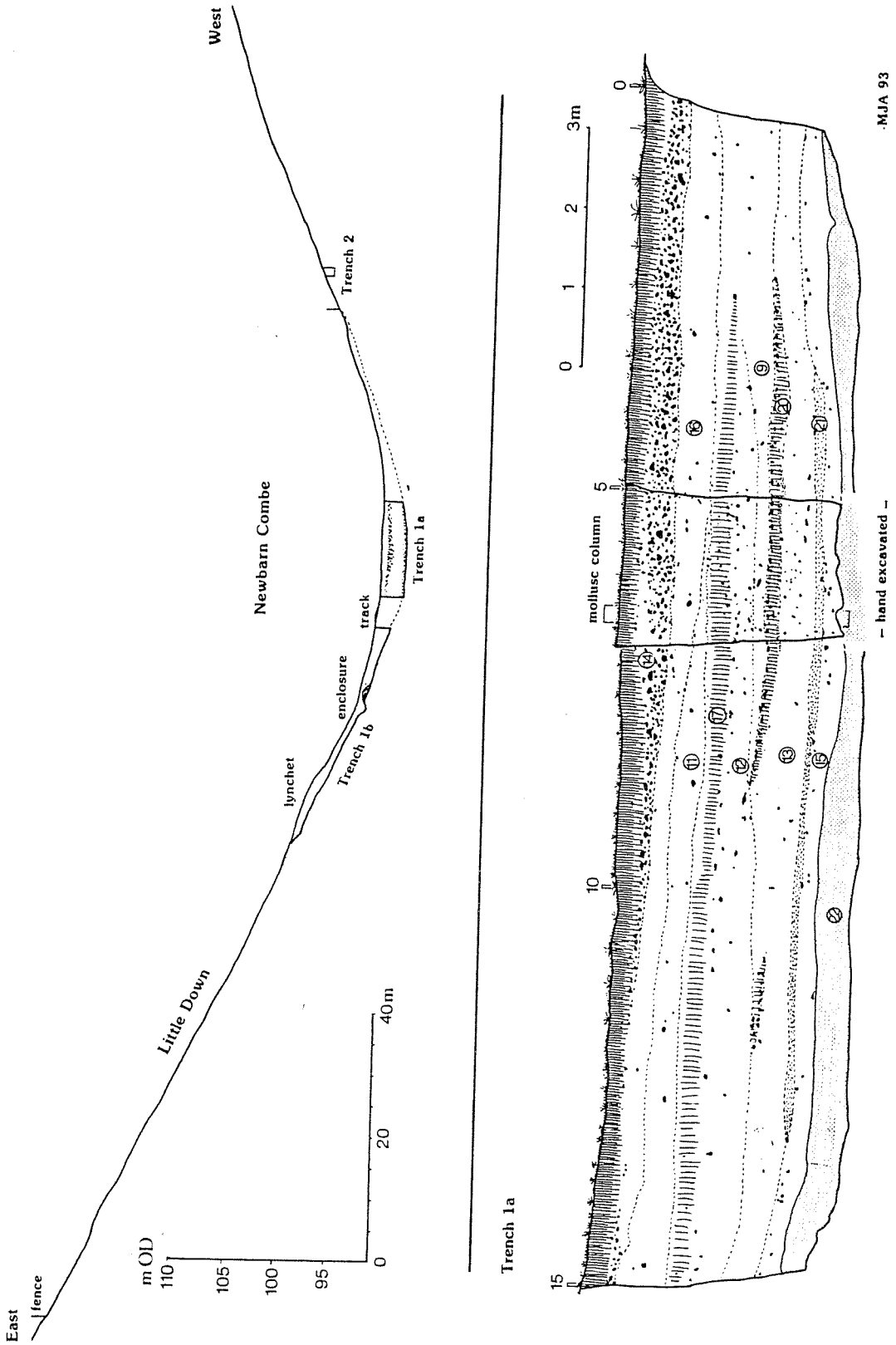


Figure 32. Newbarn Combe valley cross-profile and summary sections of trench 1a.

slope revealed a comparatively simple sequence of calcareous colluvium with a lynchet and also sectioned the bank and ditch of the rectilinear enclosure.

Stratigraphy; Trench 1a

The stratigraphic sequence was most complete in, and largely confined to, the valley floor, trench 1a (Figs 32 & 33). A summary of those horizons is given below and detailed descriptions are in appendix 3.1.

Layer 22: At the base of the trench were chalky periglacial solifluction deposits. These varied from deposits of soliflucted chalk mud with some small chalk pieces to zones of cemented chalk pieces. These only occurred on the lower slopes and in the valley bottom and were also observed in trench 2 (see below).

Layer 15: In the centre of valley (trench 1a) the chalk deposits were overlain by a non-calcareous dark brown clay loam with a dark reddish hue. It contained some flints and was a uniform layer approximately 25cm deep. The interpretation of this layer is problematical. It contains no artifacts and displayed poor structure and abrupt wavy boundary and although may be a essentially *in situ*, albeit, a truncated and reworked. It was thought, after detailed field description, to represent largely material soliflucted into the valley after the chalky melt-water deposits which was subsequently altered by post glacial pedogenic processes and formed the Bt horizon of a former argillic brown earth. Its fairly abrupt boundary with overlying deposits indicates some degree of chronological discontinuity and points to erosion and limited truncation of its upper surface and former soil horizons.

Layer 21: In the centre of the valley (3.1m to 13.8m) a dark brown non-calcareous layer occurred with weak blocky structure and which was interpreted in the field as the stony B horizon of a buried typical brown earth soil formed in colluvium derived from the erosion of (argillic) brown earths. It only survived on the valley floor and seems to have been truncated as it reached the valley sides. Unlike the clay loam below, it did produce some artifacts, predominantly flint flakes, but unfortunately no pottery.

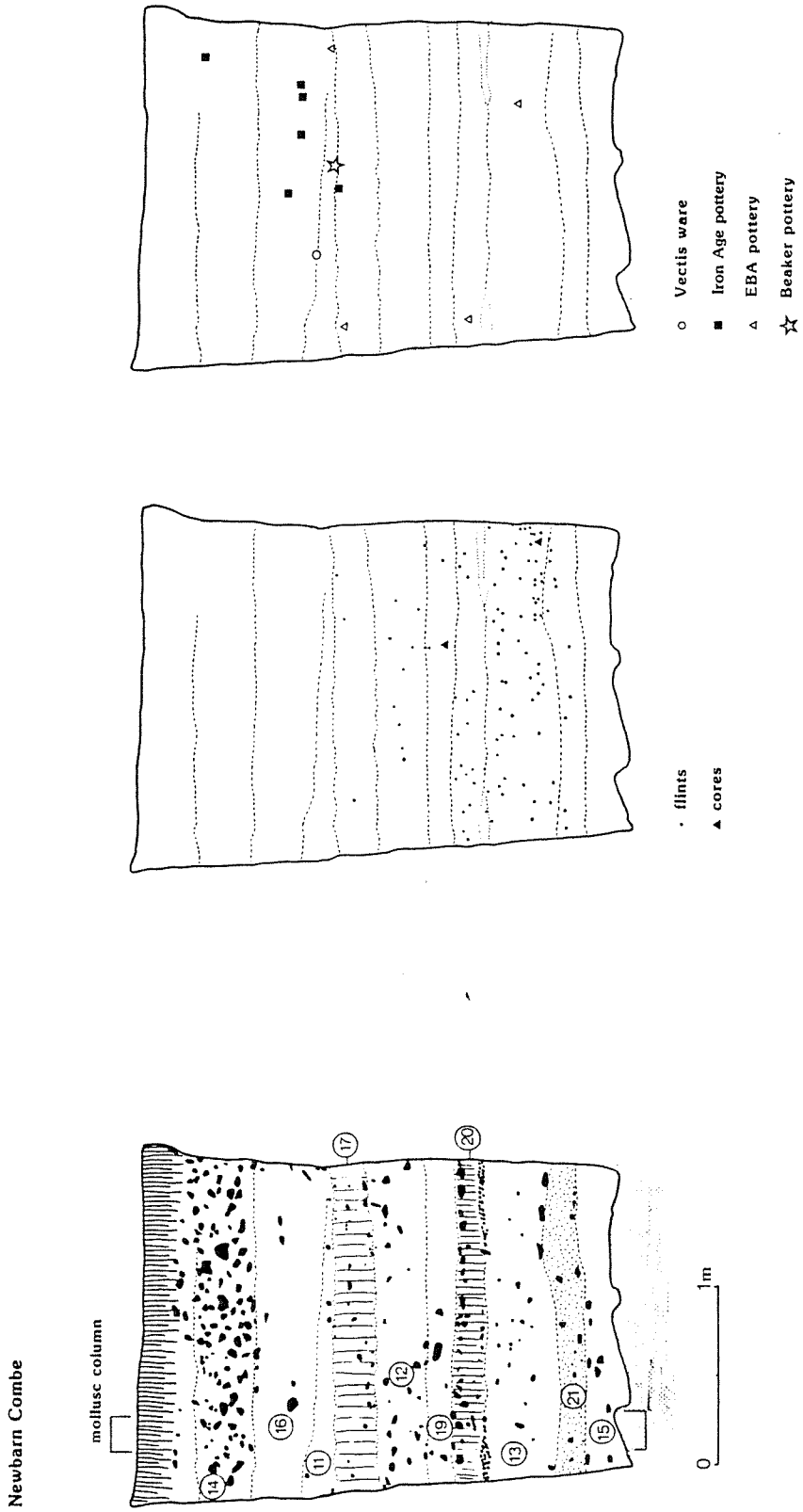


Figure 33. Newbarn Combe; Section of the hand excavated colluvium in the valley floor and artifact distributions.

Layer 13: Overlying the putative buried B horizon, and extending laterally for over 23m, was a thick largely stone-free dark brown silty clay loam with strong blocky structure. Its only inclusions were sparse, medium to large sized flint nodules. This horizon was only weakly calcareous, and may be the buried A horizon of typical brown earth soil (layer 21). The majority of artifacts from the excavations were recovered from this layer and included Early Bronze Age pottery.

Layer 20: A layer of brown soil scattered with flints and the occasional small chalk pieces. The origin of this layer was not discerned in the field. It is likely to be largely colluvial in origin, but modified by subsequent limited pedogenesis. It was however, restricted to the centre of the valley floor being a maximum of *c.* 0.18m thick and extended for only 6.5m in total. Perhaps most significant was the concentration of artifacts, particularly flints and small flakes recovered from the layer. A series of lenses of small rounded chalk pieces possibly resulting from rill erosion (Chapter 2, p.28) were observed at its base.

Layer 19: Overlying the relatively stony horizon, and also restricted to the centre of the valley floor was a predominantly stone-free brown silty loam. This has been interpreted as the earthworm worked horizon of the layer 20, but may also represent deposition of well sorted fluvio-colluvial fines, i.e. silt fraction (see Fig. 2). To both east and west this layer merged and inter-digitated with a typically unsorted colluvium; layer 12.

Layer 12: Calcareous unsorted colluvium seen predominantly on valley edge locations, comprising a silty loam with many small chalk pieces. The layer is almost lentoid in shape being deepest on the edge of the valley floor and extending up the valley side to 26m. In the centre of the valley, between 10m and 4m, this layer becomes more stony and probably represents the separation and deposition of coarser material in the centre of the valley just as layer 19 probably represents the fines washed out from this colluvium. On the eastern side of the valley it can be seen to inter-digitate with the buried soil, layer 17. The fact that the colluvial layer is present on both sides of the valley, albeit being slightly darker (possibly more humic) on the eastern side, indicates uniformity of erosion if not land-use. This probably dates to the late

Iron Age or post-Roman period on the basis of included, but highly eroded pottery fragments.

Layer 17: A buried soil horizon developed within a calcareous colluvium (layer 12); although present in the centre of the valley, it is predominantly on the eastern side of the valley floor. A darker coloured and more pedologically structured horizon indicates a period of stability or cessation of erosion and development of a soil horizon within the upper portion of the colluvium. In the valley centre this horizon overlies the 'gravel fan' deposits within layer 12, while just to the east of the valley centre it was observed inter-digitated with the colluvial layer 12.

Layer 11: A calcareous, unsorted typical chalk colluvium extended from 32m on the steeper western slope, where it was cut by a later ditch, and thinned out in the valley centre where it disappeared. The significantly lighter colour, and more calcareous nature of this colluvium is indicative of the erosion of thinner soils on the interfluves.

Layer 16: A light yellowish brown highly calcareous chalky colluvium interspersed with a number of flint nodules overlay layer 11. In contrast to layer 11, this colluvial deposit was thinnest at the western margin of trench 1a (15m) and thickest in the valley centre and eastern edge possibly indicating that these two colluvial units originated predominantly from opposite sides of the valley. Although this layer cannot be traced with certainty up the western slope it is however, remarkably similar to layer 10 which is sealed by the bank and cut by the ditch of the rectilinear enclosure. If this is the same horizon then it can be seen to extend to 32m.

Layer 14: A gravel fan within a darker colluvial matrix. The flints are predominantly situated in the centre of the valley, but do occur to the east. The origin of these flints is uncertain. Although some probably derived from the western slope it was not possible to determine whether the majority originated from the eastern slope or were the results of deposition along the valley axis. If the latter was the case then they must predate the rectilinear enclosure which would have formed a barrier to subsequent erosion events.

Layer 1: The present topsoil is a colluvial calcareous brown earth approximately 30cm thick, being considerably thinner on the steeper eastern slope. The soil is largely stone-free and extensively worm-worked indicating long-term grassland, probably pasture which had not been ploughed for some time.

Stratigraphy; Trench 1b

A lynchet and negative lynchet was excavated on the eastern slope in trench 1b, which also sectioned the bank and ditch of the rectilinear enclosure. The stratigraphy associated with these features is summarised below, except where already discussed in relation to trench 1a (Figs 34 & 35).

Layer 4: A subsoil hollow was observed in section at 42m. It had an irregular base and was filled with a dark brown clay loam with a number of large flint nodules. On its upslope side was a layer (4a) of small rounded chalk pieces. This feature is interpreted as a tree-throw hollow in which the tree trunk fell downslope and the chalk from its roots washed off on the eastern, upslope, side of the hollow leaving the chalky deposit.

Layer 3: A calcareous silty clay loam with relatively few chalk pieces occurs in lenses overlying the chalky melt-water deposits. This may be a relict old land surface as seen in other dry valleys (e.g. Bourne Valley Sussex) in which case it might represent a severely truncated calcareous brown earth. It produced two undiagnostic flint flakes.

Layer 5: A yellowish brown calcareous unsorted colluvium which occurs immediately upslope of the valley entrenchment ditch in a small negative lynchet. Its location indicates that it predates the enclosure and the nature of the colluvium indicates that it post dates layer 5.

Layer 2: A characteristic unsorted, highly calcareous colluvium forming the lynchet on the eastern valley side. A number of large flint nodules were recorded on top of the lynchet and probably represent a higher energy erosion event depositing flints on the edge of the field. The lynchet seals a former negative lynchet at its foot (layer 5) and is cut by the ditch of the enclosure.

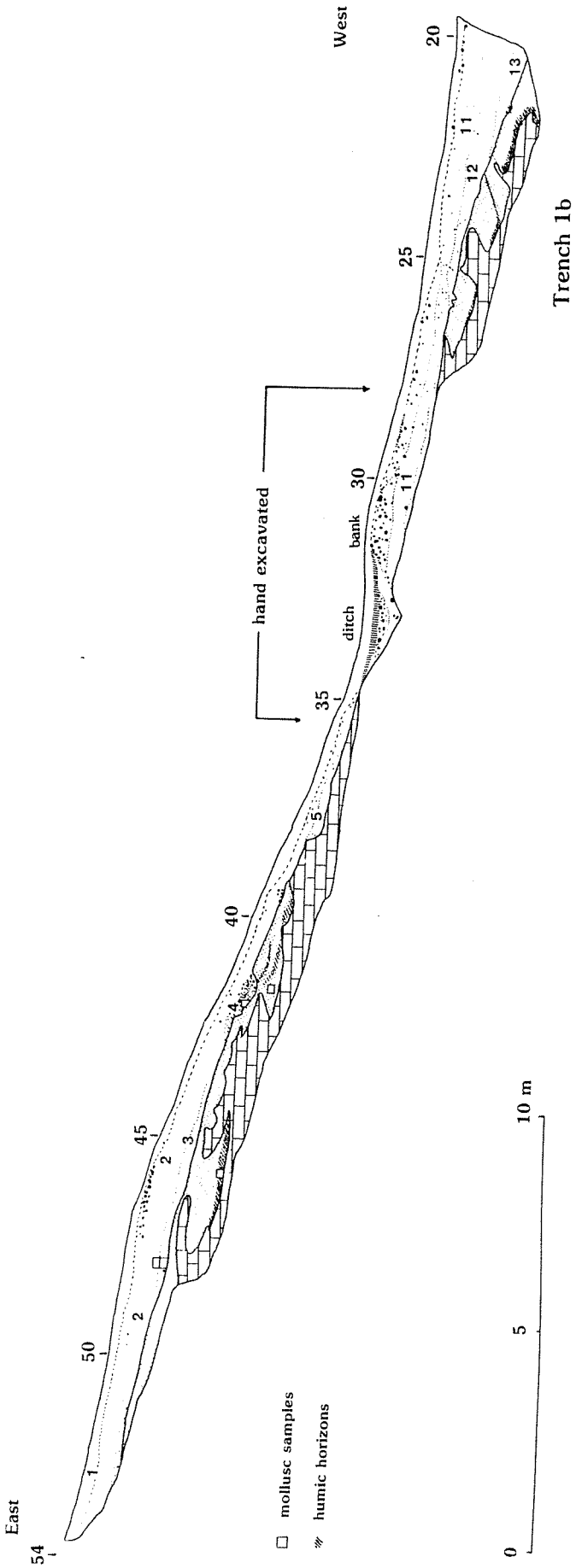


Figure 34. Newbarn Combe; Section of deposits on the valley side, trench 1b.

The rectilinear valley entrenchment

The bank and ditch were excavated by hand in an attempt to recover artifacts with which to date the rectilinear valley enclosure. The ditch has a simple shallow V-shaped profile cutting through the lynchet deposits on the east and colluvial deposits of layer 11 downslope (Fig. 35).

Layer 11: This colluvial deposit is described above where it reaches the valley floor. It is sealed by the internal bank (layer 9) of the entrenchment. Hand excavation at this point produced a number of artifacts beneath the bank which included a small sherd of a BB1 vessel.

The bank

Layer 9: A simple dump of soil and flints formed a low bank on the inner, downslope side of the ditch. It extends for just over two metres and stood nearly 40cm, although this amplitude is today hidden by ditch fills and colluvial deposits. The bank (layer 9) may equate with layer 16 seen on the valley floor and described above.

Layer 10: On the downslope side of the bank is a light brown colluvial deposit with a number of flints. This probably represents the eroded bank.

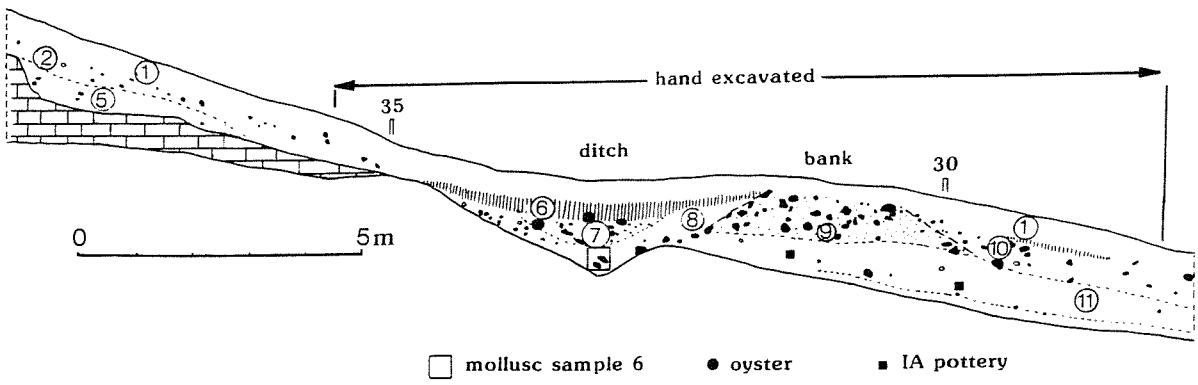


Figure 35. Newbarn Combe, trench 1b; section through the bank and ditch of the rectilinear valley entrenchment.

Ditch fills

Layer 8: A typical calcareous colluvial deposit comprised the primary ditch fill. It contained a number of artifacts, but unfortunately nothing datable with the exception of specimens of the snail *Helix aspersa* which indicate a Roman or later date (Kerney 1966; 1977).

Layer 7: A large number of flint nodules formed the upper fill of the ditch. These may well have rolled off the top of the lynchet deposit (layer 2). The finds include oyster which might indicate a Roman or later date.

Layer 6: A greyish brown, humic silty loam buried soil sealed the ditch. It was a stone-free worm-worked soil typical of a grassland soil. This probably represents stabilisation and the onset of a grazed downland environment. No datable artifacts were recovered.

Trench 2

A single area at the southern end of the trench, nearest to the recorded flint scatter, was selected for hand excavation (Figs 31 & 32). The post-glacial sequence within this trench was relatively shallow; it was only 1.5m thick with seven simple horizons overlying the chalky melt-water deposits. Even the chalky melt-water deposits were consistent, and in contrast with trench 1b revealed very few periglacial involutions and other features. Although the hand excavated section was not placed through quite the deepest part of the sequence it was located in such a way that it sectioned the buried humic horizons at their greatest depth (Fig. 36). The section was surprisingly uniform and most horizons can be broadly equated with those described in trench 1a. The stratigraphy is summarised below and detailed in appendix 3.1.

Layer 58: The basal deposits comprised chalky periglacial solifluction deposits. Where they were sectioned, distinct lamination and silty/ sandier lenses could be detected within the largely calcareous marl matrix. These deposits were recognised uniformly to form the base of the post-glacial deposits and are paralleled by layer 22 in trench 1.

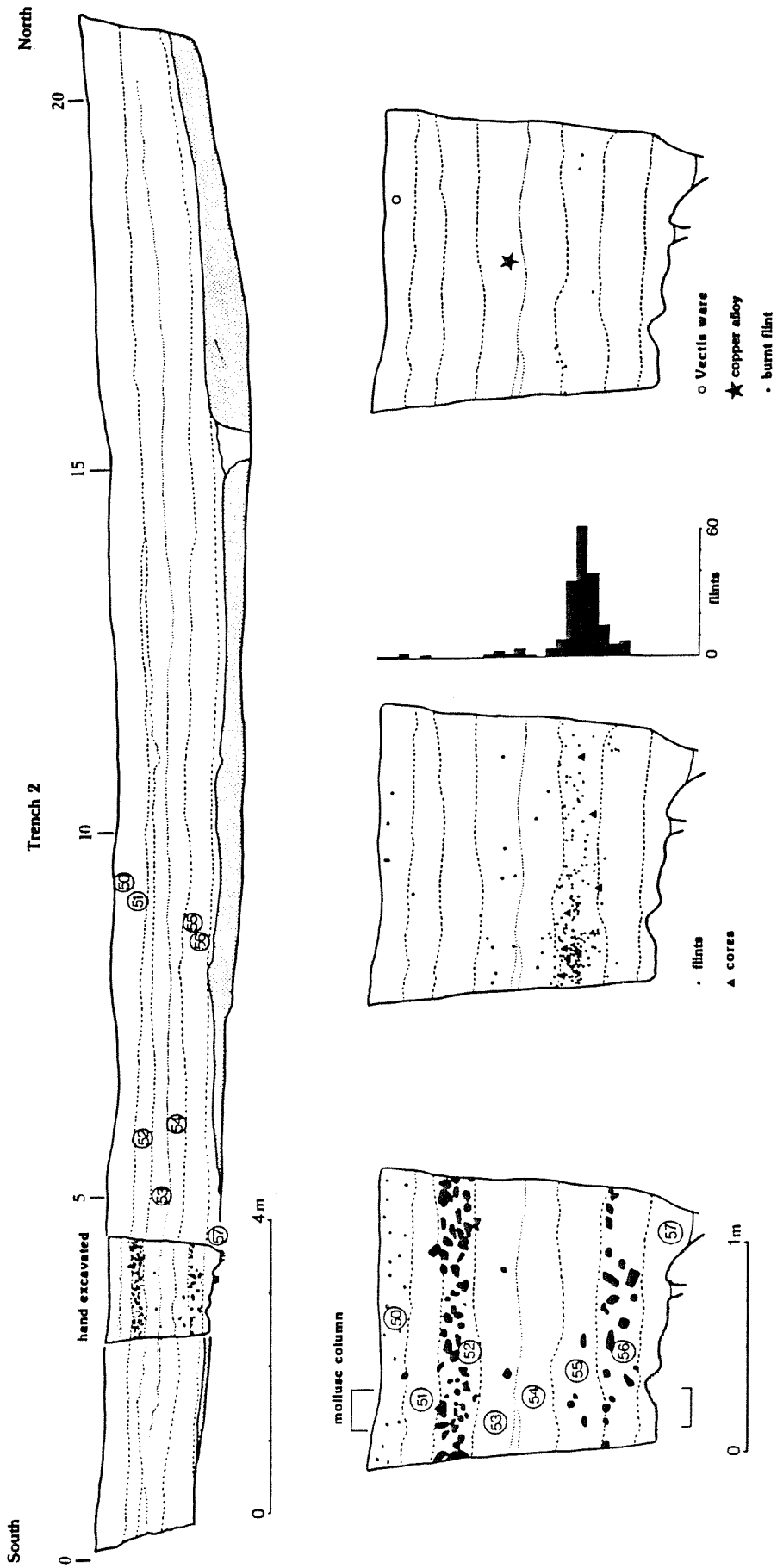


Figure 36. Newbarn Combe; Section of the hand excavated colluvium within trench 2 and artifact distributions.

Layer 57: The basal post-glacial deposit was a stone-free, dark strong brown silty clay horizon that was recorded within most of the section; only becoming indistinguishable from the overlying horizons (layers 56 and 55) where the valley profile rises at 15m+. Thus, like layer 15, this might represent the basal, possibly truncated horizon (B) of a relict early Holocene brown earth. It was largely artifact free.

Layer 56: The relict early Holocene soil, as in trench 1a, was overlain by a slightly mottled dark grey silty clay, weakly calcareous layer with a number of medium to large flint nodules. This horizon was interpreted as a part of a buried soil and containing a large number of flint flakes but was unfortunately devoid of pottery.

Layer 55: Undoubtedly associated with layer 56, this horizon was similar but largely stone-free. It, too, contained a larger number of flint flakes which may be more or less *in situ* and thus this layer may represent the earthworm worked, or upper horizons, of a buried brown earth. It extends throughout the length of the trench.

Layer 54: An unsorted silty clay loam, calcareous colluvium comprising a silty loam with many small rounded chalk pieces. It contained only few artifacts.

Layer 53: An unsorted, light silty clay loam, highly calcareous, almost artifact-free, colluvium with common small and very small chalk pieces.

Layer 52: On the valley floor another gravel fan occurred, here within a colluvial matrix. Flint nodules extended for over 15m on the valley floor but did not extend up the gentle northern slope. These probably originate as deposits from the valley axis or the slightly steeper southern valley side. This may equate with the episodes of higher energy erosion seen in trench 1a (i.e. layer 14).

Layer 51: Overlying the gravel fan was a dark greyish brown, humic horizon, largely stone-free with regular strong blocky peds. This horizon is reminiscent of a long term grassland soil which has been heavily worm worked.

Layer 50: The modern ploughsoil is typically mixed and distinctly more humic than some of the underlying colluvial horizons observed.

Artifact distributions

Relatively few artifacts were recorded from the general cleaning of the trenches. Nevertheless the artifact distribution was able to provide some crude dating evidence for the lynchet in trench 1b. The controlled, hand-excavated areas produced higher numbers of artifacts, but again the overall density was relatively low. The artifacts from the hand excavated sections in the valley floor of both trench 1a and 2 produced very definite skewed distributions (Figs 33 & 36).

Pottery

Although three areas were carefully hand excavated, pottery was conspicuous by its absence. A total of only 20 sherds was recovered in all. The paucity of sherds has contributed to the lack of any rigid chronological framework for the layers described above; their distribution is, however, chronologically logical. The sherds were identified by David Tomalin (Table 22).

Bronze Age sherds and their distribution

All the Bronze Age pottery was recovered from trench 1 (Fig. 33). Only five sherds could be certainly ascribed to the Bronze Age (Table 22). This included three Early Bronze Age sherds, one of which was Beaker, and all of which came from the upper buried soil (layer 17) developed in colluvium and were associated with Iron Age fabrics. The distribution and small, weathered character of these sherds indicates that they were eroded into this sequence at a later date than their original deposition and indicate Bronze Age activity on the valley sides. Two other undiagnostic Bronze Age sherds were, however, recovered from the lower buried soil sequence (layer 13 and 20) in trench 1a and may be nearly *in situ*. They belong to different vessels.

Iron Age sherds and their distribution

The Iron Age sherds from trench 1 were more distinctly clustered and confined to the colluvial layers 11 and 16 (Fig. 33). Another Iron Age sherd also from layer 11 was recovered from trench 1b. A single sherd of late Iron Age pottery was recovered from a comparable layer (layer

53) in trench 2 (Fig. 36).

Romano-British sherds and their distribution

Very few Romano-British sherds were recovered. One was within the lynchet colluvium of trench 1b and another was sealed beneath the bank of the rectilinear enclosure. A single sherd of Vectis ware was recovered from hand excavation in trench 1a and was associated with the Iron Age pottery while the only Romano-British sherd in trench 2 was from the subsoil.

Sherd	Trench	Description
BRONZE AGE		
105	1a	?Beaker, weathered base and foot
107	1a	Early Bronze Age, grog tempered
109	1a	Bronze Age ?Biconical Urn, flint tempered body sherd
171*	1a	B. A. Grog tempered body sherd with dissolved shell
73*	1a	Prehistoric rim. Miniature vessel. ?BA
PREHISTORIC		
76	1a	Prehistoric body sherd
27	1b	?Prehistoric. Soft thin-walled sherd
40	1b	?Prehistoric. Soft thin-walled sherd
IRON AGE		
91	1a	?Prehistoric: IA/?BA Shell tempered
103	1a	Iron Age rim sherd, shell tempered
38	1b	Late Iron Age jar, ?1st BC - spall of
56	1b	?Late Iron Age. Shell tempered jar/saucepan. 1st BC
85	1a	?Iron Age, body sherd
86	1a	?Iron Age, flint tempered body sherd
92	1a	Late Iron Age BB jar
ROMANO-BRITISH		
26	1b	R-B. BB1
3	1b	R-B. Vectis Ware. Bead rim
95	1a	R-B. Vectis Ware
78	1a	R-B. ?Vectis Ware
271	2	R-B. Vectis Ware/BB1

Table 22. Pottery from Newbarn Combe; identified by D.J. Tomalin.

Distribution of flints

The flint distributions were more informative and over 320 pieces were recorded. The flints in trench 1 were mainly restricted to the lower buried soil horizons (layers 13, 20 and 21) where the density of artifacts was higher. One concentration which included a core was recorded in the stone-free buried soil, layer 13, on the western edge of the hand excavated portion (Fig. 33). There is a gap in the sequence (*c.* 1.60 - 1.75) which corresponds to the stone-free colluvium (possibly a stabilisation horizon) and above this in the calcareous colluvial layers are a further 13 flints. As these were not obviously different from those seen in the rest of the section the whole assemblage was considered together.

The distribution in trench 2 was very distinct in that over 86% of the flints came from the buried soil (layer 55). The paucity of flints in the overlying horizons was marked. Again, a concentration could be seen in the northern end of the hand excavated section but this was largely due to a higher number of small flint chips. The distribution here is certainly indicative of burial of a surface an activity horizon.

The artifacts

Pottery

The Bronze Age sherds represent a number of ceramic traditions. The more diagnostic pieces included a weathered base and foot of a Beaker (no. 105) a flint tempered sherd probably belonging to a Biconical Urn (no. 109), and a rim of a miniature vessel (no. 73). Two grog tempered sherds were recovered, one of which also probably contains dissolved shell.

The Iron Age sherds were predominantly from vessels of the 1st century BC and they represented a shell tempered saucepan pot, a jar and body sherd of a 'soapy' fabric. Otherwise, flint and shell tempering traditions were recognised in the small assemblage.

The Romano-British wares included the local Vectis ware and black burnished ware (BB1).

The flint assemblages

The assemblages were recorded following the criteria adopted by Schofield (1988). A number of attributes were recorded; these were principally artifact type (i.e. flake, blade, core etc), dimensions and proportion of cortex (primary, secondary and tertiary), presence of hinge fractures and mis-hits and the colour/nature of the flint (Tables 23 - 26). Only those flints from the hand excavations were included in the comparison between the two trenches (cf. Table 23). This showed that in all criteria the assemblages were similar and therefore can probably be considered a part of the same general episode, although trench 2 contained a higher number of flint chips and splinters. In both cases no significant differences could be detected within the distributions of each trench. The flints from each trench are, however, considered as separate assemblages.

	Trench 1	Trench 2
Flakes	92	189
Core trimming flakes	4	2
Hammerstones	1	0
Core/bashed lumps	5	8
blades	2	3
Tools	0	1
Total	**104**	**203**
% flakes	92	94

Table 23. Flint assemblage composition from the hand excavated sections.

The colour and cortex of the flint (Table 24), and the high number of 'tested' pieces from both trenches suggest that the flint was local, relatively poor-quality weathered surface flint from calcareous and locally acidic soils (such as survive on Gallibury Down today).

	Trench 1				Trench 2			
	Flakes		tools/cores		Flakes		Tools/cores	
	no	%	no	%	no	%	no	%
Colour								
Grey	46	50.0	4	40.0	102	53.0	8	57.1
Grey/white	19	20.7	1	10.0	29	15.3	1	7.1
White	20	21.7	3	30.0	46	24.3	4	28.6
Grey/black	6	6.5	2	20.0	12	6.3	1	7.1

Table 24. Colour attributes of the flints

	Trench 1		Trench 2	
	no	%	no	%
Mis-hits/hinges	40	38.5	74	36.5
Flakes				
Primary	13	14.1	28	14.8
Secondary	55	59.8	104	55.0
Tertiary	24	26.1	57	30.2
Core trimming	4	-	2	-

Table 25. Composition of the flake assemblage

Apart from the material detailed in the tables (23 - 26) other flints were recovered during the cleaning of the section. By the very nature of their recovery they tend to be larger and more diagnostic pieces such as cores and core trimming flakes (Table 26).

Total non-flake material	Trench 1	Trench 2	Total
Hammerstones	1	-	1
Cores - systematic	2	2	4
Single platform	(1)	(2)	(3)
Two platforms	(1)	(-)	(1)
Cores - irregular	3	6	9
Core trimming flakes	6	2	8
Blades	2	3	5
Scrapers	-	1	1
Total	14	14	28

Table 26. Composition of the total Non-flake material.

Hammerstone

The hammerstone was a very crude irregular flint nodule that had a number of discrete areas of surface damage.

Cores

There were two types of core. Those characterised by a single platform and being systematically worked with prepared platforms were largely exhausted cores. The larger, more irregularly flaked flint nodules comprising the second group had had a number of crude core trimming flakes removed before being discarded. In these cases the aim was not, as in the former, for blade production, but for the preparation of core or flake-based tools.

Flakes

A relatively high proportion of the flakes were comparatively large

primary, secondary or core trimming flakes. Most of the tertiary flakes were relatively small, and in trench 2, in particular, they comprised flint chips and splinters. These might have been a product of crude core preparation rather than the deliberate removal of tertiary flakes and as such may not have been part of the sequential and reductive nature of core formation.

Blades

There were few blades. They were characterised by a distinct lack of attempts to retouch or re-work them. Only five blades were recognised in an assemblage of over 300 pieces.

Tools

The only tool was a simple undiagnostic scraper with crude retouch on the rounded edge furthest from the bulb of percussion. Even this tool seems to be just crude modification of a waste flake.

Discussion

There seem to be two industries represented within the assemblage (J. Richards pers. comm.). One, based upon blade production using large pieces and systematic flaking, core and platform preparation resulting in exhausted cores, represented only a small proportion of the overall collection. This is typical of later Neolithic blade industries. The second was a very crude industry using predominantly field nodules (but which also included well-rolled and stained flints presumably from the periglacial deposits) to create unsystematic multi-directional cores (bashed lumps), setting up fairly straight forward simple platforms with minimal preparation before flaking and producing broad, irregular flakes. The nodules were worked from many different directions with many hinge fractures and were quickly discarded; the cores being poor raw material and far from exhausted. This latter assemblage is more typical of crude Bronze Age industries and it may be this that was responsible for the large number of chips and splinters recovered in trench 2.

It is possible that the later Neolithic blade industry is largely residual and reworked from upslope, while the Bronze Age assemblage, which includes flakes, very small flint chips and cores, seems to have

involved the preparation and testing of flints on site. Thus much of this debris is largely *in situ*. The high number of mis-hits and hinge fractures confirm the crude, exploratory nature of this knapping and the poor quality of the raw material. The majority of the flint used was low quality; probably local field flints. Most of the assemblage is waste debris and very few tools or blades. It is characterised by large quantities of waste, low percentages of retouch, and large flake and core size. This correlates with Schofield's (1988) secondary home-range and local source model where flint acquisition and tool manufacture is frequently on a relatively small scale, and the raw material is almost in unlimited supply (Schofield 1986; 1987; Healy 1986). Although basic core preparation and trial of flint was occurring on site, the finished products were taken elsewhere. The finishing of tools may have been anywhere, though not necessarily any great distance from the excavated areas.

Land-use history; Molluscan evidence

Two columns of contiguous samples were taken; one from each of the main hand excavated areas in trenches 1 and 2. These columns were augmented by a number of spot samples, predominantly from trench 1b.

Late Glacial (Late Devensian)

Three spot samples were taken from specific deposits in trench 1b, including a potential tree-throw hollow, a periglacial involution and a possible Windermere Interstadial (possibly Allerød) soil horizon (Zone II). Unfortunately all these samples were almost devoid of shells. Even the weakly calcareous tree hollow infill which may represent a relict early Holocene soil only produced 7 shells; all open country species (Table 27). A sample (number 32) of the calcareous solifluction deposits in trench 2 was, however, not so deplete in shells (Table 29).

The spot sample from the solifluction deposits produced a typical restricted periglacial assemblage comprising the Vallonias, *Pupilla muscorum*, *Cochlicopa*, *Vitrina pellucida* and *Punctum pygmaeum* (Fig. 37). This resembles Kerney's (1977) late Devensian mollusc biozone z and is characteristic of open ground and perhaps even bare earth and tundra of pollen zone III (i.e. 8,900 - 8,000 BC).

Sample	3	5	4	1	2	6
Layer	14	-	4b	3	2	8
	Allerød soil	invol-tion	tree hollow	colluvium		Ditch
Wt.	1000	1000	1000	1000	1000	1000
Pomatias elegans (Müller)	-	-	-	-	1	-
Carychium tridentatum (Risso)	-	-	-	-	2	68
Cochlicopa spp.	-	-	-	1	3	9
Vertigo pygmaea (Draparnaud)	-	-	-	7	14	26
Pupilla muscorum (Linnaeus)	-	1	4	3	32	73
Vallonia costata (Müller)	-	-	3	22	109	147
Punctum pygmaeum (Draparnaud)	-	-	-	-	-	8
Discus rotundatus (Müller)	-	-	-	+	+	9
Vitrina pellucida (Müller)	-	-	-	-	-	2
Vitrea contracta (Westerlund)	-	-	-	-	-	27
Aegopinella nitidula (Draparnaud)	-	-	-	-	-	12
Oxychilus cellarius (Müller)	-	-	-	-	-	2
Limacidae	-	-	-	-	2	4
Cecilioides acicula (Müller)	-	-	-	1	-	25
Clausilia bidentata (Ström)	-	-	-	-	-	1
Cernuella virgata (da Costa)	-	-	-	-	-	5
Helicella itala (Linnaeus)	-	-	-	3	9	14
Trichia hispida (Linnaeus)	-	-	-	3	7	30
Cepaea spp.	-	-	-	-	-	3
Helix aspersa (Müller)	-	-	-	-	-	+
Taxa	0	1	2	5	10	17
Shannon Index (*H'*)	-	0.0	0.68	1.32	1.33	2.10
TOTAL	**0**	**1**	**7**	**39**	**181**	**440**

Table 27. Newbarn Combe; Land mollusc data from spot samples in trench 1b.

Post glacial sequences

The main suite of samples was taken in a column of 24 contiguous samples through the deposits within the hand excavated section on the valley floor in trench 1a (Fig. 33). The largely decalcified basal buried soil sequence produced only few shells (Table 28). This is disappointing as it is precisely these deposits that equate with the concentration of artifacts which probably indicate *in situ* activity and occupation on the valley floor. Nevertheless, molluscs are present from the stone-free earthworm-worked horizon (layer 19) upwards. However, fragments of *Helix aspersa*, a Roman introduction, are noted throughout this sequence. Also, the Helicellid *Helicigona lapicida* is present throughout the sequence as both apical and non-apical fragments, yet is virtually unrecorded in the northern half of the Island today (Preece 1980a). The assemblages are typical of colluvial open country sequences and are overwhelmingly dominated by *Vallonia*

costata (Fig. 38). The relatively high numbers of Zonitoides together with *Carychium tridentatum* however, are not indicative of late prehistoric or Roman arable conditions, but of habitats with some limited shade and stability; probably grassland environments. The assemblages remain fairly constant through the overlying colluvium, old land surfaces and colluvial sequence. The nature of colluvial units 11 and 16 suggests harsher erosion regimes on the valley sides, but the mollusc evidence contradicts this, since an increase in Zonitoides and decrease in *V. costata* indicate more stable conditions. It is difficult to reconcile these two conflicting lines of evidence and the shells of no species, or groups of species, were particularly worn indicating the obvious mixing of more than one fauna. However, one can invoke a simple regime whereby lush, but grazed/trampled, grassland existed on the valley floor and was gradually inundated by sediments eroding from fields on the adjacent slopes. Undoubtedly, further studies of erosion analogues are required to provide more specific and documented regimes for the proposed scenarios. The hypothesis of gradual inundation of the pasture by arable deposits is supported by two spot samples from the colluvium on the valley side (Table 29) which produced typical assemblages of ploughwash. Not surprisingly, therefore, they indicate tillage on the slope and are associated with the formation of the lynchet. Pottery from this colluvium suggests a Roman date for this activity and is corroborated by the regular occurrence of *Helix aspersa* (Fig. 37). This may therefore reinforce the hypothesis presented above that fields were cultivated on the western valley side as demonstrated by the lynchet, but the valley floor was kept as grassland, possibly pasture, enabling access up the valley axis.

The upper gravel lens, consisting of flint nodules (layer 14), indicates large scale erosion events (Chapter 2). These, as has previously been argued, are potential indicators of the use of winter cereals (Allen 1988a). The nature of this fan and the valley morphology makes erosion down the valley axis a more likely source than from the valley sides, thus giving us some indication of the land-use at the head of the valley. The decrease in the shade-loving species and increase in both Vallonias is compatible with this hypothesis. Mollusc assemblages from the modern soil continue the trend of more

NEWBARN COMBE TRENCH 1a

\Sample	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
\Layer	22	15	21	21	13	13	13	20	20	19	19	12	12	17	17	17	11	16	16	16	14	14	14	1
\Depth (cm)	260-	245-	235-	230-	220-	210-	200-	190-	175-	165-	160-	150-	140-	130-	120-	110-	100-	90-	80-	70-	50-	30-	15-	0-
\	270	260	245	235	230	220	210	200	190	175	165	160	150	140	130	120	110	100	90	80	70	50	30	15
\Wt.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	2000	2000	1000	1000
Pomatias elegans (Müller)	-	-	-	-	-	-	-	-	-	-	1	1	2	+	4	+	-	+	+	1	+	-	-	+
Carychium tridentatum (Risso)	-	-	-	-	-	-	-	-	-	-	8	54	58	22	38	19	26	20	39	73	69	8	2	-
Cochlicopa lubrica (Müller)	-	-	-	-	-	-	-	-	-	-	-	1	2	-	1	2	-	-	1	-	9	7	2	-
Cochlicopa lubricella (Porro)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Cochlicopa spp.	2	-	-	-	-	-	-	-	-	-	7	9	7	6	8	5	-	3	2	5	12	16	3	1
Vertigo pygmaea (Draparnaud)	-	-	-	-	-	-	-	-	1	-	5	2	4	2	4	4	6	1	1	5	22	14	5	7
Abida secale (Draparnaud)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	7	-	-
Pupilla muscorum (Linnaeus)	-	-	-	-	-	-	-	-	-	-	+	1	2	-	16	5	3	7	7	7	44	31	21	7
Vallonia costata (Müller)	2	-	-	-	-	1	-	1	-	11	91	157	134	91	201	200	196	145	122	109	196	188	95	63
Vallonia excentrica Sterki	-	-	-	-	-	-	-	-	-	-	3	-	-	-	2	3	-	-	-	-	4	10	17	43
Acanthinula aculeata (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
Ena obscura (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	4	2	-	-	-	-	-	-	2	-	-	-
Punctum pygmaeum (Draparnaud)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	4
Discus rotundatus (Müller)	-	-	-	-	-	-	-	-	-	-	-	4	9	8	8	7	2	1	21	57	85	19	2	2
Vitrina pellucida (Müller)	1	-	-	-	-	-	-	-	-	-	2	1	1	3	1	-	-	-	-	1	-	-	-	-
Vitrea crystallina (Müller)	-	-	-	-	-	-	-	-	-	-	-	4	34	-	-	-	-	-	-	-	-	-	-	-
Vitrea contracta (Westerlund)	-	-	-	-	-	-	-	-	-	1	2	31	6	10	9	33	93	68	128	67	30	3	-	-
Nesovitrea hammonis (Ström)	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	1
Aegopinella nitidula (Draparnaud)	-	-	-	-	-	-	-	-	-	-	1	4	6	5	18	9	12	6	13	21	11	7	5	-
Oxychilus cellarius (Müller)	-	-	-	-	1	-	-	-	-	-	-	-	2	4	4	2	-	-	-	4	-	3	-	-
Limacidae	2	-	-	-	-	-	-	-	-	-	5	10	8	5	14	11	5	9	13	10	10	6	4	1
Euconulus fulvus (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Cecilioides acicula (Müller)	-	-	-	-	2	3	7	3	1	3	1	1	4	4	18	6	18	19	15	23	158	38	3	3
Cochlodina laminata (Montagu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	2	-	-
Clausilia bidentata (Ström)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-
Clausiliidae	+	-	-	-	-	-	-	-	-	-	-	+	+	-	+	-	-	-	-	-	-	-	-	-
Candidula intersecta (Poiret)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Cernuella virgata (da Costa)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3	1
Helicella itala (Linnaeus)	1	-	-	-	-	-	-	-	-	-	7	11	7	4	10	10	6	6	6	5	10	12	-	2
Trichia hispida (Linnaeus)	-	-	-	-	-	-	-	-	1	-	9	25	18	23	36	32	47	33	52	40	89	49	26	16
Helicigona lapicida (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Cepaea spp.	-	-	-	-	-	-	-	-	-	-	-	1	1	3	3	-	+	+	2	3	4	2	1	-
Helix aspersa (Müller)	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	+	-	+	+	+	+	+	-
Taxa	5	0	0	0	1	1	0	1	2	2	13	15	17	15	18	14	11	11	13	15	15	18	13	13
Shannon Index (*H'*)	1.56	-	-	-	-	-	-	-	0.69	0.29	1.46	1.69	1.90	1.90	1.81	1.60	1.49	1.55	1.82	2.06	2.10	2.00	1.69	1.69
TOTAL	**8**	**0**	**0**	**0**	**1**	**1**	**0**	**1**	**2**	**12**	**142**	**316**	**305**	**191**	**379**	**343**	**379**	**299**	**409**	**409**	**600**	**389**	**187**	**153**

Table 28. Newbarn Combe; Land mollusc data from the valley floor colluvium.

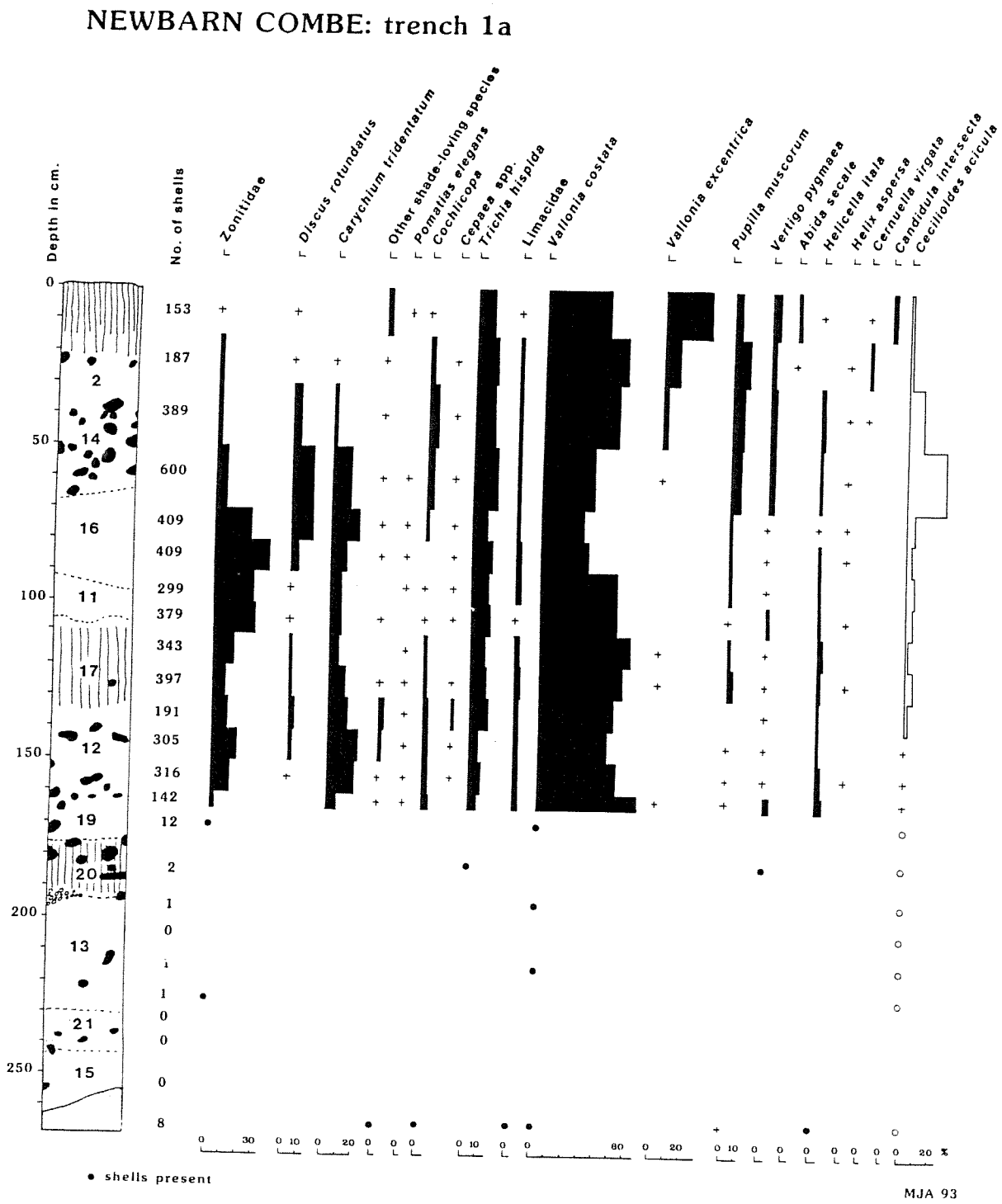


Figure 37. Newbarn Combe; Mollusc histogram from the valley floor colluvium.

being overtly open country; *Vallonia excentrica* increases and *Abida secale* is recovered for the first time in the sequence. Such an assemblage is typical of the open short grazed grassland that exists in the valley today.

A further single sample was taken from the base of the ditch of the rectilinear enclosure on the western valley side (Fig. 35). The molluscs (Table 27) indicate a fauna similar to that from the colluvium upslope. A number of specimens of *Helix aspersa* were recorded indicating a Roman or later date and the assemblage indicates continued tillage on the slope during the life of the enclosure. In fact the ditch and bank acted as a fairly effective boundary to the eroding deposits.

A further column of eight samples were taken through the hand excavated colluvial sequence in trench 2 and augmented by a single spot sample of the periglacial solifluction material (Table 29).

The basal sample of the early Holocene soil (layer 57) beneath the artifact concentrations of the old land surface produced only 10 shells probably re-worked from the late glacial deposits. As in trench 1, the old land surface was largely de-calcified and very few shells were recovered (Fig. 38).

As with the basal sequence from trench 1a, few shells were recovered from the buried soil; i.e. precisely those horizons from which the majority of the archaeological artifacts had been recovered. The colluvium sealing the buried soil was however, relatively rich in molluscs. The diagram (Fig. 38) shows that the entire colluvial assemblages were dominated by *Vallonia costata* which became more dominant with time at the expense of its congener *Vallonia excentrica* and as such can be compared with assemblages from layer 19 in trench 1. This suggests the phase of grassland may have been confined to the valley floor, and over which soil had been deposited as a result of tillage on the gentle valley slopes.

<u>Summary</u>

Although unfortunately devoid of molluscs the presence of a significant

buried soil in the base of the valley (trench 1a) was inundated by colluvium indicating erosion of a cleared landscape. Whether this erosion (probably Neolithic - Bronze Age) was a result of clearance itself or other post clearance activities cannot be determined. Subtle, but significant local and spatial changes can be detected within the rest of the sequences. However, by the Iron Age/Roman period the valley floor was being utilised as pasture while the valley sides were largely tilled. Presumably leaving the valley floor as grassland allowed easy access up and down the valley. This regime seems to have continued through the medieval period and may give some weight to the interpretation of the rectilinear earthwork as a stock enclosure which has been suggested by Toms for other similar valley entrenchments earlier this century (1926) though recently challenged at

Sample	32	33	34	35	36	37	38	39	40
Context	58	57	¦--56--¦		¦--55--¦		¦--54--¦		53
Depth (cm)	--	130-140	120-130	110-120	100-110	90-100	80-90	70-80	60-70
Wt.	1000	1000	1000	1000	1000	1000	1000	1000	1000
Pomatias elegans (Müller)	-	-	-	-	+	+	+	+	+
Carychium tridentatum (Risso)	-	-	-	-	-	3	2	1	1
Cochlicopa lubrica (Müller)	-	-	-	-	-	-	-	-	2
Cochlicopa spp.	38	1	-	-	-	2	1	4	2
Vertigo pygmaea (Draparnaud)	-	-	-	-	-	6	3	13	5
Pupilla muscorum (Linnaeus)	31	1	-	-	2	1	5	2	10
Vallonia costata (Müller)	37	2	-	-	5	46	152	172	261
Vallonia excentrica Sterki	60	2	-	2	2	7	16	-	-
Ena obscura (Müller)	-	-	-	-	-	-	-	1	-
Punctum pygmaeum (Draparnaud)	17	-	-	-	-	-	1	1	-
Discus rotundatus (Müller)	-	-	-	-	-	-	+	1	1
Vitrina pellucida (Müller)	10	-	-	-	-	-	4	-	-
Vitrea contracta (Westerlund)	-	-	-	-	-	-	2	1	4
Nesovitrea hammonis (Ström)	-	-	-	-	-	1	-	-	-
Aegopinella nitidula (Draparnaud)	-	-	-	-	-	-	3	-	-
Oxychilus cellarius (Müller)	-	-	-	-	-	-	-	1	1
Limacidae	2	1	-	-	-	-	2	8	6
Cecilioides acicula (Müller)	-	33	3	2	5	6	9	10	7
Clausilia bidentata (Ström)	-	-	-	-	-	-	1	+	1
Candidula intersecta (Poiret)	-	-	-	-	-	-	-	1	-
Helicella itala (Linnaeus)	1	1	1	1	1	3	22	15	16
Trichia hispida (Linnaeus)	-	2	-	1	1	11	22	26	28
Helicigona lapicida (Linnaeus)	-	-	-	-	-	-	-	1	-
Cepaea spp.	-	-	-	-	-	-	+	+	1
Taxa	8	7	1	3	5	9	14	15	13
Shannon Index (*H'*)	1.72	1.88	0.00	1.04	1.41	1.44	1.36	1.21	0.99
TOTAL	**196**	**10**	**1**	**4**	**11**	**80**	**236**	**248**	**339**

Table 29. Newbarn Combe; Land mollusc data from the Trench 2 colluvium.

NEWBARN COMBE: trench 2

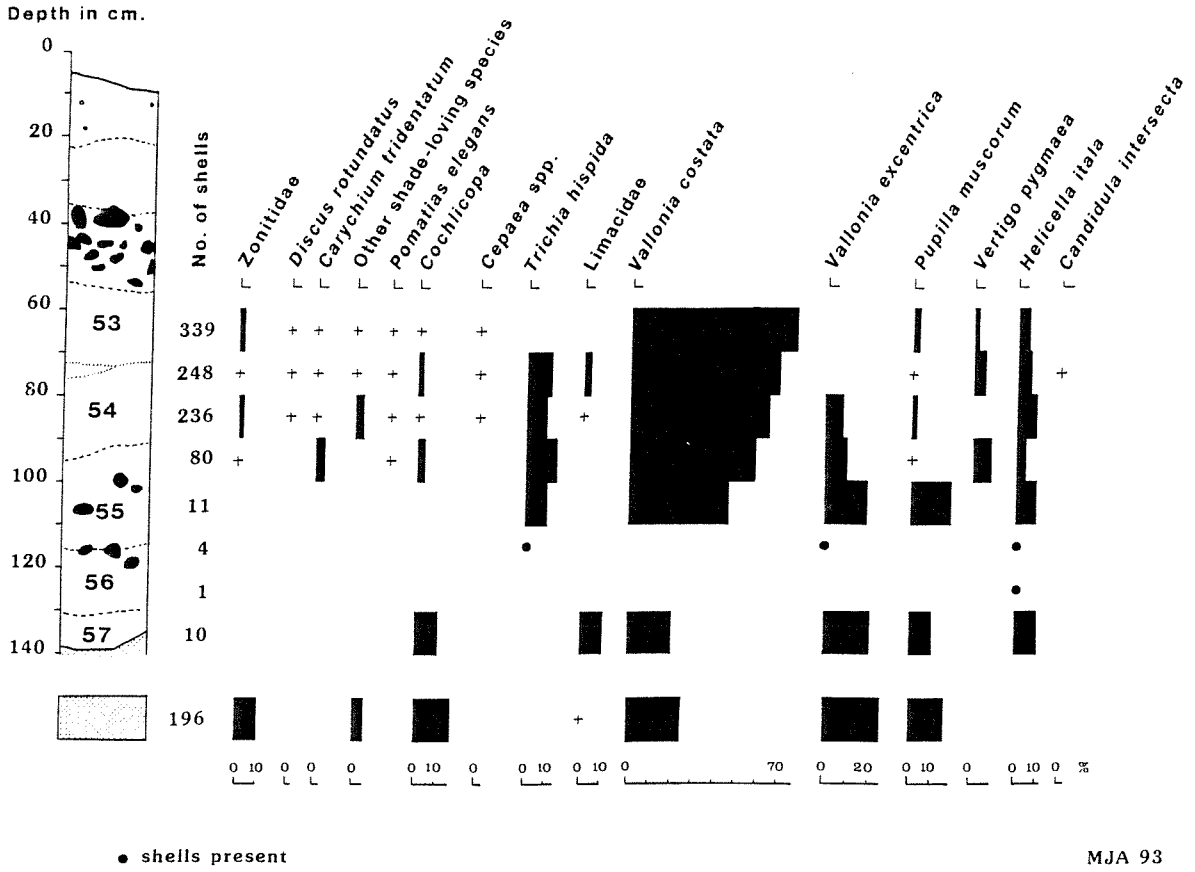


Figure 38. Newbarn Combe; Mollusc histogram from the colluvial sequence in trench 2.

one site in Sussex (Allen and Fennemore 1984). Cultivation can be suggested on all valley sides and at the head of the valley. Thus the land-use pattern in the Roman to medieval periods was not significantly different to that recorded today. The Bronze Age land-use pattern is however, more enigmatic. It seems likely that activity and occupation occurred on the valley floor where localised preliminary flint napping and tool preparation occurred. This is associated with contemporary colluvium indicating arable activity on the slopes, and in view of Scaife's (1984) pollen record for Gallibury, suggests a mosaic of farming activity within the vicinity.

Soils

Although four samples for soil micromorphology were taken in Kubiena tins, finances were not available for their preparation.

Pollen

A soil monolith was taken but again no finances were available for its analysis; it is currently refrigerated and stored by Dr. Scaife.

Discussion

Early post glacial

There is evidence of the presence argillic brown earths with silty topsoils over silty clay loam (?paleo-argillic) subsoils formed over Coombe Deposits in the valley floor at least (layer 15). Evidence for the later existence of typical (argillic) or even paleo-argillic brown earths upslope is suggested by the silty, chalk-free colluvium and buried soil horizons (layers 21, 13, 20 and 19) overlying the basal horizons. Unfortunately these basal horizons were not conducive to the preservation of shells but it is likely that these soils indicated by the basal soil (layer 15) supported Atlantic woodland. The high acidity created both by the leaf litter and decalcification of the soils themselves led to the lack of shell survival. There is, therefore, no direct evidence from molluscan analysis for the associated environment or activity precipitating erosion. Limited post-depositional pedogenesis was noted within the upper portion of these reworked (argillic) brown earth soils which indicated some stabilisation, but was followed by truncation indicating further erosion episodes associated with other activities within the combe. These events can probably be broadly ascribed to the earlier Neolithic period, although as the evidence from Strawberry Hill, Wiltshire (Chapter 6) and Dorchester (Chapter 7) has shown, the possibility of earlier, Mesolithic, activity cannot be discounted. Soil truncation here may have been associated with localised, larger scale and more permanent clearance than that which was responsible for the initial truncation and removal of the valley bottom soils.

The activity facilitating the truncation of the looser upper soil horizon was probably tree and shrub clearance and possibly even limited cultivation. The truncation of the earlier soil however, has resulted in a lacuna in the environmental evidence in the sequence created by decalcification regardless of potential truncation. Limited evidence for the truncation of an earlier (paleo-argillic) soil horizon (layer 15) might suggest woodland clearance, and possibly cultivation. This

was followed by the formation of typical brown earth soils (layers 13 & 21) and long term stability, probably grassland on the valley floor. We can tentatively suggest that this episode, too, belongs to the earlier Neolithic.

Final Neolithic and Early Bronze Age

The thick earthworm worked horizon (from which worm papules were readily recognisable when processing the soil samples) suggests long term grassland. This is probably the Neolithic, species rich downland pasture, and localised cultivation recorded by pollen analysis at Gallibury (Scaife 1984). Cultivation in the Early Bronze Age at least was not restricted to cereals, as Scaife was able to identify an impression of *Vicia faba* in the Early Bronze Age food vessel from Gallibury (Scaife 1982b; Scaife in Tomalin unpub. MS). The vessel may however, not be local.

The limited later Neolithic flint assemblage indicates the presence of some human activity within the vicinity and the number of isolated flint axe finds is in accord with this. Small scale localised arable plots would not be unusual in the easily tilled silty brown earths. This is corroborated by the long land-use history indicated by the lower fills of the valley sediments and the pollen from Gallibury.

The Bronze Age Flint knapping episodes occurred within a largely open grassland environment . As flint nodules collected from local fields were being used it indicates that the soils may have been thinned (probably on the valley sides) by erosion and tillage. This is evidenced by the deposits in trench 2 and by poorly preserved brown earth (Scaife 1984), over clay, under the Gallibury barrow.

Localised activity

Although the excavation cannot claim to have recovered evidence for settlement within the locations excavated (which represent *c.* 0.001% of the valley floor) they have located definite evidence for an *in situ* local flint working industry. The flint-working evidence from the excavations must relate to that recorded by Tomalin and Halpin which indicates not only the extent of this area (approximately 7,800m^2), but also that 75m upslope the material is now confined to the topsoil,

whereas downslope it is preserved within the buried soil. The use of poor quality local field flints may partially be due to the absence of known flint mines on the Island, and also that Newbarn Combe is some distance from coastal flint resources; i.e. chalk cliffs at the Needles and Tennyson Down. Further, the lack of tools and preponderance of flakes indicates that knapping was occurring and is in direct contrast to the contemporary flint assemblage from the Gallibury barrow where 43% of the small flint assemblage (only 134 pieces) were implements (Tomalin unpub. MS).

The flint assemblages show characteristics typical of secondary home-range activities (Schofield 1988, 173). That is to say that knapping occurred beyond the immediate settlement domain where specific tasks (knapping) may be repeated consistently over a period of time within the given radius of the home-range (Foley 1981b). Thus it is not surprising that they are not associated with other material more characteristic of settlement or domestic activity.

It is probably with this activity that we can associate at least some of the field systems. Furthermore, the location of the combe head barrow cemeteries is certainly suggestive of activity in the valley bottom (from which the barrow can be seen on the sky-line). Thus, a more settled and agriculturally competent society can be seen with enough labour to construct the barrow cemetery and more elaborate ceramic vessels.

Later Bronze Age

The fact that the putative soil and worm-worked horizon (layer 13 and 20) were largely preserved indicates that the deposition of the overlying material was relatively gentle and non-erosive. It comprised only weakly calcareous material indicating the erosion of brown earths from the steeper eastern slopes at least, while the comparable (though not necessarily contemporary) material in trench 2 indicates the erosion of more calcareous soils probably those more typical of the Andover or Millington Series. Erosion from the eastern slope included a number of flints but also the series of lenses of rounded chalk pieces from rilling (cf. Chapter 2) indicate that erosion was either cutting through the entire (thin) soil profile or was of generally more

calcareous (chalk rich) soils locally.

This type of erosion is more indicative of open disturbed ground, probably tillage, but could also represent the effects of shrub (e.g. hawthorn and hazel) clearance. Although the overlying layer is a stone-free horizon reminiscent of an earthworm-worked layer, the lack of worm casts and its inter-digitated nature at its western and eastern extremities make this more likely to be the result of fluvial slurry erosion; similar to that from Strawberry Hill which was isolated by soil micromorphology (Macphail, see Chapter 6). The slurry probably represents the washing of fines from arable fields. This is supported by the fact that the overlying horizons are the more commonly typical calcareous unsorted colluvial deposits containing small abraded sherds of Iron Age pottery. Thus larger scale tillage on the steeper eastern slopes, formerly predominantly pasture, can be recognised. It is probably this tillage episode that can be observed in trench 2 overlying the earlier Bronze Age buried soil.

Iron Age - Romano-British

Increased intensity of cultivation practices is evidenced by the lighter, more calcareous nature of the overlying colluvium which indicates the presence of thin rendzinas on all slopes of the valley. It is this Iron Age/Romano-British arable episode that can be specifically associated with the lynchet sectioned on the eastern valley side (trench 1b). Although it is evident that tillage of all the valley slopes occurs, and indeed aerial photographs show a number of ploughed out 'Celtic' field systems on these slopes, it is equally evident that the valley bottom remained under grass.

The reason for this is not obvious, especially as the valley would have contained much thicker more fertile soils than the brown (Andover Series) and grey (Upton Series) rendzina soils that occupied the slopes. The valley may have been largely used for pasture, and although settlement was not recorded in the excavations it does not preclude settlement further down the valley.

Iron Age and Romano-British farming was followed by continued episodes of tillage on the valley slopes and the valley floor remained grassy

even in the post Roman but pre-medieval period, when larger scale erosive events occurred depositing large gravel fans. Such high energy erosion events may be a result of serious soil degradation and winter sowing as Allen has suggested (1988a; 1991a), but here it seems likely that this erosion down the valley axis is largely a result of the very long slope combined with soil degradation and tillage, rather than specifically related to the use of winter cereals.

These events certainly occurred prior to the construction of both the valley earthworks as their ditch and banks would have impeded the transport of such coarse material. It is perhaps significant in this respect that, although much later in date, it is in this area that a dew pond was constructed!

Medieval

The lack of deposits dating to the medieval period in both trenches may be taken as evidence of more stable, long term grassland conditions. This is certainly consistent with the idea that the medieval valley entrenchments are for stock enclosures. That enclosures were required for animal management may allow us to postulate that larger herds, and thus larger areas of downland were set aside for pasture. This would also fit well with the the general picture seen for all the studies in southern England.

Conclusions

The main conclusions of the local land-use history that can be drawn from these investigations are summarised below.

Early Neolithic clearances can tentatively be suggested resulting in severe erosion and truncation of thick argillic brown earths on the slopes and valley bottom.

Later Neolithic clearance was for more permanent pasture and limited areas of cultivation.

During the Early Bronze Age lush pasture developed on the valley floor while there is evidence of tillage on the less steep slopes, and lightly grazed pasture on the hill tops. Settlement was probably

located nearby, possibly lower down the valley. Soils on the steeper slopes were certainly reduced to rendzinas and the barrow cemetery was constructed on these soils overlooking the settlement and pasture in the valley.

Construction of larger areas of formalised arable field systems, particularly on the western and southern slopes at the head of the valley followed in the Iron Age and Romano-British periods, but the valley floor remained under grass possibly for pasture and communication. Thin brown rendzina soils were ubiquitous.

Continued tillage led to the soils unviable for arable purposes with the available technology; i.e. soil thinning and loss of structure and nutrients may have led to lower cereal crop yields. This led in the post Roman period to the downland being largely made over to grassland for pasture and the construction of valley entrenchments (and later a dew pond) for stock management and watering.

5.3 LIMPET RUN, CULVER (SZ 6275 8555)

The site at the Limpet Run was selected because of its proximity to the Neolithic and Early Bronze Age settlement site at Redcliff (Basford 1980; Tomalin unpub. MS) and the physical accessibility of the calcareous colluvial sequence exposed in the cliff section (Fig. 39). The Limpet Run is situated at the base of Bembridge Down where the Upper Chalk of Whitecliff and Culver Down meets the softer lithologies of the glauconitic Upper Greensand and Gault Clay. Approximately two metres of colluvium was observed in the cliff section at the break of slope at the base of the Down overlying the Upper Greensands. To the east the land gradually slopes downwards over thin and largely obscured Carstone and Sandrock Beds onto the ferruginous sandstones of the Lower Greensand Series, which form the 40m high cliffs at Redcliff (Fig. 39). Iron within the Lower Greensands acts to cement the sand grains together providing a fairly resistant geology. The cliffs are, however, not sheer and are formed by a series of block falls along vertical joints and rotational slumps. The Upper Greensands are poorly consolidated finer sands and the softer nature of this lithology forms very shallow 'cliffs' comprised of large amounts of detritus. It is

this shallow 50m cliff form that enables access down to the beach. In contrast the chalk creates a typical near-vertical cliff face with the chalk wave-cut bench of Whitecliff Ledge at its base. Although the origin of the name Limpet Run is not known its derivation is likely to have been associated with these geological and topographical phenomena. Basford suggests (pers. comm.) that it is likely to be a derivative of 'Lime Pit Run'. Lime pits being a common feature on the island and the chalk would be easily accessible on the slopes of Bembridge Down. 'Run' is probably a longshoreman's term for a pathway from the top of the cliff down to the shore; in this case caused by the softer, slumping geology.

Archaeological background

One of the main attractions of the colluvial sequence at the Limpet Run was its proximity to the Neolithic and Early Bronze Age occupation site at Redcliff only *c.* 430m to the west on the same cliff face (SZ 6226 8543) and the wealth of archaeological finds of all periods in the Yaverland to Culver Down area (Fig. 39). Isolated Palaeolithic finds are recorded in the area, and an ovate Palaeolithic hand axe was recovered from a ploughed field at Yaverland (Poole 1938). Also found at Yaverland were four Mesolithic tranchet axes, two 'transverse flaked axes' and four microliths (Poole 1938) and another possible tranchet axe was found on the slope of the cliff at Yaverland (Poole 1929). Neolithic axes, both chipped and polished, were recovered from Yaverland, Limpet Run and Culver Down (Poole 1930) and Bronze Age lithic scatters have been recorded at Whitecliff Bay (Basford 1980) and two barb-and-tanged arrowheads from Yaverland (Poole 1926; 1936). There seems to be little evidence of Iron Age activity in the area, and although a few sherds of Iron Age pottery were recovered from Redcliff (Sherwin 1936), it is likely that they were Vectis ware (see Redcliff - below). Two Anglo-Saxon burials were recovered from Bembridge Down (Kell 1863; Grinsell and Sherwin 1940) and sherds of medieval pottery collected from both Redcliff (Poole 1936) and Yaverland (Basford 1980). Medieval ridge and furrow can be seen along the southern slope of Bembridge Down, running down towards Limpet Run and Redcliff.

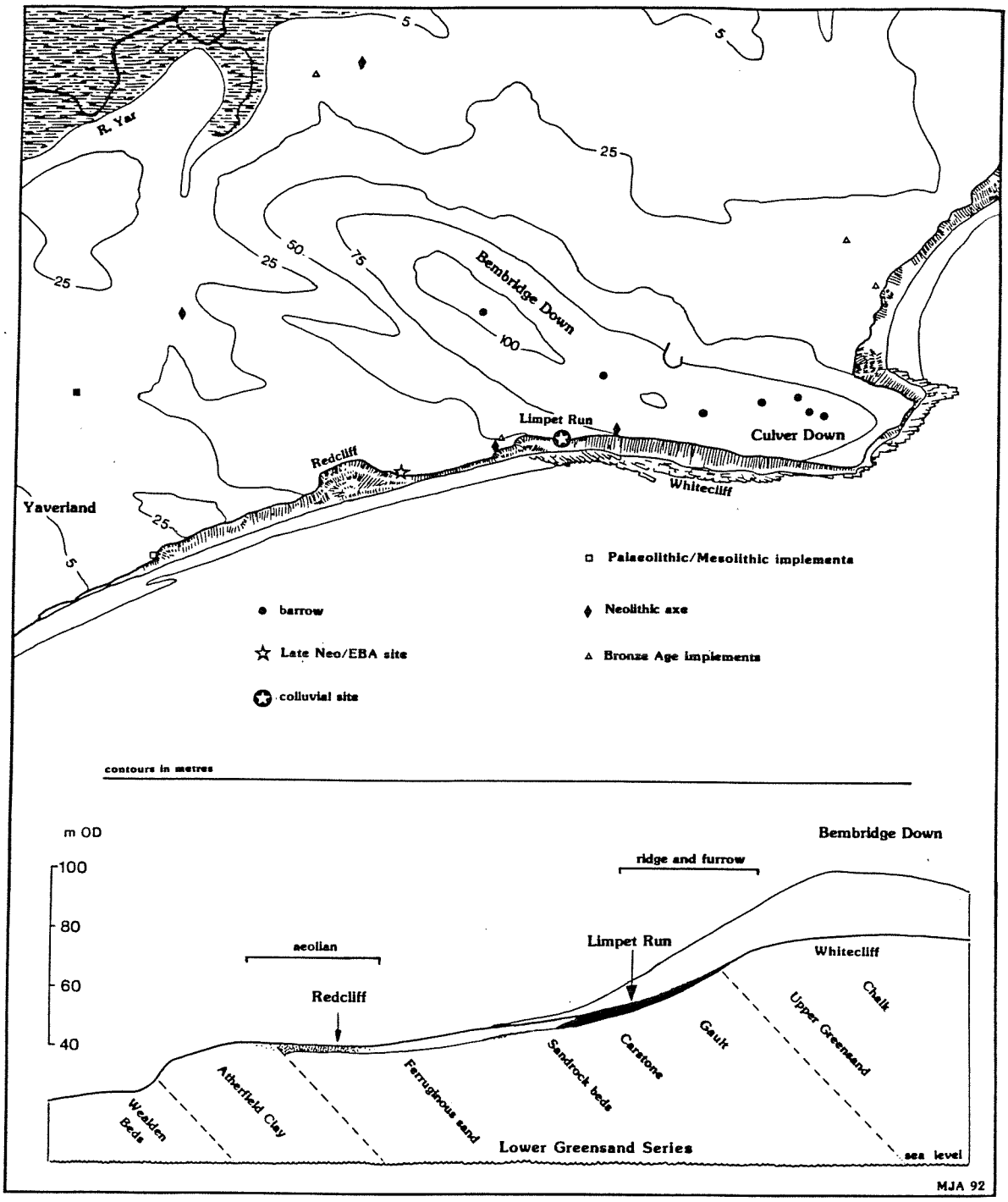


Figure 39. Geomorphology and archaeology of Limpet Run, Redcliff and the surrounding down.

Redcliff

Undoubtedly the most significant site is that at Redcliff which was initially recorded by Poole in 1927 and subsequently excavated by Tomalin in 1978. A number of Mesolithic finds were recovered from Redcliff (Poole 1936) and included a series of Mesolithic axes and

microliths which were retrieved by Hubert Poole from the eroding section. He suggested that most of the Mesolithic site had been lost to the sea (Poole 1927). Indeed Tomalin's excavations in 1978 produced very little Mesolithic material, but did recover comprehensive evidence for Late Neolithic and Early Bronze Age occupation. Significant quantities of Late Neolithic Grooved Ware and Peterborough ware were associated with a wide range of flint implements. An Early/mid Neolithic plain bowl was recovered from a rabbit scrape several years prior to the excavation (Tomalin in prep.). Also associated with this broad phase of activity are Beaker sherds and Collared Urn/Food Urn pottery and Biconical Urns.

There then seems to be a hiatus in the activity at Redcliff and a second phase of occupation is dated to the 1st century AD, centred on a hearth and stake holes associated with salt-working. A discrete scatter of pottery was associated with these features and was predominantly Vectis ware; the indigenous Island coarse ware (Tomalin 1987). Other ceramic types included Samian, Black Burnished ware (BB1), Terra-Nigra and amphorae.

Limpet Run slope edge deposit

The colluvium at the Limpet Run is a slope edge deposit and is restricted to a linear band *c.* 125m wide along the base of Bembridge Down at between *c.* 50 and 55m OD. The adjacent eastern slope rises fairly steeply at about 5.5° to Bembridge Down at 100m OD, whilst the western slope runs gently towards Redcliff at less than 0.5°. The local soils are dependent not only upon slope and topography but also the underlying geology. On the chalk slopes of Bembridge Down, a thin typically silty greyish brown (Andover Series) rendzina exists. This slope today is under permanent grassland which, from its botanical composition, seems to have been fairly long standing although there is evidence of medieval ridge and furrow cultivation. The soils on the Upper Greensand to the west of the slope edge colluvium are darker humic rendzinas, while on the ferruginous sandstones (Redcliff) the soils are podzolic brown earths (Fig. 40). The soils at Redcliff are complicated not only by archaeological occupation but also by the inclusion of aeolian sand and complex long-term pedogenesis.

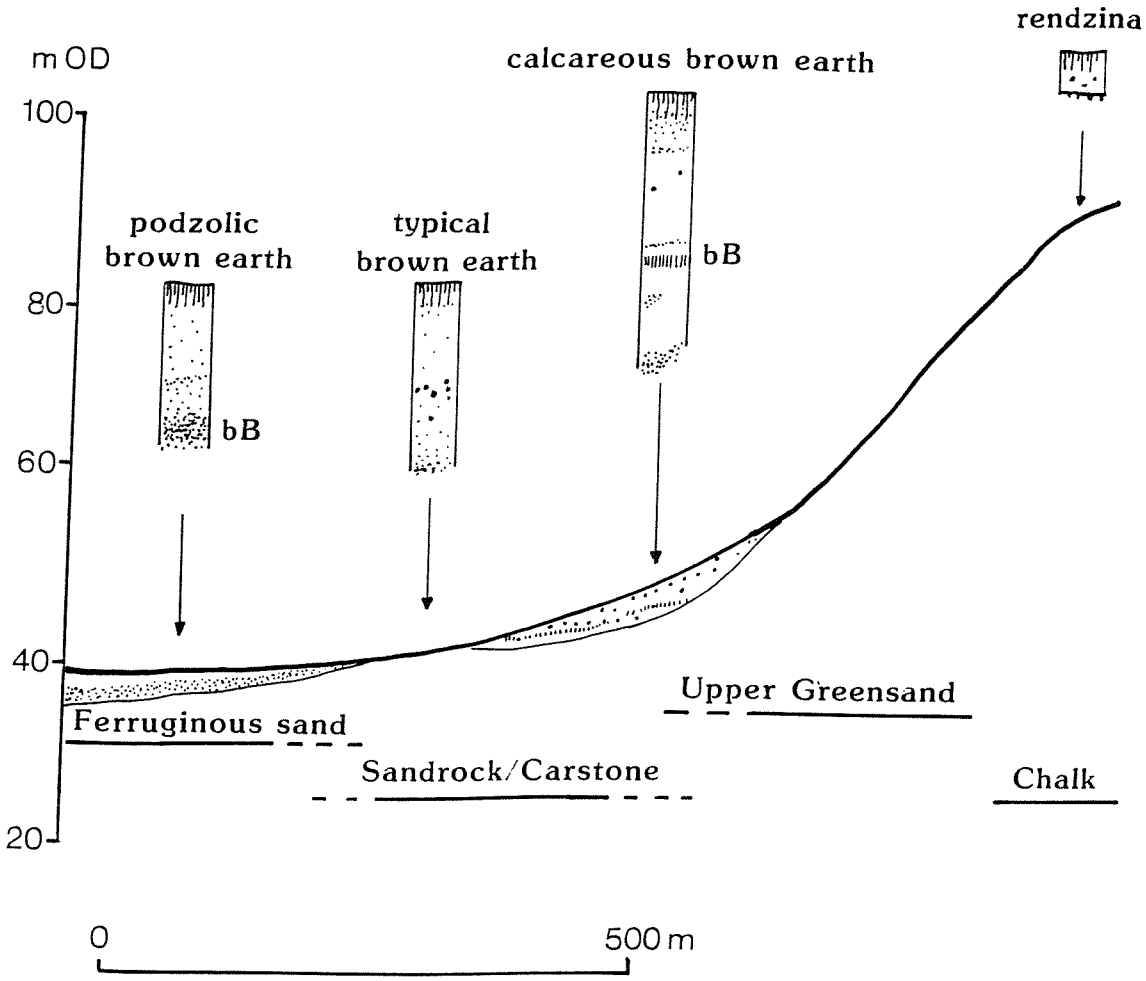


Figure 40. Soil catena at Redcliff to Bembridge Down.

The aim of sampling the colluvial deposits was to attempt to provide palaeo-environmental information which could be related to the Neolithic and Early Bronze Age occupation at Redcliff. The ferruginous sandstones, *c.* 430m away, give rise to podzolic soils which do not preserve molluscs (or pollen; Scaife pers. comm.). At the Limpet Run, however, the calcareous nature of the deposits is due primarily to the chalk hillside to the east from which the colluvium is derived and consequently preservation of mollusc shells is likely.

The stratigraphic sequence

Much of the colluvium exposed in the cliff was obscured by slumping, but a strip 2.5m wide was cleaned back, examined for artifacts and sampled. The total depth of deposits revealed was 3.00m (Fig. 41). Munsell notation was not recorded at the cliff edge section in the field, but full soil descriptions are given in appendix 3.2.

Context 10: Nowhere along the upper accessible cliff section were substantial Greensand deposits encountered. Instead the base of the cleaned section revealed weathered loosely consolidated light olive grey (5Y 6/2) glauconitic sands and marly sands which were easily cut with both spade and trowel.

Context 9: Approximately 1 metre of light brown/grey (5Y 6/1) almost stone-free silty marl overlay the Greensand. The matrix contained fine sand and its light hue indicated that most of this matrix was derived from the greensand marls beneath. It contained few small and very small rounded chalk pieces, occasional flints and localised lenses of small-very small chalk 'pea-grit' pieces (context 9a). The predominance of Greensand within the matrix and lack of chalk inclusions indicates that this deposit must have originated inland and is primarily derived from the Upper Lower Greensand Series. The nature of this deposit is suggestive of Pleistocene, late glacial, melt-water deposits; i.e. periglacial solifluction material.

Context 8: Stratigraphically the earliest post glacial deposit was the basal stone-free silty loam which represents a B horizon of a palaeosol. This horizon is slightly calcareous, low in organic matter and a strong blocky structure could be detected on drying.

Context 7: The upper horizon of the palaeosol was highly calcareous with many chalk pieces indicating material derived from the adjacent slope. The chalk inclusions indicate the acceleration of colluvial processes, possibly as a result of clearance or cultivation.

Context 6: The thin (20cm) layer of less stony colluvium; possibly a standstill phase; the concentration of small chalk pieces at the top of this layer may indicate earthworm working.

Context 5: Truncation of context 6, suggested by the abrupt boundary, was probably a result of cultivation which resulted in the deposition of 50cm of colluvium. This chalky ploughwash probably indicates a fairly long period of tillage on the chalk slopes of Bembridge Down. It becomes lightly stonier and more calcareous upwards through the section.

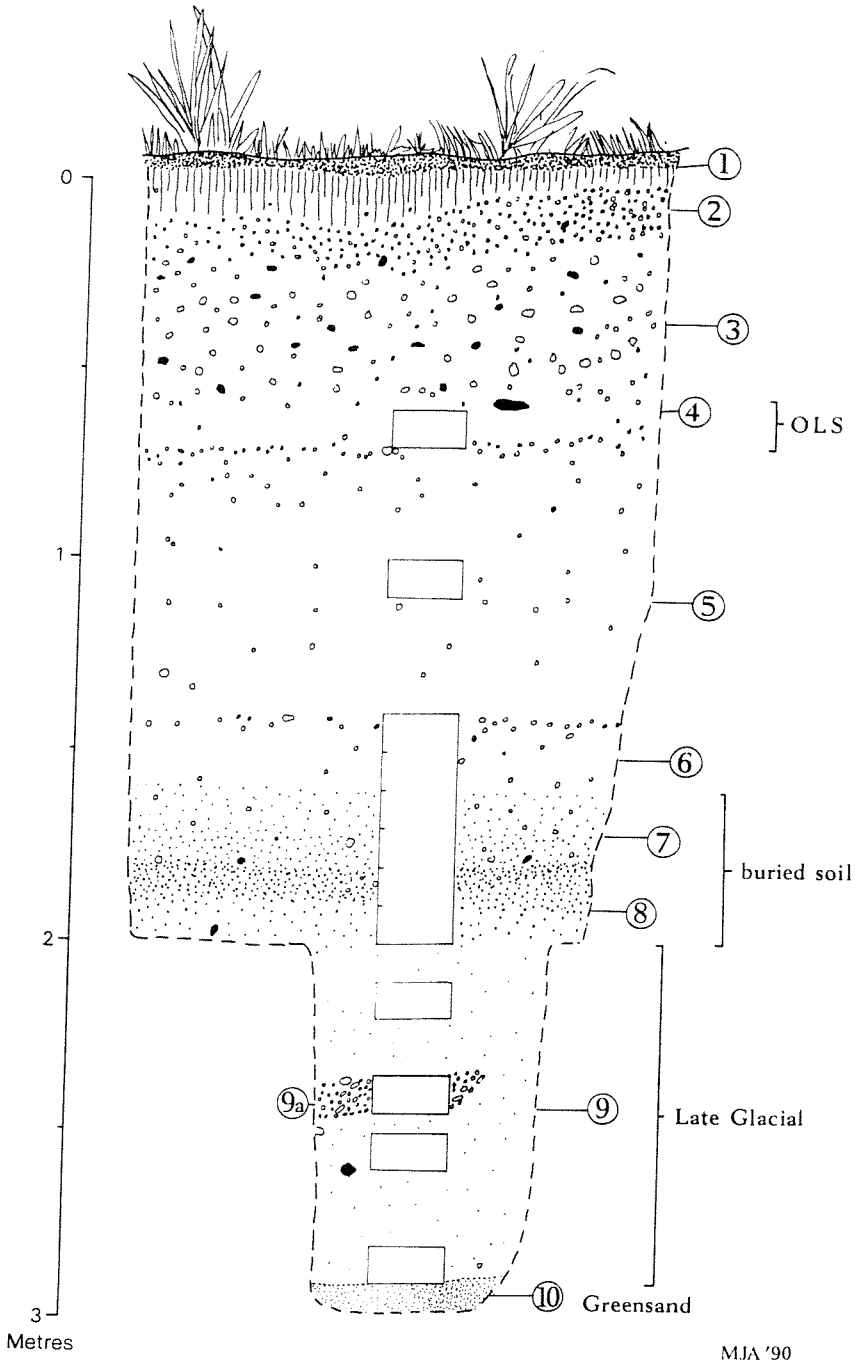


Figure 41. Cliff section at Limpet Run, Culver.

Context 4: Cessation of tillage, or at least colluviation is indicated by the upper earthworm-worked, buried soil horizon. This was presumably formed when grassland existed at least at the base of the slope.

Context 3: Initiation of colluviation on the slopes indicates a renewed phase of tillage and the increased number and size of the chalk inclusions suggests extensive thinning of the slope soils.

Context 2: The finer matrix deposits and coarser rounded flint pebbles indicate a combination of processes. Much of the stone in this layer is rounded, beach derived, flints, whilst the finer silty and slightly humic matrix indicates low energy erosion, possibly a result aoelian deposition or rainsplash movement of fines. The stones have largely been imported, possibly accidentally with seaweed (cf. Bell 1981) or for buildings or path construction. What is evident is that neither of these activities was in the immediate vicinity as the stones in this layer are the product of erosion, not direct deposition. The essentially stoneless nature of this horizon may be attributed to a combination of worm working and deposition of fine silts.

Context 1: The present grassland supports a calcareous colluvial brown earth. It is essentially stone-free, humic rich and dark brown to black approximately 20cm thick.

Artifact based chronology

Although cleaning the section involved excavating undisturbed deposits by as much as 60cm, particularly at the base of the sequence, no artifacts were recovered. A small unidentifiable (J. Ede pers. comm.) piece of charcoal was recovered from context 8 and a complete shell of *Helix aspersa* was noted in context 4, indicating a Roman or post-Roman date. Apart from that reliance must be put upon previous discoveries from the section as a whole. A Neolithic flint axe was recovered from Limpet Run by Poole (1930) but no precise details are given for its location or stratigraphical position. A single rim sherd of *Vectis ware* (Tomalin 1987, 37 and 39; 1989) was recovered from the exposed section by Frank Basford at approximately the location examined, recorded and sampled (Basford pers. comm.). It was recovered at a depth of approximately 140cm (IWAC SMR 01353) placing it in context 5.

Land Molluscs

Samples for mollusc analysis were taken from a single column through the cleaned and exposed section (Fig. 41). Analyses are presented in diagrammatic form (Fig. 42) and in Table 30. Due to the non-calcareous nature of the Greensand-derived late glacial melt water deposits, few molluscs were preserved in the lower part of the column. Similarly the basal sample of the palaeosol (context 8) was also devoid of shells.

Sample	1	2	3	4	5	6	7	8	9	10	11	12
Context	10	9	9a	9	8	8	7	7	6	6	5	4
Depth (cm)	280-290	250-260	235-245	210-220	190-200	180-190	170-180	160-170	150-160	140-150	100-110	60-70
Wt.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Pomatias elegans (Müller)	+	-	-	1	+	+	27	16	4	4	6	4
Carychium tridentatum (Risso)	-	-	-	-	-	10	30	30	4	+	2	1
Cochlicopa spp.	-	1	-	-	-	+	4	2	1	2	3	2
Vertigo pygmaea (Draparnaud)	-	-	-	-	-	-	1	3	3	5	2	2
Pupilla muscorum (Linnaeus)	-	2	-	-	-	-	5	4	27	21	9	5
Vallonia costata (Müller)	-	4	-	2	-	3	21	50	118	96	57	106
Vallonia excentrica Sterki	-	-	-	-	-	3	2	5	11	21	12	12
Acanthinula aculeata (Müller)	-	-	-	-	-	-	1	1	-	-	-	-
Punctum pygmaeum (Draparnaud)	-	-	-	-	-	-	-	1	-	-	-	-
Discus rotundatus (Müller)	-	-	-	-	-	1	21	19	2	1	-	+
Vitrina pellucida (Müller)	-	-	-	-	-	-	-	-	1	-	-	-
Vitrea contracta (Westerlund)	-	-	-	-	-	2	3	1	5	6	5	11
Nesovitrea hammonis (Ström)	-	-	-	-	-	-	-	1	-	-	-	-
Aegopinella pura (Alder)	-	-	-	-	-	-	-	2	-	-	-	-
Aegopinella nitidula (Draparnaud)	-	-	-	1	-	2	13	2	1	-	-	-
Oxychilus cellarius (Müller)	-	-	-	-	-	3	6	3	-	-	1	-
Limacidae	-	-	-	1	-	1	2	3	6	5	13	8
Cecilioides acicula (Müller)	-	-	-	-	-	6	1	3	1	-	92	8
Cochlodina laminata (Montagu)	-	-	-	-	-	-	2	1	1	-	-	-
Clausilia bidentata (Ström)	-	-	-	-	-	-	1	1	+	-	-	-
Candidula intersecta (Poiret)	-	-	-	-	-	-	-	-	-	-	1	1
Cernuella virgata (da Costa)	-	-	-	-	-	-	-	-	-	-	-	2
Helicella itala (Linnaeus)	-	-	-	-	-	-	-	2	9	8	8	12
Trichia hispida (Linnaeus)	-	2	-	-	-	3	11	10	38	23	7	17
Helicigona lapicida (Linnaeus)	-	-	-	-	-	+	-	+	+	-	-	+
Cepaea spp.	-	-	-	+	+	+	6	8	2	2	1	-
Helix aspersa (Müller)	-	-	-	-	-	-	-	-	-	+	1	2
Taxa	0	4	0	4	0	9	17	21	17	12	15	14
Shannon Index (*H'*)	0.00	1.27	0.00	1.33	0.00	1.94	2.35	2.28	1.71	1.72	1.93	1.63
TOTAL	**0**	**9**	**0**	**5**	**0**	**28**	**156**	**165**	**233**	**193**	**128**	**185**

Table 30. Limpet Run; Land mollusc data.

Shell numbers increased significantly through the palaeosol as a result of both increased chalk content and the stable environment indicated by the palaeosol itself. *Carychium tridentatum* was the most abundant species (36%) and together with the Zonitids at the base indicates fairly mesic environments. *C. tridentatum* and the predatory Zonitids are common in leaf litter habitats on woodland floors. However, the occurrence of the Vallonias (21%) and *Trichia hispida* is suggestive of slightly more open conditions. Although *T. hispida* has been recovered from palaeo-woodland habitats at Durrington Walls (Evans 1971c), it is likely that the assemblage represents an open canopy woodland, probably

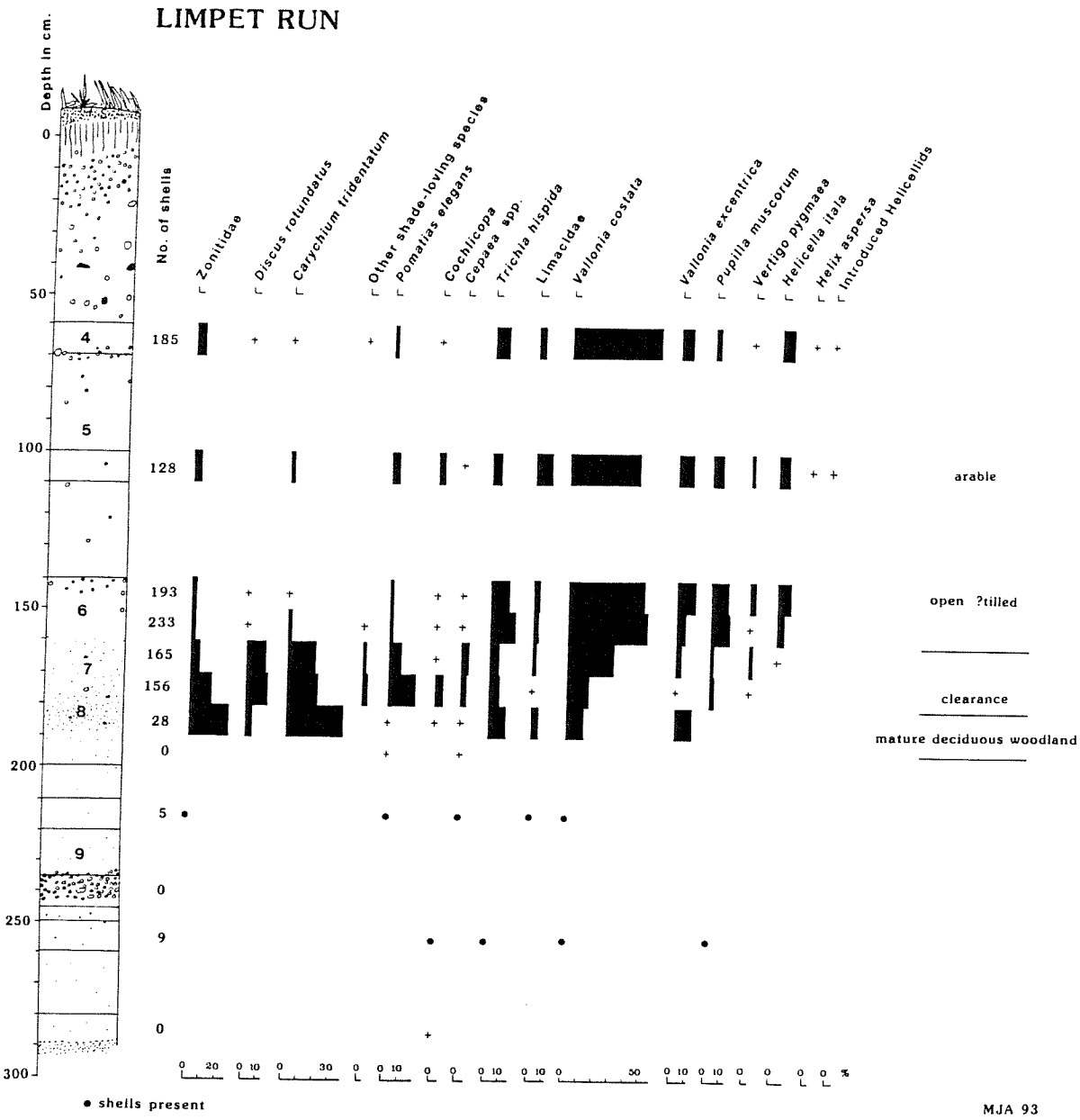


Figure 42. Limpet Run mollusc histogram.

a secondary or regenerated woodland. In many respects this assemblage is not significantly different from modern regenerated woodland on the chalk Downs (Cameron 1973). Apart from the dramatic increase in shell numbers through the palaeosol, various trends in the assemblages can be recognised. Within the palaeosol the shade-loving species decline; both the Zonitids and *C. tridentatum* occur in reduced proportions although one shade-loving species, *Discus rotundatus* is seen to increase. *Pomatias elegans* appears abruptly and then declines slightly. It is a species that prefers generally shaded and moist habitats and because it is a shallow burrowing species it favours

broken ground. Because of this it is often taken as an indicator of clearance or cultivation (Evans 1972). Here we can suggest that the shady woodland environment is being destroyed giving way to more open, possibly tilled, environments preferred by the Vallonias. This would account for the increase in chalk pieces in the upper palaeosol. At the top of the palaeosol *Vallonia costata*, often considered a pioneering species able to colonise poorly vegetated habitats such as recently cleared land (Ellis 1986), is seen to attain 30%.

The overlying colluvium (context 6) produced quite different snail assemblages. *Vallonia costata* was the most abundant species (51%) and together with the other open country species *Vallonia excentrica*, *Pupilla muscorum*, *Vertigo pygmaea*, and *Helicella itala* constitute 78% of the assemblage. The shade-loving species are only represented by occasional shells. *Pomatias elegans* is significantly depleted in numbers and apart from the open country species only *Trichia hispida* is represented in any significance. The occurrence of *T. hispida* with the Vallonias and *H. itala* can be seen in a number of other colluvial sequences and lynchet deposits (e.g. Bishopstone, Sussex (Thomas 1977b), Kiln Combe, Sussex and Chalton, Hampshire (Bell 1983)) and thus this assemblage can be seen as one of arable environments. Small fragments of *Helix aspersa* in the top of the colluvium are probably a result of limited mixing and contamination from the main colluvium above, rather than indicating a Roman or later date for this context.

The land snail assemblage from the main colluvium (context 5) is dominated by *Vallonia costata* with the open country species and *T. hispida* as in the previous layer. The presence here of apices of the Roman introduction, *H. aspersa* (Kerney 1966), indicates the onset of Kerney's mollusc biozone f; i.e. a Roman date (Kerney 1977). It was probably from this context that Frank Basford recovered the rim sherd of Vectis ware.

The final sample analysed was from the upper old land surface. Although a similar mollusc assemblage was recovered, various minor, but significant variations can be recognised. As before, the open country species predominant, but the Zonitids (*Vitrea contracta*) in particular show a slight increase. It is possible that this is a consequence of

the stability indicated by the stone-free earthworm worked horizon and that this assemblage although indicating very open conditions might represent very short, grazed grassland. The presence of two species of Introduced Helicellid indicates a Medieval or post-medieval date for this episode (Kerney 1977).

Discussion and interpretation

Although the distinct lack of artifactual evidence to provide even a basic chronological framework is disappointing, it is possible to place the major environmental episodes into a temporal sequence with reference to other known activities within the environs of the Limpet Run. The late Devensian deposits indicate erosion of the Lower Greensand Series further inland, probably as a result of melt-water action. The buried soil which sits upon these deposits shows no evidence of weathering at the junction between it and the earlier deposits. Severe truncation of the upper portion of the periglacial solifluction deposits must have occurred and, presumably, the entire early post-glacial soil profile was also removed. Using Allen's (1988a) hypotheses we can suggest that this was a relatively deep,typical brown earth which, being high in silt content was highly susceptible to erosion. Removal of the basal buried soils in valley situations is a common phenomenon and must be assumed to be associated with initial local clearance of the Linden forest. The buried soil that survives thus represents later stabilisation in the landscape. Here such stabilisation takes the form of a secondary, open canopy deciduous woodland. Placing a date on this vegetation, and more importantly its subsequent clearance of which there is an excellent record in the mollusc evidence, is more difficult. However, we can assume that clearance is attributable to one of two main phases of activity within the local archaeological record. This enables the choice to be between the Late Neolithic-Early Bronze Age occupation and the 1st Century AD Roman activity. The palaeosol is sealed by the Roman or post Roman colluvium (context 5) which itself is probably the result of the extensive impact on the landscape of Roman activity. Such activity would probably severely truncate immediately pre-Roman deposits. Thus it is likely that the secondary open canopy woodland probably represents mid-later Neolithic regeneration of earlier Neolithic, or even Mesolithic, clearance. Clearance of the secondary

woodland recorded here can be firmly attributed to the later Neolithic episode seen at Redcliff. Opening of the landscape for settlement and presumably farming in the form of both animal husbandry and cultivation led to the erosion of the soils on the slope of Bembridge Down. Cessation of this activity and any associated vegetation regeneration is lost from the record. Certainly the Roman activity at Redcliff was likely to have had a more extensive impact on the area and was associated with tillage of the slopes of Bembridge Down. The recorded sequence can be explained if we assume that Roman clearance and agricultural activity led initially to erosion and truncation of the Early-mid Bronze Age colluvial sequence and then to deposition of ploughwash. Most of the recorded colluvium (i.e. context 5) can be attributed to Roman agricultural activity. Although agriculture was practised here during the medieval period it was restricted to ridge and furrow which would severely inhibit erosion. It is during the medieval or post medieval period that the first stable grassland environment is recorded in the sequence and it is likely that, once established, it was maintained almost continuously until the present.

Summary

Once again the lack of artifactual evidence must be emphasised, nevertheless a plausible hypothesis has been proposed. Two major phases of clearance followed by agriculture resulting in colluviation can be seen. On the basis of the known archaeological activity these can be seen to be clearance of open woodland and tillage in the the Late Neolithic/Early Bronze Age in the first instance, and extensive cultivation in the 1st century AD as a result of expansion of Roman farming on the Island in the second.

5.4 EVIDENCE FOR THE NEOLITHIC AND BRONZE AGE LAND-USE OF ARRETON DOWN

The recent work on the extant barrow on Arreton Down (Fig. 43) has allowed sampling for land snails. Mollusca from two barrows on Arreton Down have now been examined. The assemblages from the barrow excavated by Alexander and Ozanne (PRN 891) were analysed and published by Sparks (1960) and those from the extant barrow (PRN 890) are reported here. The assemblages from both barrows are reviewed.

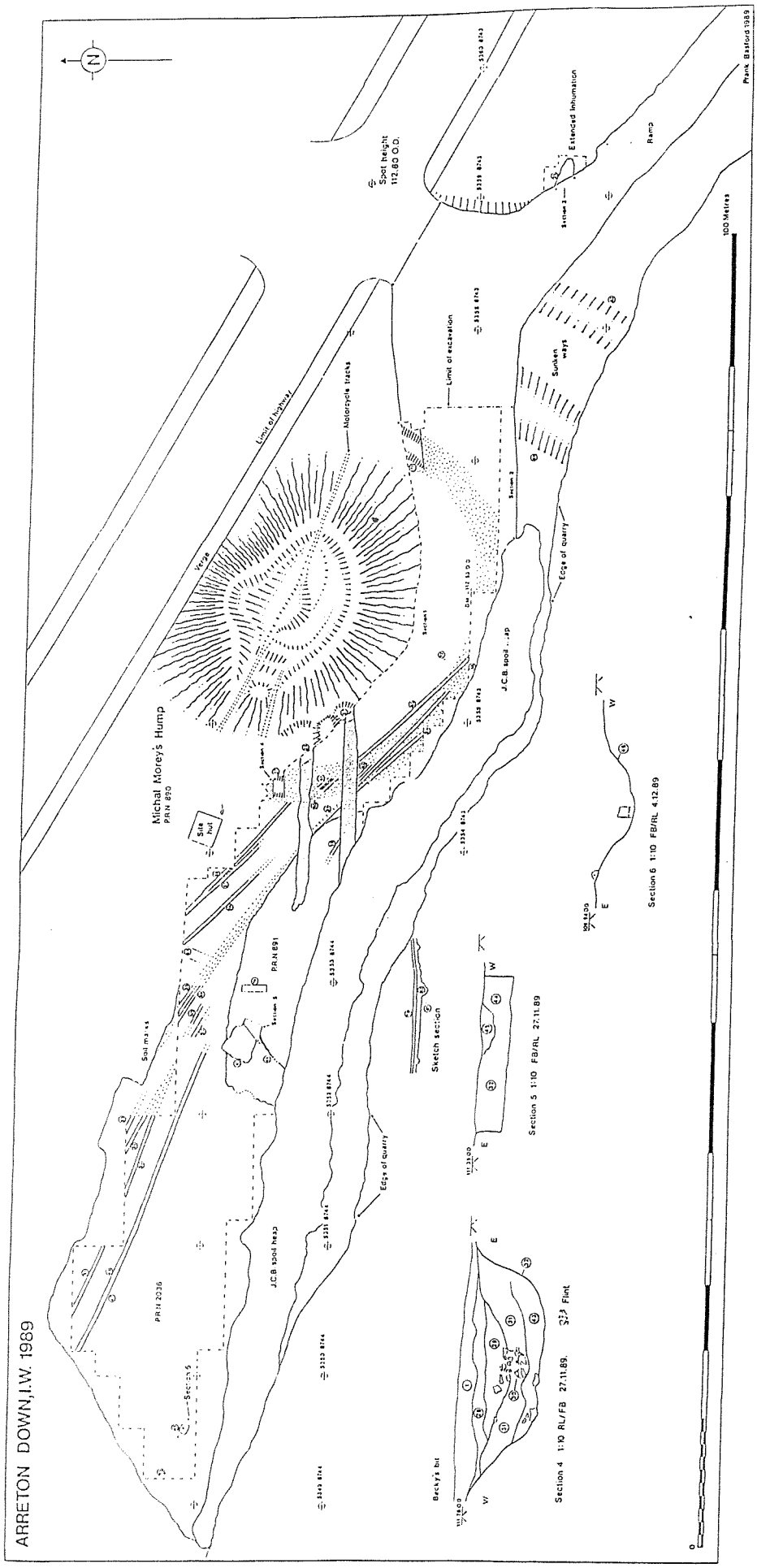


Figure 43. Arreton Down; plan of barrow PRN 890 by F. Basford, IWAC.

The Bronze Age barrow adjacent to that now quarried away and excavated by Alexander and Ozanne (Alexander *et al.* 1960), was examined by the Isle of Wight Archaeological Committee in 1989 after accidental damage to the barrow during construction of a lorry park to service the quarry (Fig. 43). Damage resulted in a small exposure of the buried soil and work involved in the restoration enabled the archaeological recording of three ditch profiles. Samples were taken from the buried soil beneath the barrow by W. Timmins and analysed as a part of an undergraduate dissertation at St. David's University College, Lampeter (Timmins 1991) and a further five samples taken from the ditch section by Frank Basford of the County Archaeological Unit were examined by the myself. The results of Timmins' work have been incorporated here and his data used in the compilation of a single diagram (Fig. 45). It is unfortunate that the samples from the buried soil, although closely sampled, were small; ranging from only 512g to 749g. Further I have some reservations about Timmins' identification of *Vallonia pulchella*, as neither my nor Sparks' work on the adjacent barrow identified this species (Sparks 1960), although it has been recorded in the vicinity (Preece 1980a, 28).

Old land surface

The buried soil is reported by Timmins to comprise a "light grey soil containing particles of chalk" surviving to 20cm thick. It lacked any evidence of a worm sorted horizon and is a typical calcareous rendzina soil. Although no description for the buried soil is given by Alexander *et al.* (1960) for the adjacent barrow, they state that it was about 25cm thick (10 inches) (*op. cit.* p.276) and from examination of plate XXVIIa it was also a typical rendzina, similar to that observed here except that it seems to display an obvious worm worked horizon nearer the centre of the barrow (to the left of the plate).

Land snails: buried soils

PRN 890. The buried soil is dominated throughout by four species; *Trichia hispida*, *Vallonia excentrica*, *Helicella itala* and *Pupilla muscorum*. Shade-loving species only represent a tiny proportion of the assemblages. There can be no doubt that this restricted assemblage represents open dry downland. The lower portion of the buried soil (25-40cm) is dominated by *Pupilla muscorum* with *H. itala* and *V.*

excentrica and may indicate either arable or more probably short grazed grassland with some bare earth, possibly as a result of trampling (Chappell *et al.* 1971). The upper sample (20-25cm) is different. *Pupilla* numbers drop as do those of *H. itala*. This probably represents a species-poor dry grassland especially in view of the presence of *Carychium tridentatum*. If under grassland, this soil should have a worm worked horizon like that noted under PRN 891. This may indicate that the rendzina profile had been de-turfed. The molluscan assemblages suggest either cessation or reduction in grazing/trampling pressure; either way the land seems to have been taken out of agricultural/occupation use prior to the construction of the barrow.

PRN 891. The single assemblage from the buried soil (see Table 31 and Fig. 45) is also dominated by open country species and as Sparks states (1960, 300) is typical of dry open downland. The low numbers of *Pupilla* and the relatively significant presence of *Carychium* indicate that a lightly grazed grassland existed, certainly containing taller herbaceous species than that indicated from the adjacent barrow.

Ditches; the post-monument environment

PRN 891 The excavated ditch surrounding the stakeholes was hardly more than a small trench and was deliberately backfilled (Alexander *et al. op. cit.*, 266) before the mound was constructed. The land snail assemblage (Table 31) indicates a dry ditch with perhaps more humus and dead vegetation created by weeds growing within it (Sparks 1960, 300). Undoubtedly some of the shade-loving species, *Oxychilus* and *Vitrea* in particular, can be attributed to the rubbly nature of the ditch fill itself (cf. Evans and Jones 1973). The fact that these species were present in the old land surface indicates that colonisation could have been fairly rapid and that niches were available in the pre-barrow landscape to accommodate them.

PRN 890. The ditch around the bowl barrow revealed a series of fills which were sampled to provide a limited temporal sequence (Fig. 44). Although the lower ditch fill contained predominantly open country species, they included both shade-loving species and a greater taxonomic range. Of the open country species *Pupilla* and *Vallonia*

Feature	From Timmins 1991				Analysis by Allen					Sparks 1960	
					PRN 890					PRN 891	
Sample	9	8	7	6	5	4	3	2	1	A[1]	B[1]
Context	Buired soil				70	69	68	66	65	OLS	ditch
Depth (cm)	35-40	30-35	25-30	20-25							
Wt (g)	746	759	882	512	2000	2000	2000	2000	2000	1750	1750
MOLLUSCA											
Pomatias elegans (Müller)	+	+	+	+	2	4	16	1	2	4	4
Carychium tridentatum (Risso)	-	-	-	-	2	34	140	9	6	19	7
Cochlicopa lubrica (Müller)	1	2	3	1	2	12	24	1	1	55	15
Cochlicopa lubricella (Porro)	1	-	-	1	-	-	5	-	1	-	-
Cochlicopa spp.	-	-	-	-	4	27	48	8	8	-	-
Vertigo pygmaea (Draparnaud)	1	3	2	1	10	6	-	1	-	7	3
Pupilla muscorum (Linnaeus)	31	42	49	18	116	227	384	27	36	71	67
Lauria cylindracea (da Costa)	-	-	-	-	-	-	2	-	-	-	7
Vallonia costata (Müller)	1	3	3	5	16	74	393	29	23	464	171
Vallonia pulchella (Müller)	-	1	-	2	-	-	-	-	-	-	-
Vallonia excentrica Sterki	21	16	23	18	155	308	331	12	12	64	26
Vallonia spp.	-	-	-	-	2	3	3	-	1	77	14
Acanthinula aculeata (Müller)	-	-	-	-	-	1	11	-	-	3	1
Ena obscura (Müller)	-	-	-	-	-	-	-	-	-	-	2
Punctum pygmaeum (Draparnaud)	-	-	-	-	1	7	27	-	-	2	1
Discus rotundatus (Müller)	-	-	-	2	-	5	8	-	-	6	213
Vitrina pellucida (Müller)	-	-	-	-	-	1	3	1	-	2	-
Vitrea contracta (Westerlund)	-	-	-	-	-	3	36	1	1	1	55
Nesovitrea hammonis (Ström)	-	-	-	-	-	1	5	1	-	-	-
Aegopinella pura (Alder)	-	-	-	-	-	3	14	1	-	3	-
Aegopinella nitidula (Draparnaud)	-	-	-	-	1	2	27	1	-	-	3
Oxychilus cellarius (Müller)	-	-	-	-	-	4	4	-	1	2	102
Limacidae	1	1	+	+	-	12	21	-	1	24	13
Cecilioides acicula (Müller)	2	2	4	3	2	-	-	-	-	-	7
Cochlodina laminata (Montagu)	-	-	-	-	-	-	1	-	-	-	-
Clausilia bidentata (Ström)	-	-	-	-	-	-	2	1	-	4	2
Helicella itala (Linnaeus)	11	32	16	8	54	84	138	26	18	44	38
Trichia hispida (Linnaeus)	13	19	38	30	6	18	52	5	1	9	1
Helicigona lapicida (Linnaeus)	-	-	-	-	-	1	+	-	1	-	7
Cepaea spp.	+	+	+	+	-	3	6	2	1	13	5
Cepaea/Arianta spp.											
Taxa	9	9	7	10	11	21	24	16	14	19	21
Shannon Index (*H'*)	1.55	1.62	1.53	1.74	2.00	2.11	2.26	1.86	1.50	1.77	2.15
TOTAL	**81**	**119**	**124**	**86**	**371**	**890**	**1752**	**127**	**114**	**974**	**757**

Table 31. Land mollusc data from samples from both Arreton barrows.
[NOTE: Old land surface data from Timmins (1991) and PRN 891 from Sparks (1960)]

costata are more numerous; *Trichia hispida* is seen to have declined in relation to the assemblages from the old land surface. In these respects this assemblage is more akin to that from the buried soil of the adjacent barrow; i.e. an environment of longer herbaceous vegetation. This is supported by the Zonitids and *Carychium* which probably exploited the slightly more humid ditch micro-environment.

Stabilisation is indicated not only by the presence of an almost stone-free soil horizon (68) but also by an increase in both shell numbers (to 1,752) and by species adept at inhabiting long stable grassland and weedy environments. The presence of *Helicigona lapicida* is of interest in that it has been recorded by all three workers from ditch fills but has not generally been found on the Isle of Wight Downs (Preece 1980a). It was probably inhabiting crevices within the chalk rubble.

The upper fills of the ditch (66 and 65) produced assemblages dominated by *Pupilla* and *Vallonia excentrica* while a reduction in *V. costata* is recorded. These assemblages are typical of downland arable contexts seen over much of southern England, in particular the colluvial deposits from Newbarn Down (Section 5.2), Limpet Run (Section 5.3) and Gore Cliff (Preece 1980b).

Arreton Down

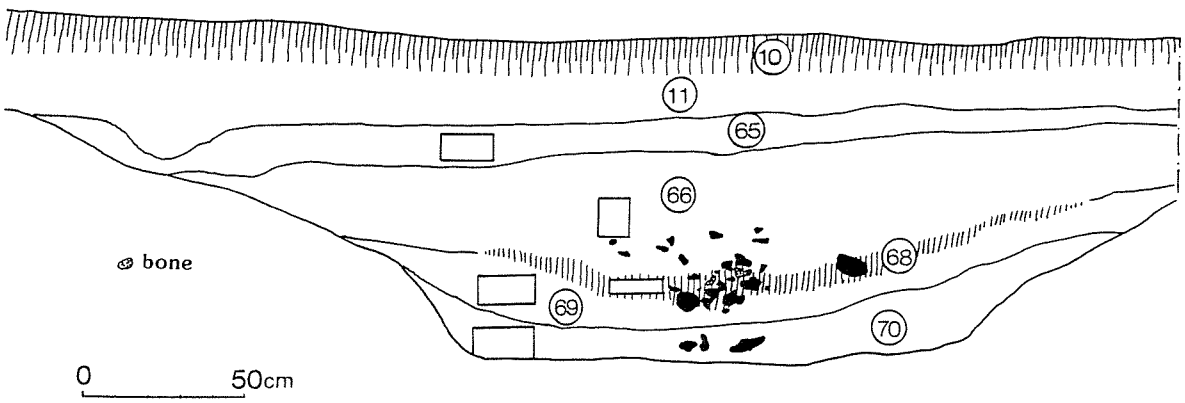


Figure 44. Ditch section showing sample location.

Discussion

The old land surface assemblages are probably Neolithic. The absence of worm a sorted horizon beneath barrow PRN 890 suggests deturfing and the removal of the Bronze Age faunas. The fact that a mollusc fauna of tall grassland became established, indicates that this environment survived long enough to facilitate a worm sorted horizon. These assemblages are highly significant if they are broadly contemporary with the later Neolithic activity seen beneath the excavated barrow. The Neolithic activity, represented by struck flints from the excavated

barrow (PRN 891), occurred in a long, ungrazed grassland, but the unexcavated barrow has produced evidence for shorter, possibly trampled grassland. If these two habitats are contemporary then it may be possible to suggest that the focus of Late Neolithic activity was in the area of the extant barrow and thus still preserved! An alternative scenario can be invoked if the two barrows are not contemporaneous. It would be more likely that the extant barrow (PRN 890) was constructed prior to the adjacent now destroyed barrow, as the assemblages from the ditch of the former are more similar to those of the old ground surface of the latter (Fig. 45).

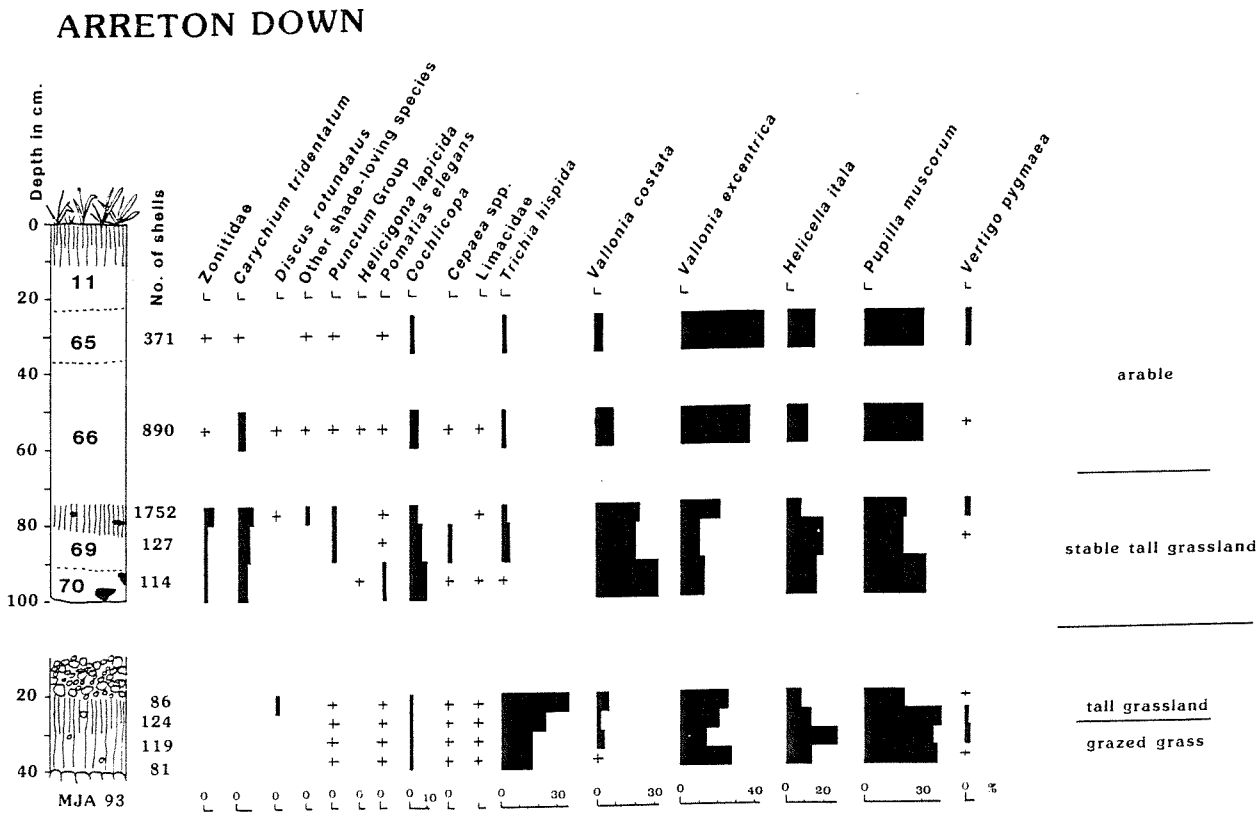


Figure 45. Composite mollusc histogram from Arreton Down barrow PRN 890.

Although Scaife (1980a; 1980b; 1982; 1987b) provides evidence for woodland regeneration during the Neolithic period from palynological analysis of Gatcombe Withy Beds, Borthwood and Ninham Bogs there is no evidence for any such regeneration from the Arreton molluscan evidence.

It may be that no assemblages relating to this episode have been analysed. Nevertheless, the number of shade-loving species does suggest that the microhabitats afforded by such vegetation were within the vicinity, until the onset of the arable activity associated with the later infilling of the ditch. Woodland regeneration seems to be primarily confined to the Greensand areas.

5.5 LAND MOLLUSCA FROM THE BRONZE AGE BARROW AT MOUNT JOY

Introduction

A Bronze Age Barrow at Mount Joy, Newport, Isle of Wight was excavated in 1980 by David Tomalin for the Isle of Wight Archaeological Committee (Fig. 46). A number of soil samples were taken during excavation and a selection were analysed for land Mollusca. In common with many plough damaged barrows no old land surface survived and thus sampling was restricted to ditches and features. Samples were taken in the field from individual contexts rather than contiguously through ditch sections. All ditch contexts were sampled and analysed enabling the environmental history of the complete profile to be reconstructed.

Apart from the ditch, samples were analysed from irregularly shaped, loess filled features and from the base of one pit. The soil samples were taken by the excavators and processed by the writer.

Pleistocene features

A large anomalous irregular feature was recovered in the south east quadrant. The fills were variable in nature but were predominately loessic and have been interpreted as loessic brickearths of the Main Devensian Glaciation (Scaife pers. comm.; cf. Evans 1968b) or early part of the Late Devensian periglacial conditions (cf. Catt 1977; 1978; 1971). This would imply a date for these deposits of between *c.* 25,000-14,000 BP.

Land Mollusca

Three samples were analysed (Table 32) from these deposits. The site descriptions show that the deposits varied from a brown silty loessic deposit with common flint nodules and occasional, sometimes large,

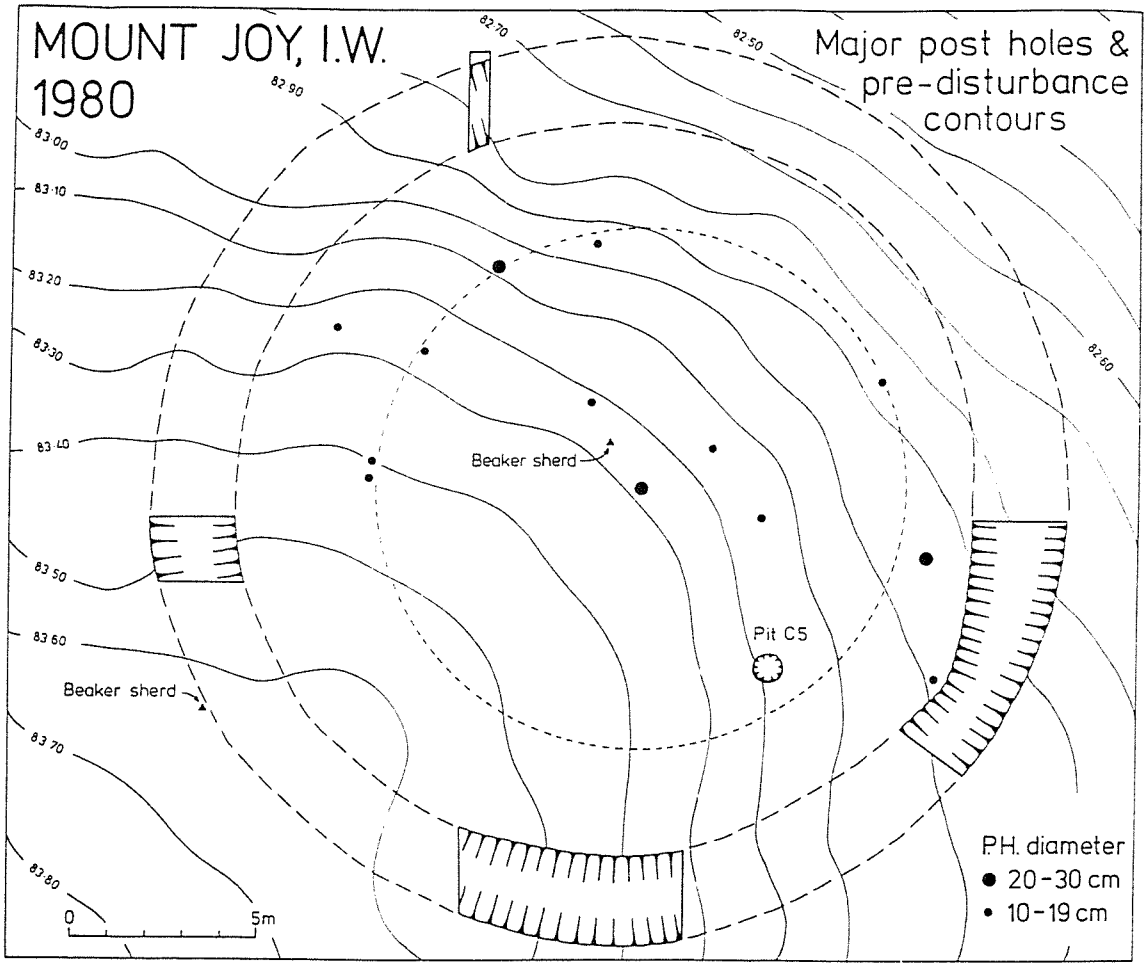


Figure 46. Plan of the excavated barrow at Mount Joy (IWAC).

charcoal flecks to a sandy loess (10YR 6/4 & 10YR 5/4) with charcoal flecks. All three samples produced depauperate assemblages and none produced more than ten individuals. Nevertheless, they were all dominated by open country species, especially *Pupilla muscorum* and *Helicella itala* which is typical of these deposits (Catt 1978). However, the occurrences of *Discus rotundatus* and non-apical fragments of *Pomatias elegans* would not be expected in late Devensian deposits. *Discus rotundatus* does not occur until the Boreal in Kerney's mollusc biozone c (1977) which is dated to approximately 6,500 BC and *Pomatias* does not occur until later in the Boreal, *c.* 6,000 BC (Kerney 1966). These fragments are thought to be intrusive via earthworm burrows or brought in by the action of other biota through the soft loessic silts. The restricted assemblage, taking account of the probable intrusive elements, is comparable to other Pleistocene assemblages (Sparks 1957;

Evans 1972) and particularly some of the Late Devensian records from southern England (Kerney 1963) and thus may be attributable to Kerney's (1977) mollusc biozone z.

Ditch

The ditch, approximately 75cm deep, comprised a typical sequence of primary, secondary and tertiary fill with a buried soil sealing the a secondary fill.

	¦-Pleistocene--¦			¦--------Ditch fills---¦					¦Pit 5¦	
Sample	10	8	5	2	9	6	7	3	1	4
Context	12	13	3	47	46	45	44	2	6	4
Wt.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Pomatias elegans (Müller)	+	+	-	-	6	+	+	1	+	-
Carychium tridentatum (Risso)	1	-	-	2	72	14	-	2	4	-
Cochlicopa lubrica (Müller)	-	-	-	-	5	1	-	-	-	-
Cochlicopa spp.	-	-	-	2	9	-	1	1	-	1
Vertigo pygmaea (Draparnaud)	-	-	-	-	4	4	6	1	-	-
Pupilla muscorum (Linnaeus)	2	2	1	1	8	10	8	4	4	2
Vallonia costata (Müller)	-	-	-	4	37	19	27	27	1	5
Vallonia excentrica Sterki	1	-	-	2	14	7	5	2	-	-
Punctum pygmaeum (Draparnaud)	-	-	-	-	-	1	-	-	-	-
Discus rotundatus (Müller)	-	2	-	-	33	6	+	1	3	-
Vitrea contracta (Westerlund)	-	-	-	2	5	1	-	-	2	-
Aegopinella pura (Alder)	-	-	-	-	6	-	-	-	-	-
Aegopinella nitidula (Draparnaud)	-	-	-	-	12	2	-	1	-	-
Oxychilus cellarius (Müller)	-	1	-	-	3	-	-	-	2	-
Limacidae	-	-	-	-	4	1	-	6	1	61
Cecilioides acicula (Müller)	5	8	-	-	20	22	98	36	11	59
Clausilia bidentata (Ström)	-	-	-	-	1	-	-	-	-	-
Clausilidae	-	+	-	-	-	-	-	-	-	-
Candidula intersecta (Poiret)	-	-	-	-	-	-	3	1	-	2
Helicella itala (Linnaeus)	1	3	-	2	19	16	12	8	-	1
Cochlicella acuta (Müller)	-	-	-	-	-	-	-	5	1	-
Trichia hispida (Linnaeus)	-	2	-	3	20	2	12	9	8	1
Helicigona lapicida (Linnaeus)	-	-	-	-	+	-	-	-	-	-
Cepaea/Arianta spp.	-	+	+	-	3	1	1	-	+	-
Helix aspersa (Müller)	-	-	-	-	-	-	+	+	+	+
Taxa	4	5	1	8	18	14	9	14	9	7
Shannon Index (*H'*)	1.33	1.33	0.00	1.85	2.40	2.15	1.82	2.02	2.07	0.71
TOTAL	**5**	**10**	**1**	**18**	**262**	**84**	**75**	**69**	**20**	**73**

Table 32. Land mollusc data from the Mount Joy barrow.

Summary context descriptions of the ditch sequence are given in Tomalin (in prep.) and the mollusc data is presented in figure 45 and table 30. The basal primary chalk inwash (context 47) produced only 18 shells This depauperate assemblage contained a typical open country assemblage

of *Vallonia costata*, *Vallonia excentrica*, *Pupilla muscorum* and *Helicella itala* with the catholic species *Trichia hispida* and *Cochlicopa* (Fig. 47). The other species (*Carychium tridentatum* and *Vitrea contracta*) although classified by Evans as shade-loving (1972, 195-196) are common species of grassland succession environments (Cameron and Morgan-Huws 1975). These occur when grassland increases in species diversity and becomes taller offering moister, shadier habitats for the mollusc community. Such grassland is typical of ungrazed or at least only occasionally grazed downland. The primary fill was a quite calcareous fine sediment and thus the depositional regime was conducive to mollusc life and shell preservation. The lack of shells might however, be due to the nature of the soils through which the ditch was cut. If the pre-barrow soil was not especially calcareous then the number of preserved shells would be limited. In contrast, although the upper primary fill was still only slightly calcareous, it was composed of flint nodules in a relatively chalk-free brown earth. Amongst the flint nodules was a proportion of chalk lumps presumably derived from the ditch sides. By analogy with the Overton Down experimental earthwork, we can suggest that it was probably deposited with 20 years of ditch construction (Crabtree 1971; 1990).

MOUNT JOY

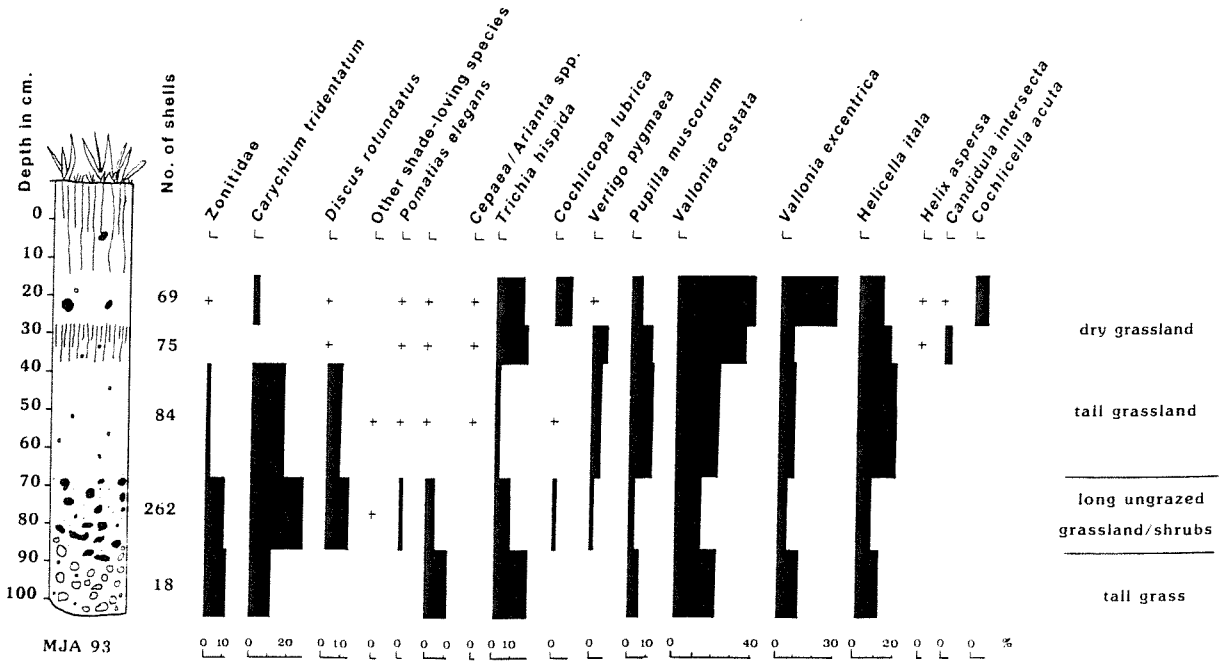


Figure 47. Mount Joy; Mollusc histogram from ditch fill.

The Mollusc assemblage was fairly rich and preservation was good (262 shells). The assemblage was dominated by *C. tridentatum*, with the Zonitids, *Discus rotundatus*, *V. costata*, *H. itala*, and *T. hispida* all attaining between 19 and 37% of the assemblage. The increase in the shade-loving species, very soon after barrow construction indicates more mesic environments. Long ungrazed grassland and even some open scrub might have regenerated, but such vegetation still constituted a broadly open, but unfarmed environment.

The finer secondary fill and almost chalk-free buried soil produced progressively fewer shells and displayed restricted taxonomic ranges. A decline in shade-loving species occurred which is a concomitant of an increase in the open country species. A typical open dry grassland assemblage dominated by the Vallonias, *Pupilla muscorum* and *H. itala* predominated. Small non-apical fragments of *Helix aspersa* in the buried soil (context 44) might indicate the onset of Kerney's mollusc biozone f, i.e. the Roman period (1977). The overlying horizon (context 2) shows an increase in *Vallonia excentrica* and a reduction in *Vertigo pygmaea*. These slight changes in the composition of the open country assemblage might indicate continued open conditions of unbroken grassland. The appearance of the Introduced Helicellid *Cochlicella itala* which has essentially a maritime distribution (Kerney and Cameron 1979) certainly suggests a medieval or post medieval date for this horizon.

Pit C5

A single sample was analysed from the basal fill of the pit C5 which was 0.8m in diameter and approximately 0.6m deep. The pit was cut through the loess fill of a large solution cavity and into the weathered chalk. Upon excavation it was assumed to be prehistoric in date although it produced no artifacts. Only 20 shells were recovered. Both *C. tridentatum* and *D. rotundatus* were present and together with the Zonitids constituted over half the assemblage. Together with these were the open country species *P. muscorum* and *V. costata*. It is unlikely that the pit was large enough or open long enough for its microhabitat to be reflected in the recovered depauperate assemblage. However, the occurrence of both fragments of *H. aspersa* and a specimen of *C. acuta* certainly indicate a medieval, or later date, for the pit.

Some of the species recovered might have originated from the loess through which the pit was cut. Indeed the specimens of *D. rotundatus* in particular were heavily pitted. Thus we can suggested a mixed assemblage probably partially relating to the loess and partially to the medieval or post medieval open grassland environment.

Modern B horizon

A sample from the modern B horizon produced only 12 shells excluding the burrowing, and thus palaeo-ecologically insignificant, species *Cecilioides acicula.* The assemblage was predominantly open county (83%) and indicative of open dry grassland or possibly arable environments. Both *H. aspersa* and *C. acuta* were present in accordance with its probable post medieval date.

Discussion

The loessic deposits produced restricted Pleistocene assemblages more typical of Kerney's (1977) mollusc biozone z. These deposits, though patchy, were formerly more extensive and made a significant contribution to pedogenesis and the resultant soils.

It is evident that the Early Bronze Age barrow at Mount Joy was constructed in a predominately cleared, but not intensively managed or grazed, landscape. Because of the almost total lack of a relict woodland fauna we can suggest that clearance of the forest cover occurred some while prior to the activity recorded here. The soils during the Bronze Age were only slightly calcareous, probably calcareous brown earths. Such soil exist almost intact to the present. The thicker nature of the soils here is partially attributable to the patchy Devensian loessic deposits. Soon after construction of the barrow, probably within 20 years or so, the grassland became tall and unkempt and there is a likelihood of the regeneration of isolated shrubs such as hawthorn. Such grassland succession is typical of that recorded by Cameron and Morgan-Huws (1975) and suggests that neither the monument, nor the immediate environs, was maintained after the initial construction. Certainly there were no tillage or heavy grazing regimes within the environment. Such rapid regeneration and 'abandonment' of the monument, although relatively unusual, can be paralleled with an Early Bronze Age barrow at Buckskin, Hampshire

(Allen *et al.* forthcoming). Here a similar rapid regeneration of the vegetation was identified from the molluscan evidence of the ditch (Allen forthcoming b).

The post barrow environment seems to have been essentially an open mainly grassland landscape, though interrupted episodes of tillage cannot be ruled out. By the Roman period, and certainly during the medieval period, an open maintained downland existed.

5.6 SUMMARY; THE ISLE OF WIGHT

The series of studies detailed here include the identifications of over 16,500 molluscs and provide further, specific, information about the land-use of the chalklands on the Isle of Wight. This can now be viewed both in conjunction with palynological work undertaken by Scaife, and with reference to the specific questions originally addressed by Tomalin in 1980 in *The Vectis report*.

A reappraisal of the value of buried soils beneath round barrows was recommended on the basis of pollen evidence (Tomalin 1980b). This study has demonstrated that such contexts are prime sources of preserved environmental data (including Mollusca) as well as cultural information. Such reappraisal is no longer an issue. These buried soils are islands of archaeology preserved by mound construction and thus represent some of the only preserved relict Neolithic land surfaces on the Island. The environmental information from these land surfaces has been seen to be stratified and contain time-depth, and with the detailed land-use history obtained from ditches, potentially provides a full sequence of pre- to post-barrow land-use and landscape history.

The analyses have concentrated on archaeological sites, which themselves were obviously biased towards open country and deforested areas. In many cases the stratified soil sequences beneath barrows provide information about the environs well *before* the construction of the mound and the molluscan and soil evidence is not necessarily biased towards open country by the presence of a prior archaeological activity (i.e. a site). The dry valley and footslope deposit investigations

have also been shown to have inherent biases, in that the erosion (and consequent deposition) is largely a result of deforestation or arable activity. Thus it is again not surprising that the evidence is biased towards open environments. Nevertheless, on the Island, this Molluscan evidence is complemented by limited, but extremely significant, palynological analyses from the chalkland, as well as more extensive work from localised valley mires on non-base rich lithologies. Most of Scaife's pollen analyses, with specific exceptions, are from small valley mires located primarily on the greensand. These analyses provide detailed vegetational information on the local environs, but not specifically those of the chalklands, except perhaps Borthwood which is overlooked by the chalk ridge. This evidence therefore provides a general, regional background in which the downlands are a part.

Late Glacial environment (Late Devensian)

The analysis from Newbarn Combe (Section 5.2) provided evidence of steppe-tundra of the Loch Lomond Stadial (Younger Dryas) phase (pollen zone III). The molluscan assemblages were however, more predominantly open country than many of those reported by Kerney (Kerney 1963; Kerney *et al.* 1964; Kerney *et al.* 1980) from southern England, especially Kent. This is particularly significant because of Scaife's (1980a; 1982a; 1987b) analyses of zone III pollen sequences on the Island which have depicted harsh open periglacial environments dominated by herbaceous plant communities (Scaife 1987b, 158). Detailed analyses from Gatcombe Withy Bed and Munsley Peat Bed show dominant herbs with some *Betula*, *Pinus* and sporadic occurrences of *Quercus* from grains transported over long distances. Both molluscan and palaeo-vegetational studies indicate harsh tundra environments. The Younger Dryas vegetation has been shown by Scaife (*op. cit.*) to contain few trees, predominantly *Betula*, and a distinct dwarf shrub community comprising *Juniperus* and Ericaceae (*Calluna*, *Erica* and *Empetrum nigrum* - Crowberry). Scaife also presents evidence for a mosaic of vegetational communities including short turf *Helianthemum* communities and disturbed soil communities (tall herbs), both attributable to the tundra conditions (cf. Kerney *et al.* 1964) of the Loch Lomond Stadial (Younger Dryas) and are reflected in the specialised mollusc fauna (biozone z).

On the Isle of Wight subtle variations can be detected. The molluscan evidence (Section 5.2) indicates a more open environment with fewer shrubs or dwarf species and local open bare earth. Although, obviously, significant regional interpretation cannot be determined from a single molluscan sample, it is however significant that Scaife's palynological evidence (Scaife 1980a; 1982a; 1987b) also suggest a steppe-tundra environment. He too notes the lack of more shrubby vegetation as compared with other sites in southern England.

The Flandrian forest

Although there is evidence for the mid-Flandrian forest on the Island from pollen data, none of the molluscan studies undertaken here or any of the chalkland pollen studies were able to provide confirmatory evidence. That is not to say that this refutes the palynological evidence. Rather it indicates the severe nature of landscape degradation, soil decalification and possibly also some limited soil truncation on both chalk hill slopes and valley bottoms. Palynological evidence for the mid-Flandrian forest necessarily comes from non-chalkland sites. Since the pollen catchments of some of these small inland mires are limited, forest cannot necessary be inferred as a vegetational 'blanket' for all terrains on the Island.

How can we reconstruct the Flandrian forest? Is it reasonable to directly infer that the forest existing on lowland, non calcareous sites in the early post-glacial period was the same as that existing on the chalk downlands? To a certain extent the indication that the Atlantic soils on the chalk were largely acid brown earths, at least provides a broadly comparable pedological base; so the forest may not have been significantly different from that of the chalk. But that differences may have existed, and even that some areas remained as relict grassland just as relict heathland may have survived on Tertiary lithologies, must be recognised. In the end, therefore, one must *assume* broad leaved typical Atlantic woodland existed on the chalklands; and certainly there is now increasing evidence that pine may have been a major component even on the chalk. There may have been a number of glades/openings through tree fall in an otherwise dark, high canopy woodland (Scaife 1980a).

Modification of the Flandrian forest

Large scale deforestation and modification of the Flandrian forest is largely attested by the consequent erosion rather than direct evidence from this research of the woodland itself. *Tilia* was however, probably dominant on the chalk. The relatively high rates of erosion in earlier prehistoric times is indicative of serious erosion as a consequence of clearance. The silty soil is physically disrupted and susceptible to erosion. The consequence of deforestation is rapid, catastrophic, although localised, erosion events. Significantly increased run off rates truncate valley soils and later re-deposit clay rich-brown earth soils on the valley floor. Stabilisation is noted in all colluvial sections examined, and indicate the presence of large permanent pasture, probably within the earlier to mid Neolithic. Some localised erosion during this period might indicate tillage of small scale arable plots. Unfortunately we have yet to find conclusive corroborative evidence for these activities.

Plough and pasture: the relationship between combe and hilltop

Relationships between the woodland clearance, combe-head clustered barrows and human activity on the valley floor as posed by Tomalin (1980b, 18) can now be considered. It is evident that large areas of both the hilltops and valley bottom were cleared of trees some considerable time prior to the construction of the barrow cemeteries. The hilltop barrows at Gallibury (Scaife 1984) and Arreton (Section 5.4) indicate clearance at some considerable time prior to their construction, while the valleys of Newbarn Combe (Section 5.2), Apes Down (Scaife 1984) and Duxmore (Allen 1992a and unpub. MS) suggest clearance on the valley floors in the Neolithic period. Whether hilltop or valley bottom was cleared first has not been determined. But such a question is purely academic when ascertaining the relationships between valley located human activity and contemporary barrows, in a landscape that may have been largely cleared almost a millennium earlier. Thus there can now be seen to be little relationship between the relative date of hilltop tree clearance (as indicated by the barrows and sealed environmental contexts) and that of the floor of the combes.

The relationship between the combe-head clustered cemeteries and activity on the valley floor is more a part of an integrated agricultural strategy. We can, therefore, go some way to answering Tomalin's (1980b, 18) more complex query, namely "the relationship of the barrows and lynchets in the development of combe-related agricultural units".

Scaife (1984) tentatively speculated from his palynological evidence from the barrows at Gallibury and Apes Down, situated on the high downland crest and valley bottom respectively, that pasture was present in valley bottom, while both pasture (of a subtly different character) and limited arable evidence was interpreted on the ridge. This tentative speculation, has been verified by the analysis of the sediments and Mollusca at Newbarn Combe, where it has been suggested that the valley bottom was one of almost permanent pasture (as it is today), while the adjacent gentle slopes and hilltops were areas of a rotating mosaic of pasture and arable agriculture. This is further borne out by the Duxmore molluscan sequence, which indicated that the valley floor was predominately grassland and pasture and it was the slopes and hilltops that were tilled and subsequently suffered erosion. Although the molluscan evidence has not been available or not detailed enough to distinguish the differences between lowland and hilltop pasture, the palynological evidence has indicated subtle variation.

Human activity in the valley bottom;

Pasture seems to have been one of the major uses of the valley floors examined, in modern, historic and prehistoric times. Certainly this also enables the valley floor to be utilised as a route-way from, perhaps, settlement to arable fields. The formalisation of animal management and corralling is evidenced in the medieval period by the valley entrenchments. Earlier evidence is probably obscured by colluvium rather than being absent.

Apart from the valley floor being used for communication, access and pasture, a number of other activities have been determined or can be postulated. The presence of large flint scatters, the nature of the flake debris in Newbarn Combe and evidence of knapping, possibly over a prolonged period, is suggestive of settlement in the vicinity. At

Newbarn Combe, excavations were conducted at the head of the valley; hence over 90% of the valley floor was not sampled, nor was it represented in subsequent erosion events in the sections investigated. Duxmore, however, did produce evidence of settlement activity on the valley floor and the site at Redcliff is situated on the footslope only 430m from the colluvial deposits at the Limpet Run. Settlement, although still elusive, does seem to be located in dry valleys.

The knapping of flint in Newbarn Combe is of particular interest. There are no flint mines on the Island and thus the flint sources for its lithic industries have always been a mystery. They may have been cliff exposures as suggested by Drewett (1978, 27; 1982) in Sussex, but at Newbarn Combe, the use of poor quality, but abundant, field flints was resorted to. It is perhaps significant that field survey was only able to record a very small percentage of this flint scatter, the rest being masked by colluvium as was predicted in earlier chapters.

Plough and pasture

In the Early Bronze Age, relatively large areas of the downland, predominantly the shallow slopes and hilltops, may have been under the plough or ard. As farming expertise grew and sedentism increased, so the formalisation of fields and formation of lynchets can be seen within the mid- to later-Bronze Age. Thus by the later Bronze Age mixed farming had become an accomplished and expansive industry and farm estates may have existed (cf. Bowen and Fowler 1978), largely based around valleys where settlement was probably located. Such an hypothesis would also provide a mechanism and reason for the occurrence of combe-head barrow cemeteries which seems to be largely an Island phenomenon.

Unfortunately this study has not been able to examine the true spatial variation across the Island, as Scaife attempted with his palynological evidence (Scaife 1987a). Instead it has concentrated upon topographical variation and, at this stage, assumed some degree of uniformity.

Summary

This research has highlighted the significance of Mollusca and valley sedimentological investigations not considered by Basford (1980) in *The Vectis Report*. It is to be hoped that this research has redressed that imbalance and shed light on the questions of land-use and settlement in the Bronze Age present in *The Vectis Report*.

Chapter Six

Investigations on Salisbury Plain

6.1 INTRODUCTION TO THE STUDY AREAS

Salisbury Plain, home of Stonehenge, is one of many archaeologically rich, and well studied, landscapes in Wiltshire. Recently, two major, and contrasting, landscape projects have been conducted in Wiltshire with varying components of environmental archaeology. The *Stonehenge Environs Project* (Richards 1990) concentrated on 'Neolithic and Bronze Age settlements and their associated landscapes' (Richards 1990, 4). Sixteen sites were excavated and molluscan sequences analysed from 6 of these sites. In contrast, the recently published *The Marlborough Downs: a later Bronze Age landscape and its origins* (Gingell 1992), concentrates on the later prehistoric (later Bronze Age) landscape and more emphasis is placed upon sites and their setting than the environmental evidence. In neither projects were colluvial deposits examined, though as reported earlier (page 39) this was attempted at Stonehenge Bottom, but no deposits were recovered (Richards 1990, 210). Further work is detailed below. In the Stonehenge Environs Project, most of the molluscan work was conducted by Martin Bell and Julie Jones, or Roy Entwistle; but a summary of the landscape from that evidence was written by myself with contributions from Roy Entwistle and Julian Richards and published in 1990. That summary, largely presented here (Section 6.4), provides an overview of a prehistoric landscape in which there are a number of sites with Beaker material. The Marlborough Downs project produced limited scope for molluscan analysis but reviewed the new data in relation to the evidence of previous workers, primarily John Evans (Allen 1992b).

In neither of these projects were deep colluvial deposits encountered. In order to try and establish a long environmental sequence, dry valley locations in the Stonehenge area were examined and detailed analysis of a small dry valley at Strawberry Hill Reservoir on the northern scarp slope of the Salisbury Plain was undertaken (Section 6.2).

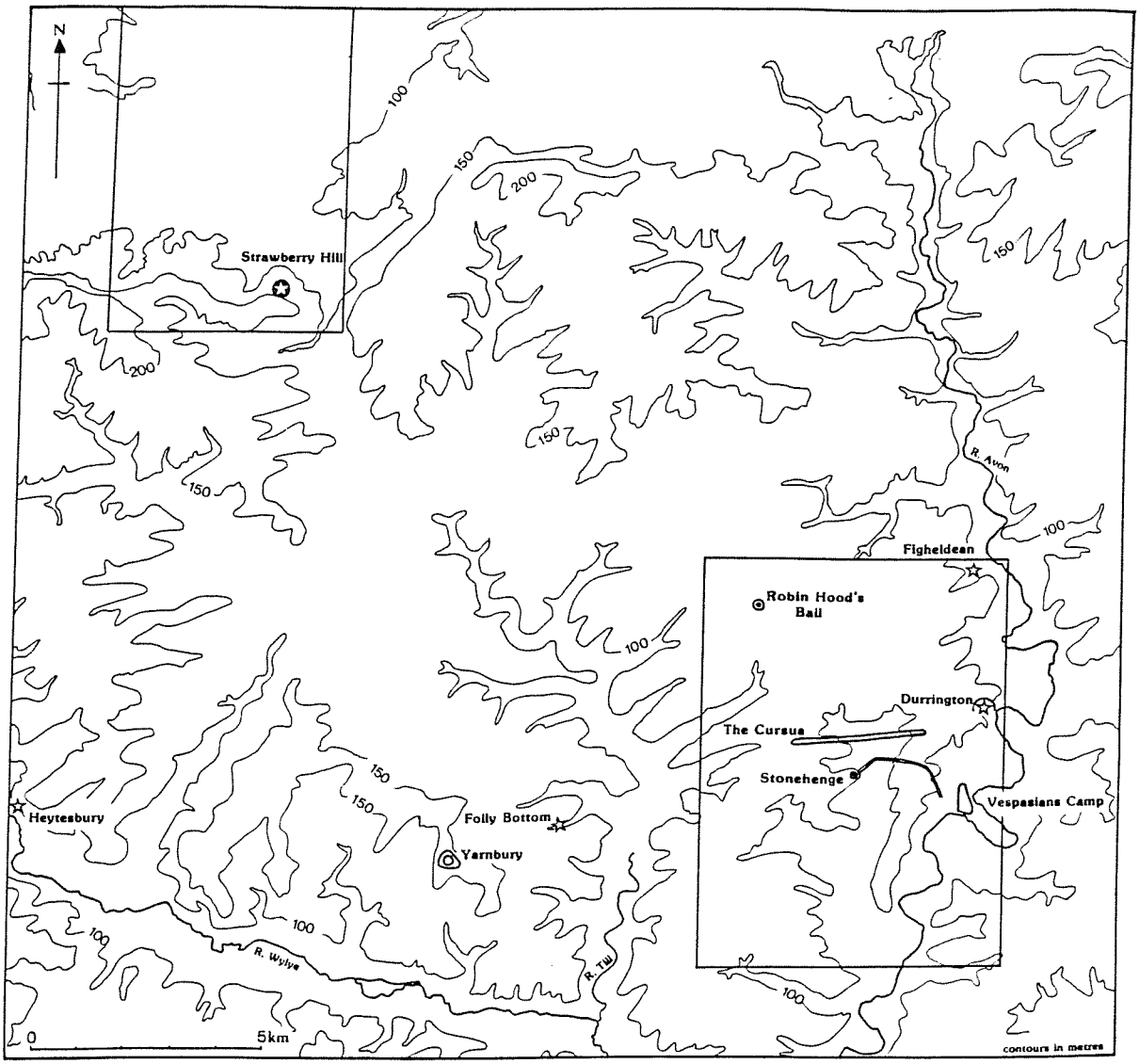


Figure 48. The Salisbury Plain study area showing the two areas of detailed studies.

Topography

Salisbury Plain constitutes one of the largest expanses of chalk in southern Britain and lies at the junction of several downland outcrops. These are the Dorset Downs and Cranborne Chase to the south-west, the Marlborough Downs to the north and the Hampshire Downs to the east (Fig. 1). Salisbury Plain forms a large plateau; most of the chalk is horizontally bedded, dipping only gently southwards. It has steep escarpments on its north and west sides which overlook the Vale of Pewsey and the country beyond Warminster respectively. It is bounded

by the Vale of Wardour to the south and adjoins the Hampshire Downs to the east. The Plain is covered with a dendritic pattern of dry valleys, whose main systems broadly run north-south down the dip slope. A number of scarp combes are also evident, particularly overlooking the Vale of Pewsey.

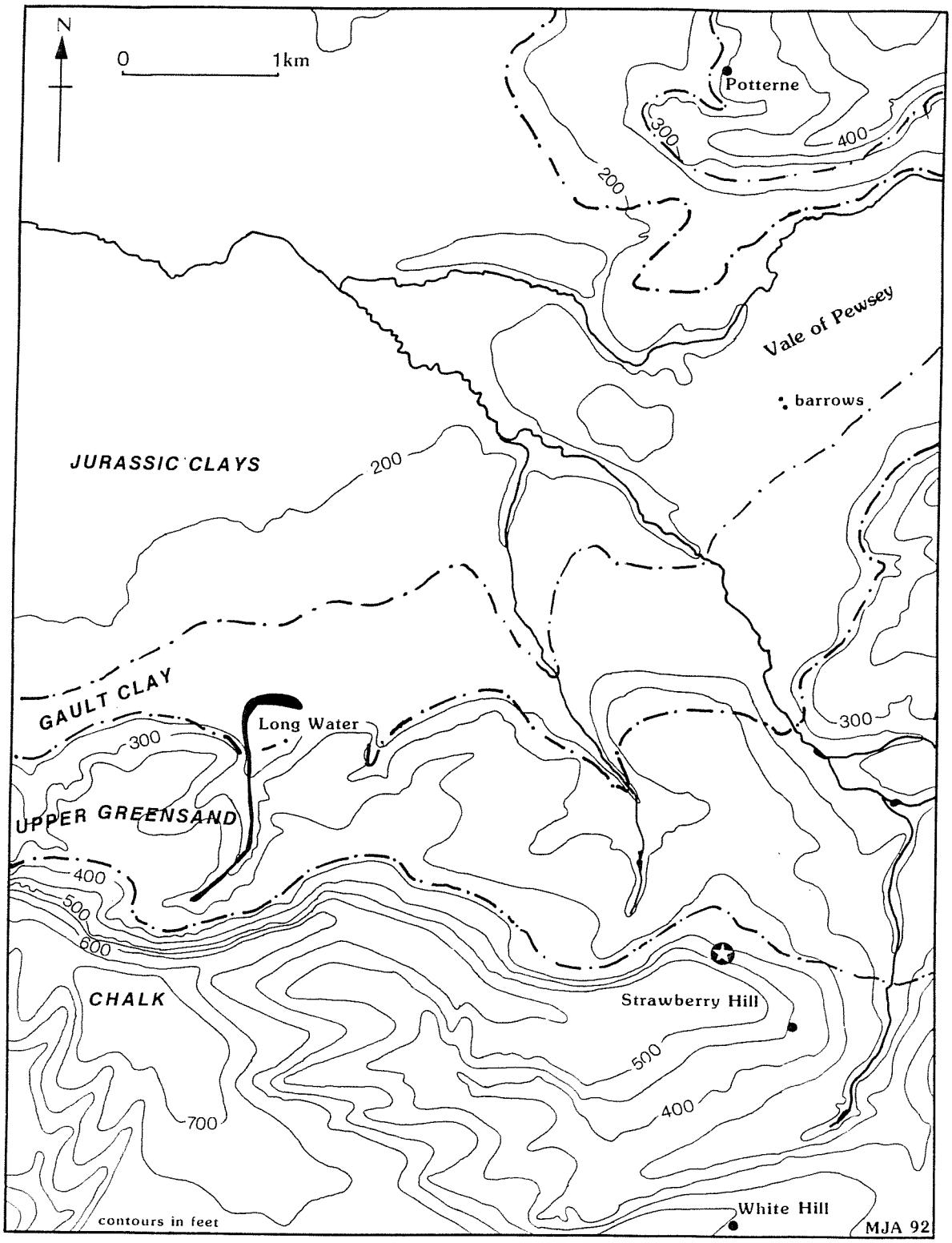
The Study areas

The two study areas are the Stonehenge Environs and detailed investigations at Strawberry Hill Reservoir. The detailed colluvial analysis and review of the Stonehenge data, in conjunction with the recently published review from the Marlborough Downs (Allen 1992b) provides an opportunity to examine variation within, but more particularly between, the defined areas. Except at Strawberry Hill Reservoir, Beaker material is evident in both landscape projects and allows an examination of changes in the landscape and economy at this time (Section 6.5). Such changes may be also be detectable in the long colluvial sequence at Strawberry Hill.

6.2 EXCAVATIONS AT STRAWBERRY HILL RESERVOIR

The area of investigation was situated in the parish of West Lavington, and lies just to the south west of the village of West Lavington itself. The site is located on the gently sloping northern scarp slope of Salisbury Plain (ST 996 528) overlooking the vale of Pewsey and is situated *c.* 4km south of the Late Bronze Age/Early Iron Age midden at Potterne (Fig. 49). The scarp slope comprises Lower Chalk and possibly Melbourne Rock (British Geological Survey Map 282) which is devoid of flints and contains common fragments of marcasite and iron pyrites. The scarp foot gives way to the Upper Greensand series and then the Jurassic Clays (Gault and Kimmeridge) of the Vale of Pewsey. The soils on the steep chalk slope are thin silty grey rendzinas of the Upton Series which are typically restricted to the steep convex slopes where colluviation and/or cultivation has removed much of the topsoil and incorporated chalk into the present soil profile (Moffat and Cope 1984, 90).

The scarp slope descends at *c.* 13° and two minor linear depressions perpendicular to the scarp, both approximately 20 - 30m wide and no



colluvial site

Figure 49. Geomorphology and archaeology of the Strawberry Hill area.

more than 92m long were noted in the area of the proposed Wessex Water service reservoir. They terminated to the north, at the base of the slope, at a large east-west scarp-foot lynchet. Accumulation of soil material at this break of slope between the scarp and scarp-foot was accentuated by its use as a field boundary. The linear depressions as recorded in the field were so minor as to be unrecognisable to the untrained eye, and no edge definition could be recorded in the field. Survey showed that maximum amplitude was only 0.75m over a distance of 100m. The examination of colluvial deposits within the depressions and of incorporated artifacts enabled a detailed landscape history to be constructed. This is especially significant in view of the early Iron Age pit complex and Romano-British occupation only 1km away on Strawberry Hill (SU 000 525), the Middle Bronze Age ditch on White Hill (SU 005 513) and the major midden deposits of comparable date at Potterne (Lawson and Gingell 1984). More significant is the collection of flints to the south below the crest of Strawberry Hill at ST 996 526). These include two Mesolithic artifacts: a possible core and butt end of a tranchet axe (SMR ST95SE 052), and thirty Neolithic implements including a discoidal and end scraper, leaf-shaped arrowheads, the butt end of a polished axe, a fabricator and a number of rejuvenation flakes (SMR ST95SE 104) and an Early Bronze Age barb-and-tanged arrowhead (SMR ST95SE 151).

Excavations

An 80m long section running approximately west-east across the scarp slope and bisecting both linear depressions was examined by means of two machine cut trenches (Fig. 49). The western edge of the trenches was restricted by conditions imposed by Wessex Water thus enabling only the eastern half of the western depression to be sectioned. The machine trenches were cut through the linear depressions to evaluate any colluvial deposits. Where colluvial deposits of any depth were encountered (trench 2) an adjoining strip, 0.75m wide, was hand excavated to enable to recovery of artifacts. Sampling for molluscs, soil micromorphology and magnetic susceptibility were undertaken.

Trench 1

A 20m long machine trench bisected the eastern most depression. It revealed a maximum of 40cm of colluvium beneath the modern soil profile

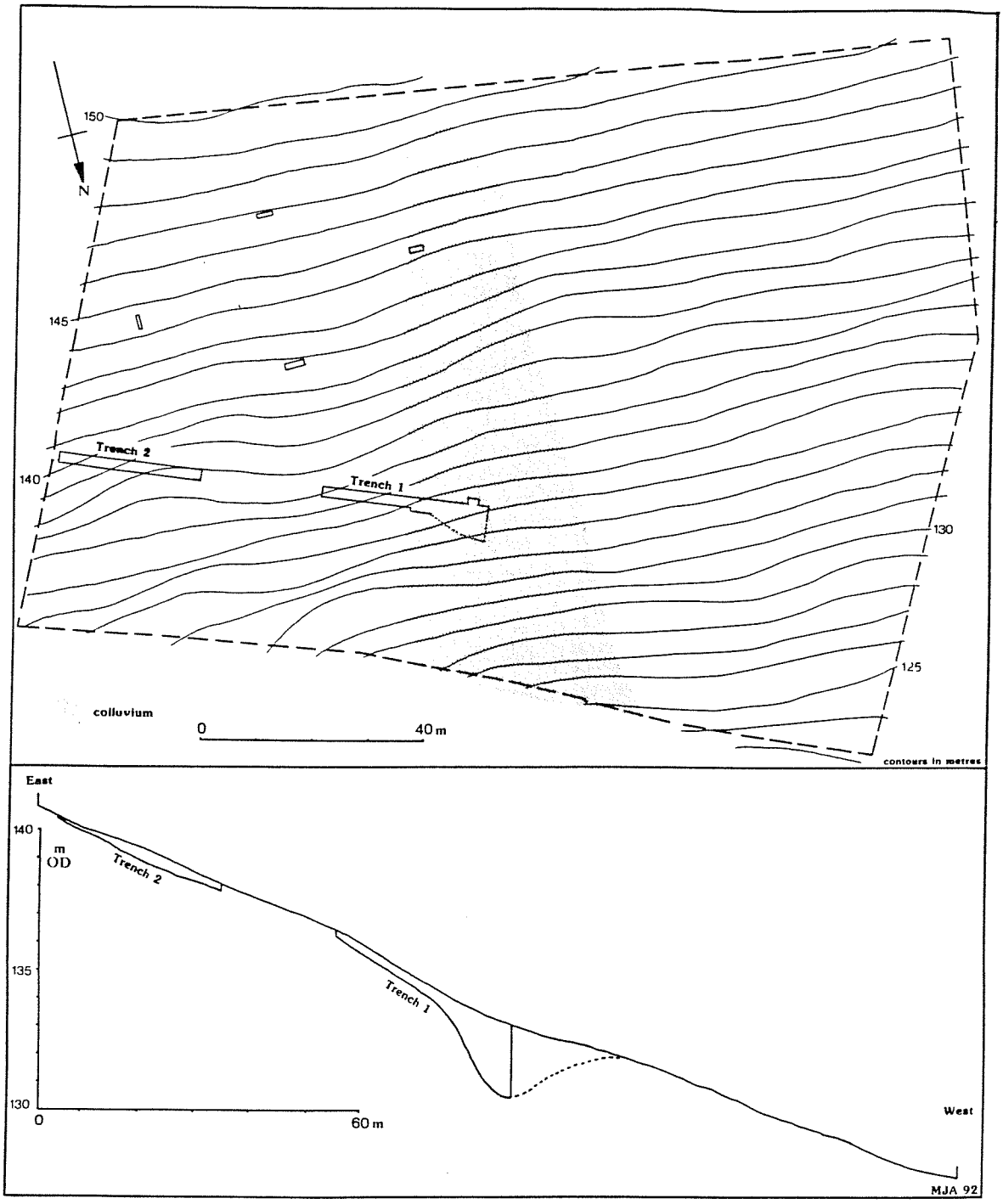


Figure 50. Strawberry Hill Reservoir; location and palaeo-valley profile.

and no features except for a Wessex Water borehole. The deposits were extremely calcareous with abundant small and medium chalk pieces. The nature of these sediments indicate comparatively rapid deposition probably channelled down the axis of the depression. No artifacts or other dating evidence was recovered.

Trench 2

A 31.8m machine trench sectioned the western most depression and half sectioned a relatively narrow, deep and steep-sided, U-shaped but completely infilled valley (Fig. 50). Valley width is calculated at only *c.* 20 metres. A total depth of 3.4m of deposits was encountered and represents one of the deepest colluvial sequences examined for anthropogenic activity in southern England. The restricted valley contained several distinct stratigraphic horizons including a series of stony and stone-free layers. A two metre length of the trench one metre wide was hand excavated and a total of 88 artifacts recorded with three co-ordinates. A portion of the hand excavated block was also sieved through a 10mm mesh sieve to monitor artifact recovery.

The stratigraphic sequence

The sequence encompassed over 3m of post-glacial deposits overlying a chalky periglacial solifluction deposit of soft 'cheese-like' consistency. Two ditches were cut into the chalk solifluction deposits and sealed by the colluvial sequence. Both ditches were on the edges of the hand excavated section. Many of the lower layers in particular were confined to valley centre (Fig. 51), only the colluvial units occupied the whole valley and were typically compressed towards valley margins. Full soil descriptions are presented in appendix 4, but due to he significance of this sequence, fuller, but summary descriptions, with archaeological and field interpretation are presented below.

Context 13, periglacial solifluction material. Pale yellow (2.5YR 8/4) silty clay marl, a chalky matrix of soft 'cheese-like' consistency with chalk pieces and occasional stony pockets.

Ditches

Two ditches were cut into the periglacial marl and are sealed by the colluvial sequence.

Ditch 15 (fill 14). At 76m a U-shaped ditch 0.63m deep and about 1m wide was recorded. It was cut into the steep natural slope of the periglacial marl on the east. The ditch, orientated north-south and running down the slope along the eastern edge of the valley bottom, was exposed and excavated over a length of *c.* 1.8m. It terminated in a

simple butt end to the north within the machine excavated trench. Rapid examination after excavation revealed the ditch continuing for another 2.27m south and thus a total length of 3.4m was planned.

The ditch contained a single fill (context 14) of dark greyish brown (10YR 4/2) silty clay with common to many small chalk pieces and with some fragments and flecks of charcoal. Although all the excavated material was sieved through a 10mm mesh and a further 30 litres were wet sieved in the laboratory, no artifacts were recovered. Fragments of charcoal and the land snail *Cepaea* spp. were submitted for radiocarbon dating.

Ditch 16 (fill 17). On the western edge of the hand excavated section a shallow V-shaped gully 0.38m deep and 0.81m wide was recorded and was observed for *c.* 3m running down slope through both the machine trench and hand excavated section. This was also partially recorded for 0.9m north of the main excavation giving a total exposed length of *c.* 4m. Two sections were excavated which produced a couple of undiagnostic flint flakes and an unidentified long bone (probably radius or fibula) of cattle or horse (Bourdillon *dett.*).

Colluvial sequence

The colluvial sequence and humic horizons sealed both ditches and overlay the chalk solifluction deposits. Pedological descriptions from the sampling point indicated in figure 49, are presented in full in appendix 4 and summarised below with archaeological and field interpretative comments.

Context 12, basal humic colluvium. Dark greyish brown (10YR 4/2) silty clay, with many small chalk pieces, subangular blocky structure. Abrupt wavy boundary. This humic basal horizon was almost totally devoid of artifacts, only a single flint flake was recovered, and is restricted to the valley floor. The nature of this layer is suggestive of an early colluvial unit eroded from a decalcified or weakly calcareous brown earth that existed upslope.

Context 11, transported soil. Dark greyish brown (10YR 4/2) silty clay, common small chalk pieces, contains charcoal fragments.

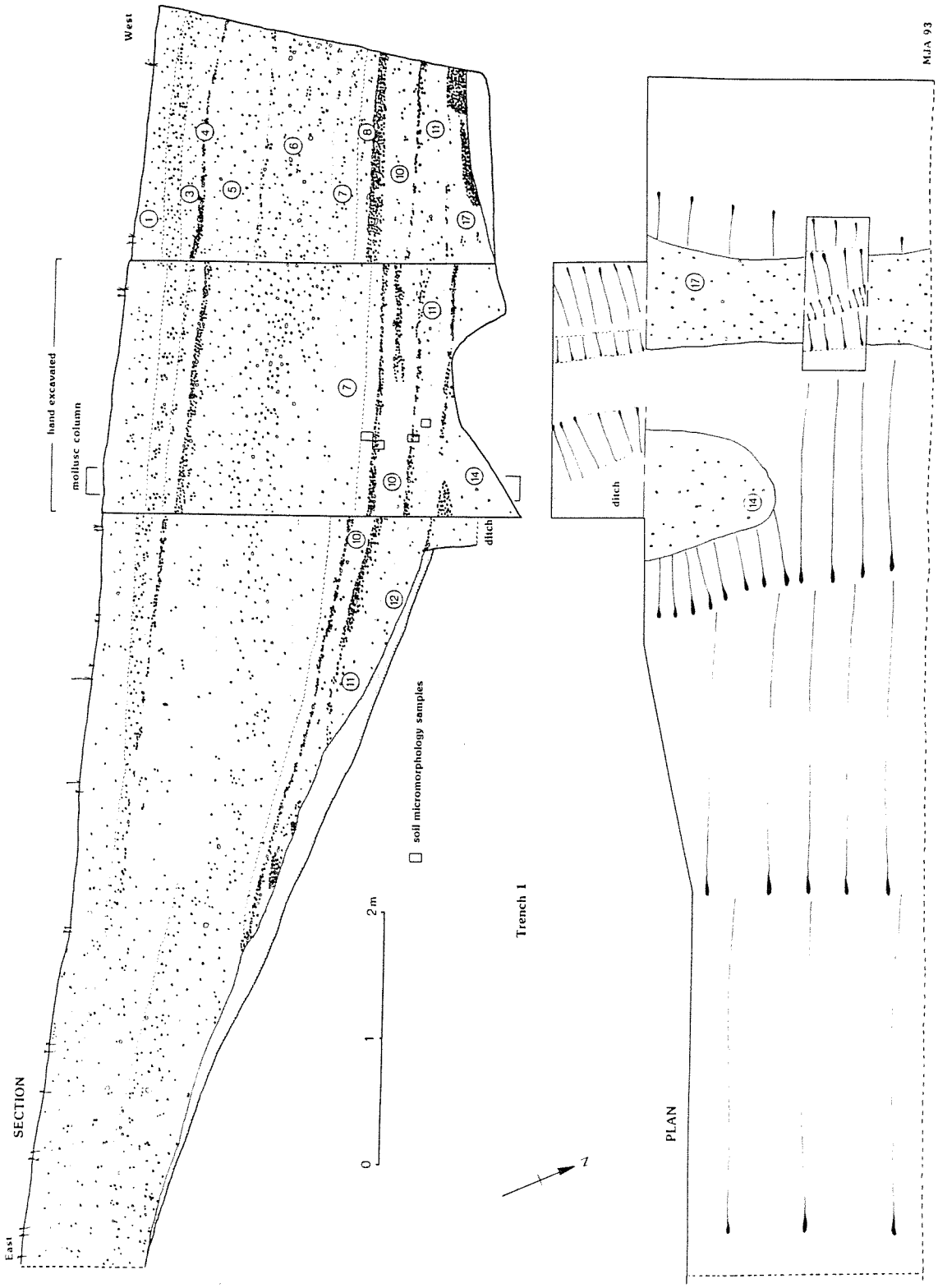


Figure 51. Strawberry Hill Reservoir; section of the main deposits and plan of ditches cut into the valley floor.

Prismatic/ subangular structure. Gradual wavy boundary. This weakly humic unit comprised a stone-free band over which was a discrete lens of small chalk pieces. This latter layer might represent a typical earthworm worked horizon or could be the result of rill erosion and the deposition of a small chalk fan (Chapter 2). The only artifacts recovered were undiagnostic flint flakes.

Context 10, humic colluvium and stone lenses. Brown (10YR 5/3) to greyish brown (10YR 5/2) silty clay, rare small stones and chalk flecking, with stony lenses, generally becoming more stony towards base (context 10a), weak subangular blocky structure. Clear wavy boundary. A number of chalky lenses were noted in section throughout this unit, these probably relate to chalk fans (see context 9).

This is a humic colluvial layer, indicating erosion and mixing of brown earths/calcareous brown earths. It was the first layer to contain pottery and produced relatively large quantities of early Iron Age pottery, predominantly from one vessel.

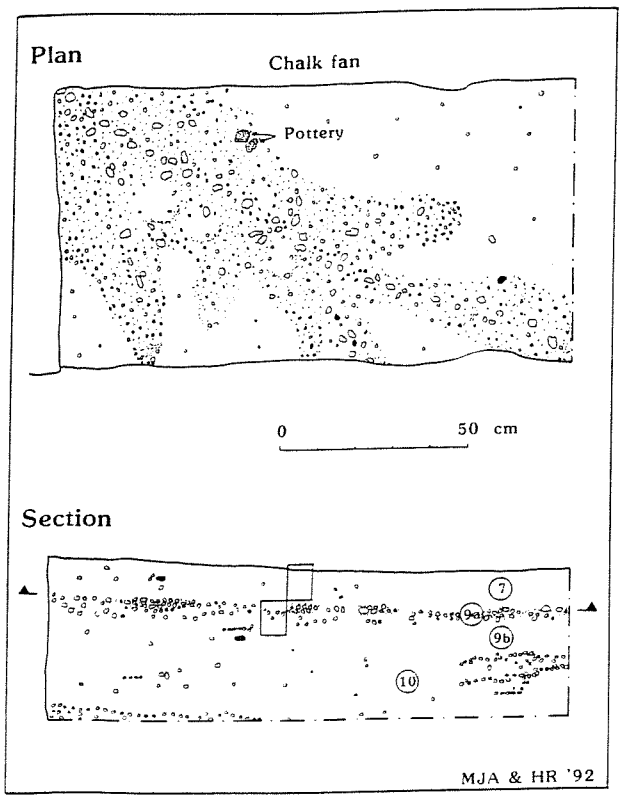


Figure 52. Plan and section of the excavated chalk fan. Rectangular boxes are soil micromorphology samples.

Context 9b, stone-free horizon. A thin but discrete stone-free brown/dark brown (10YR 4/3) silty clay with medium blocky peds, clear wavy boundary. It is distinguished from layer 10 by its darker colour and absence of small chalk flecking.

Context 9a, chalk stone lens. Abundant to many small and very small chalk pieces in a brown/dark brown (10YR 4/3)

silty clay. Clear wavy boundary. In section this looked like a worm-worked stone lens, but when excavated in plan it was obviously a chalk fan (Fig. 52). A few sherds of early Iron Age pottery were recovered from this thin horizon.

The chalk fan was exposed over an area of 0.75m by 1.85m and originated from the south east corner of the excavation. The fan consisted of a series of fingers of very small to medium chalk pieces with patches of chalk flecking (Fig. 52). The centre line of the fan was marked with a line of slightly larger chalk pieces, whereas the fingers were comprised of smaller chalk stones. A series of lobes of finer, silty material was also seen. This pattern was replicated in modern chalk fans observed as Ashcombe Bottom (see Section 4.2 and Allen 1992a, figure 4.5) and indicates the varying flow rates within the deposition episode.

Context 8, stone-free colluvium. Dark greyish brown (10YR 4/2) silty clay, stone-free, small subangular/prismatic peds, 2% macropores, calcareous. Clear smooth boundary at its base and an abrupt boundary at its upper surface, possibly indicating truncation. This stone-free horizon was lighter in colour than the underlying colluvium and probably more calcareous. It contained no sherds of pottery, suggesting that it post-dated the early Iron Age activity.

Context 7, calcareous stone-free colluvium. Brown (10YR 5/3) calcareous silty clay loam, few small stones, weak subangular blocky structure. Abrupt wavy boundary. The stone-free colluvium occurs in the lower part of the valley. The occurrence of diagnostic sherds of Roman pottery provide a *terminus post quem* date for this horizon.

Context 6, lower Main Colluvium. Brown (10YR 5/3) calcareous silty clay loam with common small and very small rounded chalk pieces, subangular blocky structure. Gradual wavy boundary. The lower colluvium indicates the onset of major period of erosion probably as a result of more widespread tillage. The result of such Roman action was not only to initiate erosion over a larger area, but also to degrade the soils from the dark, organic and weakly calcareous soils described above, to thin highly calcareous rendzinas.

Context 5, upper Main Colluvium. Light yellowish brown (2.5YR 6/4) highly calcareous silty loam/silty clay loam, many (10%) small rounded chalk pieces. Subangular blocky structure, medium macropores 2%. Very few flints in this layer or anywhere in the sequence. Gradual wavy boundary. This layer represents continued, possibly more extensive, erosion indicating continued thinning of the local soils.

Context 4, upper Main Colluvium. Light yellowish brown (2.5YR 6/4) silty loam with abundant very small and small rounded/sub-rounded chalk pieces. Abrupt smooth boundary. The thin lens of chalk is probably the result of rilling and deposition of a chalk fan. Here it was inundated with further hillwash before it was biologically reworked into the colluvium.

Context 3, stone-free stand-still episode. Light yellowish brown (2.5YR 6/4) silty loam, rare very small rounded chalk pieces; virtually stone-free, weak subangular blocky structure, 5% medium macropores. Clearly calcareous accounting for very light colour. Occasional vertical earthworm burrows. Sharp, smooth boundary. Some indication of a possible stand-still phase is provided by this stone-free horizon. Unfortunately it produced no artifacts with the exception of a single flint flake.

Context 2. Light yellowish brown (2.5YR 6/4) very calcareous silty loam with many (15%) small rounded chalk pieces, subangular blocky structure. Few medium to fine rootlets. Abrupt smooth boundary. Continued erosion is indicated by this colluvium, presumably post-Roman but there was no artifactual evidence to support this.

Context 1, colluvial calcareous brown earth. Pale brown (10YR 6/3) silty loam with common small rounded chalk pieces and rare medium rounded chalk pieces. Clear wavy boundary. Colluvial calcareous brown earth. The colluvial calcareous brown earth is thicker and darker in the centre of the valley where it overlies the colluvial sequence than elsewhere on the scarp slope. Elsewhere on the scarp slope where the modern topsoil overlies chalk, the soils are thin grey rendzinas of the Upton Series.

Dating the sequence

Artifact numbers were low and the artifact density in the main colluvium (contexts 1 - 8 inclusive) was only *c.* 10 per cubic metre of hand excavated soil. This compares poorly with other colluvial sequences where the lowest artifact density from nine other colluvial sequences was 64 per m^3; the highest being over 250 per m^3 (Table 5). The lower humic colluvial sequence (contexts 9, 10, 11 and 12) contained over 80 artifacts per m^3, which included three pottery groups which were recorded as single finds.

The basal ditches contained no datable artifacts. Although they are probably broadly contemporary some differences were observed. While ditch 15 contained no artifacts but did contain observable charcoal fragments, ditch 17 produced a few artifacts and no charcoal. The lower portion of the sequence (context 12 and 11) contained no datable artifacts. The overlying humic colluvium (contexts 10, 9 and 8) produced most of the early Iron Age pottery. Although two sherds of early Iron Age pottery were recovered from the main colluvial sequence (contexts 7 to 2) these also produced Romano-British sherds.

The distribution of the low concentration of artifacts (Fig. 53) does not warrant detailed discussion. The main concentration was the Iron Age sherds from context 10 (see pottery) of which the majority belong to a single vessel. The ditches and lower humic derived soil remains undated. Contexts 9 and 10 are early Iron Age and contexts 5 and 6 are Romano-British.

Radiocarbon dates

Two samples were submitted to the Oxford AMS system, both from the same context (14) of the ditch (15) well-sealed beneath the colluvium. One is of charcoal and the other of terrestrial molluscs.

The ditch (15) produced no artifacts, but was notable on two counts; i) that it had a distinctly more humic (and less calcareous) infill and ii) that it was the only context from the whole site to be noted to contain any quantity of charcoal fragments during excavation.

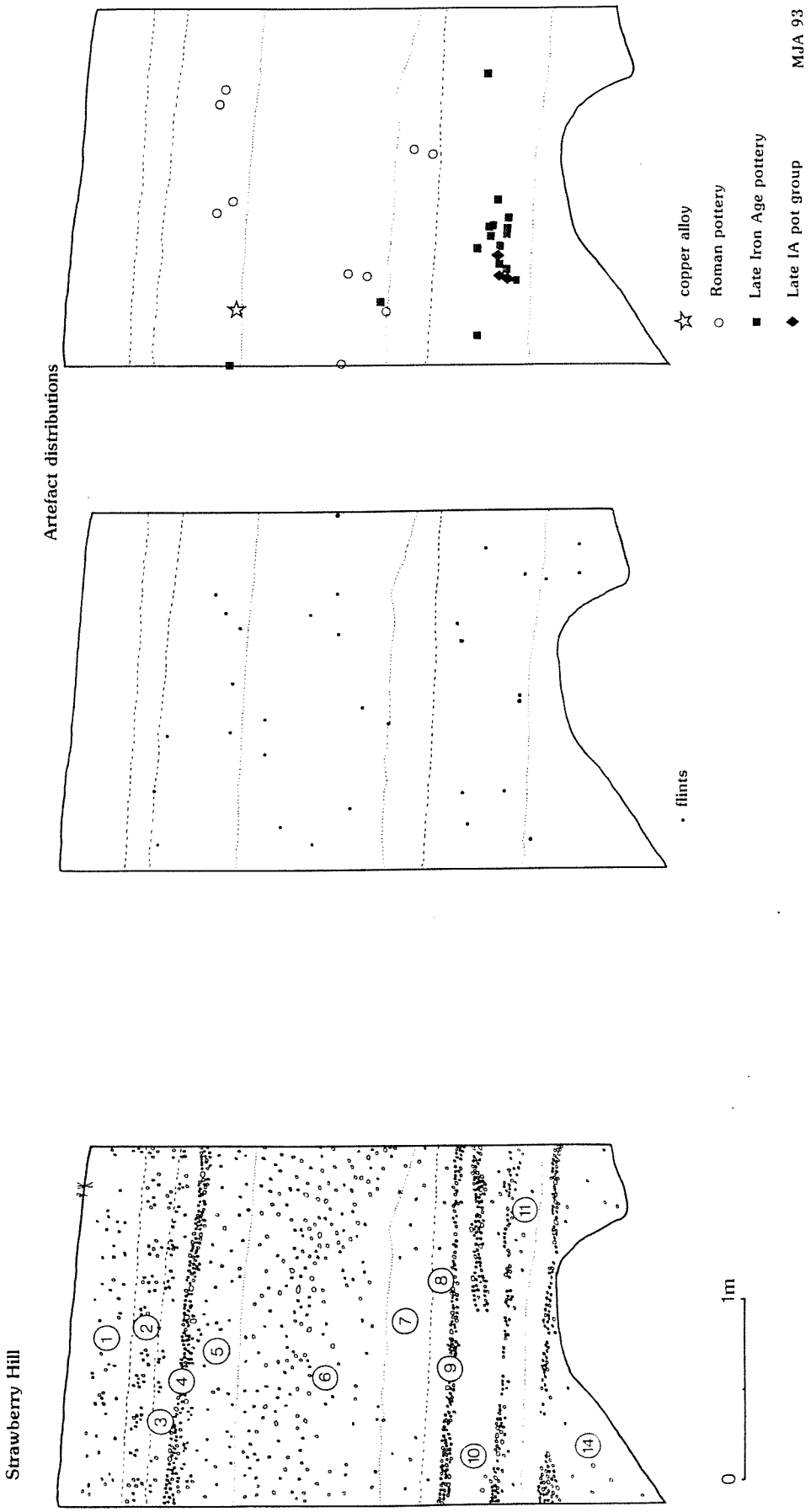


Figure 53. Distribution of artifacts from the colluvium.

The Mollusca

The land snail sequence from the site (Fig. 54) shows that the the ditch (zone 2) contained a largely woodland fauna. Further various elements of this, *Spermodea lamellata* in particular, are rare and are more usually recorded from deposits relating to the post-glacial Thermal Optimum (Kerney 1968) i.e. roughly during the Atlantic (later Mesolithic) Period (Table 2).

The samples

Two bulk samples taken from the centre of the ditch were processed by standard flotation methods. A total of 30 litres of soil was processed.

Charcoal. Two 15 litre soil samples were processed and all charcoal fragments larger than 2mm extracted. The flots from these samples and from the mollusc samples were also submitted if required. All the identified charcoal was *Pinus*.

Land snails. All the mollusc fragments larger than 2mm from the two 15 litre samples were extracted. Every shell fragment was screened ensuring that the same species was represented and only fragments of *Cepaea* spp. were submitted. Approximately 5g of shell were submitted. A further *c.* 2g of cf. *Cepaea* was also submitted from samples 7, 8 and 9. This is a genus suitable for dating because it is a relatively large species and is a vegetation browser and unlike some snails does not eat chalk which would result in the incorporation of geological radiocarbon into its shell. (Vita-Finzi pers. comm.; Yates 1986). At Strawberry Hill the numbers of specimens of this species in the contexts above the ditch is minimal, thus reducing the possibility of contamination from overlying horizons.

The results are as follows (see Hedges *et al.* 1992);

OxA-3040	*Pinus* charcoal,	$d^{13}C$= -22.1‰	9350 ± 120 BP
OxA-3041	*Cepaea* shells,	$d^{13}C$= -8.6‰	6820 ± 120 BP

Although the two samples were sieved and extracted from the bulk samples of the same feature, the two significantly different dates are not inconsistent with the archaeological and palaeo-environmental

record. The pine charcoal date (OxA-3040) corresponds with the early Boreal pine maximum in southern England. This provides further confirmation of pine stands on the chalk (Allen 1988). Whether the charcoal indicates localised anthropogenic clearance or natural fires cannot been determined, but its occurrence here and presence of Mesolithic flints on the hilltop suggest the former. The shell date (OxA-3041) from the ditch is, however, more likely to be contemporary with the construction/infilling of the ditch and the typical Atlantic mollusc assemblages. This indicates a late Mesolithic date for the site and may be contemporary with a tranchet axe found nearby and recorded in the SMR.

These dates provide important evidence for a late Mesolithic site on the northern scarp of Salisbury Plain. Of particular importance, however, is the potentially significant residuality of charcoal within the eroded soil sequences. Such information has implications beyond the interpretation of the land-use history of this site.

Pottery by Elaine L. Morris

A total of 93 sherds (223g) of early Iron Age pottery, nine (49g) of Romano-British pottery and one undiagnostic fragment (2g) was recovered during hand excavation. In addition, four unstratified Romano-British sherds (31g) were found. Only the stratified material is discussed here. The early Iron Age sherds are soft and small (mean sherd size 2.4g), while the Romano-British sherds are larger (mean 5.4g). The material is presented by fabric type for each plotted sherd or sherd group by context in Table 33. Fabric and form descriptions are detailed in the archive.

The Forms

The fine sandy fabric (Q1) is represented by a single, red-slipped, carinated bowl with a plain vertical rim which measures 31-32mm from the rim edge to the neck join and is 120mm in diameter. The vessel is burnished on both surfaces, but the slip is present only on the exterior. This vessel is typical of the early Iron Age period in Wiltshire and Hampshire, and can be classified as part of the Later All Cannings Cross style dated to the later seventh to early sixth centuries BC (Cunliffe 1978, 35). Similar examples have been recovered

		EARLY IRON AGE				ROMANO-BRITISH						UNCERTAIN	
Context	SF. No	Q1 No/Wt.	Q2 No/Wt.	Q3 No/Wt.	S1 No/Wt.	E101 No/Wt.	G100 No/Wt.	Q100 No/Wt.	Q101 No/Wt.	Q102 No/Wt.	Q103 No/Wt.	F1 No/Wt	Comment
1	-							1/4					WT
5	3					1/1							
	5								1/10				base;WT
	7									1/4			WT
	9				1/1								
6	26										1/11		shoulder
	27										1/1		shoulder;WT
	32			1/1									
	34											1/2	
7	37									2/14			rim;platter
	42						1/4						WT
9	47		1/4										
	55	1/2											red-slipped bowl
	57	1/2											same as SF55
10	58	1/3											"
	58b	1/6											"
	60	43/103											"
	61	1/6											"
	62	1/2											"
	63	1/2											"
	64	1/1											"
	65	1/1											"
	69	1/3											"
	71	1/6											"
	74	28/67											"
	75	7/17											"
10a	80	1/2											"
Total		90/223	1/4	1/1	1/1	1/1	1/4	1/4	1/10	3/18	2/12	1/2	

Table 33. Pottery data; fabric and context (weight in grammes). WT = wheelthrown.

at Little Woodbury (Brailsford 1948, fig. 4, 2ci), All Cannings Cross (Cunnington 1923, plate 28, 2), Quarley Hill (Hawkes 1939b, fig. 15, 5), Meon Hill (Liddell 1934, plate 27, p.343) and La Sagesse Convent, Romsey (Morris forthcoming a, form R21, vessel 13). The other early Iron Age fabrics are only body sherds but the absence of surface treatment on any of these suggests that they may have originated from jars. The diagnostic bowl indicates that the early Iron Age pottery is likely to date from about the end of the seventh century to the early sixth century BC, but this does not rule out possible earlier or later dates for the other fabrics.

There are four featured pieces of Romano-British pottery. The single rim sherd (fabric Q102) is from a shallow platter which is a copy of a *Terra Nigra* form of first century AD date. This vessel is burnished on both surfaces. Similar examples have been recovered at Boscombe Down West (Richardson 1951, fig. 12, 94-5). The other forms consist of two shouldered pieces from different jars, one thin-walled, wheelthrown example and one thicker-walled handmade example, and the base from a micaceous, orange-firing (fabric Q101), wheelthrown vessel. The fine, grog-tempered fabric (G100), which is recognised as early Romano-British in type, consists of a single body sherd. It is likely therefore that this collection of Romano-British pottery is mid-late first century AD in date; there is nothing to indicate that it is either pre-Conquest or continues into the second century. The only obviously non-local pottery is the sherd of Black Burnished ware from Dorset.

Deposition and Discussion (MJA and ELM)

The early Iron Age pottery consists of 90 sherds from a single bowl which were recovered from the lower part of the deposit, contexts 9 and 10, and four sherds one each from other vessels in contexts 5, 6 and 9 (Table 33), if the flint-tempered fabric is early Iron Age in date. There are three pairs of three-dimensionally recorded sherds or sherd groups from this bowl which conjoin (SF58b-SF60; SF71-SF75; SF74-SF75); all are from context 10 which suggests that they may have been discarded nearby. The fragility of bowls, and this fabric in particular, supports this interpretation. The ratio of three or four coarser jars to one fine bowl in the deposit as a whole is a typical

assemblage for the early Iron Age as demonstrated within the much larger assemblage of pottery at Potterne (Morris 1991; forthcoming b).

The earliest occurrence of Romano-British material is in context 7, the platter rim and the sherd of fine grog-tempered fabric, both of which are wheel-thrown.

Copper Alloy

A short piece of round copper alloy wire *c.* 16mm long was recovered from context 5. This fragment may have originated from a Romano-British brooch pin (Fitzpatrick pers. comm.) probably of the 1st-2nd century.

Flints

A total of 45 flints were recovered, all of which were undiagnostic. Most were secondary flakes although a single core fragment was recovered from the main colluvium (context 5). Although flints were recovered throughout the sequence (even in ditch 17) there was no distinct concentration within their distribution.

Bone

A total of 13 fragments of bone were recovered, all of which were small and badly preserved and were identified by J. Bourdillon. A single unidentified long bone (probably radius or fibula) of a large domesticate was recovered from ditch 17 and was the only bone fragment recovered from the pre early Iron Age contexts. The early Iron Age contexts (contexts 9 and 10) produced six fragments which included cattle and sheep, and a male pig canine. All fragments were badly preserved displaying surface etching and a *Bos* astragalus (context 10) showed signs of dog gnawing (Maltby observation). The only identifiable bone fragments from the main colluvium of Roman and post Roman date (context 6) were cattle, one of which was a tooth fragment.

Poor preservation was probably a result of several factors. Certainly the bone from the strictly colluvial horizons displayed extensive physical damage as a result of having been eroded with the deposit. The fragments from the less calcareous early Iron Age colluvium had suffered both physical damage in the form of dog gnawing, but also

chemical etching as a result of root action.

Small mammal bone

Seven small mammal teeth were recovered during the course of molluscan analysis and were identified by Mark Maltby as follows:

Sample	Context	identification
25	6	Vole tooth fragment
22	7	small rodent (cf. vole) incisor
21	7	small rodent (cf. vole) incisor
16	10	Vole (cf. short-tailed vole) tooth *Microtus agrestis*
15	10	Vole (cf. short-tailed vole) tooth *Microtus agrestis*
15	10	small rodent incisor
11	11	small rodent incisor

The only species identified was the short-tailed (field) vole *Microtus agrestis* which is a species adaptable to a number of different habitats and occurs in long grassland (i.e. long enough to provide cover) and open woodland (Corbet and Ovenden 1980). The short-tailed vole has been recovered from a number of Mesolithic contexts e.g. Cherhill late Mesolithic soil (Evans and Smith 1983), Itford Bottom subsoil hollow (Bell 1983).

The land-use history; the molluscan evidence

A single column of 34 contiguous samples through 3.1m of colluvium and ditch deposits produced a long palaeo-environmental sequence. The result are presented in histogram form (Fig. 54) and table 31.

Samples were taken at the deepest point within hand excavated section of the deposits. They included the terminal of ditch 15, two stone-free and stone lenses and the main colluvial deposits (Fig. 51). The sequence has been divided into a series of seven mollusc zones (Fig. 54) which broadly coincide with the stratigraphy. Because the mollusc biozone coincide with the basic stratigraphic, and thus sedimentological and pedological breaks, the taphonomy and origin of the mollusc assemblages within each biozone, at least, is considered uniform. It is thus on both molluscan *and* taphonomic evidence that biozone 4 is into three sub-biozones (Fig. 54). Although large 2kg samples were processed where possible, mollusc numbers are

significantly high, particularly in the lower colluvial sequence where species diversity also reaches its maxima.

Ditch 15 (fill 14)

The ditch did not produce a typical tripartite profile, the fills were a uniform homogeneous 'colluvium'. The dark fill produced significant numbers of shells, though considerably lower than the overlying deposits (Table 34). Two mollusc zones could be detected within these fills.

Zone 1. The basal sample was dominated by *Vitrina pellucida*, *Punctum pygmaeum* and *Abida secale*, with *Oxychilus cellarius*, *Euconulus fulvus* and *Vitrea* which represents a relatively unusual fauna. Although no modern parallels can be invoked for is assemblage it probably indicates an open secondary woodland or long grassland, *Abida* possibly being dominant because of the the steep slope. The low species diversity is typical of north facing slopes (Evans and Rouse 1991, 118). This may, however, represent a poor late-glacial (mollusc biozone z; Kerney 1977) fauna largely derived from the Coombe Deposits.

Zone 2. A relatively high species diversity with the assemblage dominated by shade-loving species, in particular *Carychium tridentatum* and *Discus rotundatus* and included *Macrogastra rolphii* and the rare species *Spermodea lamellata* which is extinct southern Britain today.

Spermodea is particularly noteworthy, as it is a species of old woodland and was widespread in the Atlantic period, its demise being attributed to Neolithic deforestation (Evans 1972, 94). With the exception of *Abida* there are no open country species. This assemblage represents regeneration of the local refugia, probably closed woodland, with *Pomatias elegans* being attracted by the loose soil of the ditch micro-environment. The radiocarbon determination of 6820 ± 120 BP from *Cepaea* shells from this assemblage confirms the Atlantic (pollen zone VIIa) date suggested by the assemblage. This indicates a primarily broad-leaved, deciduous woodland, with a rich mature leaf-litter, probably including mosses.

Figure 54. Mollusc histogram from Strawberry hill Reservoir.

\ Period	---?Meso/Neo---				-?Neo/Bronze Age-				---Late Iron Age----						----------Romano-British->								------------->-Romano-British------------->>>>?----								----Medieval---			
\ Feature	---Ditch 15----																																	
\ Sample	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
\ Context	-------14--------				12	-----11-----			-10a---10---			-9b--9a		8	------7-----			---------------6- ------------							--------5------				4	3	2	-----1------		
\ Depth (cm)	300-	290-	280-	266-	256-	246-	236-	230-	220-	215-	210-	206-	203-	195-	190-	180-	170-	160-	150-	140-	130-	120-	110-	100-	90-	80-	70-	60-	50-	40-	30-	15-	4-	0-
\	310	300	290	280	266	256	246	236	230	220	215	210	206	203	195	190	180	170	160	150	140	130	120	110	100	90	80-	70	60	50	40	30-	15	4
\ Wt (g)	1860	2000	2000	2000	2000	2000	2000	1892	2000	1840	2000	1132	1800	1900	1900	2000	2000	2000	2000	2000	1975	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	1422
MOLLUSCA																																		
Pomatias elegans (Müller)	1	10	35	55	87	66	72	89	101	64	54	39	95	61	33	37	55	33	42	23	21	18	17	19	13	8	4	4	6	8	9	2	3	3
Acicula fusca (Montagu)	-	-	-	-	-	1	2	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carychium tridentatum (Risso)	6	55	105	148	161	359	359	291	87	32	24	12	20	36	39	30	19	4	1	-	-	-	-	-	2	1	-	3	14	15	2	-	-	-
Cochlicopa lubrica (Müller)	-	-	-	-	-	-	-	2	-	4	4	3	2	13	7	6	2	1	1	-	-	-	-	-	-	-	-	-	2	19	-	-	-	-
Cochlicopa spp.	5	2	2	8	23	63	41	31	15	29	22	14	30	42	37	25	14	15	6	6	5	2	6	3	1	1	-	3	2	32	3	1	1	-
Columella edentula (Draparnaud)	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vertigo pygmaea (Draparnaud)	-	-	-	-	-	-	-	-	6	52	64	28	46	64	72	43	22	6	1	9	1	2	4	35	19	10	8	8	27	69	13	-	-	1
Vertigo spp.	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Abida secale (Draparnaud)	36	7	3	2	-	1	25	7	8	-	1	-	3	1	-	1	2	1	-	-	-	-	-	-	-	-	-	13	21	19	12	+	3	+
Pupilla muscorum (Linnaeus)	-	+	-	-	-	1	-	-	-	54	98	50	71	40	10	18	11	6	2	1	1	5	-	7	2	2	4	19	8	31	15	-	3	3
Vallonia costata (Müller)	-	-	-	-	-	-	-	5	27	228	249	142	100	141	250	206	123	123	107	94	32	26	50	97	69	57	45	54	87	147	57	-	10	6
Vallonia excentrica Sterki	-	-	-	-	2	-	2	-	20	1	38	9	146	296	81	36	36	32	57	95	63	83	58	68	21	19	9	7	4	24	11	7	2	-
Acanthinula aculeata (Müller)	-	7	1	6	27	60	43	53	33	10	5	2	9	2	2	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spermodea lamellata (Jeffreys)	-	-	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ena montana (Draparnaud)	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ena obscura (Müller)	-	2	-	-	-	10	1	-	5	1	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Punctum pygmaeum (Draparnaud)	27	10	1	7	3	12	19	17	9	19	13	14	19	53	74	79	48	15	7	7	2	5	3	1	-	2	1	1	3	12	5	-	1	-
Discus rotundatus (Müller)	1	40	43	68	238	228	111	104	45	6	7	3	11	3	1	3	1	+	1	+	1	+	+	-	1	+	-	+	1	+	+	-	-	-
Vitrina pellucida (Müller)	20	1	2	-	4	8	-	4	2	3	1	2	-	1	6	7	6	4	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitrea crystallina (Müller)	-	3	-	17	-	45	-	27	6	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
Vitrea contracta (Westerlund)	2	7	13	-	27	12	81	36	7	6	6	-	4	4	5	12	3	-	1	-	1	2	1	-	1	-	-	-	-	2	2	1	1	1
Nesovitrea hammonis (Ström)	-	-	-	-	-	1	4	-	-	4	5	1	5	9	20	16	5	-	2	-	-	-	-	2	-	+	-	-	3	18	3	-	1	-
Aegopinella pura (Alder)	-	2	2	9	15	61	38	59	19	7	1	1	1	-	2	1	3	1	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-
Aegopinella nitidula (Draparnaud)	-	1	10	12	38	98	47	74	36	13	13	4	9	6	11	15	17	6	-	2	-	2	1	-	-	1	-	-	1	8	-	-	1	-
Oxychilus cellarius (Müller)	5	3	5	15	11	9	8	7	1	-	-	-	2	2	2	4	1	4	3	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-
Limacidae	13	3	8	4	22	126	35	22	31	36	27	12	8	46	25	29	41	21	14	16	12	8	9	4	9	2	6	6	11	29	27	19	17	12
Euconulus fulvus (Müller)	2	-	-	1	6	-	-	-	-	1	1	-	1	-	1	1	1	1	-	1	-	-	1	-	-	2	-	-	-	1	-	-	-	-
Cecilioides acicula (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	6	6	19	72	73	7	3	4
Cochlodina laminata (Montagu)	-	-	-	1	7	5	7	14	2	2	1	-	-	-	2	-	-	2	1	1	-	1	-	1	1	-	-	-	-	-	-	1	-	-
Macrogastra rolphii (Turton)	-	-	+	4	5	5	4	3	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clausilia bidentata (Ström)	3	2	12	15	14	5	13	13	11	4	5	4	5	5	2	2	-	3	1	1	1	-	-	1	1	-	-	1	1	1	1	-	-	-
Balaea perversa (Linnaeus)	-	-	-	-	+	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Candidula intersecta (Poiret)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	10	26	38	33
Candidula gigaxii (L. Pfeiffer)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	1
Helicella itala (Linnaeus)	-	-	-	-	-	-	-	-	15	35	46	29	82	101	57	56	57	65	54	79	60	61	72	65	65	53	32	28	52	31	44	21	17	9
Trichia striolata (C. Pfeiffer)	-	-	1	4	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Trichia hispida (Linnaeus)	-	-	-	-	21	78	53	64	55	75	41	23	39	145	179	116	63	34	37	27	9	9	6	15	5	14	27	23	68	205	84	10	2	5
Arianta arbustorum (Linnaeus)	-	-	-	-	-	1	+	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helicigona lapicida (Linnaeus)	-	+	1	+	4	1	1	2	1	1	+	+	+	-	+	1	3	1	+	+	+	1	-	-	+	1	+	-	+	1	-	-	-	-
Cepaea spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	2	1	+	+	1	-	1	-	-	2	-	-	-	-
Cepaea/Arianta spp.	-	5	11	9	16	11	5	7	11	2	6	-	2	7	1	1	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helix aspersa (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	1	-	-	-	-
Taxa	12	17	18	18	20	25	23	26	25	24	24	22	24	21	23	24	22	22	18	15	16	15	14	13	15	14	10	13	17	22	16	10	15	11
Shannon Index (*H'*)	1.95	2.09	1.95	2.04	2.15	2.34	2.27	2.43	2.69	2.35	2.32	2.25	2.45	2.13	2.31	2.44	2.50	2.24	2.01	1.91	1.90	1.85	1.80	1.94	1.83	1.91	1.79	2.06	2.10	2.29	2.17	1.79	1.96	1.78
TOTAL	121	160	255	385	731	1273	973	939	562	689	733	397	712	1078	918	749	541	381	342	365	215	228	230	318	214	173	137	170	315	690	297	90	102	75

Table 34. Strawberry Hill Reservoir; Land mollusc data.

Basal colluvium

Zone 3. The molluscan assemblages in the basal colluvium are derived from a decalcified brown earth (see soil micromorphology) but produced high mollusc numbers. They are predominantly shade-loving (75%) and are similar to those described in zone two but with two significant additions: 1) The presence of *Trichia hispida* and *Vertigo pygmaea* and 2) the occurrence of a number of rare species; *Acicula fusca*, *Columella edentula*, *Spermodea lamellata*, *Ena montana* and *Balaea perversa*. *Trichia striolata* occurs in low numbers but is not recorded again after this zone; it is very rare in Neolithic and Bronze Age contexts in Wiltshire. These are species of old woodland, and are typical of assemblages of deciduous forest of the post-glacial thermal optimum (7500 - 5000 BP) woodland (Kerney 1968; 1976c). The two anthropophobes *Acicula fusca* and *Ena montana* suggest only limited activity associated with the earlier clearance. This is confirmed by the rapid regeneration seen in zones 2 and 3.

This assemblage indicates the erosion of an Atlantic woodland soil, the upper portion of which comprised a chalk rill/fan deposit which may be attributable to erosion as late as the Late Bronze Age/Early Iron Age.

Iron Age

Zone 4. The assemblages in zone 4 correspond to the occurrence of early Iron Age pottery and fairly high energy erosion of stone-free muds and chalk fans. Four sub-zones are recognised. The basal assemblage (zone 4a) has a large number of species present in zone 3 as well as a number of open country species. The erosion episode seen at the top of zone 3 is reflected in the mollusc fauna of zone 4a; *Pomatias elegans* increases and the assemblage is a mixed one. Zone 4b reveals a significant change in the fauna. It is dominated by *Vallonia costata*, a pioneering open country species, together with *T. hispida*, *Vertigo pygmaea Vallonia excentrica* and *Helicella itala*. A number of relict shade-loving species are still present in low numbers. This assemblage undoubtedly indicates open conditions superseding the deciduous woodland. This zone probably represents one of open grassland (predominance of Vallonias; especially *V. costata*), probably tall and not heavily grazed (lack of *H. itala* and presence of woodland species). In the stone-free deposits *V. costata* is dominant while in

the overlying chalky fan (zone 4c) *V. excentrica* is dominant. This is coincidental with a minor peak in *H. itala* which may indicate the erosion from arable contexts and the inclusion of its fauna. The elegant antipathetic behaviour of the two *Vallonia* species is marked. Whether it is a represents a real change in the local grassland environment or is a result of the input of species from an adjacent (possibly arable) habitat is uncertain. Zone 4d, which occupies the immediate post-Iron Age deposits, is comparable to zone 2b but with an increase in *T. hispida* and *Punctum pygmaeum*. Mollusc numbers decline and the assemblages represent grassland, probably only lightly grazed.

Calcareous colluvium

Zone 5. Shade-loving species are low and open country species represented by *H. itala*, *V. excentrica* and *V. costata*. *Vertigo pygmaea* almost disappears. Mollusc numbers decline as a result of the harsher local environments. The antipathetic behaviour of *Vallonia costata* and *Vallonia excentrica* in this zone is particularly elegant (Fig. 54), and probably means something in terms of grassland type. It has not be possible to determine what this difference is in terms of grassland ecology. The assemblages are typical of ploughwash indicating tillage of an open landscape.

Zone 6. *V. costata*, *H. itala* and *T. hispida* dominate, *V. excentrica* low, and *V. pygmaea* and *Abida* return. This also represents arable, possibly stonier conditions, probably of medieval date.

Zone 7. The Introduced Helicellids, *H. itala* and Limacidae are the main species. Probably still arable, the change in fauna being attributed to the colonisation of the Introduced Helicellids and possibly the onset of harsher modern mechanised farming practices.

Discussion

The long molluscan sequences provides one of the most significant series of assemblages in North Wiltshire. Early Atlantic (Mesolithic) activity is indicated by limited and localised clearance of the Thermal Optimum deciduous forest. The securely dated Atlantic woodland assemblages with high species diversity and a number of rare species is particularly significant in understanding the development of the chalk

landscape. Subsequent clearance resulted in transportation of the brown earth soils into the valley with its associated mollusc fauna. The date of this erosion event unfortunately is not securely dated, but must be post-Mesolithic (*c.* 6500 uncal BP) and undoubtedly prior to the early Iron Age activity.

In the early Iron Age a series of high energy deposits indicate local grazed grassland, and arable fields in the vicinity. Subsequently more intensive tillage practices on the now thinner, rendzina soils in the Romano-British period lead to extensive colluvial deposits. Tillage seems to have continued through until the present day.

The antipathetic behaviour of the two species of *Vallonia* is obvious (Fig. 54), but its ecological significance unknown.

The overall sequence compares well with the long molluscan sequences from the colluvial deposits at Asham, East Sussex (Ellis 1983) and Pitstone, Buckinghamshire (Evans 1966). All three sequences produced rich Atlantic woodland faunas (mollusc biozone d^2; Kerney 1977). In each case the marked change between the woodland and open country fauna probably indicates an incomplete sequence.

Soil micromorphology information from Richard Macphail
Four Kubiena samples were taken from the more humic colluvial layers (Figs 51 and 52). The thin sections were prepared at the Department of Environmental Science, University of Stirling and described and interpreted by Richard Macphail.

Sample 49 (contexts; 10, *9*, 8)
Massive chalky 'slurry' of weathered chalk, sand, silt, mollusc fragments, arionid granules, fine charcoal and organic matter (and probably abundant dispersed earthworm gut crystals). Dense soil with closed vughy porosity. Juxtaposed varying chalk soil fragments occur. Could be colluvial slurry from cultivated (high fine charcoal) exposed chalk soil (rendzina) (abundant organic fragments from Ah horizon?). Eroded soil had high biological activity - molluscs and very little *in situ* biological reworking subsequently.

Sample 50 (context 8)

The same as 49, but obviously more stony. Again little reworked biologically. All the organic matter is derived.

Comment

Samples 49 and 50 may be part of the same sequence of high energy colluvial deposition. A primary chalk fan deposit, succeeded by chalk soil slurry, probably eroded from a cultivated A/C horizon of a rendzina.

Sample 52 (context 11)

Coarse granular, fine blocky, highly biologically worked heterogeneous decalcified and non-decalcified soil. Original heterogeneous colluvium on site, had quite a lot of moderately coarse wood charcoal, so some clearance/occupation activities upslope. It looks like only humic decalcified soil (Ah horizon) present here (no derived subsoils). This was mixed with high amounts of Ah/C horizon material, that appears to have been similarly organic. Local soils were therefore thin. On site soil formation led to strong, but not total mixing by earthworms of soil materials.

A phase(s) of colluvial burial, caused very much chalky fine material to wash down and coat some of the biological porosity. Hence the upper part of the slide is biologically strongly homogenised colluvium, where amounts of decalcified soil decreases. Sample 52, seems therefore to be an incremental soil/colluvium.

Sample 51 (contexts 11, *stony lens*, 10)

Part compacted/massive, part open chambered/very coarse vughy soil. It seems that colluviation increased in intensity, and the resulting compact calcareous soil still retains many features of being a slaked slurry ("birds foot cracks"). High energy deposition is recorded by the stone line. Probably, earthworms disappeared for a while, but subsequently burrowed downwards through overlying soil, to make aestivation chambers here, which are infilled by their gut crystals. They also brought in small amounts of decalcified soil from above or below.

Discussion (MJA)

Context 11 is a mixture of decalcified Ah material and calcareous Ah\C material which has been mixed by earthworms throughout. It is a typical colluvial unit, but unfortunately does not contain any pedorelicts or eroded subsoil material. This unit has probably eroded from acid brown earths which were shallow due to the steepness of the slope. The presence of wood charcoal might indicate woodland in the vicinity, but as indicated by the radiocarbon dates (above) might be residual. An increase in phases of colluviation is shown upwards and silt and fine material has washed down through the soil. Increased and higher energy erosion events are indicated by the stone lens. The upper part of this horizon is only partially worm-worked which may indicate either an increase in rate of subsequent erosion or that worms numbers were temporarily depleted.

Erosion of typical brown earths or Icknield Series rendzinas continued during the Iron Age (context 10) but increases in both erosion episodes and the rate of erosion is evidence by the silty mud slurry and chalk rills. These may be the erosion of arable contexts locally, but the steepness of the slope must be noted here. If cultivation is occurring on these slopes then it indicates that most of the hilltop and surrounding land had already been occupied. Further slurry erosion occurred. This was buried rapidly enough to prevent worm working. Here erosion was from biologically well worked soils, possibly humic but thin, rendzinas. The fine charcoal present may be a result of tillage comminuting the charcoal.

Charcoals identifications by Joy Ede

Two sets of charcoal were identified by Joy Ede. The first was material collected in the field during excavation and the second was charcoal recovered from bulk samples and mollusc samples. Several pieces of charcoal were too small, or too badly preserved, to be identified. The identifications are summarised in table 32. The fragments from context 14 were submitted for radiocarbon dating.

species / Context	*Pinus*	*Juniperus*	*Quercus*	*Corylus/Alnus*	*Fraxinus*	*Crateagus*
6						**
9			**			**
10					**	*
11	**	*	*	*		
14	***					

Table 35. Charcoal identifications.

Context 14

All the identifiable fragments recovered from bulk samples from context 14 were monocotyledonous, coniferous wood, probably *Pinus* (pine).

Context 11

The material assumed to have derived from the brown earth contained predominantly *Pinus*, but also *Juniperus*, *Quercus*, *Faxinus* and *Alnus/* Pomoideae were identified.

The main genera represented in the rest of the colluvial sequence were *Quercus*, *Crateagus* and *Fraxinus*.

Comment

The predominance of pine charcoal in both the ditch and derived brown earth (context 11) may be human selection for burning but are also consistent with the evidence of a Boreal pine dominated forest. This evidence is discussed further in relation to both the radiocarbon dates and molluscan evidence below.

Plant macrofossils identifications by Joy Ede

A few badly preserved plant macrofossils were recovered from the small (*c.* 2 litre) mollusc samples. Although large bulk samples were processed from the ditch this only produced charcoal. All the plant macro-fossils were recovered from Roman and post Roman contexts (Table 36).

context	7	5	4
Hordeum sp. rachis; dense head	1	-	-
Avena sp. awn fragment	-	1+	-
Cerealea indet.	-	1	1
Leguminosae indet.	-	1	-
Euphrasia/Odontites verna (eyebright/bartsia)	1	-	-
Total	2	2+	1

Table 36. Strawberry Hill Reservoir; carbonised plant remains.

All the contexts from which seeds and grain were recovered are of Roman or later date and relate to colluvium thought to be the product of more widespread tillage. It is also interesting to note that the cereals recovered (barley and oats) are more hardy species and ideally suited to thin rendzina soils that exist on the downs.

Discussion

Early post Glacial

Buried beneath the deeply stratified colluvial sequence was a simple ditch which terminated within the excavated trench (Fig. 51). It did not contain the normal tripartite ditch fills but was rapidly infilled with a single fill of a dark, humic and homogeneous colluvium. This deposit indicated erosion from weakly calcareous soils, possibly typical brown earths. No artifacts were recovered but pine charcoal gave a Boreal date of 9350 ± 120 uncal BP (OxA-3040). As discussed earlier (radiocarbon dates) it is unlikely that this dates the construction of the ditch, but was probably charcoal residing in the topsoil when the ditch was dug. It therefore may provide evidence of local burning of an early Boreal (zone V) pine forest on the scarp slope of the Salisbury Plain. However, whether this represents anthropogenic activity such as a camp fire or local slash and burn clearance by early Mesolithic populations or even a natural fire caused by lightning, remains unresolved. Evidence of Mesolithic features on the chalklands are relatively rare, it is, however, significant that 16km (10 miles) to the south-east, two post holes (Vatcher and Vatcher 1973) and a pit in the Stonehenge car park have all produced early Mesolithic radiocarbon dates from pine charcoal; 9130 ± 180 BP (HAR-455), 8880 ± 120 BP (GU-5109) and 8090 ± 140 BP (HAR-456). These dates

span about 1,000 years and although they are slightly later than that from Strawberry Hill, they indicate the presence of a Boreal pine woodland on the chalk, as well as local woodland clearance. The features and clearance are clearly early Mesolithic and it is therefore not inconceivable that burning of woodland and even the possibility of the creation of local clearances at Strawberry Hill was anthropogenic in origin.

Mesolithic and earlier prehistory

The Mollusca from the same ditch, however produced a typical Atlantic fauna and the accelerator date from *Cepaea* fragments accords with this; 6820 ± 120 BP (OxA 3041). The ditches were, therefore, probably dug in a full Atlantic (zone VIIa) woodland, dominated by broad-leaved deciduous trees and mature leaf-litter had developed, as evidenced by mollusc zones 2 and 3. The woodland was probably a typical linden (lime) forest, and a number of charcoals were identified as possibly of *Tilia*. The later erosion of this woodland soil indicates that it was probably a typical, but shallow, brown earth. The scarp slope may have retarded the formation of thicker soils. This dense woodland was cleared locally early in the sixth millennium cal BC by late Mesolithic populations during which time the two ditches, at least, were dug. Mesolithic activity was not confined to this. Although no artifacts of this period were recovered from the excavation, a butt end of a tranchet axe and probable core fragment (see SMR) were recovered only 350m further up the scarp slope.

Activity here seems to have been both localised and short-lived for the woodland seems to have regenerated very rapidly and included a mature mollusc fauna with a large range of species. The boundary between the ditch fill and the overlying eroded soils is sharp and may indicate truncation of deposits at this point. There are no deposits which can be ascribed with any certainty to the Neolithic and Bronze Age periods, despite the large flint assemblages to the south (Fig. 49).

The transported soil (contexts 12 and 11) is unusual in that soil micromorphological and field observation suggest relatively high energy erosion episodes normally associated with forest clearance or tillage. The molluscan fauna is one of a full Atlantic woodland. This probably

indicates the erosion of the former woodland soil and its contained molluscs. Evidence of this clearance is only apparent in the subsequent, Iron Age, mollusc assemblages (zone 4). This implies rapid erosion and truncation of the thin decalcified brown earths on the chalk slopes. Whether this erosion can be attributed to Neolithic activity evidenced by the large flint assemblages upslope, or by early Iron Age activity is unclear. From evidence in southern Britain the Atlantic woodland and its associated fauna would have been superseded by the Iron Age. However, the scarp slopes of the Salisbury Plain may, just have been one of the last refuges of such a habitat.

Early Iron Age

The quantity of Iron Age pottery, particularly the recovery of a large portion of a single early Iron Age red slipped carinated bowl is not typical of colluvial deposits. This points to the presence of occupation, if not actually within the excavated area, certainly within very close proximity. The nature of the occupation and accompanying features were not discovered from the limited excavations of the colluvium. Nevertheless, the composition of the pottery assemblage, and the fact that there is dog gnawing on bone from the same context all strongly indicate domestic occupation. The environmental evidence suggests grassland in the immediate vicinity with fields not far away. Other contemporary settlements are known at Strawberry Hill (SU 000 525; 1km to the east along the slope), and at Potterne on the greensand (Lawson and Gingell 1984).

Roman and post-Roman

Following the early Iron Age occupation the evidence indicates long-term farming of the this gentle scarp slope. Most of the lighter colluvium can be attributed to tillage of the slopes, probably largely in the Roman period. The lighter, and more calcareous, colluvium is indicative of shallow rendzina soils. The depth of deposits are suggestive of higher rates of erosion, or larger individual erosion episodes. Carbonised seeds that were recovered came from these contexts (Table 36). It is impossible to make any secure interpretations of the arable economy from so few few seeds, but it is interesting to note that they were barley and oats; both are cereals which are suited to the thin chalk soils.

Summary

The significance of this investigation is in the identification of a number of episodes of human activity on the gentle scarp slope of Salisbury Plain. Evidence for two phases of Mesolithic activity are postulated; the first being early Mesolithic clearance in the pine dominated Boreal forest (9530 uncal BP) and the second, more conclusively, included both clearance in the Atlantic mixed linden forest and the digging of a ditch in the later Mesolithic (6820 uncal BP). There is inconclusive evidence of Neolithic activity leading to further erosion on the slopes and the possibility that a relict lindens woodland existed until the early Iron Age is postulated. Early Iron occupation occurred on the grassy slopes of a small combe on the scarp slope; now buried by over 2m of colluvium. Roman and post Roman tillage was extensive and erosive, being largely responsible for the thin rendzinas and the 2m of highly calcareous colluvium.

6.3 INVESTIGATIONS OF COLLUVIUM AROUND STONEHENGE

Following the unsuccessful attempts by Martin Bell and Julian Richards to section colluvial deposits within the Stonehenge Environs at a number of locations (*Winterbourne Stoke Crossroads (W17) SU 104 414; The Diamond (Wilsford Down - W18) SU 108 407; Durrington Down (W19), SU 118 438; Stonehenge Bottom (W19) SU 127 420; Stonehenge Bottom (side valley - W21) SU 125 414; Cursus Valley (Larkhill Sewage Farm - W22) SU 128 430; Stonehenge Bottom II (north of A303 - W225), SU 127 421 and Greenland Farm ('The Deep Hole' - W26) SU 098 435)* see Richards 1990, 210-211 and fig. 8), further areas were investigated in an attempt to provide a deep colluvial sequence.

This work was conducted in the Cursus Valley at SU 420 104 and SU 432123 and to the west of Vespasians Camp using a 40mm diameter dutch auger to map the soil/sediment profiles (Fig. 56).

Cursus Valley

Two profiles (Fig. 56) were augered at 30 - 50m intervals and confirmed Richards' conclusions that no colluvial deposits existed. The soil profiles were between 28 and 37cm on the valley sides, and 35 and 45cm in the valley floor. No cross-profile was constructed.

Vespasians Camp

A single auger transect conducted at the base of the slope on the eastern side of the Iron Age hillfort was prompted by the possibility of discovering colluvial deposits, and the observation of peat in the Avon valley by Dr. G. Wainwright (pers. comm.). The auger transect of 12 bore holes, augmented by a number of other 'probabilistic' soundings, was conducted the south-east side of the Camp (Fig. 55).

Colluvial deposits had accumulated at the base of the steep eastern slope, probably a relict river cliff. They were calcareous, unsorted deposits, typical of colluvium in southern England. From field observations and augering, it is likely that the colluvium forms a ribbon along the foot of the slope.

The colluvium was a maximum of 1.3m deep overlying wet grey and grey-brown alluvial silts and peat. Almost at the base of the colluvial deposit were a number of lenses of largely clean chalk, possibly eroded from the slope during the construction of the hillfort. Up to 0.3m of colluvium was sealed by the chalk rubble, but most of the sequence was assumed to be Iron Age or later.

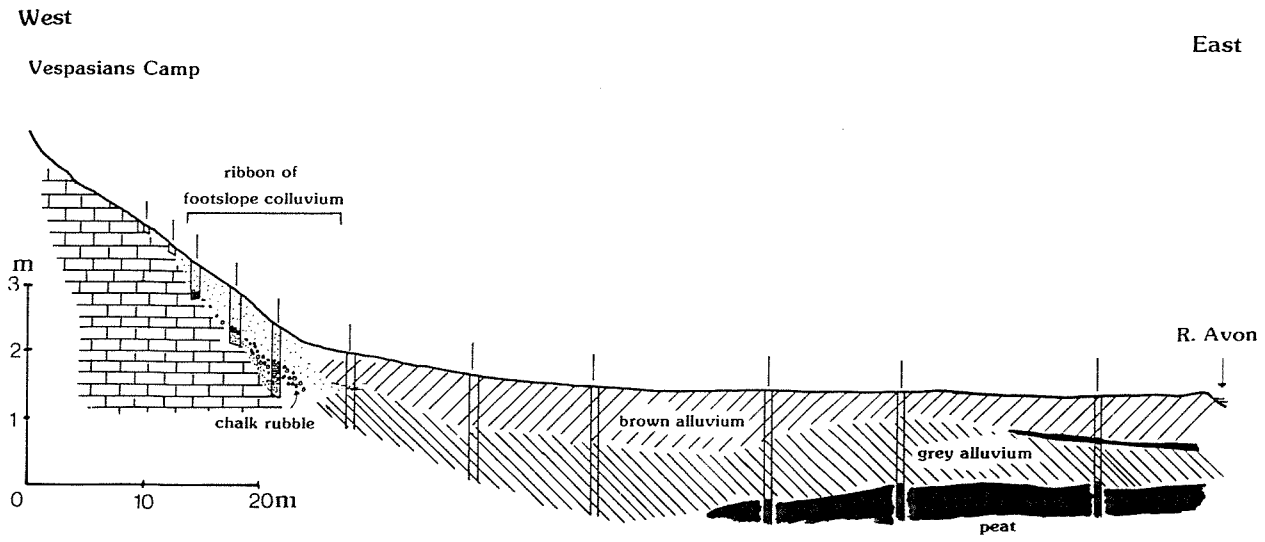


Figure 55. Schematic section of the footslope deposits on the Avon floodplain at Vespasians Camp.

Discussion

The lack of colluvial deposits within the Cursus Valley remains enigmatic, but confirms previous work. At Vespasians Camp, despite the

Bronze Age barrows on the hill only 30cm of colluvium could be considered as being potentially earlier than the Iron Age. The potential of this shallow deposit was not explored.

6.4 MOLLUSCAN STUDIES IN THE STONEHENGE ENVIRONS

During the Stonehenge Environs Project a number of molluscan studies were conducted on a series of dated deposits within Neolithic and Bronze Age monuments (Fig. 56). This evidence (published in Richards 1990), together with a number of other published molluscan studies in the vicinity and the recent work on the King Barrow Ridge allow a detailed summary of the evolution of and human impact upon the Stonehenge landscape throughout later prehistory. This summary aims to integrate the available data from molluscan analyses, discussed below, together with those from the study of plant remains and charcoals published in the *Stonehenge Environs Project*.

The study area, with one remarkable and localised exception (the Wilsford Shaft; Ashbee *et al.* 1989), is exclusively one of dry chalkland. Consequently, the data for the study of environmental change have been derived principally from the analysis of terrestrial Mollusca.

A number of individual studies were undertaken as part of the Stonehenge Environs Project, and are presented within the appropriate site reports. These can be summarised as follows:

* W2 (1981) Coneybury 'Anomaly' (Bell and Jones 1990a): pit fill
* W55 Lesser Cursus (Entwistle 1990b): three ditch sequences
* W56 Stonehenge Cursus: two ditch sequences
* W58 Amesbury 42 long barrow (Entwistle 1990c): ditch sequence and buried soil
* W2 Coneybury Henge (Bell and Jones 1990b): ditch sequence and subsoil hollow
* W52 Wilsford Down North Kite (Allen 1990c): buried soil

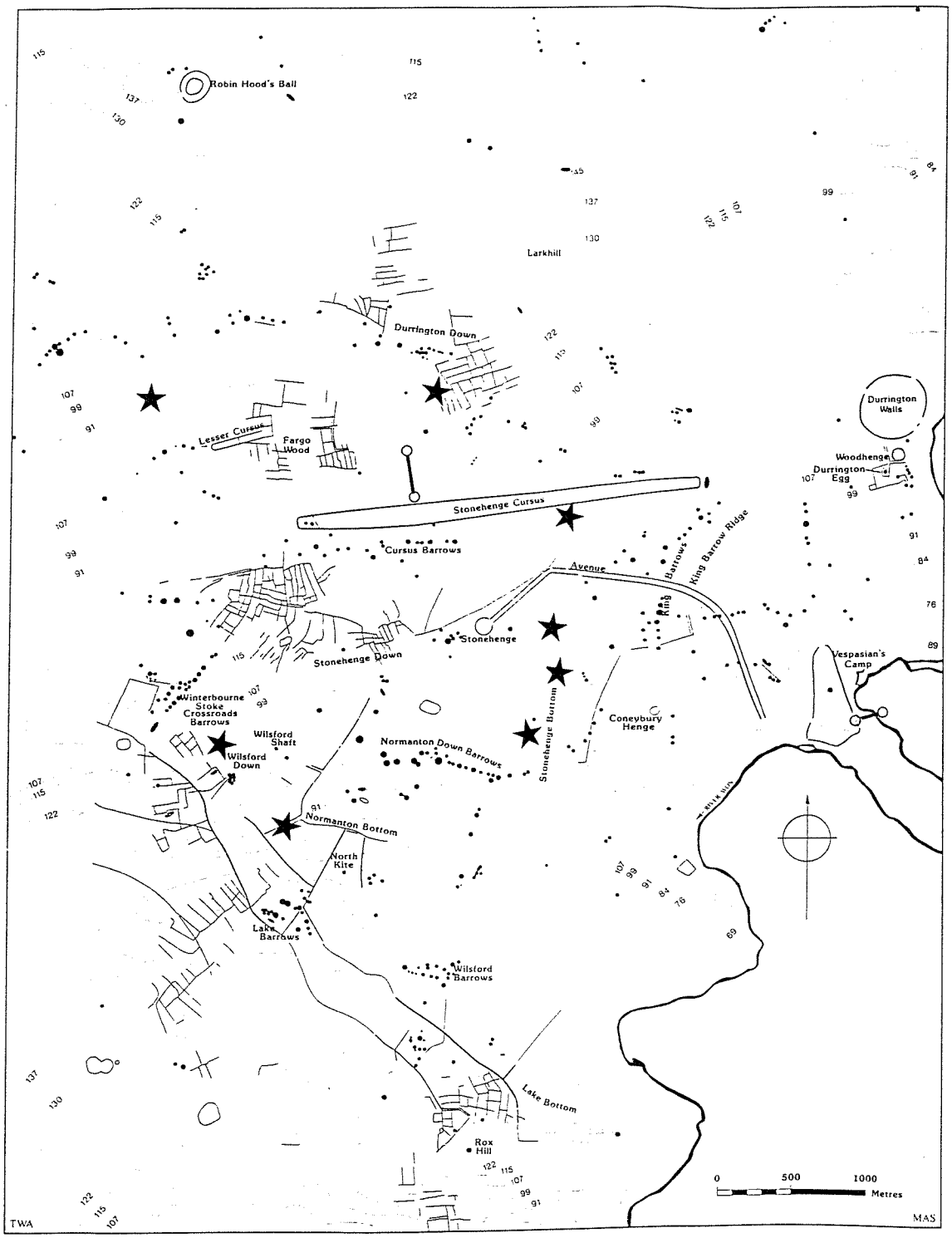


Figure 56. Geomorphology and archaeology of the Stonehenge Environs, showing the location of the auger transects and previous colluvial studies (marked by stars). *From Richards 1990, by permission of English Heritage*

Additional data are available from previous studies and from work carried out subsequent to the completion of project fieldwork. The major contributions can be summarised as follows:

* Durrington Walls (Evans 1971c): buried soil beneath henge bank
* Woodhenge (Evans and Jones 1979): buried soil beneath henge bank and ditch sequence
* Stonehenge (Evans 1984): ditch sequence
* Wilsford Shaft (Ashbee *et al.* 1989): wide range of environmental data from fill and of well
* Durrington 3 (Allen *et al.* forthcoming): ditch sequence from round barrow

More recent detailed analyses have been conducted on the buried soils, mound and ditch contexts from a number of barrows on the King Barrow Ridge and Luxborough Plantation (Allen and Wyles 1994).

Despite these analyses there is a surprising lack of emphasis on environmental studies, particularly in an area where monuments are both densely concentrated and investigated. The lack of previous environmental analysis is due partly to the relative youthfulness of certain aspects of this area of study, but also reflects the material and structural approach of some previous archaeological investigators. In some cases within the Stonehenge Environs, round barrows appear to have been comprehensively sampled during excavation, but this has not been followed by appropriate, or indeed any, analysis. This appears to be the case, for example, with the majority of the 12 round barrows excavated by the Vatchers between 1959 and 1961 (Gingell 1988, 23).

Thus, although there is 'some sort of regional background available' (Evans 1984, 7) as figure 58 demonstrates, this is still far from comprehensive. All the suites of molluscan samples taken within the Stonehenge area are derived from identified monuments, assumed to be centres of human activity, and therefore, by their very nature, biased towards felled and open country areas within the landscape. Any overall interpretation of the molluscan evidence may therefore over-estimate or over-emphasise the open nature of the area. This bias can be partially overcome by the use of other sources of environmental information, and by the examination of Mollusca from buried soils.

Unfortunately there is a paucity of such evidence, despite the potential which clearly exists in those old land surfaces beneath the many extant barrows in the study. In fact, the Stonehenge Environs Project did not provide the opportunity to examine any buried soils with the exception of the North Kite (Allen 1990c), but recently more detailed analysis of buried soil beneath several of the large barrows along the King Barrow Ridge was undertaken (Allen and Wyles 1994). Endeavours to provide suites of off-site data and non-site-specific data was attempted via the dry valley research projects. This demonstrated the absence of typical chalkland colluvial deposits as described by Bell (1981a) and Allen (1988a; this thesis) in a number of dry valleys in the area, and consequently forced reliance upon the site-specific data. However, in the Stonehenge area, as in the Dorchester environs (Chapter 7), the relatively large number of sequences allows the reconstruction of spatial and chronological patterning on a regional scale.

Landscape development and modification

The history of land-use is process of gradual development and alteration. The changing nature of the Stonehenge landscape is, however, divided into a series of four archaeological, but in terms of land-use history, possibly arbitrary periods.

The early post-glacial

It is assumed, on the basis of extensive evidence from the chalkland of southern England (Evans 1975), that the entire Stonehenge area was once heavily forested. There is, however, little direct evidence for primary post-glacial woodland, or for Mesolithic intervention in the form of woodland modification or small-scale clearance of the type recorded at Gatcombe Withy Beds (Scaife 1982a, 1987a). Indirect evidence in the form of pine charcoal from dated pits and post-pits in the Stonehenge car park suggest both limited clearance and occupation at about 9000 uncal BP. Although full molluscan analysis has not be conducted, a scan of the snails indicates a closed woodland; a number of rare woodland species were recorded (*Ena montana*, Vertignids etc). A subsoil hollow beneath the bank at Woodhenge provides clear evidence for ancient woodland, suggested, on the basis of a single artefact, to date to the Mesolithic period (Evans and Jones 1979). This evidence,

together with abundant charcoal, appears to indicate some form of disturbance and activity. Close by, at Durrington Walls, both buried soil profiles again show clear evidence for ancient woodland (Evans 1971c). Palynological analysis of one of the soil profiles (DWII)(Dimbleby 1971), indicates a hazel- (*Corylus*-) dominated woodland, including birch (*Betula*), pine (*Pinus*), oak *(Quercus)*, lime (*Tilia*), and elm (*Ulmus*). Ferns (*Dryopteris*-type), bracken (*Pteridium*), and grasses (*Gramineae*) were also recorded. Although the pollen spectra were sparse, it is suggestive of the type of woodland resulting from regeneration of Mesolithic clearance (cf. Dimbleby 1985; Scaife 1982a; 1987a). In addition, the predominance within this woodland of hazel, typical of the Boreal *Corylus* maximum, has been suggested might be promoted by human activity (cf. Scaife 1982a). This may therefore strengthen the evidence for Mesolithic activity on the margins of the Avon Valley, similar to the emphasis on river margin and valley locations noted in the Avebury area (R W Smith 1984).

Earlier Neolithic (Fig. 57a)

At the beginning of the Neolithic, it can be assumed that the area was still extensively wooded, although, as discussed above, it appears likely that soils within the study area were appreciably thicker than today and possibly belonged to a different pedogenic regime (cf. Limbrey 1975; Allen 1988a).

The human impact on the lowland zone throughout the Neolithic has been conceptualised in terms of progressive deforestation in response to the agricultural exploitation (Limbrey 1978) of increasingly larger areas under cultivation and progressively heavier reliance on cereals. This basic concept may require radical re-examination. Localised clearance can certainly be detected, but may be undertaken for reasons other than expansions of tillage and farming practices (Smith 1984, 114). Although some clearance is presumably required prior for the construction of monuments, neither crop production nor animal husbandry necessarily require wholesale clearance or very large-scale open areas (Rowley-Conwy 1982). It is perhaps therefore more relevant to attempt to examine the specific nature and function of clearance than to record clearance activity per se. The environmental data for the earlier Neolithic is sparse, but adequate for generalised interpretation at a

local and sub-regional level.

The earliest dated environmental evidence is that available from W2 (1981), the Coneybury 'Anomaly', which, although difficult to interpret fully, appears to indicate localised clearance and the presence of grassland and scrub in the early fourth millennium BC (Bell and Jones 1990a). The evidence here appears to suggest an example of early small-scale clearance, of the type discussed by Rowley-Conwy (1982), and carbonised cereal grains (Carruthers 1990) indicate an arable component. The frequency and extent of clearance elements within the Stonehenge environs is as yet unquantified.

Additional evidence for the earlier Neolithic is provided by the environmental sequences recovered from specific monuments, the earliest datable example of which is W55, the Lesser Cursus (Entwistle 1990b). This monument was constructed within a broadly open environment, although the paucity of shells in the primary fills of all the examined ditch sections does not allow the nature of the open environment to be more precisely determined. Nevertheless, the evidence from the lower secondary fills, likely to date only shortly after the construction and apparent partial backfilling of the ditches, shows that the surrounding environment was one of open, probably grazed, grassland. The extent of this grassland regime is suggested by data from W56, the Stonehenge Cursus, and from W58, Amesbury 42 long barrow (Entwistle 1990c). The buried rendzina beneath the latter monument was distinctly lacking in shade-loving species, indicating that the barrow was constructed in a pre-existing and well established grassland. The lack of any woodland species, with the exception of fragments, indicates either long-term established and grazed grassland, or the existence of a non-calcareous soil (i.e. a brown earth) which supported a woodland flora but which was not conducive to the preservation of a molluscan fauna.

The limited range of sites discussed above provide positive data for the earlier Neolithic. In these sites the consistent appearance of grassland molluscs indicates that, within a landscape still extensively wooded, considerable areas of grassland had been established and were capable of providing colonising faunas. Beyond this positive data, communal monuments such as long barrows and the causeway enclosure at

Robin Hood's Ball are assumed to have been constructed in areas already cleared of woodland, if not cleared specifically for construction. This suggests that certain areas, for example Wilsford/Normanton Down, where long barrows are in close proximity, may have been extensively cleared. The true extent of earlier Neolithic clearance can only be guessed at, however, and figure 57 offers no more than informed speculation. This figure also reflects the inevitable bias caused by the assumption that monuments, at this period almost exclusively hilltop sited. represent the full extent of clearance. Valley bottoms, where evidence is totally lacking, may also have been as extensively cleared.

Later Neolithic (Fig. 57b)

Although a more limited number of monuments were constructed during the later Neolithic, their construction, spanning the later fourth and third millennia BC, indicates a wider variety of pre-existing land-use albeit within a more restricted topographic zone, biased towards the eastern part of the study area.

The first phase of Stonehenge was constructed within an area of grassland, possibly hinting at the extent of the grassland zone suggested by the Cursus to the north and the long barrow 'cluster' to the south and south-west. In contrast, Coneybury Henge appears to have been constructed within a recent, and probably localised woodland clearing, suggesting some regeneration during the earlier fourth millennium BC. This may be a reflection of the ephemeral nature of such early clearance episodes hinted at above.

Despite the dissimilarity of the environment within which they were constructed, the contemporaneous environmental records from Stonehenge and Coneybury show a distinct and unequivocal phase of woodland regeneration. This suggests the proximity of such habitats to both sites, and that neither was constructed within a totally open landscape. It is tempting to view this regeneration as part of a regional phenomenon, especially in the light of previous models for site abandonment during the later Neolithic (Whittle 1978). This does not appear to be the case in the Stonehenge area, however, as the regeneration seems quite short-lived and is not paralleled in any other monument in the area. The data from Woodhenge suggest continuous open

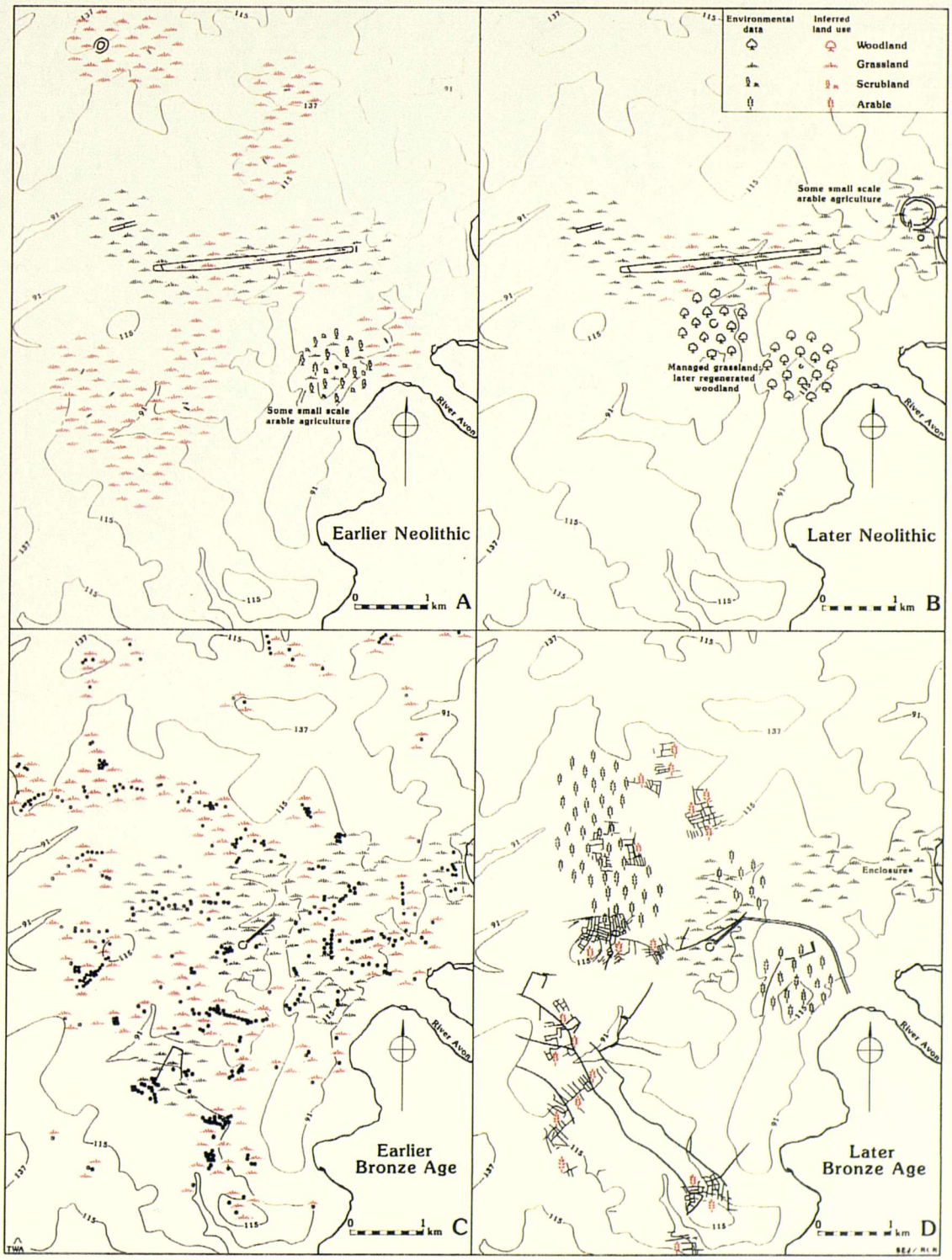


Figure 57. The changing prehistoric landscape of the Stonehenge Environs. *From Richards 1990 with permission of English Heritage.*

grazed grassland subsequent to construction, and, although some shadier elements can be seen at both the Lesser Cursus and at Amesbury 42 long barrow, these are very localised and probably represent the colonisation of the ditches by natural vegetation (cf. Evans 1972, 323-6) rather than a wider landscape phenomenon. In these two instances, the dating of ditch colonisation is poor, but it was probably significantly later than the episodes of regeneration seen at both Coneybury and Stonehenge.

At a slightly later date in the Neolithic, both Durrington Walls and Woodhenge appear to have been constructed in grassland close to the River Avon. At Durrington the establishment of grassland is preceded by a limited phase of agriculture, this evidence providing the single exception to the indications of grazed grass and shrubland which now appear to predominate in the exploited portions of the landscape.

Earlier Bronze Age (Fig. 57c)

Positive data relating to the earlier Bronze Age are sparse, and, with the exception of the buried soil from the Wilsford Down North Kite, are derived from secondary ditch fills. Not surprisingly, the one buried soil and the ditch deposits from Stonehenge, Coneybury, and Woodhenge all indicate dry, probably grazed grassland. Some indications of the extent of this managed grassland can be extrapolated from the numerous round barrows, which were constructed during this period. Most of the barrows analysed are peripheral to the main study area; the evidence from Boscombe Down (Newell 1931), Earl's Farm Down (Christie 1964), and Greenland Farm (Christie 1970), all indicate open downland. Recent detailed studies of the barrows on the King Barrow Ridge and Luxborough Plantation indicate large tracts of lightly grazed grassland (Allen and Wyles 1994).

Once again, the position of many of the cemeteries of round barrows on hilltops provides a topographic bias to any overall understanding of the environment, but still serves to indicate the apparent extent of managed grassland. It can be suggested that this extensively cleared landscape provides the ideal setting for the introduction of more extensive areas of arable cultivation in larger field systems. However, the evidence for such economic change does not appear in the

environmental record of the earlier Bronze Age.

Later Bronze Age (Fig. 57d)

From the mid-second millennium BC onwards, most of the environmental data is again derived from ditch deposits, the one major exception being the remarkable suite of data from the primary fills of the Wilsford Shaft. As well as local indicators such as molluscs, the Wilsford Shaft produced seeds and insects, perhaps derived from a more extensive area, and pollen providing a regional picture. The consistent picture from virtually all sources of information is one of a basically open landscape with very few trees. A major component of this landscape is short, grazed grassland, although seeds suggest a significant proportion of arable land, some recently abandoned. The Wilsford Shaft therefore seems to be sited close to a fluctuating boundary between areas of pastoral and arable land, both regimes indicating an open landscape.

In the absence of comparative data, it is impossible to suggest how widely this picture might be applicable within the Stonehenge area. At a general level, it may be acceptable to extend the broad indications of an essentially open landscape. Within this simple framework, the nature of subsistence would inevitably be constrained by local factors, some purely economic but including those related to ideology and the by now highly structured landscape.

The development of definable settlement foci during the later Bronze Age shows some spatial association with areas of 'Celtic' fields, and it is assumed here that these represent area of formalised arable activity. In the case of the Wilsford Shaft area, the fields to the north and west may represent such a stabilisation, here of the fluctuating arable/pastoral boundary embodied within the environmental data. Arable evidence from the Stonehenge area is reinforced by the presence of what have been interpreted as wind -blown silts from the Y-holes at Stonehenge (Cornwall 1953), possibly from the Stonehenge ditch (Evans 1984), and more recently from a long barrow close to Robin Hood's Ball (Richards pers. comm.) and from the western terminal of the Stonehenge Cursus (Richards pers. comm.). Possibly similar deposits have been identified in the Stonehenge ditch (Evans 1984) where,

although the mollusc fauna is one of grazed grassland, the wind-blown deposits indicate the proximity of areas of arable fields, possibly those some 500m to the west.

In general, these deposits are almost certainly the product of soil deflation from ploughed land. As such, it is interesting to note that their distribution, biased heavily towards the eastern half of the study area, shows a broad correspondence with that of 'Celtic' fields.

Summary

The fourth millennium BC effectively introduces the modification of the Stonehenge landscape on an extensive scale. The environmental data show clearly that certain specific locations, and by inference some broader zones, were cleared of woodland and that grassland was both established and maintained, the latter presumably by grazing. The faunal remains suggest that this was by cattle rather than by the extensive use of sheep. It also seems likely, based on the small amount of evidence from cereal remains, that some arable cultivation was being carried out. The location, nature, and extent of this activity are uncertain, and are likely to remain so.

A mosaic of land use is thus created, the emphasis within this period being on woodland and on newly created areas of grassland. A simple model, based on maintenance of existing clearances, a gradual reduction in the amount of woodland, and an increasing emphasis on arable cultivation, would quite happily accommodate the pattern discernible in the later Bronze Age. This model is over-simple, however, and does not take into account episodes of regeneration, evidence for which appears in the later Neolithic.

As noted above, however, the regeneration which does appear within the environmental record appears to be short lived and localised, the overall pattern moving towards the largely open landscape of the earlier Bronze Age. The open environment of the second millennium BC can be suggested as one in which the conflicting demands of pastoralism and cultivation, initially reflected in shifting patterns of land use, are eventually reconciled within a formalised and zoned landscape.

6.5 SUMMARY; THE SALISBURY PLAIN

The two study areas and the Marlborough Downs (Gingell 1992) display considerable differences in local topography and archaeological record. This variation is also true of the history of land-use of each area despite being within 20 miles of each other. Admittedly the nature of each investigation is also significantly different as they were dependent upon the availability of data, but the lack of consistency in approach does not seriously bias the data and interpretation presented. Indeed it shows that a diversity of approach can lead to satisfactory, and comparable, results. The main difference between the study areas is the scale and scope of the analysis conducted.

Although a number of differences can be seen, and are summarised below, it is the similarities and common trends that are of more interest here. Evidence that pine forest may have dominated Salisbury Plain is provided by a number of pine charcoal identifications from the Stonehenge car park (Section 6.4) and Strawberry Hill Reservoir (Section 6.2). Further, radiocarbon determinations provide consistent evidence for early Mesolithic clearance in this pine dominated Boreal forest. The fact that in both cases pine charcoals have been recovered from archaeological features confirms here that the although they might just represent the collection of firewood, the fact that they were both associated with cut archaeological features infers clearance of the woodland cover. The charcoal therefore represents clearance was due to human action and not a result of purely natural causes as Boyd (1982a; 1982b) and Moore (1982) have suggested for some other early 'clearance' evidence. The reasons for what were probably limited and localised clearances at both Strawberry Hill and Stonehenge may have been mainly for temporary settlement, but other reasons for deliberate clearance of woodland in the Mesolithic period have been postulated which include their creation to improve browse for wild ungulates and attract deer (Dennel 1983; Mellars 1975). Caution has however, been expressed in the use of clearings by human populations for the exploitation of wild ungulate populations (Edwards and Ralston 1984), and even the anthropogenic origin of some of these clearances (e.g. Moore 1982.)

The Stonehenge area provides limited evidence of early and progressive clearance of the forests, primarily for grazing. In fact, in

comparison with, for instance the Dorchester area (Chapter 7), there is very little evidence for agriculture. Unfortunately Strawberry Hill Reservoir provides no secure evidence of the land-use during the Neolithic and Bronze Ages, but clearance and tillage are likely reasons for the truncation of the earlier deposits despite the location of the site on the north-facing scarp slope. The Marlborough Downs area shows exploitation in a much more limited and localised manner in the Neolithic period. No extensive tracts of cleared land can be identified until the Middle Bronze Age, probably some two millennia after the large scale clearance of much of Salisbury Plain.

In both areas Beaker activity is identified, and significant cultural and monumental changes detected. Despite this no significant change in the landscape, in land-use or farming can be detected in any area. There is a continuum of change and development of farming which seems to be more formalised or organised in the Beaker period. The change seen in the cultural evidence is, however, not reflected in the environmental data.

Chapter Seven

Dorchester and its Environs

7.1 INTRODUCTION TO THE STUDY AREA

Dorchester and its environs are renowned nationally and internationally for their surviving archaeological monuments (Fig. 58), and the archaeological importance of the area is well established. The region is one of the most intensively studied and has already been the subject of a series of detailed molluscan analyses. Despite the wealth of environmental data from the Dorchester area, it has been usual for previous landscape projects to deal with data from major monuments and sites selected directly by the archaeologists, often on archaeological criteria based on typology, assumed age, topography or monumentality (cf. Smith 1984). These studies were based largely on the monumental sites of Mount Pleasant (Wainwright 1979), Maumbury Rings (Bradley 1976) and Maiden Castle (Sharples 1991), and few have examined the spatial aspects pertinent to a landscape study, with the exception of the Maiden Castle landscape survey (Woodward 1991b; Evans and Rouse 1991a) and the recently published *South Dorset Ridgeway* (Woodward 1991b). Both were 'landscape' oriented but only limited sampling of archaeological features or sites outside monuments was conducted. In the latter volume, for instance, molluscan analysis and detailed land-use history are based only on limited assemblages from three sites, although the analysis of the colluvial deposits at Loscombe Wood provided an off-site environmental critique (Bell *et al.* 1991).

Recent excavations by Wessex Archaeology were not based on known archaeological sites but were undertaken as a result of development and road-building which negates the bias of being specifically site or monument oriented. The route of the Dorchester By-pass in particular, provided a sample corridor through this exceptional archaeological landscape (Woodward and Smith 1988) which "threads a calculated route around Dorchester" (Smith *et al.* forthcoming). It deliberately avoided known monuments and did not knowingly include archaeological sites. The Dorchester By-pass project provided an opportunity to examine a broad spectrum of sites spread over 8.1km of downland, an opportunity not available to previous workers. This allowed the investigation of a

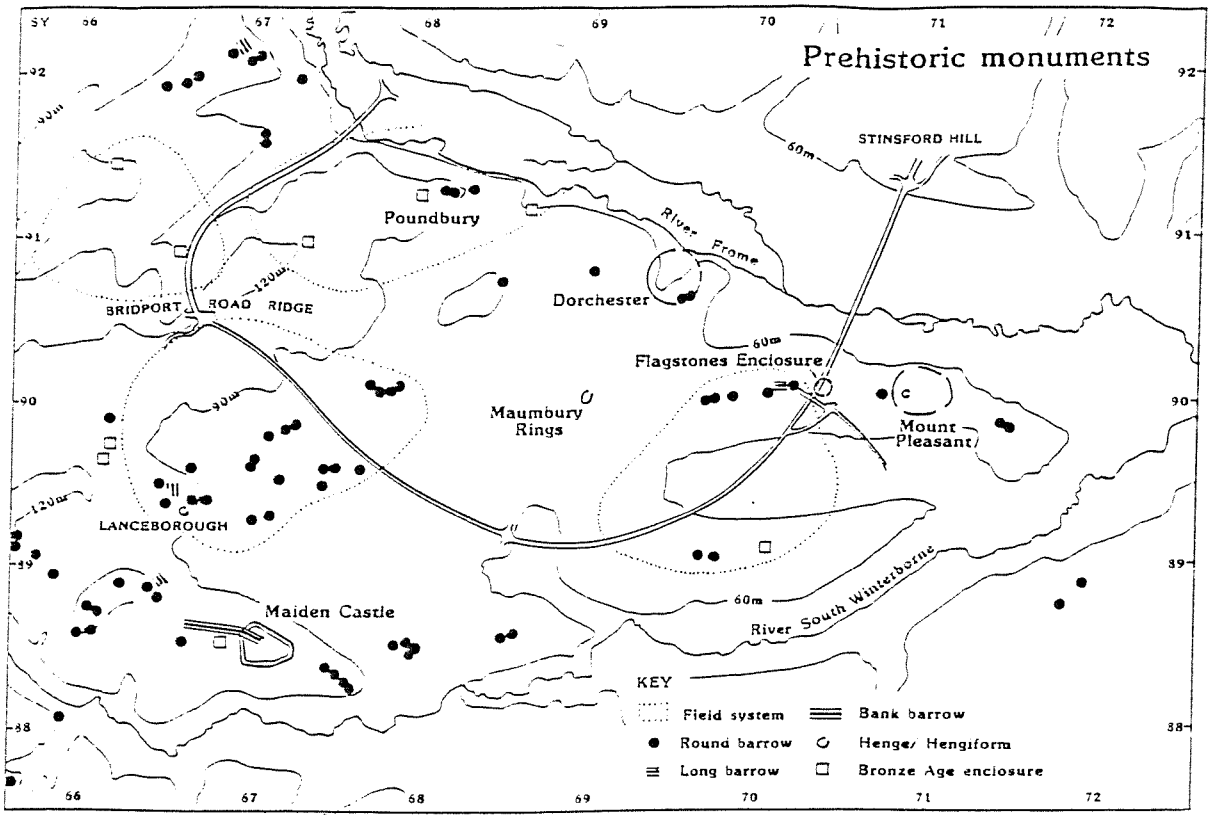


Figure 58. Geomorphology and archaeology of the Dorchester area.

substantial block of downland rather than a number of isolated monuments. This information is more representative of the land-use and farming practices as a whole, rather than of specific monuments within that landscape.

The opportunity was taken to conduct an extensive programme of sampling aimed at providing a detailed reconstruction of the history of land-use and farming practices. The general aims were to characterise and contrast farming practices and exploitation of resources and thus to examine the human utilisation of the landscape and define the human rôle in shaping the chalkland landscape. An attempt was made to understand farming through time and the reasons and pressures for change within those systems over both space and time. The Dorchester area affords the opportunity not only for multiple, detailed analysis allowing an attempt to reconstruct a high resolution, temporally variable environmental mosaic, but also provides considerable evidence of Late Neolithic and Early Bronze Age monuments and Beaker activity.

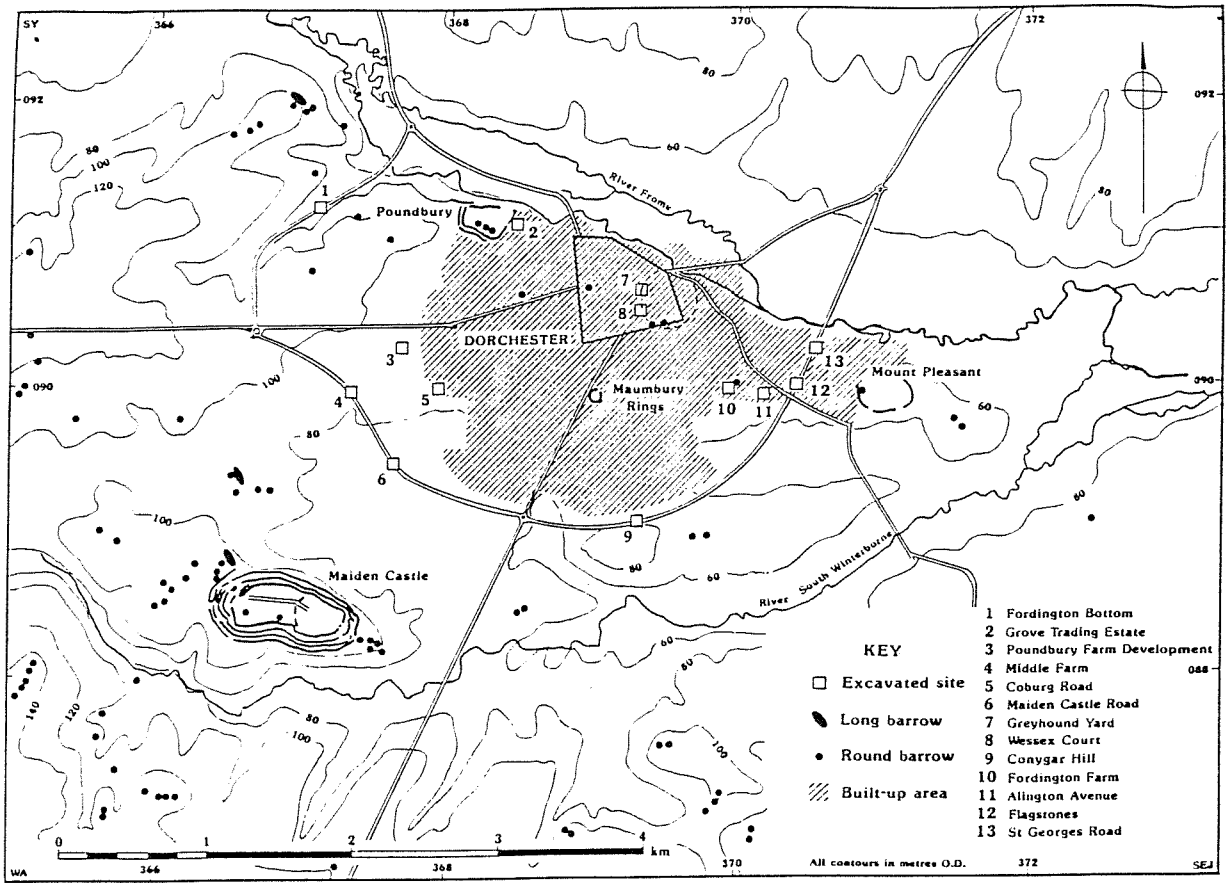


Figure 59. Location of sites analysed in the study area.

The analyses presented here attempt to integrate on-site and off-site data as well as examining both monumental and non-monumental sites within the landscape. Most of the molluscan data is site-based (only Middle Farm Trench B and Fordington Bottom offered off-site analysis), and it is prudent to be wary of on-site land snail analysis, the results of which will almost inevitably be biased towards the open environments of the habitation or activity site itself. If however, enough analyses are conducted within limited spatial proximity then this bias can to some extent be overcome (see Chapter 3). Within this project the sample and site density is such that a comprehensive cover is provided (Fig. 59). Further, the By-pass data also includes more than 36,000 identified snails which, taken with the large scale analyses at Alington Avenue, Fordington Farm and Greyhound Yard, constitute a data-base of over 235 samples and over 75,000 identified snails. This can be considered a sound basis from which to make statements about the land-use history of the southern Dorchester area.

The previous analyses from Mount Pleasant, Maiden Castle, Maumbury Rings and Poundbury provide further information which enable comparison between the land-use history and farming practices of land designated for domestic, funerary and monumental sites. This comparison may also give an indication of the representative nature of environmental information from the larger communal sites.

Geology, Topography and Soils

Dorchester lies at the centre of the chalk outcrop of Dorset which is almost entirely comprised of very pure Upper Chalk (Reid 1899). To the north the dip slope of the chalk outcrop rises gently to the steep scarp slopes of North Dorset, while to the south the pronounced steep slopes of the South Dorset Ridgeway mark the southern limit of the chalk outcrop and cut Dorchester off from the coast. Tertiary sands and gravels over the chalk survive on some of the higher ridges and hilltops but nowhere in the immediate vicinity of Dorchester. Drift deposits thought to derive partly from Tertiary deposits do however occur. Clay-with-flints or Plateau Drift, occurring as reddish flinty clays, cap the chalk on the higher ground to the west of Dorchester. Valley and Tertiary Gravels, both highly flinty in content, occur as a series of broad terraces to the north of the River Frome.

Topography of the downland

The downland around Dorchester forms a central lowland with a series of low ridges and a number of dry valleys that run down to the River Frome and South Winterborne stream (Fig. 58). Dorchester itself lies within a shallow basin on the watershed between the Rivers Frome and South Winterborne, both of which drain eastwards and meet some three kilometres to the east of the town. The River Frome is the senior of the two and provides the natural routeway eastwards to the Isle of Purbeck and ultimately to Poole Harbour. The Frome has a broad floodplain and the present river consists of a series of meandering channels, partly as a result of previous water meadow management. The South Winterborne only flows seasonally and its floodplain and meadows are not as extensive as those of the Frome.

Between the two rivers the topography consists of fairly typical, gentle, undulating chalkland with a series of low ridges amid a

dendritic pattern of dry valleys running into the rivers Frome or South Winterborne. Two of the more pronounced ridges in the area are of particular archaeological interest: to the east of Dorchester the 'Alington Ridge' provides the location for the monuments of Alington Avenue, Flagstones and Mount Pleasant, while to the south of the South Winterborne a parallel chalk ridge includes Conygar Hill (Fig. 58). The most pronounced and deeply incised dry valley is that of Fordington Bottom which runs into the floodplain of the River Frome to the west of Dorchester. Colluvium occurs on the valley floors and extensive alluvium exists on the Frome floodplain (Fig. 58).

Soils

Most of the present-day soils of the area consist of very shallow calcareous silty grey, and greyish brown rendzina soils of the Upton Series. They are restricted to steep chalk convex slopes where erosion and cultivation has removed much of the topsoil and incorporated chalk into the present soil (Moffat and Cope 1984). Deeper, loamy calcareous soils (typical brown earths to calcareous and colluvial brown earths) exist in dry valleys and on lower slopes. The only acidic soils are the deeper silty or clayey soils that occur on the Clay-with-flints and Plateau Drift deposits to the west of Dorchester or the stony soils on Gravels to the east of Dorchester. Detailed and comprehensive soil studies were undertaken for the Maiden Castle and South Dorset Ridgeway Surveys (Staines 1991; Woodward 1991b), and further reference, if required, should be made to these volumes.

The chalk downlands immediately surrounding Dorchester and to the north of Maiden Castle can be sub-divided into three broad sections on geological and topographic evidence.

1. Rolling chalk downland from St. Georges Road to Middle Farm consists of low ridges and dry valleys with shallow calcareous soils. These soils are extensively ploughed today. This area includes the sites of Flagstones, Alington Avenue, Conygar Hill, Fordington Barrow, Maiden Castle Farm and Middle Farm (Woodward's Central lowland Zone, 1991a, 8)

2. Bridport Road Ridge is an area of higher undulating ground, with chalk capped by Plateau Drift deposits, and these in turn sealed by acidic flinty brown soils. These are also extensively ploughed today.

3. Fordington Bottom is a steep sided, colluviated dry valley, with deeper, calcareous, colluvial soils in the valley floor and very shallow, calcareous rendzinas on the valley sides. The valley sides and floor are presently maintained as permanent pasture.

Sites studied (see Fig. 59)

The analyses of land Mollusca and colluvial sequences were all undertaken in conjunction with Wessex Archaeology on excavations conducted between 1984 and 1988. Two dry valleys were examined, both to the west of Dorchester, and provide long temporal sequences of off-site data. A colluvial sequence at Middle Farm Trench B (Section 7.2), is adjacent to a Middle to Late Bronze Age site, while excavations in Fordington Bottom (Section 7.3) revealed a number of colluvial sequences with discrete occupation horizons and features. These two studies are augmented by large scale excavations of which only the molluscan analyses from Neolithic to later Bronze Age are detailed here. They include the sites of Flagstones (Section 7.4), Conygar Hill (Section 7.5), Alington Avenue (Section 7.6), Greyhound Yard (Section 7.7), Maiden Castle Farm (Section 7.8) and Maiden Castle Road (Section 7.9).

The summaries of excavations along the By-pass are based on Woodward and Smith (1988) and the unpublished site descriptions by Roland Smith, Frances Healy (Flagstones) and Ian Barnes (Fordington Bottom). The other excavation summaries are derived from published interims and site reports as follows: Alington Avenue (Davies *et al.* 1986 and forthcoming); Greyhound Yard, Dorchester (Woodward *et al.* 1985; 1993); Fordington Barrow (Woodward *et al.* 1987; Copson 1989; Bellamy 1992) and Fordington Bottom, Western Link (Chowne 1988). Further details were provided in discussion with colleagues at Wessex Archaeology. Other recent relevant molluscan analysis includes that from the recently published preserved Bronze Age barrow at Fordington Fields (Allen 1992c).

7.2 INVESTIGATIONS OF COLLUVIAL DEPOSITS AND THE ARCHAEOLOGICAL SITE AT MIDDLE FARM

The site at Middle Farm lies to the south west of Dorchester in the central lowland zone and immediately south-west of the farm buildings of that name. The dry valley is aligned approximately north-south and is one of the dendritic pattern of valleys running off the Bridport ridge. The valley was asymmetrical and shallow with an almost flat floor (Fig. 60). The excavation was *c.* 0.6 km south of the head of the valley, where the eastern valley side was a short sharp incline partly formed by a substantial lynchet. The western slope, by contrast, was moderately steep (9°), at the top of which, and on the Plateau Deposits, was the Middle to Late Bronze Age site (Fig. 60).

Dry valley excavation; Trench B

Excavations conducted by Wessex Archaeology initially involved a single machine cut trench through the deposits on the valley floor. Subsequently, a trench perpendicular to the western slope was excavated to provide a complete section through the colluvial deposits and an area of *c.* 2460m^2 on the valley floor was stripped (Fig. 60). A maximum of 1.5m of colluvial deposits was exposed, showing that the valley formerly had an asymmetrical V-shaped profile with a steep slope (*c.* 20°) to the west and a shallow slope (*c.* 6°) on the east.

The deposits were deepest at the foot of the western slope and hand excavation of a 3m section was undertaken at this point. Analysis and soil descriptions (see <u>The colluvial sequence</u> - below) were concentrated on this section.

<u>The valley floor</u>

A series of features were recorded cut into the chalk on the floor of the dry valley and sealed by colluvium. A number of irregular solution hollows were present on the valley floor. Five irregular, linear solution features were recorded running directly down the western slope of the valley. All were cut into the chalk and sealed by the colluvium.

All the archaeological features beneath the colluvium, and cut into the chalk of the valley floor, have been ascribed to the Bronze Age. A 2.5m

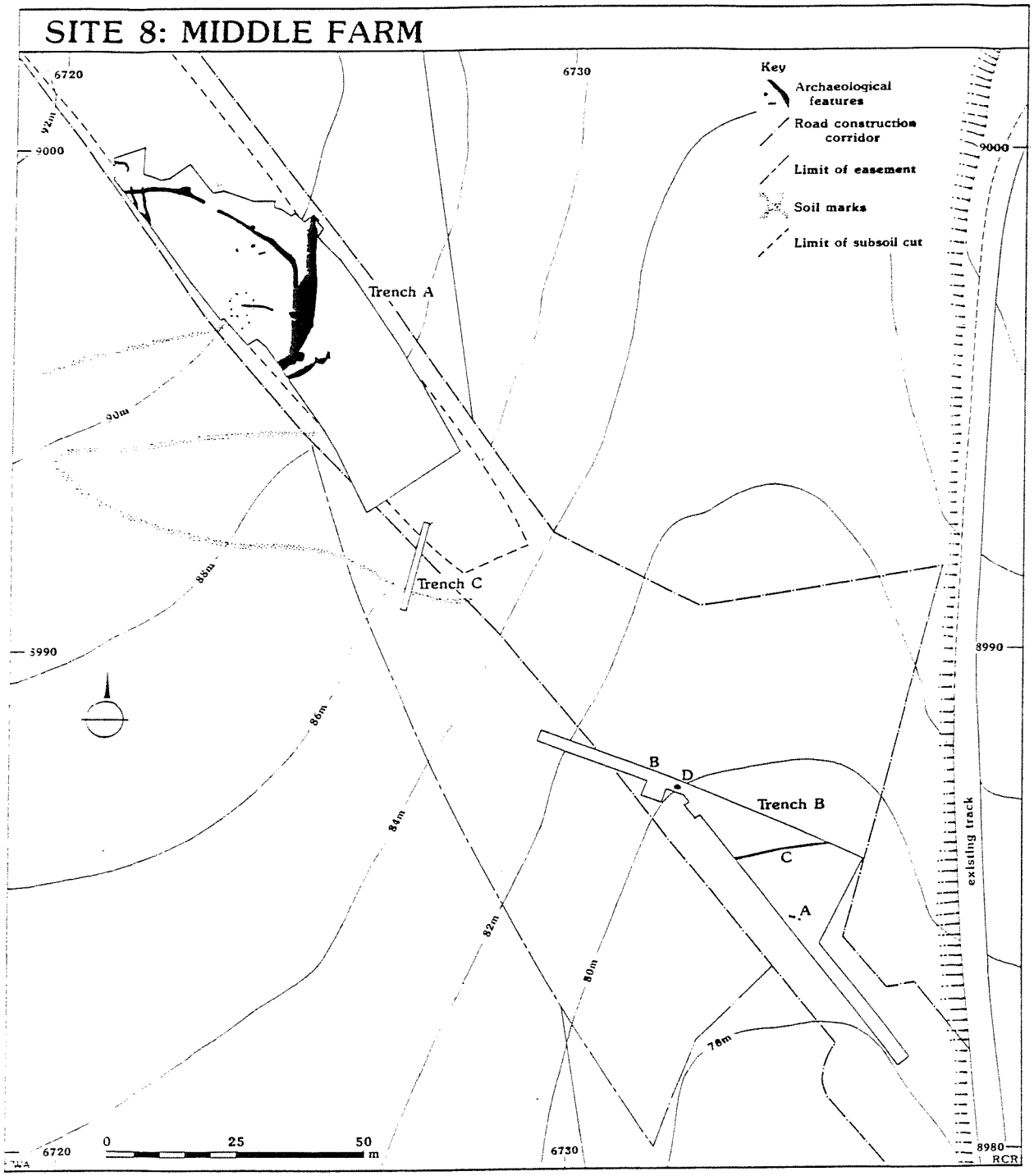


Figure 60. Location of the excavations at Middle Farm.

long arc of three post-holes no greater than 65cm in diameter and 40cm deep was found in the south-east of the trench. Twenty-five sherds (252g) of Beaker pottery, probably representing no more than five vessels, were recovered from these post-holes. Conjoins between sherds from the post-holes were also recorded.

A Bronze Age ditch was recorded running east-west across the valley. At the western edge of the trench the ditch was cut through the 'lower colluvium' (layer 50806) but was sealed by stony lens 50805 (Fig. 61). Two sherds of grog-tempered Bronze Age pottery came from its fills.

The colluvial sequence

The deeper deposits were located on the valley edge, at the base of the slope, rather than in the centre of the relatively broad, flat valley.

Stratigraphic sequence

The colluvial sediments were recorded by Wessex Archaeology in 1987 using standard context records. Such records do not include Munsell colours nor horizon boundary form or distinction. The descriptions below are those taken from the field context records and augmented by field notes that I kept while sampling the section. Measurements of depths of deposits given are those at the sampling point (Fig. 61).

Layer 50809; (102cm +). Gravels. At the base of sequence overlying the chalk bedrock was a densely packed deposit of medium to coarse flint gravel (90%) in a brown, slightly rubified, silty clay matrix - relict Valley Gravels. The layer was at its thickest (40cm) at the base of the western edge of the dry valley and gradually thinned out on the gentle east slope. No finds were recovered from this deposit.

Layer 50808; (102 - 120cm). Stone-free lower colluvium. An almost stone-free dark brown silty clay with weak blocky peds and occasional flint inclusions. It did not contain the chalk flecking apparent in the overlying layers. This deposit was only *c.* 10cm thick and occurred on the base of the valley and was not as extensive as the underlying Valley Gravels (layer 50809). It had an abrupt boundary with the gravels and soil material within the gravels was distinctly redder and more clay rich. This lower colluvium was cut by ditch 03001.

Layer 50807; (97 - 102cm). Flint band. An intermittent band of small to medium flints in a brown silty clay loam matrix. This lens was 5cm thick and only occurred in the deepest part of the deposit and tapered away towards the east. The layer was most pronounced in the centre of the combe and was cut by ditch 03001.

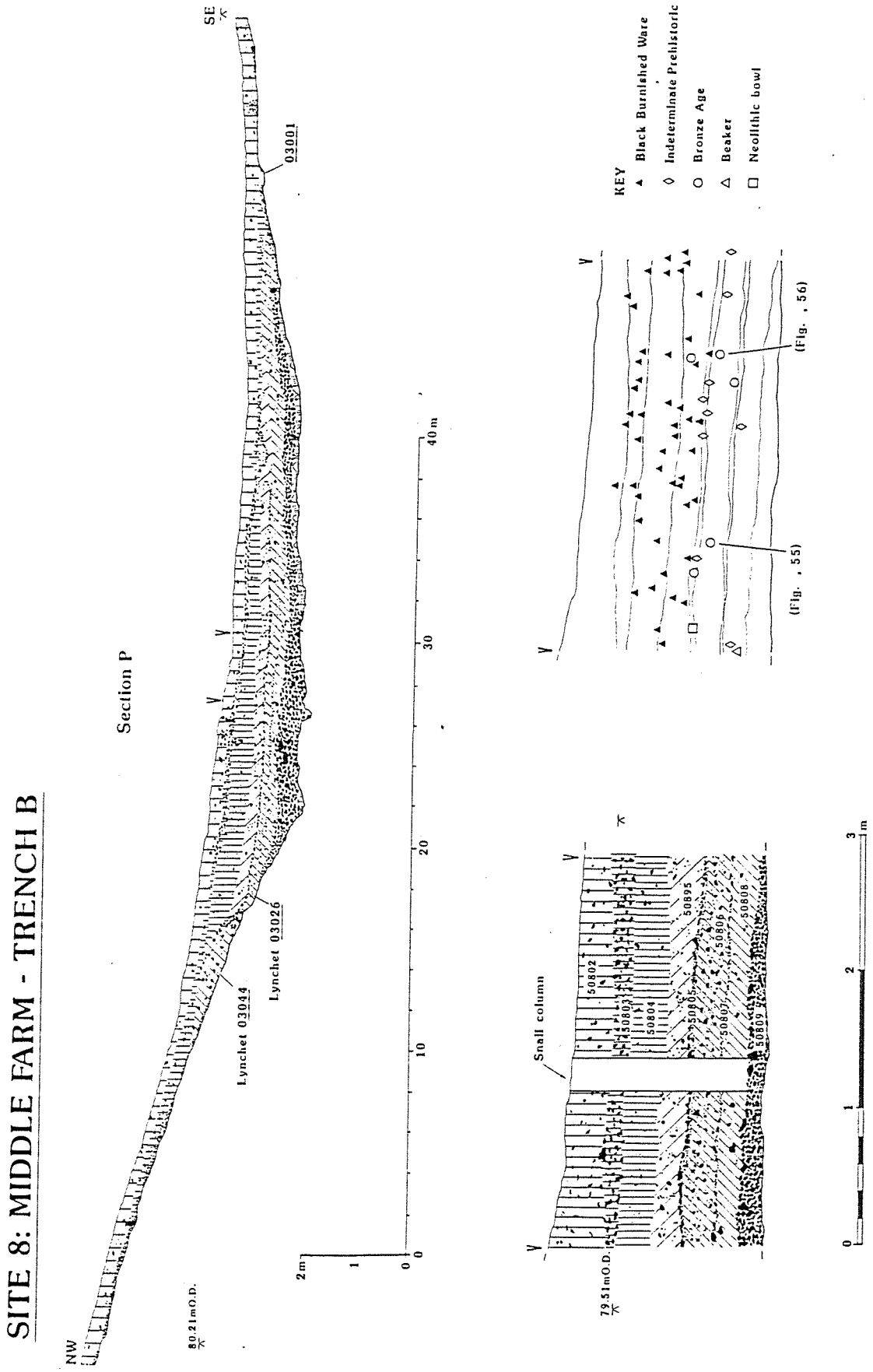


Figure 61. Middle Farm valley profile, colluvial section and artifact distribution.

Layer 50806; (91 - 97cm). Lower colluvium. Weakly calcareous brown silty clay with some small flint (7-8%) and very small to small chalk fragments (5%), becoming stonier (predominantly flinty) towards base (50807). The deposit occurred across the floor of the combe and to the west infilled a negative lynchet (Fig. 61, 03026), aligned *c.* north-east to south-west, parallel to the contours of the valley sides. To the west of this negative lynchet and upslope was a 40cm thick bank of brown silty clay loam forming a positive lynchet (Fig. 61, 03044). The negative lynchet must partly be associated with the truncation of layers 50809, 50808 and 50807 on this west slope of the valley side. Layer 50806 was cut by ditch 03001.

Layer 50805; (80 - 91cm). Stony lens. A calcareous band of abundant medium flints (70%) and small to very small chalk pieces in a silty clay matrix. This deposit occurred only across the centre of the valley floor, tapering away to the east, while to the west it butted against the positive lynchet 03044. This layer sealed the upper fills of linear ditch 03001.

Layer 50895; (67 - 80cm). Upper colluvium. Medium brown silty clay loam with occasional very small chalk and small flint inclusions. This deposit occurred only across the centre of the valley.

Layer 50804; (38 - 67cm). Upper colluvium. Pale medium brown silty clay loam, calcareous with rare flint and some small to medium chalk pieces. A 40cm thick layer similar to layer 50895 but distinguishable by a slightly paler brown colour. The deposit also only occurred across the centre of the valley and 'butted' the positive lynchet 03044 on the west slope of the valley.

Layer 50803; (21 - 38cm). Stony horizon. Many medium and large flints (70%), common small and very small chalk pieces in a medium light brown silty clay loam matrix. The deposit varied from 15cm to 20cm in thickness, being greatest at the centre of the valley floor.

Layer 50802; (0 - 21cm). Topsoil. Dark greyish brown silty loam with rare (5%) small flints.

Artifact distribution; dating the colluvial sequence

A total of 700 objects was recovered from the hand-excavated section through the colluvium and recorded three-dimensionally. This included eighty-three sherds of pottery, 55 of which could be assigned to a ceramic style on decoration or fabric-type and whose position within the stratigraphic sequence could be precisely located. Figure 61 indicates these locations, also including those of nine sherds of indeterminate prehistoric pottery. A limited quantity of metalwork, glass, clay pipe and ceramic building material was recovered. The flint contained no diagnostic elements to support the pottery dating evidence.

Pottery (Fig. 62).

Details of the artifacts are provided by Dr. Ros Cleal and Rachael Seager Smith and are taken from the unpublished site summary (Smith *et al.* forthcoming).

Neolithic Bowl

A single sherd of neolithic bowl tempered with 'beef'-type calcite was recovered from layer 50805. One sherd of flint-tempered neolithic bowl was also recovered from layer 50895 but its precise location is unrecorded.

Beaker

A single sherd of grog-tempered impressed decorated beaker was recovered from layer 50808. The fabric and decoration are the same as beaker sherds recovered from post-hole 50850 (Fig. 62, P32, P33 and P36). Two sherds of quartz-tempered pottery of indeterminate prehistoric date were also recovered from layer 50808.

Bronze Age

Five sherds of pottery representing grog-tempered and flint-tempered Bronze Age fabrics were recovered. Four of the sherds including decorated sherds (Fig. 62, P55 and P56) were recovered from layers 50806 and 50805, alongside nine sherds of shell, limestone and flint tempered prehistoric pottery of indeterminate date. One sherd of later prehistoric pottery was recovered from layer 50802.

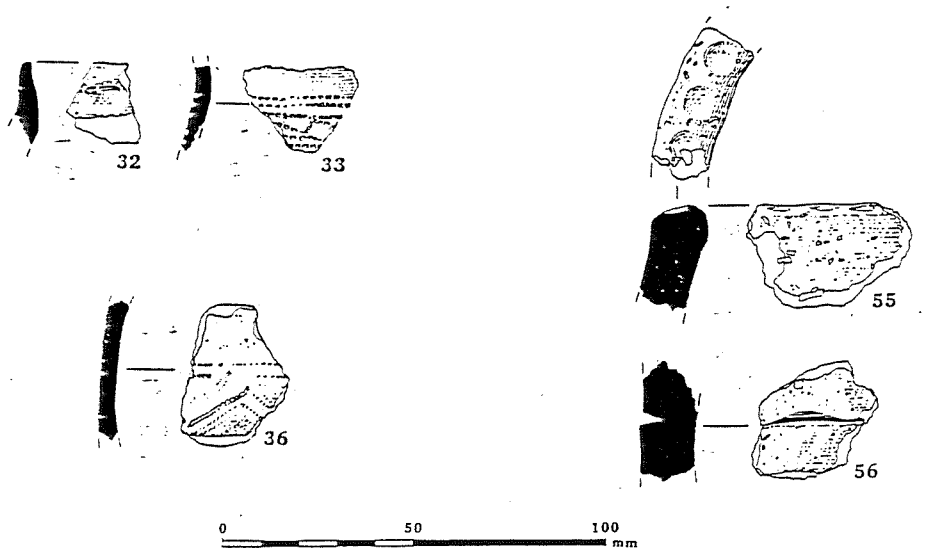


Figure 62. Beaker and Bronze Age pottery from the Middle Farm colluvium

Black Burnished ware

Sixty-one sherds of Late Iron Age/Romano-British Black Burnished ware were recovered, 48 of which are precisely located within the sequence (Fig. 61). With the exception of one sherd from layer 50805, all this material was recovered from layers 50895, 50804, 50803 and 50802. The material was evenly distributed between these layers and showed no strong concentration within any one layer. In addition one sherd of Dressel 20 amphora and one sherd of decorated samian were recovered from the topsoil (layer 50802).

Post-medieval pottery

Two certain sherds of post-medieval material were recovered from layers 50804 and 50802, although their precise location is unrecorded. A further three sherds of uncertain medieval date were recovered from layers 50803 and 50802.

Land-use history; the molluscan evidence

Two main molluscan studies were conducted at Middle Farm. The first from the colluvial deposits in Trench B at the base of the slope provides off-site evidence and a more rounded picture of the landscape, while two sequences from ditches within the occupation area (Trench A) give a basic history of the local site environment.

Trench B; The colluvial sequence

A column of 13 contiguous samples was taken through the deepest point in the colluvial sequence and within the section hand-excavated for the recovery of artifacts (Fig. 61). The deeper deposits were located on the valley edge, at the base of the slope, rather than in the centre of the relatively broad, flat valley. The advantage of studying the colluvial sequence is that it provides an off-site land-use history into which to fit the more site-oriented molluscan data. Here, as with many colluvial sequences (Allen 1988a; 1991a; 1991b), Beaker activity was discovered beneath the colluvium. The molluscan data thus provides on-site evidence relating to this episode of activity and more general off-site evidence relating to the Bronze Age and later land-use in the vicinity.

Because of the non-calcareous and weakly calcareous nature of the colluvial deposits, large (2kg) soil samples were processed. Surprisingly these contained large numbers of molluscs (Table 37) except for the very basal clay-rich deposit (50808) and the modern topsoil. The assemblages are dominated throughout by open country species which represent about 85%, but never less than than 56%, of the assemblage. Shade-loving species are extremely scarce, often absent, and never occur as more than 6% of any assemblage. Although the environment throughout the period of colluviation was one of open downland, subtle variations can be observed within the mollusc sequence (Fig. 63).

The basal weakly-calcareous and stone-free colluvium (50808) is dominated by *Vallonia excentrica* and *Trichia hispida*, with other open country species, primarily *Pupilla muscorum*, *Helicella itala* and *Vallonia costata* and few shade-loving species. These assemblages can be paralleled in many other colluvial sequences (e.g. Malling Down, Sussex, -Section 4.5; Pink Hill, Bucks, -Evans 1972; Kiln Combe, Sussex, -Bell 1983 and Strawberry Hill, Wilts, -Section 6.2) and are typical of ploughwash, indicating cultivation on the adjacent slope during the Final Neolithic or earlier Bronze Age; possibly associated with the Beaker activity. There was no evidence of the previous soil, or of a woodland mollusc assemblage indicating an erosive phase prior to the basal deposit.

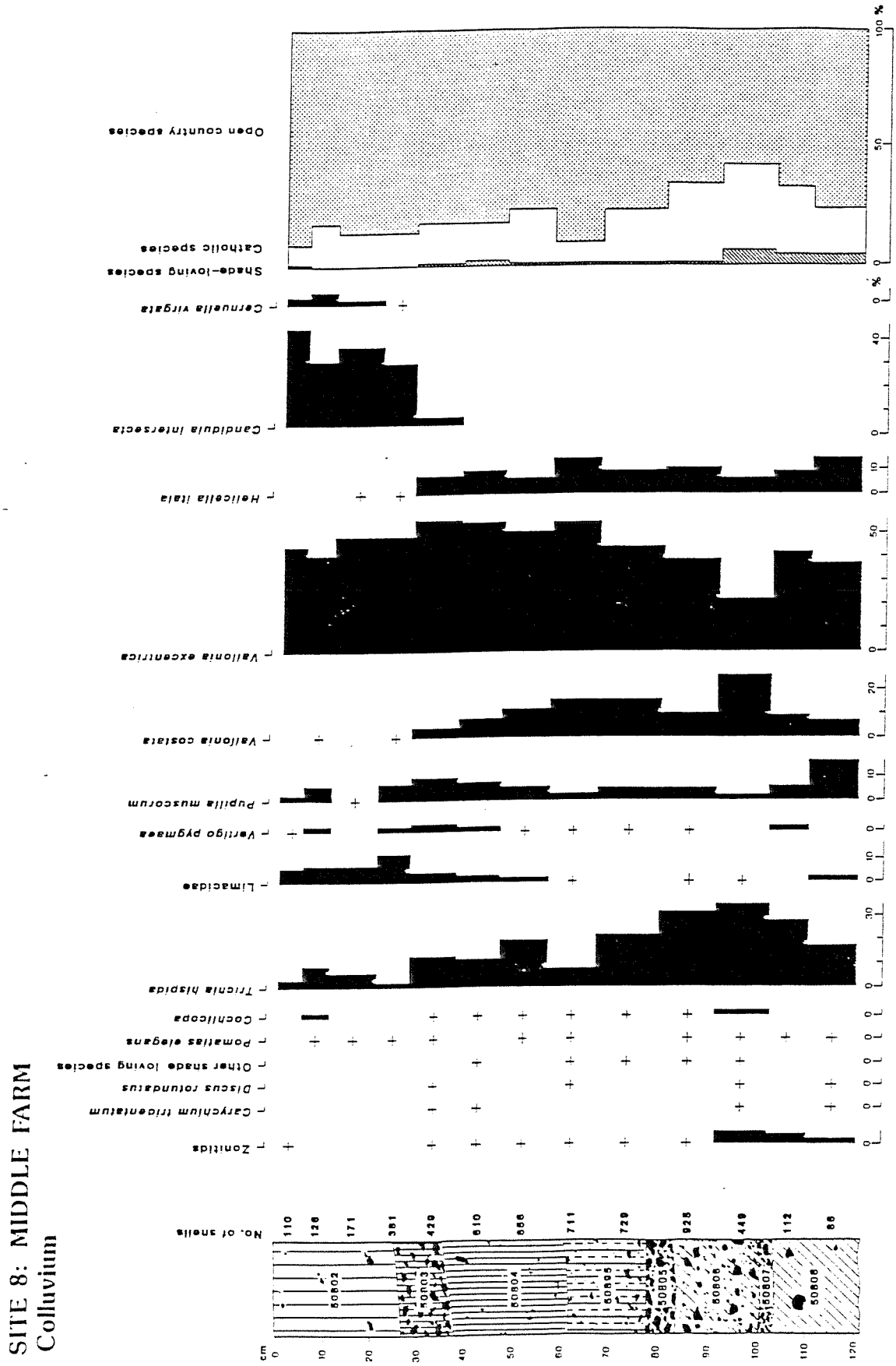


Figure 63. Middle Farm; mollusc histogram from the colluvium.

\ Sample	1	2	3	4	5	6	7	8	9	10	11	12	13
\ Context	¦-50808-¦		50807	50806	50895	¦-50804-¦		¦---50803----¦			¦----50802---¦		
\ Depth (cm)	110	102	91	80	67	57	47	38	28	21	11	5	0
\	-120	-110	-102	-91	-80	-67	-57	-47	-38	-28	-21	-11	-5
\ Wt (g)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	1750	1500
MOLLUSCA													
Pomatias elegans (Müller)	+	1	1	+	-	+	-	-	+	+	1	1	-
Carychium tridentatum (Risso)	-	-	-	-	-	-	-	1	1	-	-	-	-
Carychium spp.	1	-	1	-	-	-	-	-	-	-	-	-	-
Cochlicopa lubrica (Müller)	-	-	4	1	2	-	-	-	-	-	-	-	-
Cochlicopa lubricella (Porro)	-	-	-	1	-	-	-	-	-	-	-	-	-
Cochlicopa spp.	-	-	4	3	1	1	2	2	2	-	-	2	-
Vertigo pygmaea (Draparnaud)	-	2	-	12	10	4	7	11	12	6	-	3	1
Pupilla muscorum (Linnaeus)	15	7	9	42	42	26	36	51	43	25	2	7	2
Vallonia costata (Müller)	6	10	115	96	125	116	80	47	15	4	-	1	-
Vallonia excentrica Sterki	32	47	97	362	348	390	337	333	239	186	84	52	49
Punctum pygmaeum (Draparnaud)	-	-	1	1	-	-	-	2	-	-	-	-	-
Discus rotundatus (Müller)	+	-	1	-	-	1	-	-	1	-	-	-	-
Vitrina pellucida (Müller)	-	-	-	-	-	1	-	-	-	-	-	-	-
Vitrea crystallina (Müller)	-	-	-	-	-	-	-	2	-	-	-	-	-
Vitrea contracta (Westerlund)	1	-	-	-	-	-	2	4	1	-	-	-	1
Nesovitrea hammonis (Ström)	-	1	15	4	1	-	-	1	-	-	-	-	-
Aegopinella nitidula (Draparnaud)	1	3	6	2	-	-	-	-	1	-	-	-	-
Oxychilus cellarius (Müller)	-	-	2	1	1	1	3	1	1	-	-	-	-
Limacidae	2	-	2	5	-	3	15	20	16	47	12	9	6
Cecilioides acicula (Müller)	48	38	57	61	110	145	317	504	344	190	26	5	6
Clausilia bidentata (Ström)	-	-	-	-	1	-	-	-	-	-	-	-	-
Candidula intersecta (Poiret)	-	-	-	-	-	-	-	-	11	98	56	34	45
Cernuella virgata (Da Costa)	-	-	-	-	-	-	-	-	-	4	3	6	3
Helicella itala (Linnaeus)	13	10	31	103	82	106	43	58	32	3	2	-	-
Trichia hispida (Linnaeus)	15	31	155	291	175	60	129	75	54	8	11	11	3
Arianta arbustorum (Linnaeus)	-	-	-	-	+	-	-	-	-	-	-	-	-
Cepaea/Arianta spp.	-	+	5	1	1	2	2	2	-	-	-	-	-
Taxa	9	9	15	14	11	12	11	15	14	9	8	10	8
Shannon Index (*H'*)	1.69	1.58	1.72	1.53	1.49	1.34	1.47	1.54	1.54	1.42	1.28	1.66	1.24
TOTAL	**86**	**112**	**449**	**925**	**789**	**711**	**656**	**610**	**429**	**381**	**171**	**126**	**110**
Magnetic Susceptibility	26	32	37	47	66	59	58	62	71	72	90	93	62

Table 37. Middle Farm, Trench B; Land mollusc and magnetic susceptibility data.

Above this a single sample from the stony flint lens (50807) produced an increase in both the shade-loving species and *T. hispida*, but most dramatic is the apparent replacement of *V. excentrica* by *V. costata* and significant reduction in the proportion of *P. muscorum*. *V. excentrica*, the most xerophile of its genus (Thomas 1977b), is well-suited to arable micro-habitats, while its congener *V. costata* is more common in grassland and even open woodland (Evans 1972, 153-160). The thin stone horizon itself indicates a possible hiatus or local stabilisation and earthworm working, while the molluscan assemblage supports this and is

typical of grassland conditions and the temporary colonisation by some of the shade-loving species. The grassland does seem, however, to have been kept short and the reduction in *H. itala* may indicate intensive grazing (Evans 1972, 181) or even trampling (cf. Chappell *et al.* 1971). A minor peak within the magnetic susceptibility profile supports the interpretation of an episode of stabilisation (see below).

The mollusc assemblages above this temporary stabilisation horizon remain relatively consistent until the modern topsoil, despite distinct sedimentological variation. The assemblages are dominated by *V. excentrica* which represents approximately 50%. Although *H. itala* and *P. muscorum* remain constant, *T. hispida* and *V. costata* decline up profile. Shade-loving species are rare and virtually disappear altogether. This assemblage is similar to that described from the basal colluvium, and like there, indicates a re-introduction of cultivation on the adjacent slopes. No hiatuses can be detected within the mollusc sequence.

The modern topsoil shows a general reduction in shell numbers, a proportional reduction in *T. hispida* and complementary increase in Limacidae. *H. itala* gives way to the Introduced Helicellids *Candidula virgata* and *Cernuella virgata* which between then become dominant with *V. excentrica*. These upper assemblages are similar to the those from the main colluvial sequence and certainly indicate open downland. The increase in Limacidae, which usually shuns intensively cultivated areas, and the reduction of *T. hispida*, a common inhabitant of arable land, perhaps suggests grassland. The modern soil profile therefore probably represents an overall reduction in cultivation and introduction of more grazing; it is likely that a rotational system operated thus preventing even limited colonisation by more mesic species.

Shell preservation

The relatively high numbers of shells, as stated above, were surprising. The weakly calcareous deposits derived from acid soil, although they might support molluscs, do not usually preserve shells. Here it is likely that shell preservation was made possible because of two factors. The eroding deposits would have run over thinner chalk

soils and if erosion was in rills or gullies rather than sheets (cf. Chapter 2) then chalk may become incorporated within the deposits. The upper colluvial deposits were highly calcareous, and calcium carbonate from these horizons would easily be washed down profile into the less calcareous horizons, facilitating shell preservation.

Magnetic susceptibility

Magnetic susceptibility was recorded on each of the samples (Table 37). Relatively high readings (averaging 75 SI units x 10^{-8} SI/Kg) were recorded in the topsoil, decreasing steadily downwards to a minimum of 26 at the base. One minor peak corresponds to the episode of grassland stabilisation marked by the stony, earthworm-worked horizon. Magnetic susceptibility would increase during a stabilisation phase when biotic activity was greater (Chapter 3; Allen and Macphail 1987).

Summary of the land-use history

The sequence shows four main molluscan zones (Fig. 63). This data, when integrated with the sediment information, can provide a more detailed history of land-use and elucidate its effect.

The basal gravels were set in an clay-rich matrix which may have supported a typical or argillic brown earth. These putative former soils (cf. Staines 1991) have however been lost, presumably due to fairly large-scale erosion events. This reminds us that the sequence described above, is incomplete and only represents a proportion of the soil/colluvial sequence remaining at the sampled location. Further, the initial erosion was probably caused by localised clearance and accelerated by clearance of appreciably larger areas of woodland. As a hiatus exists within the sequence, the date of initial clearance cannot be determined; however, a Mid Neolithic radiocarbon date (3776 - 3380 cal BC (OxA-2382); Table 49) from the Bronze Age round house and a sherd of neolithic bowl recovered from the colluvium (Fig. 61) indicate clearance prior to this at least. The fact that the basal colluvium contained a well-established, open country mollusc fauna with so few shade-loving species gives some indication of its long establishment; it also suggests that any local woodlands must have been removed some considerable time prior to the first colluvial deposits recorded here.

The earliest colluvium recorded is an almost stone-free weakly-calcareous deposit (50808) and the included silty soil matrix is probably largely derived from soils formed on Plateau Drift deposits and Clay-with-flints on the adjacent slope and hilltop. Erosion is undoubtedly due to the tillage and cultivation of the adjacent slopes. This shallow colluvial deposit may not represent the entire products of erosion from arable activity. The molluscan fauna seems to be a relatively well-established and specialised one, from which one could suggest the loss of the earliest ploughwash. Although only a single sherd of Beaker pottery was recovered from this deposit, cultivation can probably be attributed to Final Neolithic or Early Bronze Age (Beaker) activity.

This ploughwash is sealed by a thin flinty horizon (50807), which in the field was ascribed to the overlying colluvium. Field measurements of stone orientation (Briggs 1977) of both dip and strike of 192 flints showed mean lateral (dip) orientation of 0° indicating that they were lying on a flat surface, while the strike was random showing no modal orientation. Subsequent molluscan and magnetic susceptibility analysis, suggests that this represents an episode of short-grazed or trampled grassland. A second episode of colluviation (50806) not only sealed this horizon but also truncated the old land surface, removing the turf and earthworm-worked, stone-free horizon. Colluviation was once again initiated by the renewed onset of tillage probably dating from the Early to Middle Bronze Age which can be associated with the enclosure and settlement at the top of the slope. Tillage was probably increased and the more calcareous nature of the ploughwash and inclusion of chalk pieces is indicative of severely thinned soils, probably rendzinas, on the valley sides.

A third erosion phase comprising a stony lens (50805) and the upper calcareous colluvial deposits (50895) and 50804) then followed. The stony lens is probably a result of a high energy erosion event stripping the soil from the slopes while depositing the coarse material (flints) at the base of the slope and taking the fines (soil material) further down valley (Fig. 2). Stone orientation measurements on 248 clasts showed a preferential dip of 49° and strike of *c.* 94° and is comparable to erosion fans on the chalk at Ashcombe Bottom, Sussex

(Section 4.2) and the Sussex Downs (Boardman 1984a; 1992). Such events occur regularly after harvest when the fields are dry and bare and highly susceptible to run-off erosion caused by the first winter storms (Stammers and Boardman 1984). It has been suggested that this may indicate an autumn winter sowing regime, i.e. the use of winter cereals (Allen 1988a; 1991a).

Overlying this erosion fan were more typical colluvial deposits, becoming increasing calcareous and paler up profile. Although a distinction could be recognised in the field between a lower darker colluvium (50895) and an overlying lighter colluvium (50804), the Mollusca show no significant change. The paler colour is due to a higher chalk content resulting from erosion of chalk as well as soil on the hillside. The relatively large quantities of Black Burnished ware enable this to be confidently dated to the Romano-British period, itself indicating a possible hiatus from the later Bronze Age through the Iron Age. Whether this hiatus resulted from erosion, or absence of deposition at the sample point cannot be determined.

A final episode of erosion can be seen in the form of an extensive flint layer, probably a large erosion fan. This also probably indicates intensive arable activity; the stone orientation from 276 records was similar to the previous stone lens (50805). The stones were larger and may represent an inter-, rather than intra-, field event (cf. Fig. 2). The occurrence of the Introduced Helicellids in this and the overlying soil indicates a medieval or later date, consistent with the recovery of a sherd of post-medieval pottery.

The modern topsoil probably also contains a colluvial element, but suggests a reduction in the intensity, and possibly extent of cultivation. A combination of grazed grassland and lower intensity arable activity is indicated by both molluscs and sediments. A general reduction in the pressure of land-use led to stabilisation and minimisation of erosion.

Excavations of a Middle and Late Bronze Age site; Trench A

A large Middle and Late Bronze Age site was excavated at the top of the western slope of the valley, overlooking the deposits described

earlier. The hill top was capped with superficial Clay-with Flint and Plateau Drift deposits supporting argillic brown earths. The excavations revealed a sequence of Bronze Age ditches and associated features (Fig. 64). The earliest of these was the eastern portion of a curvilinear (sub-rectangular?) enclosure (ditch 03050) with an entrance to the north-east dated to the Middle Bronze Age. Subsequently the enclosure was sub-divided by two ditches. A single post-ring of 7m diameter was interpreted as the internal structure of a larger hut. In the Late Bronze Age a larger, steep-sided ditch (03051) redefined the south-east limb of the earlier enclosure.

Mollusc analysis

Two large Bronze Age ditch sections were sampled by Amanda Rouse for land snails during the evaluation excavations. Ten samples were taken contiguously through the Early - Middle Bronze Age enclosure ditch 03050 and nineteen samples from the large boundary ditch 03051 (Fig. 64). Sampling was mainly at 10cm intervals, except through the buried soil in ditch 03051 where sampling was at 5cm intervals. All the mollusc assemblages were depauperate; none produced more than 60 shells per kilogram (Tables 38 and 39) and thus the mollusc diagrams (Fig. 65) are histograms of absolute abundance. The paucity of shells (excluding the burrowing species *Cecilioides acicula*) is due to the localised capping of Tertiary Clay-with-flint deposits which overlay the Upper Chalk. Although low mollusc numbers limit palaeo-environmental interpretation, some tentative interpretations can be made, especially in view of the adjacent colluvial mollusc sequence.

Enclosure Ditch 03050

The ditch revealed a deep chalk rubble primary fill which was almost totally devoid of shells. The few species that were recovered, *Vallonia excentrica*, *Vallonia costata* and *Helicella itala* are all open country species. The molluscs from both the secondary and lower tertiary fills are predominantly open country species and *Trichia hispida*. Shade-loving species were only represented by a number of non-apical fragments. The uppermost fill sample included *Candidula intersecta* which is either intrusive here, or indicates a medieval date (Kerney 1966). The meagre assemblages indicate very open downland, possibly even arable, conditions.

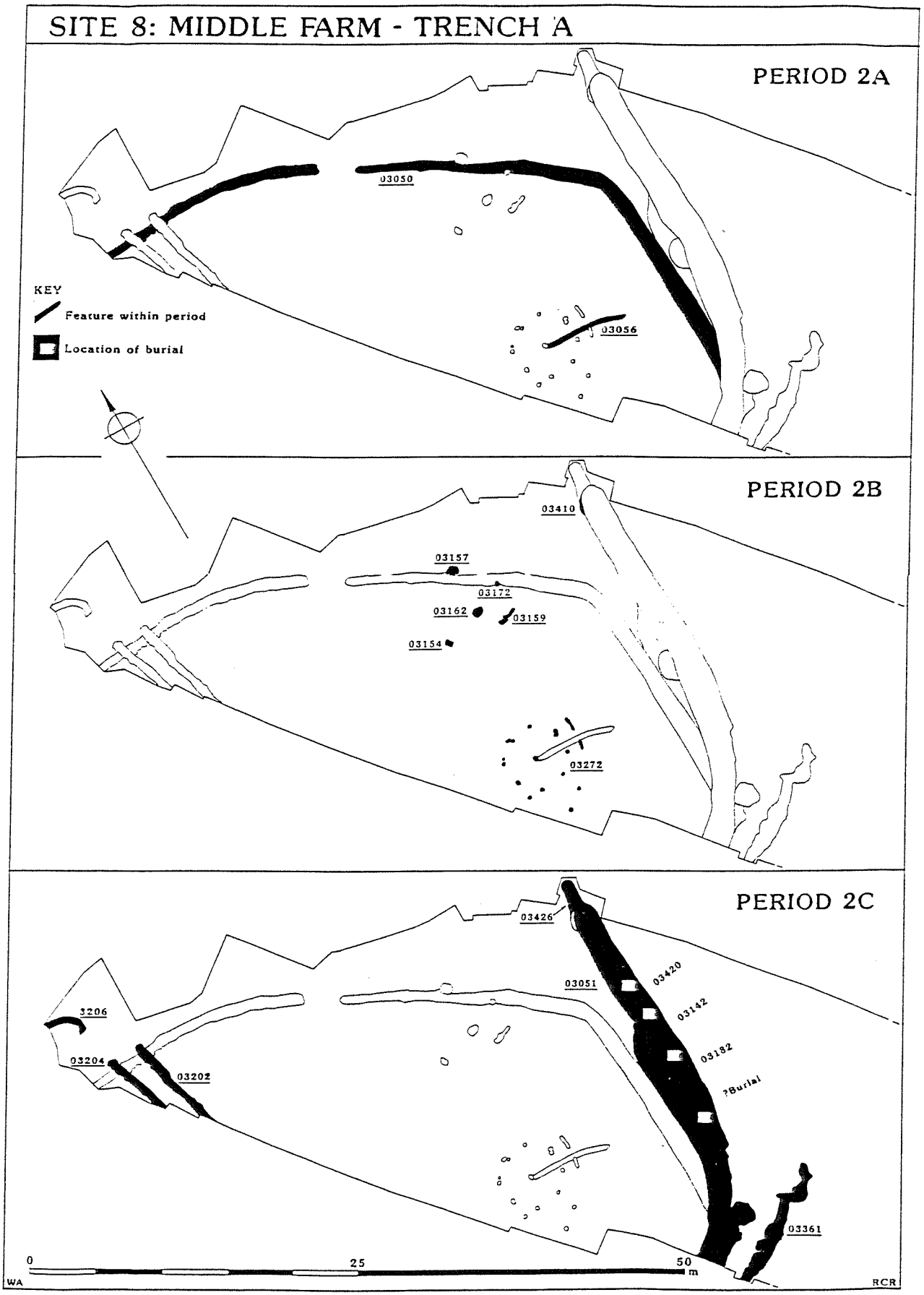


Figure 64. Plan of the Bronze Age settlement enclosure at Middle Farm

\Sample	20	21	22	23	24	25	26	27	28	29
\Context	¦---------50735--------¦					¦----50737---¦			¦-50720-¦	
\Depth (cm)	90	80	70	60	48	40	30	25	15	5
\	-100	-90	-8-	-70	-60	-48	-40	-30	-25	-15
\ Wt. (g)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
MOllUSCA										
Cochlicopa spp.	-	-	-	-	-	-	-	-	-	1
Pupilla muscorum (Linnaeus)	-	-	-	-	-	-	-	-	-	2
Vallonia costata (Müller)	-	-	-	-	-	3	-	-	-	1
Vallonia excentrica Sterki	-	-	-	-	-	8	4	2	5	30
Acanthinula aculeata (Müller)	-	-	-	-	-	-	-	-	1	-
Vitrea contracta (Westerlund)	-	-	-	-	-	-	-	1	-	-
Oxychilus cellarius (Müller)	-	-	-	-	1	-	-	-	-	1
Cecilioides acicula Müller	1	7	27	40	212	129	59	37	88	246
Candidula intersecta (Poiret)	-	-	-	-	-	-	-	-	-	2
Helicella itala (Linnaeus)	-	-	-	3	3	6	3	2	3	12
Trichia hispida (Linnaeus)	-	-	-	-	-	-	2	-	1	6
Cepaea spp.	-	-	-	-	-	-	-	-	-	1
Taxa	0	0	0	3	4	17	9	5	10	56
Shannon Index (*H'*)	0.00	0.00	0.00	0.00	0.56	1.03	1.06	1.05	1.17	1.43
TOTAL	**0**	**0**	**0**	**1**	**2**	**3**	**3**	**3**	**4**	**9**

Table 38. Middle Farm, Trench A; Land Mollusc data from ditch 3050.

Boundary Ditch 03051

The large boundary ditch 03050 contained a typical tripartite ditch fill sequence. Two mollusc zones could be detected. Although the coarse primary deposits produced very few shells, the upper primary fill and the secondary fill contained enough shells to make some palaeo-environmental statements. These deposits contained no open country species (except rare non-apical fragments). The main species present were *Aegopinella nitidula*, *Oxychilus cellarius* and Limacidae. The assemblages are ones, not of woodland, but localised shady conditions, probably afforded by the micro-environments within the deep ditch itself. The buried soil which occurred at the top of the secondary fill, and was sampled at 5cm intervals, contained very few shells. The absence of shells here was because of the lack of calcium carbonate in the humic brown earth soil that formed within the ditch.

The tertiary Late Bronze Age and Iron Age ploughwash deposits produced markedly different assemblages. The assemblages almost exclusively consist of open country species; mainly *Vallonia excentrica* and *Helicella itala* with *Trichia hispida*. Although depauperate, the assemblages are similar to many assemblages from colluvial and ploughwash deposits (e.g. Bell 1983, Evans 1972), particularly those

\Sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
\Context	3374	¦--3372-¦		3370	¦----3369----¦			3368	3366	¦----3365----¦			3364	¦----------3363----------¦					
\Depth (cm)	175	165	150	140	130	120	110	100	90	85	80	75	70	60	50	40	30	20	10
\	-185	-175	-165	-150	-140	-130	-120	-110	-100	-90	-85	-8-	-75	-70	-60	-50	-40	-30	-20
\ Wt (g)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
MOLLUSCA																			
Carychium tridentatum (Risso)	-	-	-	-	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Carychium spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Cochlicopa spp.	-	-	-	-	-	2	-	-	1	-	-	-	-	-	1	-	-	-	-
Vertigo pygmaea (Draparnaud)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1
Pupilla muscorum (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-	-	1	3	2	3	-	-	-
Vallonia costata (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	-	-	3
Vallonia excentrica Sterki	-	-	-	-	-	-	-	-	-	-	-	-	1	2	18	12	7	5	9
Vallonia spp.	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Punctum pygmaeum (Draparnaud)	-	-	-	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Nesovitrea hammonis (Ström)	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aegopinella pura (Alder)	-	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Aegopinella nitidula (Draparnaud)	-	-	1	1	11	3	1	-	2	-	-	-	-	-	-	-	-	-	-
Oxychilus cellarius (Müller)	-	-	-	13	7	1	-	-	2	-	-	-	-	-	-	2	-	-	-
Limacidae	-	-	-	3	7	9	3	7	4	2	-	1	1	-	-	1	-	-	-
Cecilioides acicula (Müller)	-	-	-	-	-	-	-	12	16	7	27	19	76	136	150	217	129	40	8
Cochlodina laminata (Montagu)	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Candidula intersecta (Poiret)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
Helicella itala (Linnaeus)	-	-	1	-	-	-	-	-	+	-	-	-	5	5	7	2	5	10	4
Helicellids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Trichia hispida (Linnaeus)	-	-	-	-	-	-	1	-	7	1	-	-	-	1	7	13	+	-	-
Cepaea spp.	-	-	-	2	-	-	-	-	+	1	-	-	-	-	-	-	-	-	-
Helix aspersa (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
Taxa	1	0	2	6	7	7	3	1	8	3	0	1	4	4	8	7	4	3	6
Shannon Index (*H'*)	0	0	0.69	1.30	1.73	1.61	0.95	0	1.54	1.04	0	0	1.07	0.24	1.52	1.59	0.90	0.92	1.42
TOTAL	1	0	2	22	34	20	5	7	17	4	0	1	8	11	38	37	13	17	21

Table 39. Middle Farm; Land mollusc data from linear boundary ditch 3051.

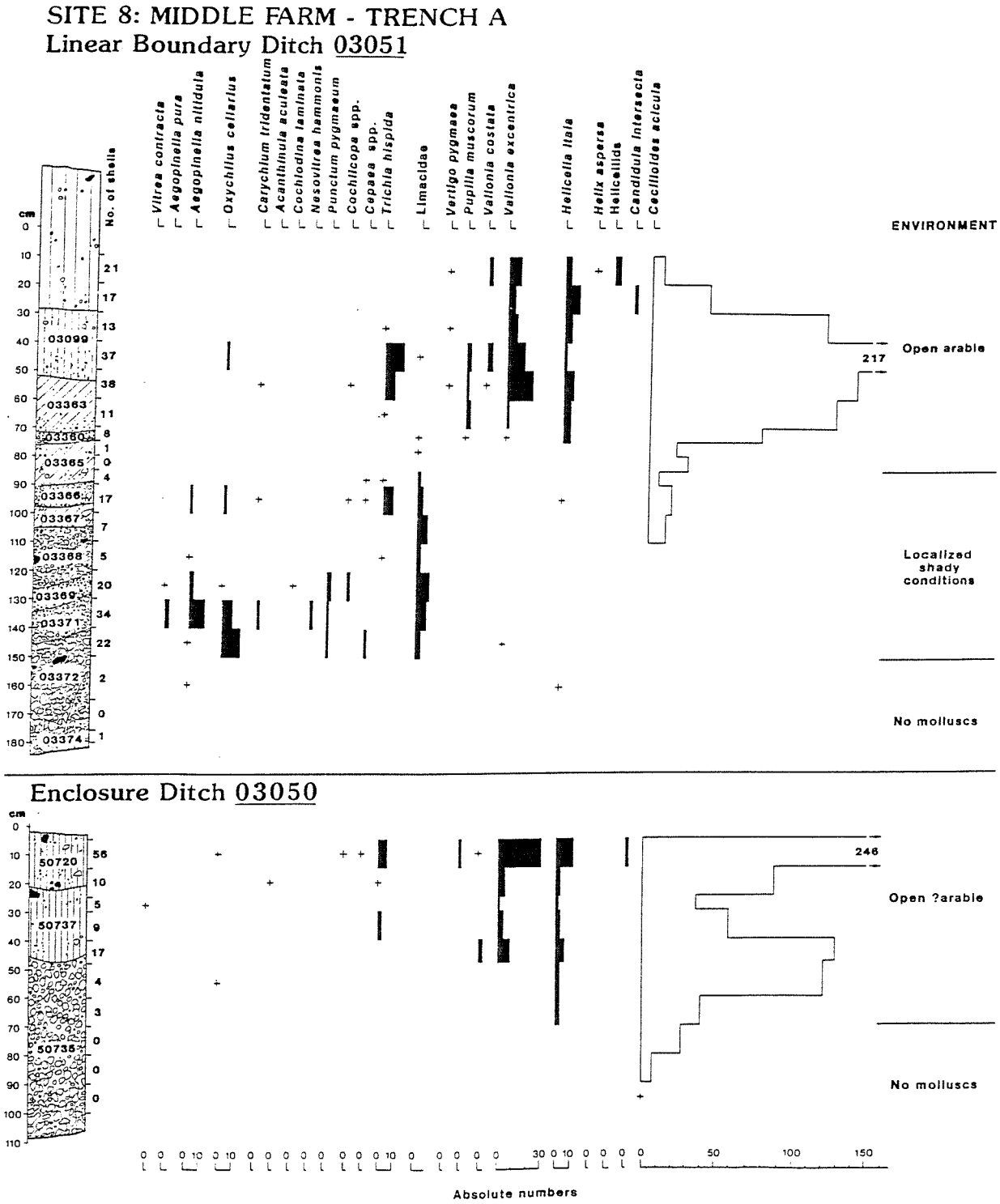


Figure 65. Middle Farm; mollusc histograms from the ditches.

from the bottom of the adjacent slope. They probably indicate open arable environments. The samples from the base of the modern soil produced similar assemblages and contained both *Helix aspersa* and members of the Introduced Helicellids, indicating that these layers at least are probably medieval or later.

Middle Farm Trench A and B Summary

It is evident that the original soil cover, and probable initial colluvial deposits do not survive in the sequence examined. Clearance therefore occurred some considerable time earlier than the Final Neolithic/Beaker occupation. After a short period of Early Bronze Age cultivation the valley bottom was returned to pasture and grassland. This however was superseded by large-scale cultivation of the valley slopes during the Bronze Age. Cultivation led to severe erosion events, depositing flints in the valley bottom and thinning the original thick acid soils on the valley sides. By the Romano-British period the soils had been thinned to such an extent that chalk was also being eroded. By the medieval/post-medieval periods a reduction in agricultural pressure can be seen and both grazed downland and more limited periods of cultivation occurred.

7.3 INVESTIGATIONS OF COLLUVIAL DEPOSITS AT FORDINGTON BOTTOM

Excavations along the route of the Western Link road within the steep-sided dry valley of Fordington Bottom were conducted by Wessex Archaeology. A number of trenches were excavated within the valley (Fig. 66), in which a series of colluvial sections were exposed. None of the sections was hand excavated in detail and no good sequences of dated colluvial deposits were established. The lack of any well-dated sequences makes the information here less significant than it could have been.

Fordington Bottom is an impressive, parallel-sided, deeply incised dry valley oriented south-north which extends for over 2.3km and opens onto floodplain of the River Frome at Whitfield Farm. The valley floor is narrow, usually not more than 40m wide until the valley widens at its northern end.

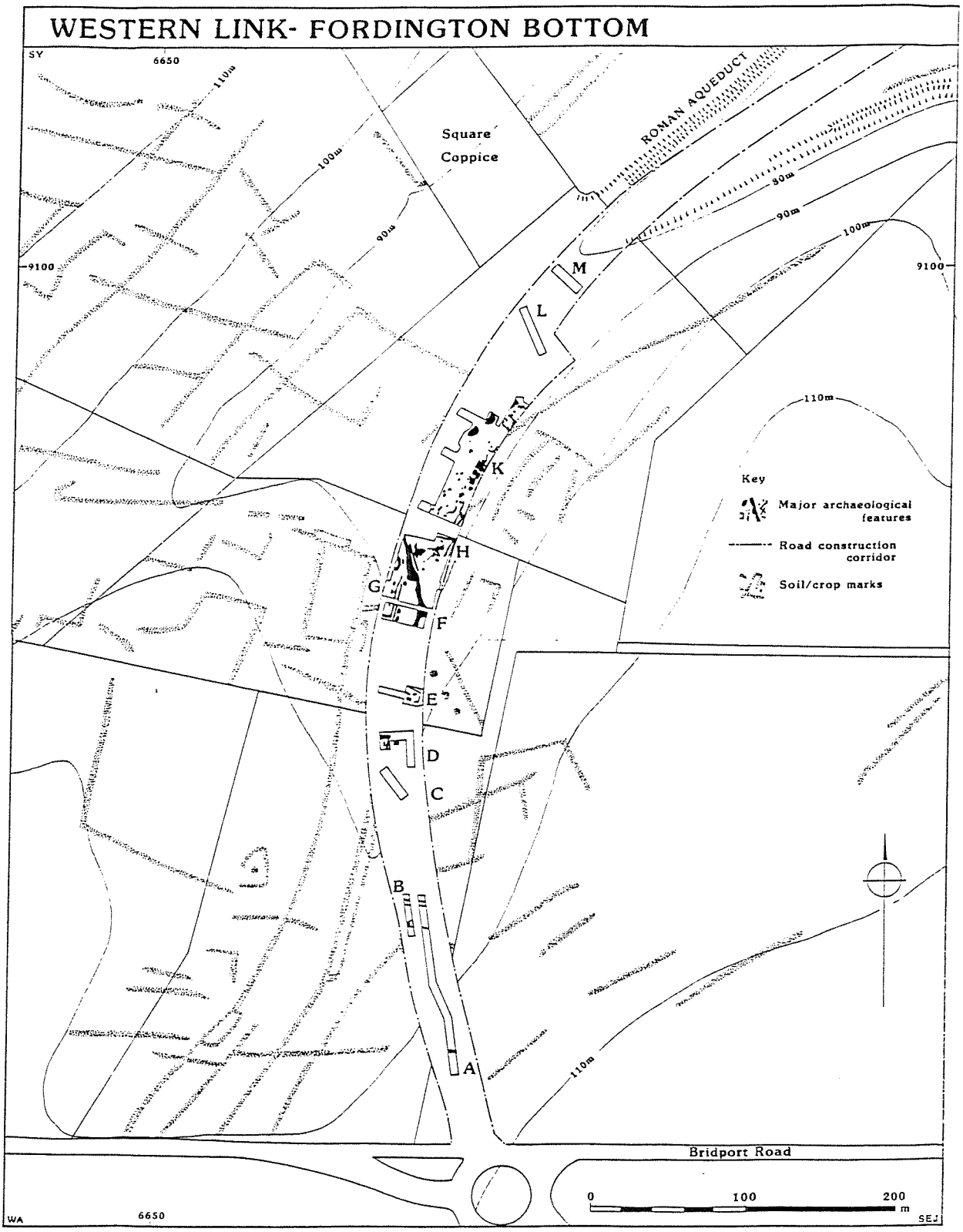


Figure 66. Fordington Bottom (Western Link); plan of excavated areas.

Excavations were mainly concerned with a Late Iron Age and Romano-British settlement and cemetery. However, in the valley bottom, and sealed beneath the colluvial deposits, there was a V-shaped ditch (262) which was identified over 30m. It has been ascribed to the Late Neolithic/Early Bronze Age on the basis of a number of residual artifacts from the chalk surface beneath the colluvium which included a Late Neolithic discoidal knife, a single Beaker sherd and a sherd of Collared Urn.

A number of Late Bronze Age features were also recovered. Two structures were terraced into the chalk on the steep eastern slope of the valley. Arcs of post-holes were found within each terrace indicating that these are the preserved portions of huts, the fronts of which once stood on a no-longer extant lynchet (Fig. 70). A number of minor ditches and hollows are also ascribed to this period.

The molluscan and colluvial evidence

The dry valley at Fordington Bottom occupies a specific topographical niche and thus the aims of the environmental analyses are more clearly focused than those elsewhere. The valley is a microcosm of the Downs on which farming was centred on the later Iron Age and Romano-British periods. Environmental analysis aimed therefore to characterise and describe the land-use history. It is however unfortunate that we only have limited information with which to date the colluvial sequences.

A series of 4 columns of samples was analysed from colluvial sequences and ditches across trenches F, G and M. Further spot samples taken from individual contexts took the total of analysed samples to 36. The results are presented in table 40 and as standard mollusc histograms (Figs 67 & 69).

Prehistoric colluvium; trench M

A 2.3m sequence of typically unsorted colluvium was revealed in trench M. The undated sequence consisted of chalky periglacial melt-water deposits which were overlain by a weakly calcareous dark reddish brown and stone-free silty clay; probably a residual portion of the early Holocene soil. This in turn was sealed by similar deposits containing a number of flints, upon which there was a stone-free buried soil. The

latter horizon was noted as containing relatively large charcoal fragments. This sequence was covered by colluvium; the lower portion contained few stones and some flints, while the upper portion (above 1.1m) was typically chalky unsorted colluvium, becoming progressively more calcareous up profile.

The basal dark silty clay and weakly calcareous horizons yielded very few mollusc shells (Fig. 67). It gave very high magnetic susceptibility results (Table 40), probably due to the clay content which is associated with higher concentrations of iron oxides (cf.

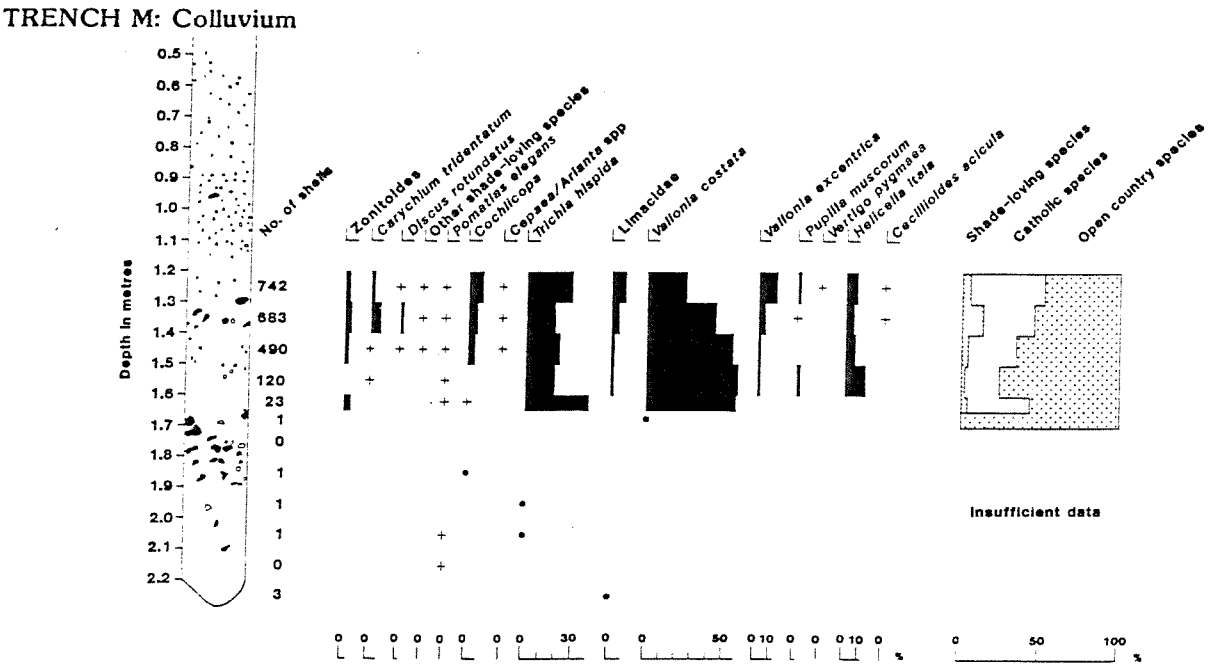


Figure 67. Fordington Bottom; mollusc histogram from colluvium in trench M.

Oades and Townsend 1963), or possibly to ancient pedogenesis. It represents an argillic brown earth (Staines forthcoming). The buried soil overlying the basal deposits contained shells and the colluvium produced abundant (up to 742) molluscs (Table 40). The assemblages were predominantly open country and dominated by two species; *Vallonia costata* and *Trichia hispida*. The buried soil contained one of the most xerophile species, *Helicella itala* and was accompanied by few shade-loving and catholic species (apart from *T. hispida*). This assemblage

is typical of very open dry grassland or arable environments. The overlying lower colluvial sequence displays a reduction in the proportion of *V. costata* and an increase in its congener *V. excentrica.* Slightly more shady and stable conditions are indicated by the presence of *Carychium tridentatum.* The mollusc assemblage in this fine, almost stone-free, colluvium probably reflects long grass. The upper colluvial sequence was not analysed but its increase in chalk pieces and general nature is so characteristic of ploughwash as to indicate local tillage.

Neolithic to Mid Bronze Age (Trench F)

A series of seven samples was taken through the pre-mid Bronze Age ditch 262, the gravel fan that seals it, and the overlying Middle Bronze Age colluvium (Fig. 68). The base of the gully produced few shells (Table 40; Fig. 69), but higher up the gully fills a mixed assemblage was recovered. No species or ecological group was dominant in the assemblage but the Zonitidae and Limacidae groups were well represented along with the open country species *Vallonia excentrica.* This probably indicates a ditch rapidly becoming overgrown with tall grass vegetation but being infilled with soils eroding from adjacent fields. The gravel fan, surprisingly, also yielded a number of shells. Typical open country, probably arable, assemblages were recovered in which *Trichia hispida* and *Vallonia excentrica* were dominant. The gravel fan itself indicates a large erosion event from arable contexts (Allen 1991a; 1992a). The overlying unsorted colluvium pre-dates the Late Iron Age/early Roman ditch 231, which both cuts the deposits and acts as a barrier to further deposition in the bottom of trench F. Colluviation here has been ascribed to the Middle Bronze Age. The deposit contained a mixed mollusc assemblage with relatively high proportions of shade-loving species. The assemblages are untypical of colluvial deposits and the presence of the Zonitids together with high proportions of *Carychium tridentatum* may indicate a grassland sward which has been inundated with colluvium from adjacent cultivated fields and is itself typified by more open country species together with *Trichia hispida.*

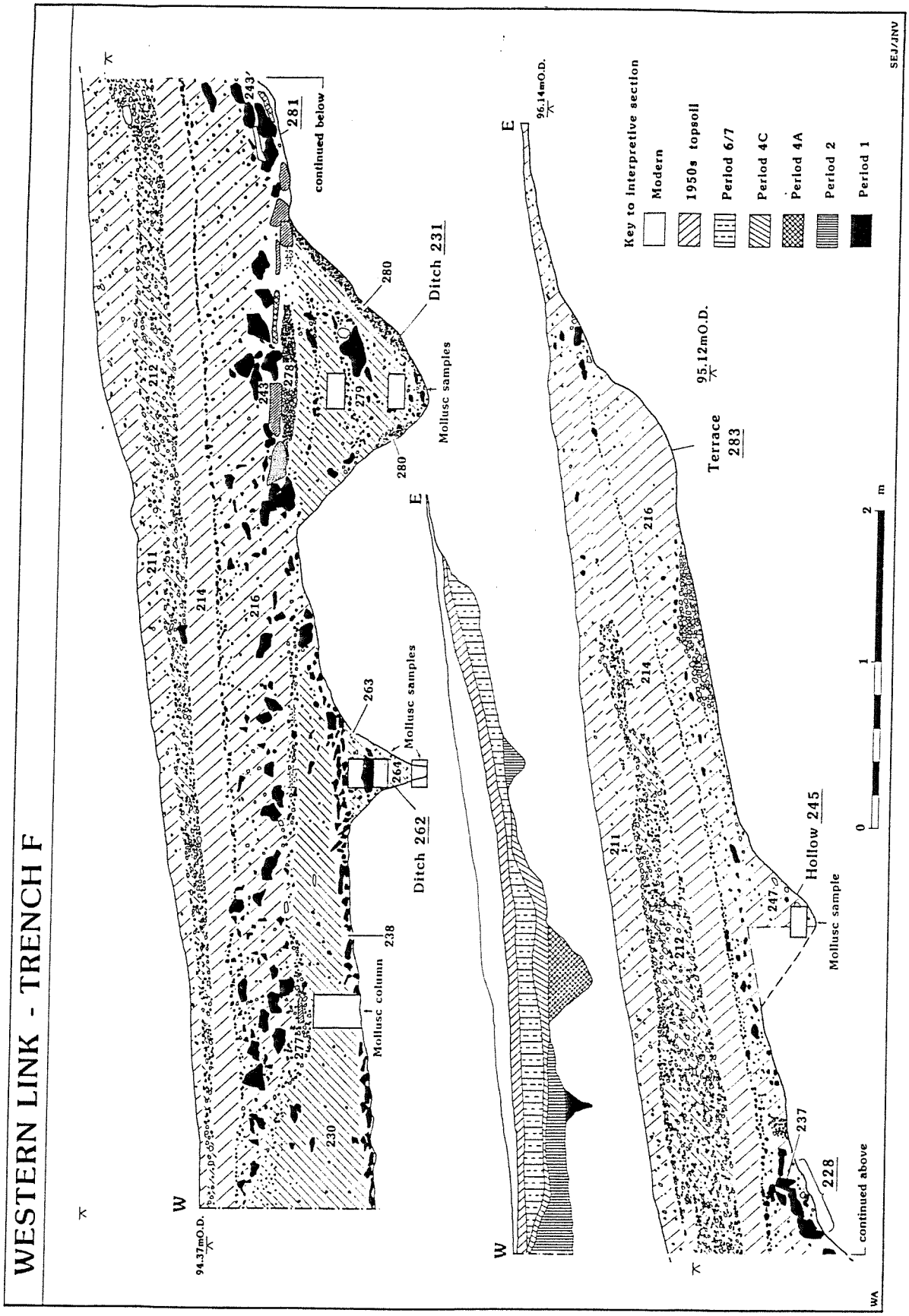


Figure 68. Fordington Bottom; colluvial profile and features in trench F.

\Period	probably 1 - 2												2			colluvium tr.G			
\Feature	Trench M												464	262					
\Context													466	264	263	238	230	230	230
\Sample	49	50	51	52	53	54	55	56	57	58	59	60	37	14	15	21	22	23	24
\Depth (cm)	220	210	200	190	180	170	165	160	150	140	130	120					20	10	0
\	-230	-220	-210	-200	-190	-180	-170	-165	-160	-150	-140	-130					-30	-20	-10
\ Wt (g)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	2000	1500	1500	1500	1500	1500
MOLLUSCA																			
Pomatias elegans (Müller)	-	+	+	-	-	-	-	+	1	7	8	6	-	-	3	2	-	-	1
Carychium tridentatum (Risso)	-	-	-	-	-	-	-	-	1	1	41	12	-	1	8	-	1	10	5
Cochlicopa lubrica (Müller)	-	-	-	-	-	-	-	+	-	2	5	10	-	-	3	-	-	-	-
Cochlicopa lubricella (Porro)	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Cochlicopa spp.	-	-	-	-	1	-	-	-	-	23	38	60	-	2	3	1	2	1	5
Vertigo pygmaea (Draparnaud)	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	1	1
Vertigo moulinsiana (Dupuy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Vertigo spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pupilla muscorum (Linnaeus)	-	-	-	-	-	-	-	-	2	-	2	18	1	2	2	1	1	-	5
Vallonia costata (Müller)	-	-	-	-	-	-	1	13	69	268	303	185	2	2	9	+	-	-	5
Vallonia excentrica Sterki	-	-	-	-	-	-	-	-	5	28	36	90	-	7	18	6	2	6	19
Acanthinula aculeata (Müller)	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Punctum pygmaeum (Draparnaud)	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	2
Discus rotundatus (Müller)	-	-	-	-	-	-	-	-	-	2	11	2	-	1	3	-	+	1	5
Vitrina pellucida (Müller)	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-
Vitrea crystallina (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
Vitrea contracta (Westerlund)	-	-	-	-	-	-	-	-	-	-	10	4	1	7	2	-	-	1	2
Nesovitrea hammonis (Ström)	-	-	-	-	-	-	-	-	-	-	3	13	-	-	1	-	-	1	-
Aegopinella pura (Alder)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aegopinella nitidula (Draparnaud)	-	-	-	-	-	-	-	1	-	11	11	1	-	-	-	2	-	+	3
Oxychilus cellarius (Müller)	-	-	-	-	-	-	-	-	1	2	3	2	-	-	1	-	-	1	-
Limacidae	3	-	-	-	-	-	-	-	3	12	36	64	-	9	7	2	4	2	7
Ceciliodes acicula (Müller)	-	-	-	-	-	-	-	-	-	-	2	3	-	8	48	5	20	34	42
Cochlodina laminata (Montagu)	-	-	-	-	-	-	-	-	-	-	6	2	-	-	-	1	-	1	2
Clausilia bidentata (Ström)	-	-	-	-	-	-	-	-	-	3	1	+	-	2	-	-	-	-	2
Candidula intersecta (Poiret)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helicella itala (Linnaeus)	-	-	-	-	-	-	-	-	15	29	35	52	5	5	1	1	-	-	3
Ashfordia granulata (Alder)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Trichia hispida (Linnaeus)	-	-	1	1	-	-	-	9	23	101	123	208	-	-	27	15	12	11	22
Arianta arbustorum (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Cepaea/Arianta spp.	-	-	-	-	-	-	-	-	-	+	9	6	+	-	1	1	1	1	3
Helix aspersa (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-
Taxa	1	0	1	1	1	0	1	3	9	13	19	18	5	12	15	10	7	12	17
Shannon Index (*H'*)	0	0	0	0	0	0	0	0.83	1.31	1.49	1.94	2.06	1.41	2.22	2.20	1.73	1.48	1.95	2.41
TOTAL	**3**	**0**	**1**	**1**	**1**	**0**	**1**	**23**	**120**	**490**	**683**	**742**	**11**	**42**	**90**	**32**	**23**	**37**	**91**
Magnetic Susceptibility	8	71	79	125	205	89	23	26	27	27	22	15	42	21	26	20	-	-	27

Table 40. Fordington Bottom; Land mollusc and magnetic susceptibility data

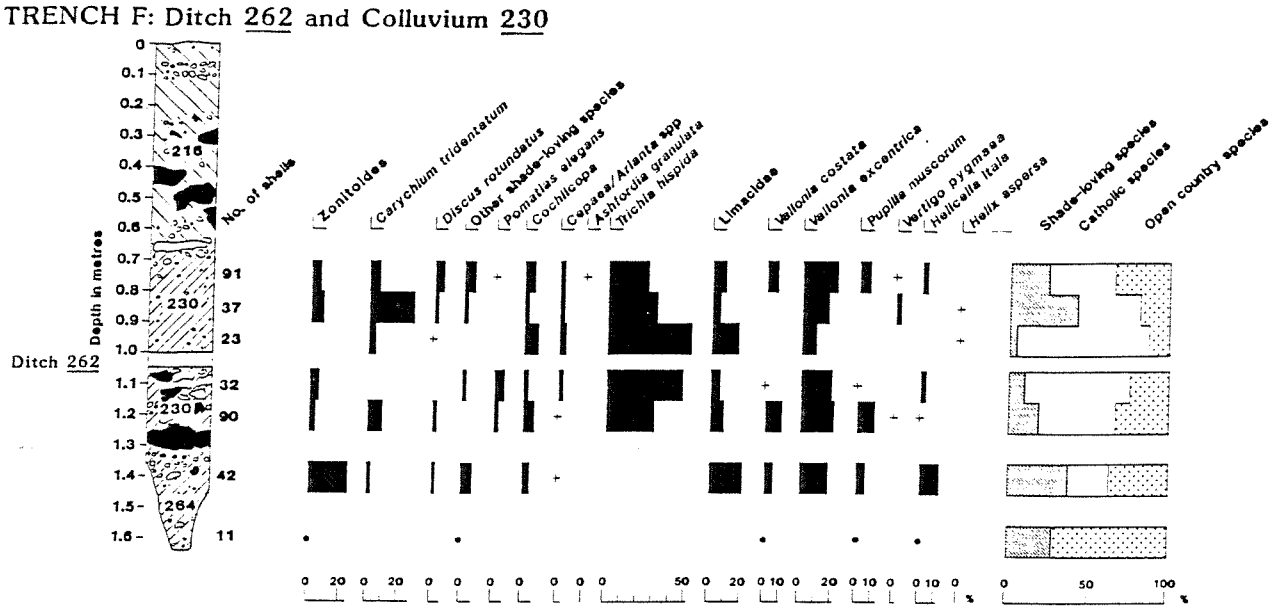


Figure 69. Fordington Bottom; mollusc histogram from ditch 262 and overlying colluvium.

Discussion and Summary

The earliest feature, the shallow gully (262) possibly of Late Neolithic/Early Bronze Age date, was dug in a pre-existing open environment, suggesting that woodland clearance and landscape management had occurred sometime previously. The relict weakly calcareous argillic brown earth in trench M may represent the severely truncated, re-calcified, former woodland soil whose original base status did not facilitate the preservation of mollusc shells. The earlier prehistoric activity seems to have been associated with pasture or open grassland (as evidenced from trench M), and limited arable activity as implied by the Mollusca from the gully fills. The gully probably represents a field boundary associated with some arable activity in an otherwise predominantly pasture environment. Destabilisation of the valley-side soils, probably in the Early Bronze Age, resulted in large scale erosion events. The gravel fan (which sealed gully 262) can be seen as only the coarse component of a larger erosion regime; the finer material being washed northwards down the

valley axis and possibly even into the Frome valley. This may be taken as evidence for more intensive farming and on the hilltop and valley sides. Limited colluvium was deposited through the Middle Bronze Age indicating continued arable activity but there is evidence for the existence of grassland, particularly in the valley bottom.

The response to the major erosion of soils on the sides of the combe may have been the creation of the series of defined fields, as a part of a whole field system, and the formation of a lynchet along the contour of the combe (Figs. 66 & 70, Period 2). The date of this event can not be precisely fixed, although two later Bronze Age buildings, 5195 and 5196, were constructed over positive lynchet material and within this field system. Both buildings were also partly terraced into the combe side. Little occupation debris was recovered from either building. Either they were only occupied for a short period or erosion after their abandonment had displaced this material downslope, as suggested by the colluvium infilling the terrace structures. During the later Bronze Age a ditched field system was established on the Clay-with-flint deposits on Fordington Down above the combe.

Although Early and Middle Iron Age colluvium may have been eroded from the sequence, it is more likely that there was a real hiatus in arable activity and the area was returned to long term pasture. Further episodes of colluviation can be recognised during the Late Iron Age to late Romano-British periods. These colluvial deposits are lighter in colour, more calcareous and less organic. This indicates considerably thinner and poorer soils in the immediate vicinity. The colluvium is indicative of tillage; evidence of pasture and grassland is limited even within the valley bottom. This can be attributed to the more intensive nature of the activity documented by the archaeological record. There is however a possible indication of a reduction in the intensity of land-use (and activity) in the valley bottom or even a hiatus. The fact that long grasses and other shady vegetation were allowed to become established in the Late Iron Age/early Roman ditch 231, may be taken as evidence of relaxation of at least local land-use pressure. Subsequent continued erosion was associated both with arable activity and intensive occupation of the valley during the Romano-British period.

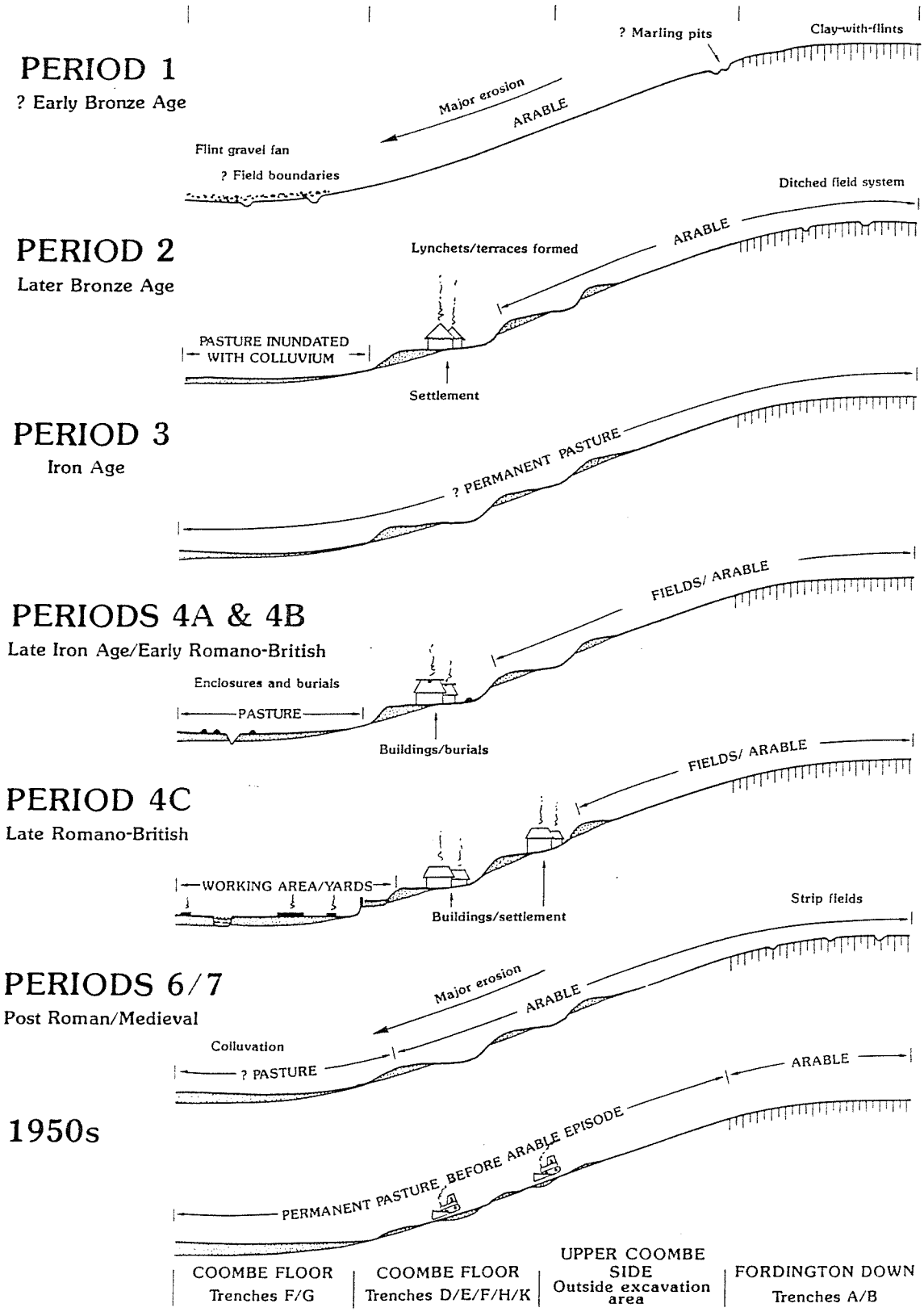


Figure 70. Schematic sections of the development of Fordington Bottom.

7.4 FLAGSTONES

The excavations

Flagstones lies on the crest and upper north-facing slopes of the chalk ridge to the east of Dorchester (Fig. 58). Excavation revealed two pre-enclosure pits, one of which (pit 00221) produced a radiocarbon determination of 3970 - 3542 cal BC (HAR-9161), see table 49. Pottery from both pits was Neolithic Bowl of the south-western style ('Hembury ware'). These are ascribed to period 1A. The pits were superseded by a single circular, segmented Neolithic enclosure (Fig. 71) formed by ovoid pits. The enclosure (period 1B), of which just over half was excavated, was approximately 100m in diameter and the segments were evenly spaced. The lower parts of the chalk sides of the segments were fresh and unweathered and a number of engravings had been carved on the ditch walls (Healy, in Smith *et al.* forthcoming; Woodward 1988). The enclosure was associated with a flint assemblage of later Neolithic character (Bellamy pers. comm.) and radiocarbon dates of 3370 - 2910 cal BC (OxA-2322) and 2889 - 2300 cal BC (HAR-8578), see table 49. A continuous inner ring-ditch approximately 28m in diameter was concentric with the Neolithic enclosure (Fig. 71). This Bronze Age ring ditch (period 2) had a centrally placed pit which contained an badly preserved inhumation of a young, adult male sealed beneath a sarsen bolder. A radiocarbon determination of 2133 - 1740 cal BC (HAR-9159) was made on the skeleton. A large copper alloy rivet and an oblique arrowhead of Portland Chert were recovered from the burial.

Molluscan analysis

One of the largest and most extensive programmes of mollusc analysis was conducted on the site at Flagstones. A total of 39 samples was analysed spanning the pre-monument Neolithic, the Late Neolithic monument, Early Bronze Age ring-ditch and subsidiary Late Iron Age contexts and features. In view of the significance of the Neolithic monument large (2kg) samples were analysed throughout the site to ensure high enough shell numbers for palaeo-environmental interpretation.

As on most sites in the area all upstanding features, banks etc., had long since been ploughed out, and thus unlike Mount Pleasant (Wainwright 1979) and Maiden Castle (Sharples 1991), no old land

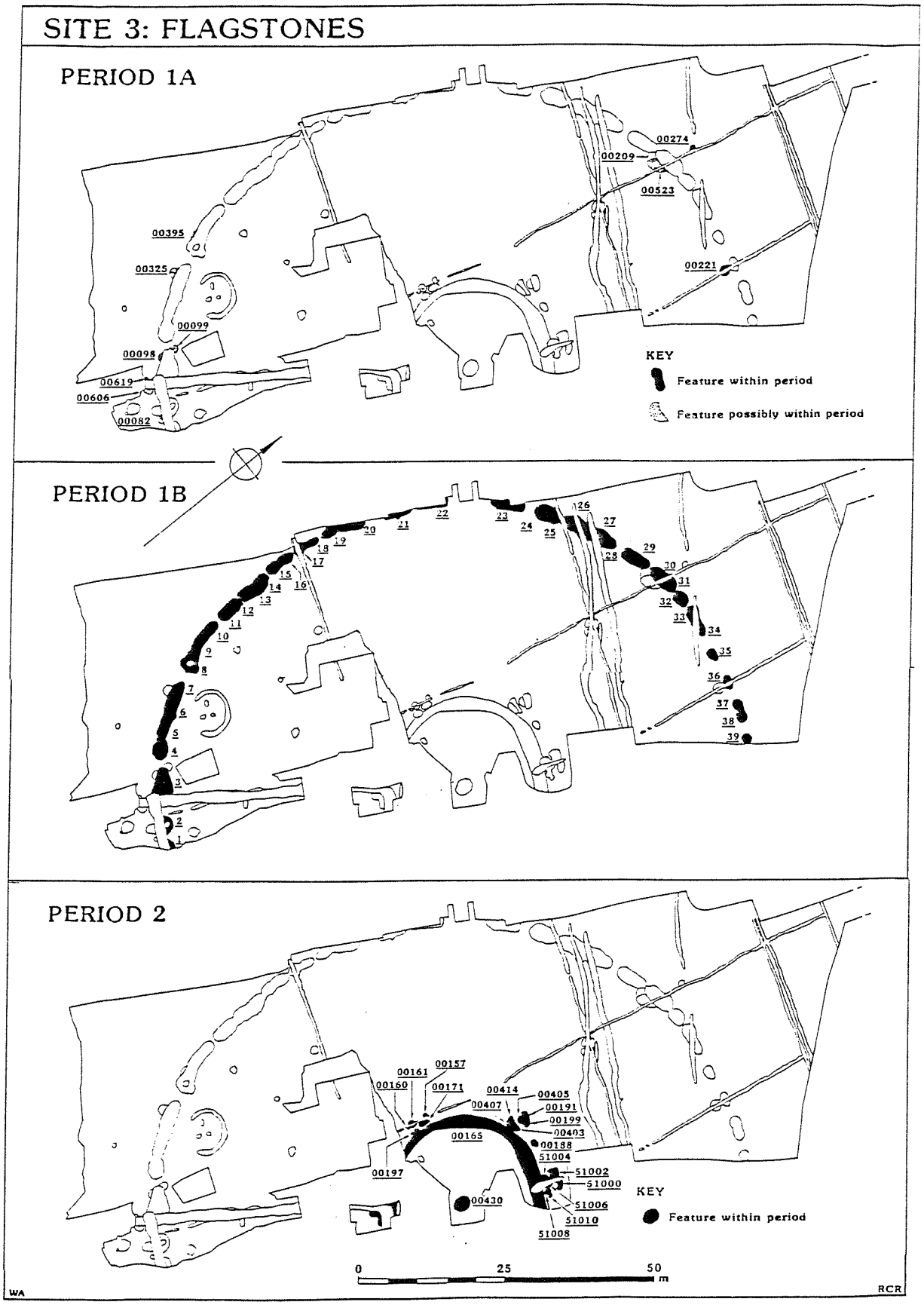


Figure 71. Flagstones; phased plans of the excavated features.

surfaces were available for analysis. The lack of suitable off-site data in the immediate vicinity made necessary the extensive sampling programme, primarily of ditch sequences. Fallen turves were recognised and examined in several sections. This detailed analysis complements the work at Alington Avenue (Section 7.6) only 120m to the south-west and Fordington Barrow (Allen 1992c), both also situated on the chalk ridge to the east of Dorchester (Fig. 58).

Pit 00221; Period 1a

Two isolated pre-monument pits containing Neolithic bowls of the south-western ('Hembury') style were excavated, and one (pit 00221) was sampled (Fig. 72). Five contiguous samples were analysed (Fig. 73). The basal sample was dominated by *Oxychilus cellarius* which attains nearly 50% and is an assemblage which is particularly difficult to interpret. Although it is a common woodland species it is also carnivorous (being found within the Neolithic burials at Waylands

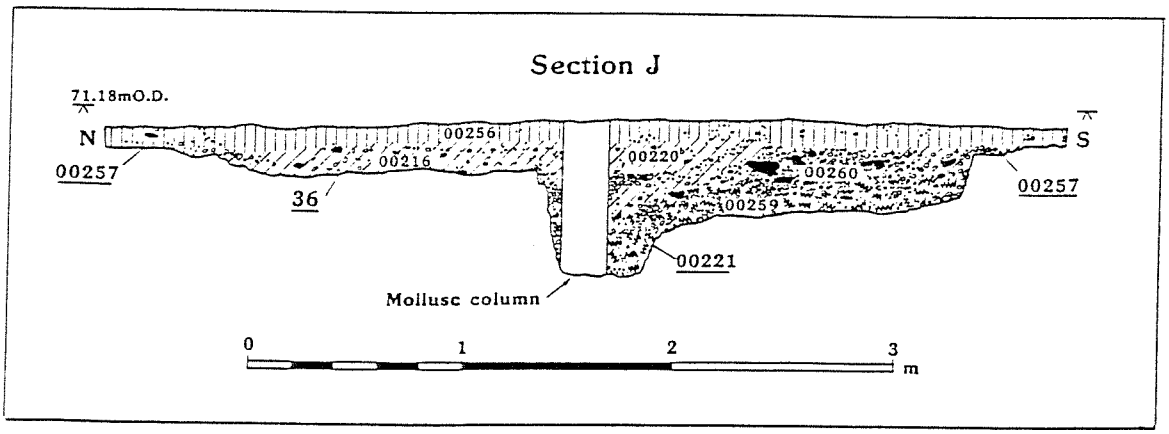


Figure 72. Flagstones; Section of pit 00221.

Smithy - Evans 1972, 34) and is a species that according to Boycott (1934) can occasionally occur on 'bare chalk downs ... where no shelter or accumulated moisture is to be had' and is also common in long grassland. Here it is not accompanied by a significant proportion of other shade-loving species but was found with both semi-articulated sheep metatarsals and a series of more typical open country species. On balance this probably represents a fairly open, rather than shady, environment. The overlying fills are dominated by open country

species, in particular *Vallonia costata* and *Pupilla muscorum* which increase up profile. These assemblages are those of open, fairly rich, grassland. Magnetic susceptibility values are relatively high (Table 41) and concur with the richer more mesic environments indicated by the molluscs. There is however a dramatic change at the top of the sequence. The relative reduction in both *P. muscorum* and *V. costata* with the accompanied dramatic rises in *Helicella itala* and *Trichia hispida* which become dominant, probably indicates the beginning of tillage. Interestingly two fresh-water species; *Valvata piscinalis* and *Bithynia tentaculata* are present. Their occurrence is in this sample probably a result of accidental incorporation by animal or man, but, if the latter, may indicate the exploitation of the riverine resources of either the Frome or the South Winterborne. As the occurrence of these two species is particularly rare, it is just possible that this may indicate manuring with riverine material (cf. Allen in press) or the use of rushes for thatch and bedding.

SITE 3: FLAGSTONES
Early Neolithic Pit 00221

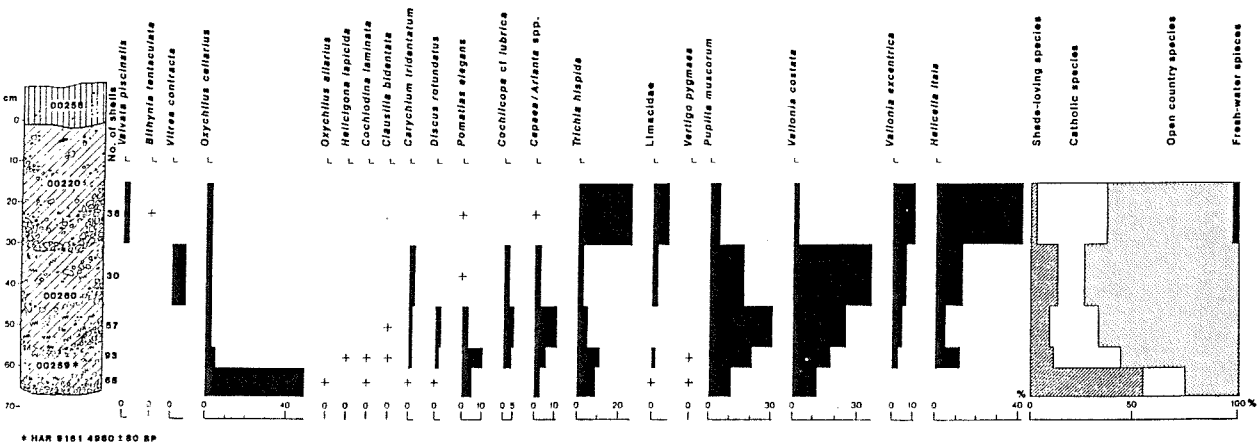


Figure 73. Flagstones; mollusc histogram from Early Neolithic pit.

A radiocarbon assay from the base of the pit gave a date of 3970 - 3542 cal BC (HAR-9161) which indicates that fairly open conditions existed during the Early Neolithic. Woodland had at least been cleared from around this site, and probably more extensively in view of the paucity of shade-loving species.

The Neolithic monument; Period 1b

Two ditch segments were sampled in the southern part of the ditch circuit; the first (segment 7) had a distinct and sharp-edged humic turf lying 10cm above the floor of the ditch, while the second (segment 13) had a fallen turf overlying the coarse primary fill.

Segment 7 (Fig. 74)

The base of the ditch contained a thin layer of chalk mud and another of small chalk rubble. The chalk mud contained very few shells however, the chalk rubble lying just beneath the fallen turf produced enough shells for palaeo-environmental interpretation and displayed an almost identical assemblage to those from the turf. The turf, which undoubtedly originated from the ground surface through which the ditch was cut, contained a predominantly open country assemblage and high shell numbers (Fig. 75). This data together with a significant peak in magnetic susceptibility (Table 42) confirms the field interpretation of a fallen turf. Although the turf was sampled at 5cm intervals in an attempt to examine any chronological variation, no significant change was observed except that shell numbers increased in the upper sample. The dominant species were *Trichia hispida* and *Vallonia excentrica* with *Helicella itala* and a number of other open country species. A significant number of shade-loving species were present although in low numbers. This suggests a well, but not intensively, grazed established grassland although the possibility of arable or similar habitats cannot be discounted. The fact that a stone-free turf was recovered reinforces the interpretation of grassland.

The main coarse primary fills were largely devoid of shells but the species present were predominantly those seen in the fallen turf. The samples from the rest of the ditch fills, secondary, and tertiary fills, are remarkably constant. The lower, more humic and less stony, secondary fill (context 00335) show a major increase in both shell numbers and magnetic susceptibility (Table 41) but no environmental change. The assemblages remain open country ones almost identical in composition to those already described from the basal fallen turf, thus indicating a continuation of grassland conditions.

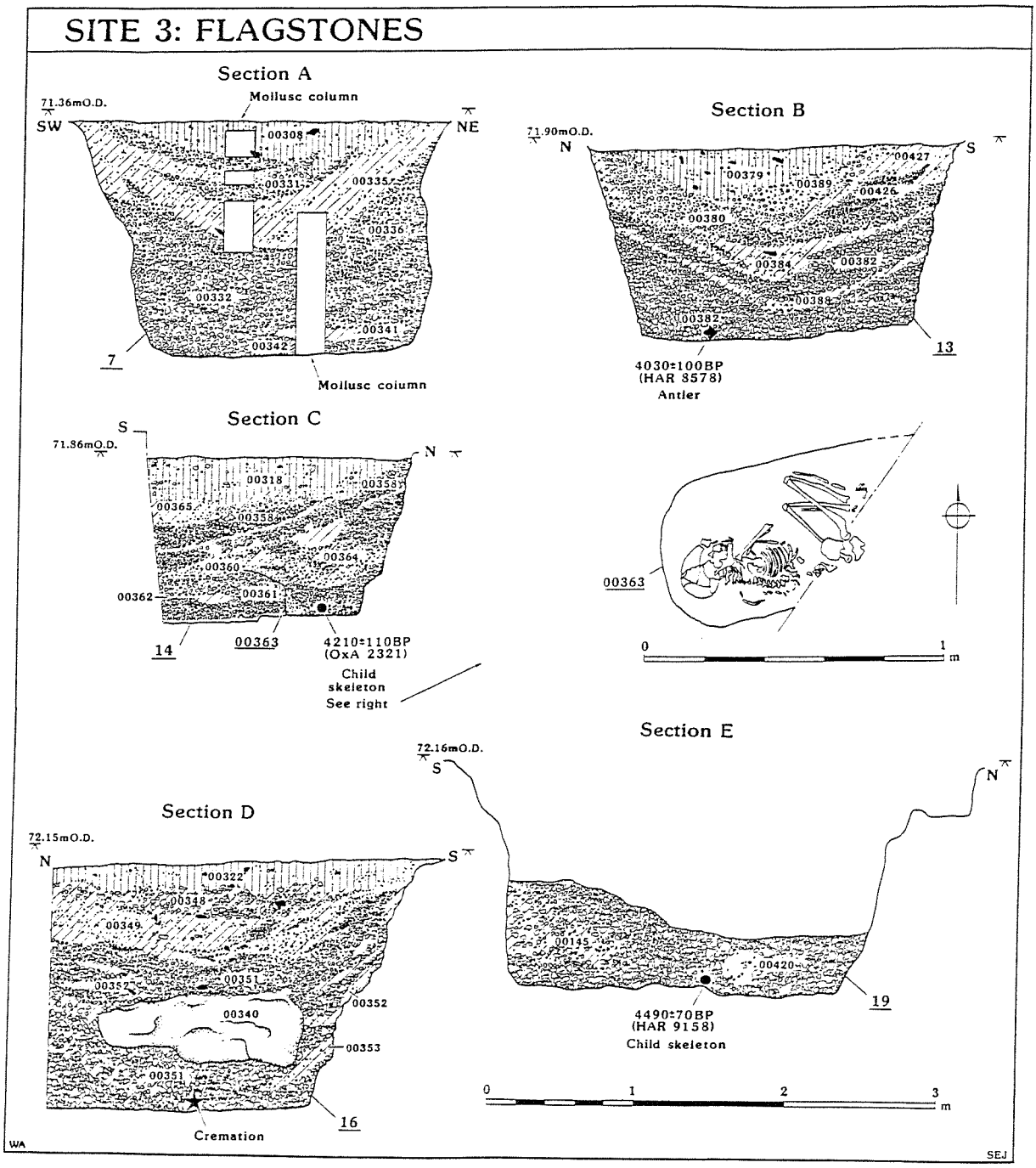


Figure 74. Flagstones; Neolithic enclosure ditch sections.

\ Period	1A					1B																		
\ Feature	pre-enclosure pit 00221					Neolithic enclosure segment 7												segment 13						
\ Sample	22	23	24	25	26	1	2	30	31	4	5	6	7	9	10	11	12	13	33	34	35	36	37	38
\ Context	00259	00259	00260	00260	00260	-00342-		-00341-		-00332-		-00336-		Turf	-00335-			00308	-00382-		00388	-00384-		00389
\ Depth (cm)	60	55	45	30		155	150	144	142	120	105	90	75	75	65	55	35	5	110	90	77	71	65	20
\	-67	-60	-55	-45		-161	-155	-150	-144	-140	-120	-105	-90	-85	-75	-65	-45	-20	-130	-110	-90	-77	-69	-35
\ Wt (g)	1950	2000 2	000	2000	1700	950	1312	1000	1000	2000	2000	2000	2000	1976	1832	2000	2000	1916	2000	2000	2000	2000	2000	2000
MOLLUSCA																								
Pomatias elegans (Müller)	3	9	2	+	+	1	1	1	2	+	+	+	1	8	3	5	-	-	-	-	2	4	6	-
Carychium tridentatum (Risso)	1	2	-	-	-	-	3	6	63	-	-	-	-	35	9	15	3	-	-	-	-	-	2	43
Carychium spp.	-	-	1	1	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Cochlicopa lubrica (Müller)	-	-	-	-	-	-	1	-	6	-	-	-	-	-	6	-	-	-	-	-	-	-	5	1
Cochlicopa lubricella (Porro)	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Cochlicopa spp.	1	4	3	1	-	5	-	9	25	-	1	-	6	19	10	3	10	16	-	-	2	1	18	4
Vertigo pygmaea (Draparnaud)	+	1	-	-	-	1	8	15	49	-	-	-	5	33	10	6	2	4	-	-	2	2	23	-
Vertigo spp.	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pupilla muscorum (Linnaeus)	8	20	18	5	2	2	3	27	21	-	1	-	1	44	9	4	31	43	1	-	4	6	40	1
Vallonia costata (Müller)	8	17	14	11	1	1	2	23	45	2	-	2	6	86	31	22	36	18	-	1	-	-	46	5
Vallonia excentrica Sterki	-	3	3	2	4	8	27	141	270	2	3	4	13	156	60	38	71	92	-	7	22	20	132	9
Punctum pygmaeum (Draparnaud)	-	-	-	-	-	1	-	4	4	-	-	-	-	2	2	-	5	8	-	-	-	-	3	-
Discus rotundatus (Müller)	1	1	2	-	-	-	-	-	-	+	-	3	6	21	3	5	3	-	-	-	-	-	-	3
Vitrina pellucida (Müller)	-	-	-	-	-	-	1	3	-	-	-	-	3	1	1	-	-	-	-	-	1	-	3	-
Vitrea contracta (Westerlund)	-	-	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-
Nesovitrea hammonis (Ström)	-	-	-	-	-	-	1	5	18	-	-	-	2	9	3	4	4	2	-	-	-	-	-	2
Aegopinella nitidula (Draparnaud)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	2	1	4	-
Oxychilus cellarius (Müller)	32	5	2	1	1	-	-	-	-	-	-	2	7	3	1	-	2	-	-	-	-	-	-	-
Oxychilus alliarius (Miller)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Limacidae	1	2	-	1	3	-	-	5	2	-	-	1	3	-	-	3	7	13	-	-	-	-	3	1
Cecilioides acicula (Müller)	12	53	116	185	218	-	-	-	-	-	-	1	-	1	2	3	377	141	-	-	-	1	-	81
Cochlodina laminata (Montagu)	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Clausilia bidentata (Ström)	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	1	-
Clausiliidae	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Helicella itala (Linnaeus)	-	11	3	4	16	5	8	61	83	-	-	4	15	129	19	20	99	92	2	10	15	21	114	23
Trichia hispida (Linnaeus)	6	10	3	1	10	7	25	164	175	1	4	4	29	251	76	31	72	76	2	6	29	6	138	2
Helicigona lapicida (Linnaeus)	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cepaea nemoralis (Linnaeus)	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cepaea/Arianta spp.	2	6	6	1	+	1	-	6	4	-	3	+	+	11	1	2	3	2	-	-	1	4	10	+
Valvata piscinalis (Müller)	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bithynia tentaculata (Linnaeus)	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxa	12	15	11	11	8	10	12	14	13	4	6	7	13	15	16	13	16	13	3	4	10	10	15	10
Shannon Index (*H'*)	1.72	2.30	1.99	1.98	1.51	1.97	1.79	1.78	1.92	1.33	1.67	1.86	2.17	2.03	2.05	2.16	1.96	1.89	1.05	1.20	1.66	1.80	1.98	1.64
TOTAL	**65**	**93**	**57**	**30**	**38**	**32**	**81**	**470**	**768**	**6**	**14**	**20**	**97**	**809**	**245**	**158**	**350**	**368**	**5**	**24**	**80**	**66**	**548**	**94**
Magnetic Susceptibility	62	94	60	30	30	61	47	101	141	7	9	9	16	120	71	27	42	64	11	22	45	81	99	11

Table 41. Flagstones; Neolithic land mollusc and magnetic susceptibility data.

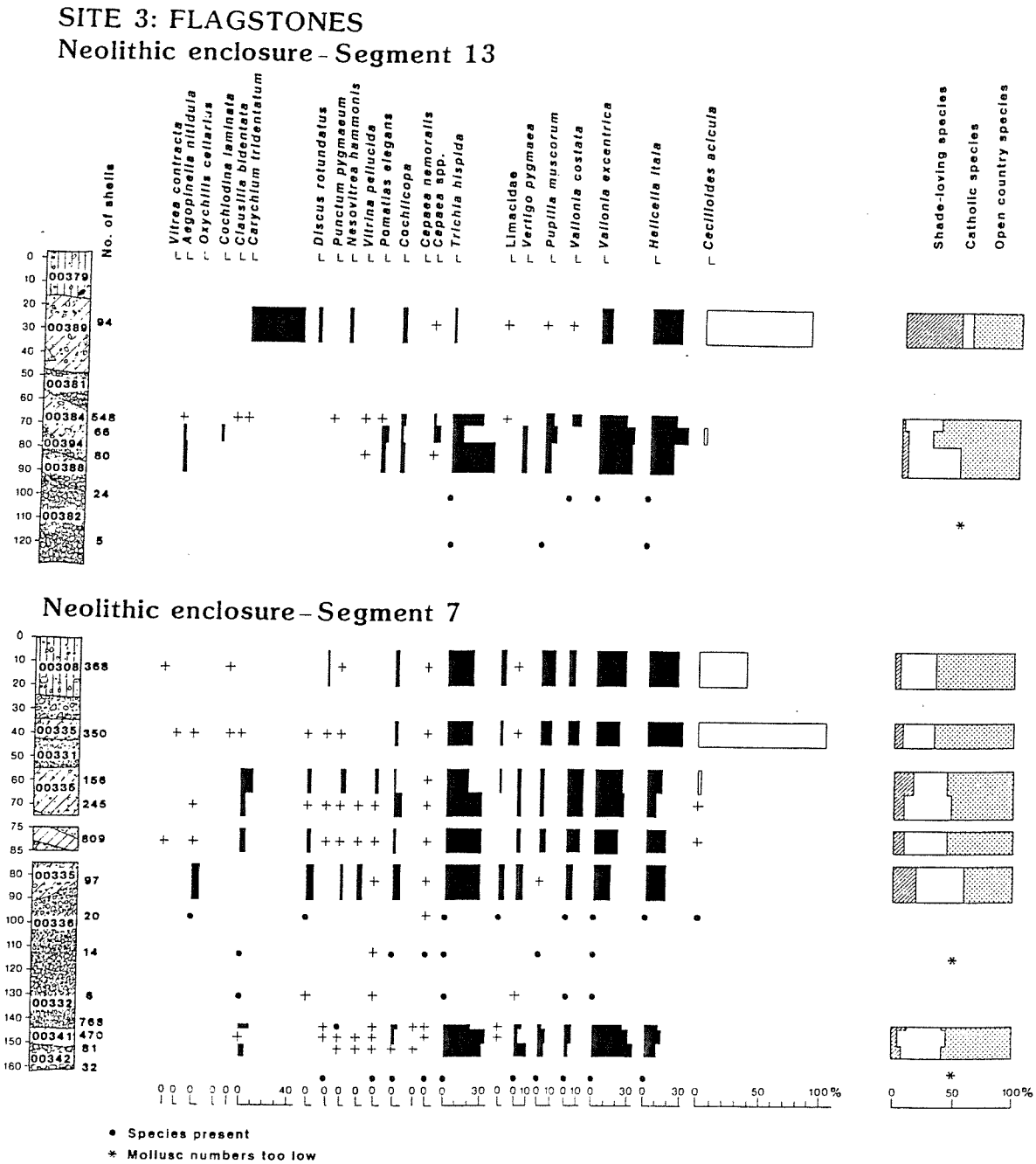


Figure 75. Flagstones; mollusc histograms from the enclosure ditches.

Segment 13

A second ditch fill sequence was analysed primarily because the occurrence of a fallen turf overlying the primary fills might enable any change within the local environments to be determined. Molluscs only occurred in significant numbers in the secondary and tertiary fills. The assemblages are almost identical to those from segment 7 (Fig. 75). The fallen turf showed an increase both in shell numbers and magnetic susceptibility. Only in the upper fill (context 00389) can any change in the assemblages be seen. A reduction in the open country species and an increase in *Carychium tridentatum* probably indicates long, possibly ungrazed grassland. A slight increase in *H. itala* can indeed be detected indicating a reduction in grazing pressure. This episode can probably be attributed to the Late Iron Age on the basis of the associated pottery.

The Bronze Age ring-ditch 00165 and associated features; Period 2

A column of eight samples from the ring-ditch (Fig. 76) was analysed. Although all the primary fills were very low in shells these were almost exclusively of open country species (Fig. 77). The finer fills overlying the coarse chalk rubble produced assemblages characteristic of harsh xerophilic arable conditions and can be seen as typical ploughwash deposits. Pits around the ring-ditch also produced assemblages of open, probably arable, conditions (Table 42).

Late Iron Age deposits; Period 3

A short sequence of samples from pit 00074 produced open country assemblages with significantly more species which prefer moister oligotrophic environments and probably represent moist longish grassland. The reduction of the large Helicellid *Helicella itala* in the upper samples might be a result of trampling and higher grazing density producing a short cropped turf suitable for the expansion of *V. excentrica*. Thus even in this short sequence a change from mesic to short grass can be detected. Although *Helix aspersa*, normally indicative of Roman or post-Roman infills (Kerney 1977), is recorded in one sample from this context, it may here represent a small hibernating group which has burrowed into the top of the context at a later date.

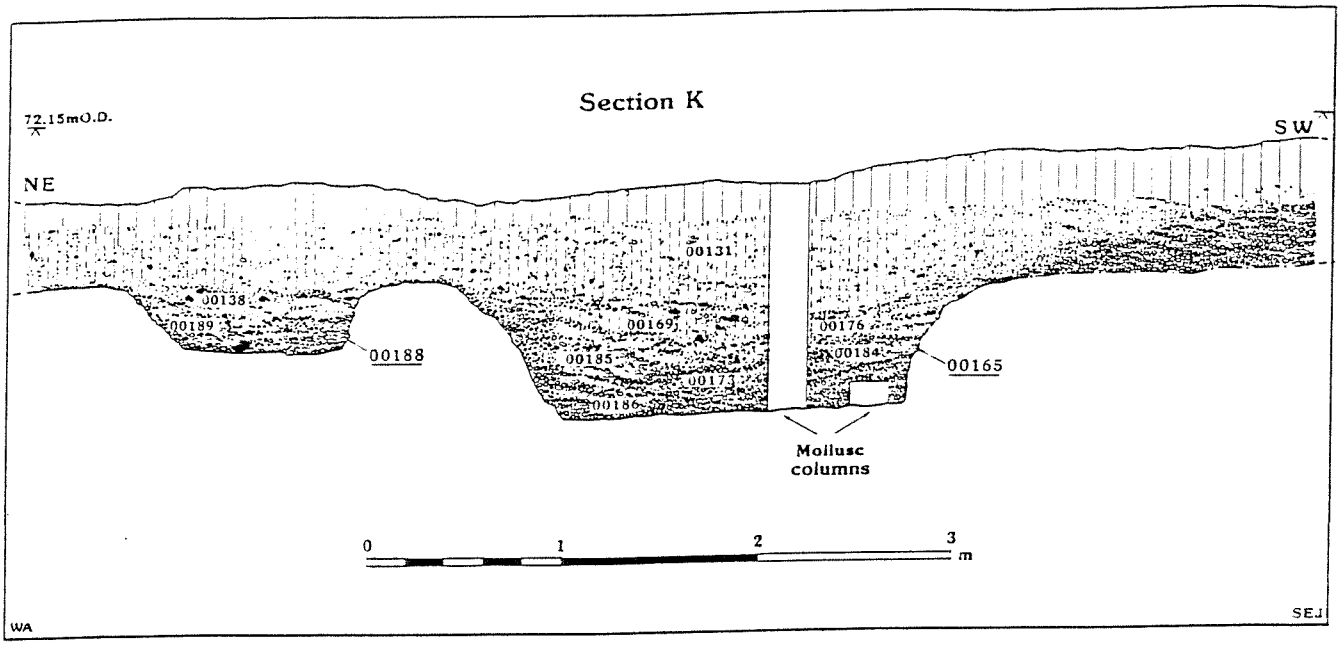


Figure 76. Flagstones; section of the Bronze Age barrow ditch.

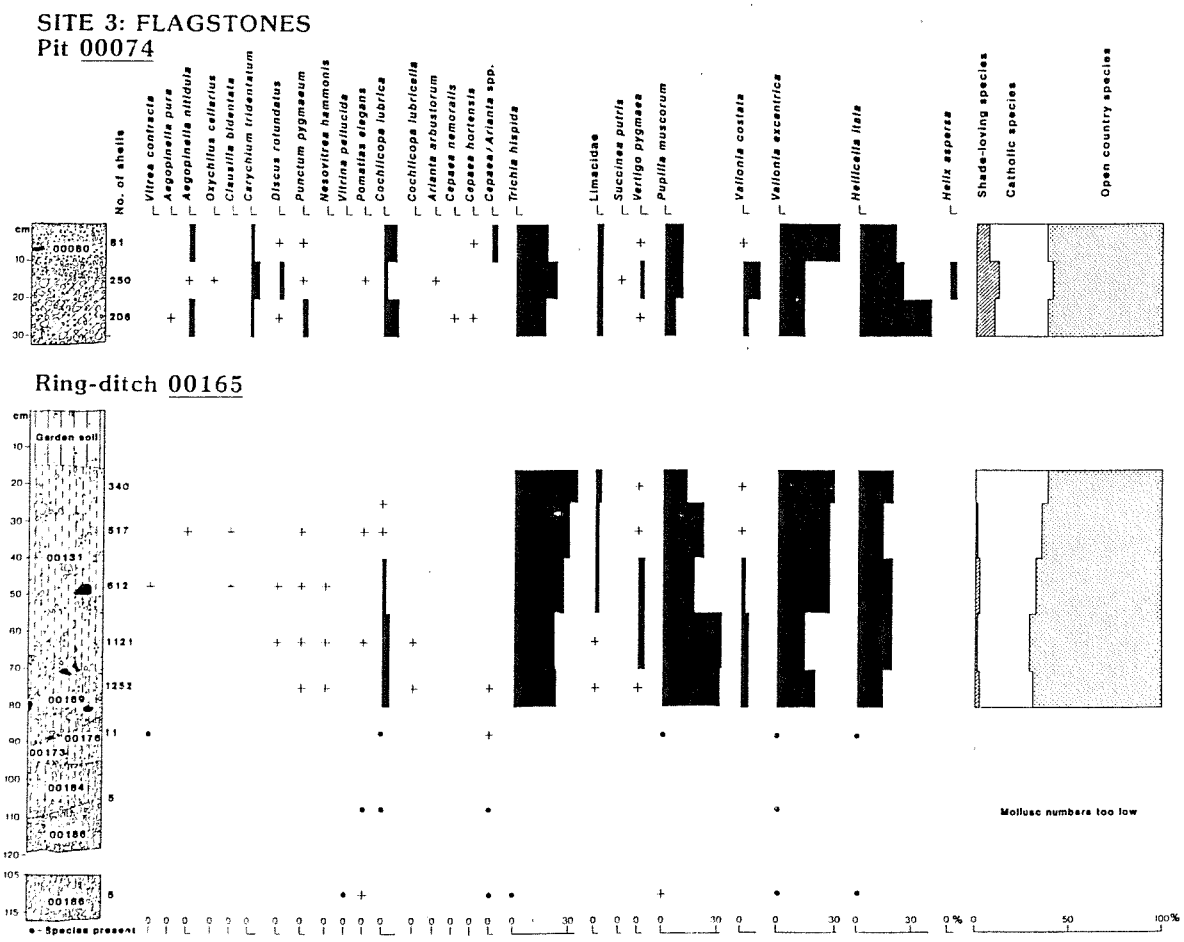


Figure 77. Flagstones; mollusc histograms from Bronze Age features.

\ Period	2											3	4		
									Pits peripheral to ring ditch						
\ Feature	ring-ditch 00165								00197		00161	00074			Tree
\ Sample	14	15	16	17	15	19	20	21	27	28	29	39	40	41	32
\ Context	00186	00184	00176/3	00169	00131				00419	00196	00183	0080			
\ Depth (cm)	Spot	100	80	70	55	40	25	16				20	10	0	
\		-115	-95	-80	-70	-55	-40	-25				-30	-20	-10	
\ Wt (g)	2000	1890	1740	2000	2000	2000	2000	1800	2000	2000	2000	1000	1000	1000	1000
MOLLUSCA															
Pomatias elegans (Müller)	+	1	-	-	1	-	1	-	-	-	-	-	1	-	-
Carychium tridentatum (Risso)	-	-	-	-	-	-	-	-	-	-	-	5	12	1	-
Succinea putris (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Cochlicopa lubrica (Müller)	-	-	-	25	18	-	-	-	1	6	1	-	2	-	-
Cochlicopa lubricella (Porro)	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-
Cochlicopa spp.	-	1	1	26	28	9	7	4	4	10	7	17	4	6	-
Vertigo pygmaea (Draparnaud)	-	-	-	11	30	18	7	4	-	10	9	1	6	1	-
Vertigo spp.	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
Pupilla muscorum (Linnaeus)	+	-	4	390	355	103	111	43	19	199	101	12	25	8	-
Vallonia costata (Müller)	-	-	-	55	40	12	6	4	10	22	2	7	23	1	2
Vallonia excentrica Sterki	1	1	3	247	164	165	139	98		96	76	28	35	25	12
Punctum pygmaeum (Draparnaud)	-	-	-	12	7	4	4	-	-	4	1	6	3	1	-
Discus rotundatus (Müller)	-	-	-	-	-	-	-	-	-	-	-	1	8	1	-
Vitrina pellucida (Müller)	1	-	-	-	2	1	-	-	-	-	1	-	-	-	-
Vitrea contracta (Westerlund)	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-
Nesovitrea hammonis (Ström)	-	-	-	8	3	2	-	-	-	-	-	-	-	-	-
Aegopinella pura (Alder)	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Aegopinella nitidula (Draparnaud)	-	-	-	-	-	-	1	-	-	1	-	6	1	2	-
Oxychilus cellarius (Müller)	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-
Limacidae	-	-	-	9	13	14	12	9	-	4	-	7	7	2	3
Cecilioides acicula (Müller)	3	-	-	26	60	162	345	417	5	-	6	3	1	9	130
Clausilia bidentata (Ström)	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-
Helicella itala (Linnaeus)	1	-	2	175	214	117	75	63	4	57	20	81	61	16	25
Trichia hispida (Linnaeus)	1	-	-	291	245	164	153	115	8	46	30	32	54	14	21
Arianta arbustorum (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
Cepaea nemoralis (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Cepaea hortensis (Müller)	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-
Cepaea/Arianta spp.	1	2	+	1	-	-	-	-	-	1	-	-	4	2	-
Helix aspersa (Müller)	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+
Taxa	5	4	5	12	13	13	12	8	7	11	9	15	16	13	5
Shannon Index (*H'*)	1.61	1.33	1.47	1.76	1.79	1.74	1.65	1.55	1.79	1.66	1.51	1.95	2.19	2.01	1.30
Total	5	5	11	1252	1121	612	517	340	54	456	248	206	250	81	63
Magnetic Susceptibility	21	37	28	35	46	54	50	61	10	15	13	48	47	37	28

Table 42. Flagstones; Bronze Age & Iron Age land mollusc and magnetic susceptibility data.

Summary

It is evident from this data that by the earlier Neolithic period an essentially open landscape existed at Flagstones. Further it may be implied from the specialised open country mollusc faunas and their continuous existence, that clearance was both extensive and well-established during the Early Neolithic. The earliest evidence indicates an open downland of long ungrazed or only lightly grazed grassland. However, within the Late Neolithic a well grazed short-turfed downland turf existed. It was in this pastoral environment that the Neolithic monument was constructed. The grassland can be seen to extend at least across to Alington Avenue (Section 7.6) and Fordington Farm (Allen 1992c) at this time. The monument existed in grassland for only a limited period of time (primary infills) before being ploughed. Although there is no evidence of a field system, the entire monument seems to have been under plough and although the Bronze Age ditches are filled with colluvium, the mound itself seems to have been respected. By the Late Iron Age the re-establishment of grassy downland conditions indicates the cessation of tillage. Initially the grass within the ditches was relatively long and probably only lightly grazed. Whether this was a localised 'crop-mark' effect confined to the ditches cannot be determined, but this longer grass was soon more intensively grazed, producing a typical downland short grass turf.

7.5 CONYGAR HILL

The excavations

This site comprises two hengiform pit-rings on the north slope of Conygar Hill (Fig. 78). Both pit-rings are on more level ground (*c.* 70m OD) below the steeper north-facing slopes and command uninterrupted views of Mount Pleasant and Maiden Castle to the north and west. Pit-ring 52118 consisted of seven discrete pits and two segments of more than one intercutting pit. The pits formed a near circle approximately 17m in diameter externally and 7.5m internally. Pit-ring 52100 was located 225m to the east of 52118 and slightly lower down the slope, but also on more level ground. This pit-ring consisted of eight discrete pits with an internal arrangement of eight post holes. It was larger than its companion; its external and internal diameter were 15m and 10.5m respectively. Sherds of Grooved-Ware were found in one ring.

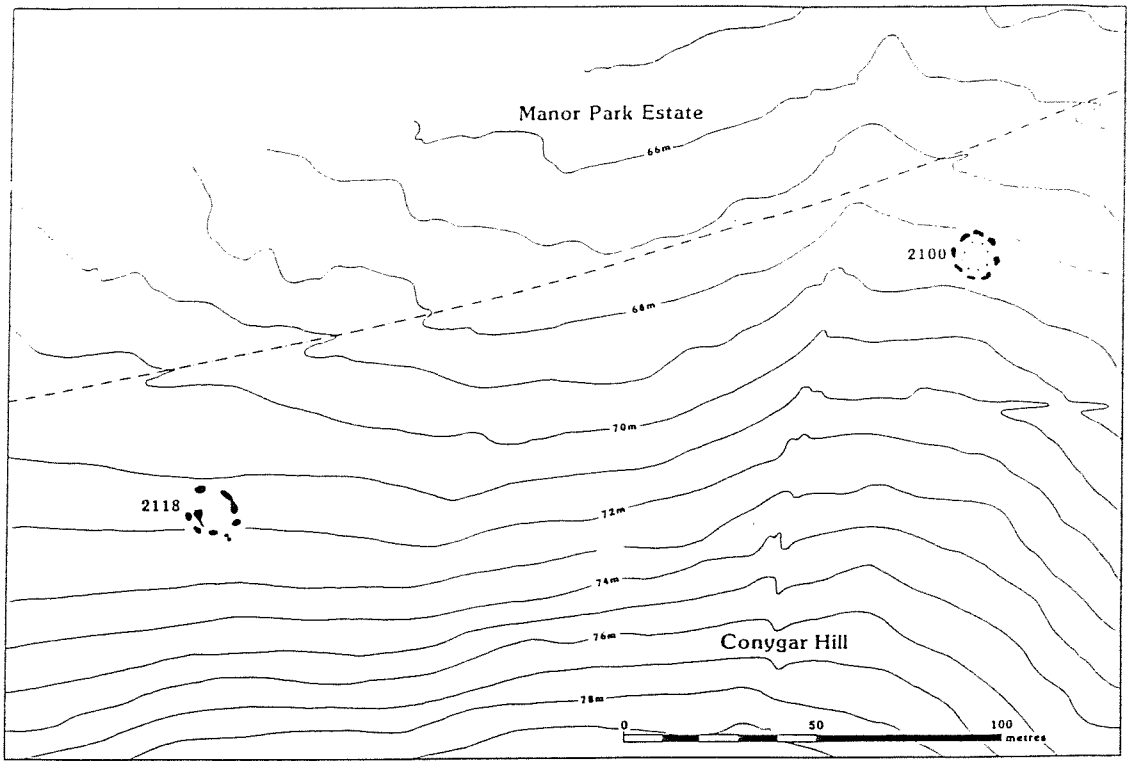


Figure 78. Conygar Hill Location and plan of the hengiform pit circles.

Molluscan analysis

A series of spot samples was taken by the excavator from both the lower and upper fills of several of pits of both pit-rings. Shell numbers varied considerably, but the assemblages were consistent and represent very open conditions. All 14 samples were dominated by open country species, in particular *Pupilla muscorum*, *Vallonia excentrica*, *Helicella itala* and *Trichia hispida* (Table 43).

These assemblages, containing the xerophilous species *H. itala* together with *P. muscorum* and the Vallonias, are typical of short-turfed, open, dry, grazed grassland. However, the basal samples of both post rings, and in particular pit 52129, contained higher proportions of shade-loving species (Fig. 79), notably *Vitrina pellucida*, *Aegopinella nitidula Nesovitrea hammonis*, *Carychium tridentatum* and *Vitrea* spp., none of which are obligatory woodland species. This suggests slightly more mesic conditions provided by longer, probably ungrazed, or only lightly grazed grassland.

\Post Ring	2100						2118							
\Sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14
\Context	2232		2231		2221		2154		2130		2161		2160	
\Depth (cm)	Lower		Upper		Basal	Top	Lower		Upper		Lower		Upper	
\	Fill		Fill		Fill	Fill	Fill		Fill		Fill		Fill	
\ Wt (g)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
MOLLUSCA														
Pomatias elegans (Müller)	+	+	2	+	5	2	+	+	+	+	+	+	-	-
Carychium tridentatum (Risso)	2	-	1	1	-	-	-	-	-	-	-	-	-	-
Cochlicopa lubrica (Müller)	-	-	2	-	-	-	-	-	-	-	-	-	-	-
Cochlicopa spp.	1	6	7	9	5	2	-	-	+	-	1	-	1	5
Vertigo pygmaea (Draparnaud)	1	-	2	2	-	1	-	1	-	2	-	-	-	1
Vertigo spp.	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Pupilla muscorum (Linnaeus)	20	13	32	29	17	10	+	7	2	7	3	10	12	20
Vallonia costata (Müller)	6	12	12	6	8	5	-	-	5	10	-	1	3	1
Vallonia excentrica Sterki	22	22	78	54	17	22	6	4	16	22	5	6	9	28
Punctum pygmaeum (Draparnaud)	2	-	1	1	1	2	-	-	-	-	-	-	-	-
Discus rotundatus (Müller)	1	1	+	1	+	+	+	+	-	1	-	-	-	-
Vitrina pellucida (Müller)	1	-	1	1	-	-	1	-	-	-	-	-	-	-
Vitrea contracta (Westerlund)	-	-	2	2	-	-	-	-	-	-	-	-	-	-
Nesovitrea hammonis (Ström)	1	2	2	-	-	-	-	1	-	-	1	-	-	+
Aegopinella pura (Alder)	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Aegopinella nitidula (Draparnaud)	-	-	1	1	-	-	2	1	1	-	-	-	-	-
Oxychilus cellarius (Müller)	1	-	1	-	-	-	-	1	-	-	-	-	-	-
Limacidae	-	-	2	4	-	1	-	-	2	-	-	-	-	-
Cecilioides acicula (Müller)	58	45	243	219	155	152	54	130	190	309	22	109	52	49
Cochlodina laminata (Montagu)	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Clausilia bidentata (Ström)	-	-	1	-	2	-	1	-	-	-	-	-	-	-
Clausiliidae	-	+	-	+	-	-	-	-	-	-	-	-	-	-
Helicella itala (Linnaeus)	5	7	50	41	27	37	12	8	32	21	3	6	13	13
Trichia hispida (Linnaeus)	12	9	18	46	6	18	5	7	7	1	+	6	5	26
Cepaea/Arianta spp.	+	+	+	+	1	1	-	+	-	-	-	-	-	-
Lymnaea truncatula (Müller)	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Lymnaea spp.	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxa	14	8	17	15	12	11	6	8	7	7	5	5	6	7
Shannon Index (*H'*)	1.97	1.82	1.88	1.82	1.94	1.76	1.44	1.75	1.41	1.50	1.43	1.46	1.57	1.57
TOTAL	**77**	**72**	**215**	**199**	**91**	**101**	**27**	**30**	**65**	**64**	**13**	**29**	**43**	**94**
Magnetic Susceptibility	6	8	24	25	20	35	21	25	36	40	6	9	15	21

Table 43. Conygar Hill; Land mollusc and magnetic susceptibility data.

Two specimens of the freshwater 'slum' group, *Lymnaea* cf. *truncatula*, were recovered. This species probably lived in the stream and adjacent environments of the South Winterborne River. Its occurrence here is outside its expected ecological range and probably due to accidental introduction by human or animal action.

No significant variation in the assemblages could be detected between the two rings. In general the samples from pit-ring 52118 produced fewer shells and proportionately slightly more shade-loving species. This might indicate that this pit-ring was constructed slightly before pit-ring 52100, when the downland grass was slightly longer and the

soil more acidic, however, if there was any time difference between the construction of the two monuments it was probably minimal.

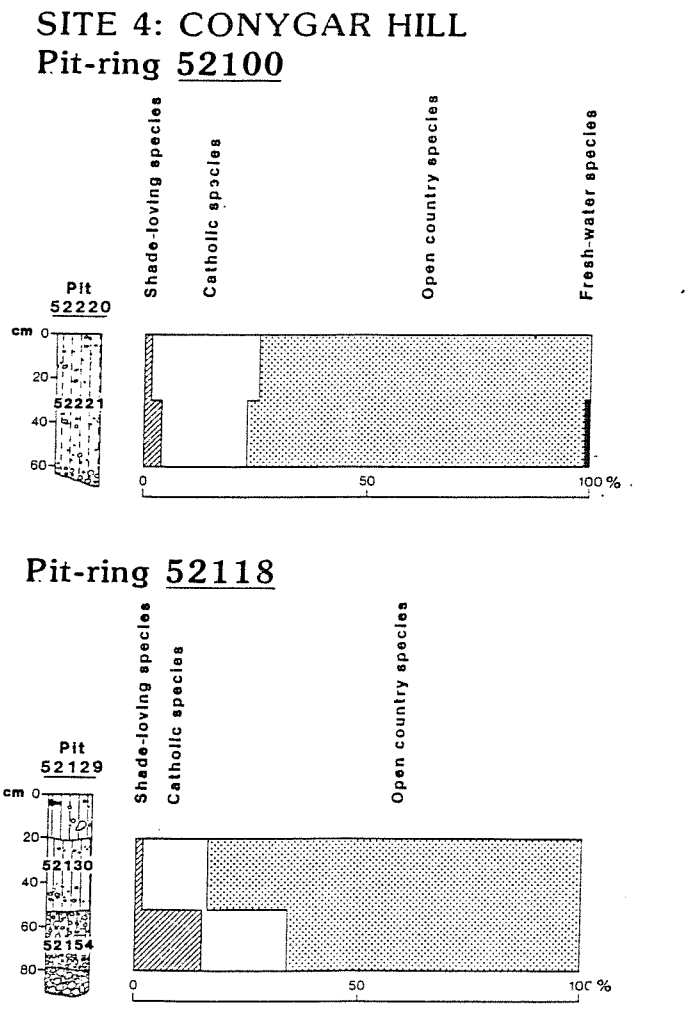


Figure 79. Conygar Hill; mollusc summary diagram.

Magnetic susceptibility

The magnetic susceptibility results were inconclusive, except that the basal fills produced lower readings (averaging 13.6 SI Units x 10^{-8} SI\Kg) and the upper fills averaged 28. The main reason for this variation was mainly due to the more calcareous lower fills 'diluting' the susceptibility reading. Interestingly though, the reading for the upper fills falls in the centre of the grassland range of susceptibility results (cf. Fig. 6).

Summary

The monuments were constructed in well-established long, ungrazed grassland and probably survived in grassy downland. Some indication of possible exploitation of the South Winterborne is suggested by the recovery of fresh-water molluscs.

7.6 ALINGTON AVENUE

The prehistoric features

The site lies on an east-west ridge about 1km to the south-east of Dorchester (Fig. 58). The earliest feature on the site is a pair of almost parallel ditches, 75m in length, aligned east-west in the centre of the excavation area (Fig. 80). These ditches probably represent the remains of a long barrow. A later Neolithic radiocarbon date of 3370 - 2910 cal BC (HAR-8579) was obtained from the skull of an aurochs (*Bos primigenius*; Maltby *dett.*) found on the bottom of the southern ditch. A subsidiary feature was added, modifying the eastern terminals by the addition of two bracket-shaped ditches. These formed an enclosure reminiscent of a Neolithic 'mortuary' enclosure.

At the west end of this long barrow was a 'waisted' barrow with a 'spectacle-shaped' ditch (Fig. 80) containing three, tightly crouched or trussed Bronze Age inhumations. The eastern part of this feature enclosed a circular timber structure and the ditch fills suggest an external mound. Davies *et al.* (1986), however, have argued for an internal mound.

Succeeding the Neolithic and Bronze Age funerary monuments are a series of ditches relating to Bronze Age and Iron Age field systems. A large Romano-British settlement and cemetery was also excavated.

Mollusc analysis

The site is located in an intensively plough-damaged landscape and all the archaeological features have been truncated and only survive as negative features, no old land surfaces or buried soils survive. Thus, as at Flagstones, the sampling strategy was to take samples from a range of ditch sections, to encompass the Neolithic, Final Neolithic/Early Bronze Age, Iron Age/Romano-British and medieval

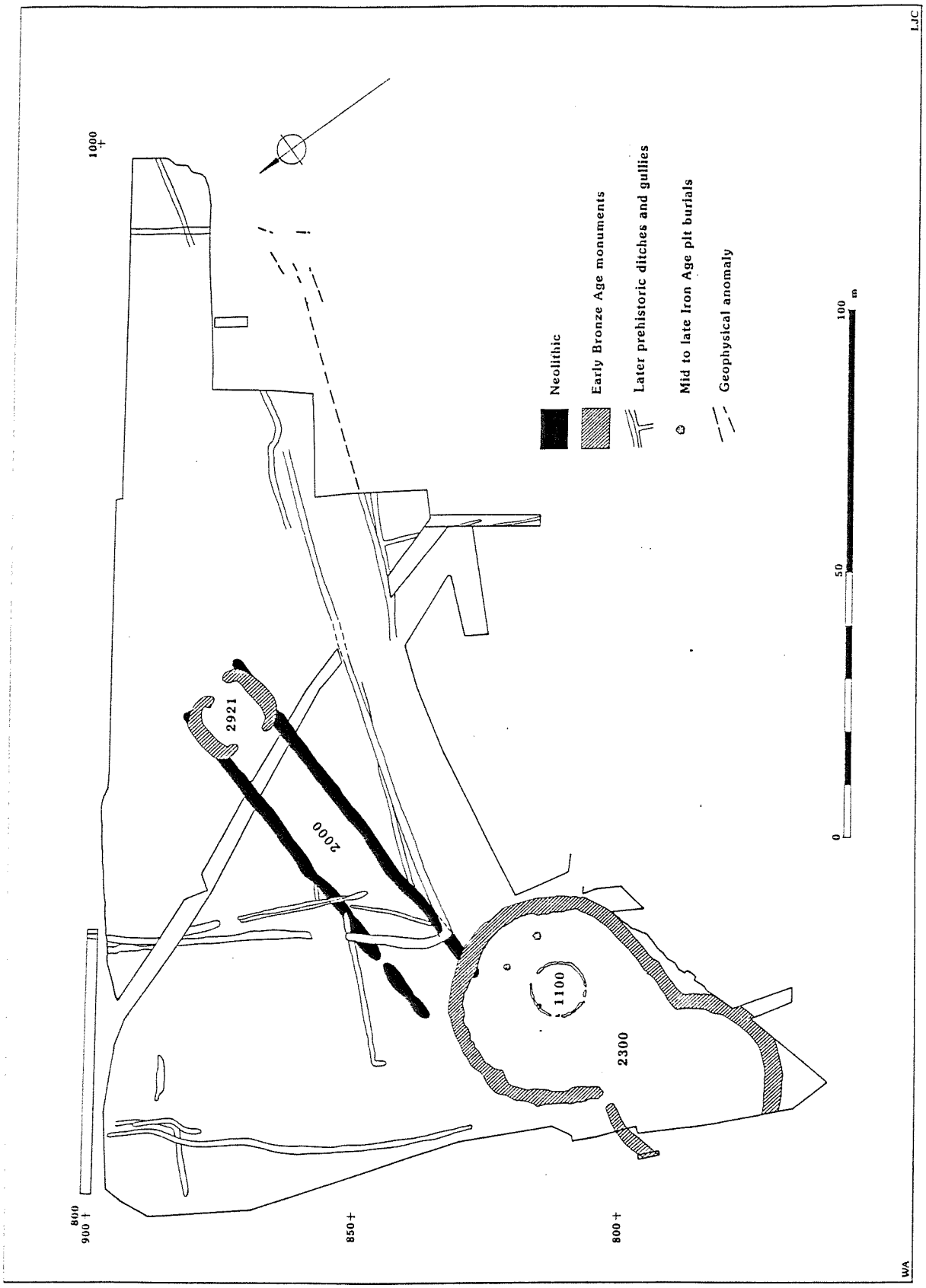


Figure 80. Alington Avenue; summary phase plan of the excavated features.

periods, and thus record the landscape history. In all thirty-six samples were taken. The highly calcareous nature of the ditch sediments ensured good mollusc preservation and significant mollusc numbers were recovered even from many of the very coarse primary fills, with a total of 19,834 molluscs extracted and identified. Only the Neolithic to Iron Age contexts are detailed here. The results of analysis are presented in table 44.

Neolithic Long Barrow - 2000 (Fig. 80)

The long barrow survived as two parallel ditches 75m long and approximately 10m apart, which had been gang-dug and were about 3m wide and between 0.8m and 1.3m deep. A slight, almost imperceptible, rise in the chalk was the only remaining evidence for an internal mound. No external banks survived, nor did any buried old land surface. The ditch fill consisted of a coarse chalk rubble primary fill overlain by a laminated fill of common medium and small chalk pieces. This was sealed by a stone-free dark brown silty loam which was interpreted in the field as a stabilisation horizon. The upper fills comprised of brown silty loams with varying abundances of smaller and medium chalk pieces and were all highly calcareous. The samples were taken in a column (column 3) at one of the deepest points at the east end, of a longitudinal section in the mid line of the north ditch and adjacent to the skull of *Bos primigenius* resting on the ditch floor.

The primary fill consisting of coarse, medium and large sub-angular chalk rubble, indicates rapid weathering of the ditch sides soon after the monument was constructed. This is attested by the unweathered nature of the ditch bottom and sides. The fill typically contains few molluscs (3) due to the hostile environment afforded by the sedimentation regime. The overlying deposit, consisting of predominantly small and medium rounded chalk pieces in a dark brown silty loam, suggests more stable conditions and this is reflected in increased mollusc numbers (74). The assemblage (Fig. 81) is dominated by *Pupilla muscorum*, with the Vallonias and *Helicella itala* as the other major components. The fauna is one of dry, open, short-turfed grassland with some bare ground, as indicated by the predominance of *Pupilla* and also the presence of *Pomatias elegans* (6.7%) which enjoys disturbed ground.

MOLLUSCA \ PHASE	NEOLITHIC BARROW						MORTUARY ENCLOSURE				aeolian			BRONZE AGE BARROW									?
SAMPLE NO.	355	356	358	359	360	361	348	349	350	351	352	353	354	339	340	341	342	343	344	345	346	347	576
CONTEXT	2102	2105	2106	2108	1797	1796	1390	1392	1303	1327	1385	495	1328	1491	1490	1490	1593	1591	1589	1586	1584	1584	704
DEPTH	85-110	65-85	49-65	42-49	18-42	0-18	115-128	90-115	60-90	38-60	18-38	11-18	4-11	97-110	84-97	75-84	66-75	59-66	51-59	39-51	25-39	0-25	18-38
WT. (g)	2000	2000	2000	1518	2000	1909	2000	2000	2000	2000	1123	1255	1875	2000	2000	2000	2000	2000	1420	1430	2000	2000	1822
Terrestrial Mollusca																							
Pomatias elegans (Müller)	-	5	7	6	4	4	2	-	+	1	1	+	3	-	+	1	+	1	1	+	+	+	7
Carychium tridentatum (Risso)	-	-	-	-	2	-	-	2	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Cochlicopa lubrica (Müller)	-	-	8	1	9	9	1	4	1	1	2	11	3	-	-	1	-	-	7	4	5	2	15
Cochlicopa lubricella (Porro)	-	-	2	-	2	-	-	-	-	-	1	4	-	1	-	-	-	-	-	-	-	-	-
Cochlicopa spp.	-	2	28	12	42	11	-	21	16	14	13	25	20	-	1	-	-	4	17	18	24	3	41
Vertigo pygmaea (Draparnaud)	-	1	7	2	16	4	2	6	1	2	-	4	2	-	-	-	-	-	6	14	15	6	12
Vertigo moulinsiana (Dupuy)	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	1
Vertigo spp.	-	-	1	3	12	-	-	4	-	-	-	-	-	-	-	-	-	2	3	10	9	1	7
Pupilla muscorum (Linnaeus)	-	21	26	13	117	61	7	108	42	136	93	300	102	+	1	8	42	152	103	196	247	100	67
Vallonia costata (Müller)	1	12	209	108	206	93	2	44	30	96	47	76	20	-	-	-	2	3	27	18	34	16	151
Vallonia pulchella (Müller)	-	-	-	2	9	-	-	-	2	2	-	5	-	-	-	-	-	4	2	-	-	-	-
Vallonia excentrica Sterki	-	15	77	17	48	26	4	61	20	20	47	95	105	1	1	3	10	58	145	218	292	206	34
Vallonia spp.	-	-	3	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	26	12	10	-
Ena obscura (Müller)	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Punctum pygmaeum (Draparnaud)	-	-	17	19	49	8	1	7	3	2	1	3	1	-	-	-	-	4	3	1	4	-	20
Vitrina pellucida (Müller)	-	1	4	1	3	-	-	2	-	-	-	3	-	-	-	-	-	5	1	1	-	-	2
Vitrea contracta (Westerlund)	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitrea spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Nesovitrea hammonis (Ström)	-	-	-	3	8	2	-	5	1	4	-	-	2	-	-	-	-	-	-	-	-	-	1
Aegopinella pura (Alder)	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Aegopinella nitidula (Draparnaud)	1	-	49	8	8	1	-	3	2	2	-	2	2	-	-	-	-	-	-	-	-	-	1
Oxychilus cellarius (Müller)	-	-	-	2	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Limacidae	1	-	7	3	23	5	-	7	2	6	2	7	3	-	-	-	1	3	3	7	9	4	1
Cecilioides acicula (Müller)	4	11	9	36	179	401	-	2	-	2	379	323	272	1	3	2	3	26	113	210	443	631	74
Clausilia bidentata (Ström)	-	-	-	1	-	-	-	+	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Candidula intersecta (Poiret)	-	-	1	-	-	-	-	-	-	-	-	4	4	-	-	-	-	-	-	-	58	79	-
Cernuella virgata (da Costa)	-	-	1	-	-	1	-	-	-	-	1	7	2	-	-	-	-	-	-	6	22	23	-
Helicella itala (Linnaeus)	-	11	40	56	219	83	13	85	103	132	60	175	144	-	10	10	5	55	188	208	135	43	162
Monacha cantiana (Montagu)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	-	-	-
Trichia striolata (C. Pfeiffer)	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichia hispida (Linnaeus)	-	3	75	61	373	164	8	120	52	142	74	281	106	2	1	1	9	15	228	180	171	86	208
Cepaea spp.	+	3	3	4	7	1	-	+	1	+	+	1	5	-	1	-	+	1	-	1	-	1	9
Helix aspersa (Müller)	-	-	-	-	+	+	-	-	-	-	-	+	-	-	-	-	-	-	+	+	1	+	1
Fresh- Brackish-water Mollusca																							
Bithynia tentaculata (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Lymnaea truncatula (Linnaeus)	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Lymnaea peregra (Müller)	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Pisidium casertanum (Poli)	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pisidium nitidum Jenyns	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxa	4	10	16	22	21	15	9	15	16	16	12	21	15	3	7	6	8	14	15	15	14	13	17
Shannon Index (*H'*)	1.10	1.92	2.07	2.17	2.04	1.93	1.86	2.02	1.82	1.76	1.79	1.80	1.94	1.04	1.17	1.39	1.20	1.53	1.72	1.54	1.95	1.57	2.00
TOTAL	**3**	**74**	**565**	**334**	**1161**	**472**	**40**	**482**	**278**	**564**	**305**	**1004**	**524**	**4**	**15**	**24**	**69**	**308**	**736**	**911**	**1039**	**580**	**744**

Table 44. Alington Avenue land mollusc data.

The absence of any significant shade-loving component from this assemblage, as defined by Evans; ecological groupings (1972, 194-6) and the lack of even non-apical fragments of the more robust shade-loving species (e.g. *Pomatias elegans*, Clausiliidae etc.) in the primary fill, indicate that this barrow was constructed in a pre-existing, well-established, dry, open downland environment, unless of course, a pre-monument woodland soil had been stripped prior to construction. If the monument had been constructed in recently cleared woodland, then shade-loving species from that land surface would have eroded into the primary fill. There is an absence of archaeological evidence at Alington, and elsewhere, for complete deturfing prior to long barrow construction (Ashbee 1970), while buried soils conspicuously survive at the excavated sites at Beckhampton Road, South Street (Ashbee *et al.* 1979) and indeed Maiden Castle (Wheeler 1943, 87; Sharples 1991). This suggests the former hypothesis is more likely.

The assemblage in the stone-free tertiary fills displays an increase in mollusc numbers (564) and is again dominated by open country species (81%) with *Vallonia costata* being the principal component and *Vallonia excentrica*, *Helicella itala* and *Trichia hispida* being common. The reduction in both *Pupilla* and and *Pomatias elegans* suggests a more complete vegetation cover. This is complemented by an increase in *V. costata*, which also prefers complete grassland cover, and *T. hispida*. Evans' Punctum Group (*Punctum pygmaeum*, *Vitrina pellucida* and *Nesovitrea hammonis*) represent 4% of the assemblage, which, with an increase in catholic species, can be seen to indicate stabilisation of the environment and colonisation of the ditch by plant species. The reduction in the and xerophile *Helicella itala* may be due to the ditch colonisation producing a locally more shady environment.

The assemblage overlying the stabilisation horizon is very similar. It displays a reduction in the Vallonias and an increase in *T. hispida* and *Punctum pygmaeum*, which indicate slightly more lush vegetation, perhaps longer grassland. Apart from the presence in very low numbers of more shade-loving species, the occurrence of a single specimen of the fresh- and brackish-water species *Pisidium casertanum* and also one individual of *Vertigo moulinsiana*, which Evans describes as a 'slum' species (1972, 196), may be indicative of damper environments, perhaps even

temporary puddles in the ditch.

The upper tertiary fill continues to indicate open dry grassland. *T. hispida* increases progressively becoming the most numerous species, while *Pupilla* shows a minor increase and *V. costata* an overall reduction. This indicates a certain amount of intermittent disturbance: *V. costata* shuns arable contexts whilst *Pupilla* is more tolerant of intermittent vegetation cover and bare ground, and *T. hispida* is common in ploughwash (cf. Thomas 1977b) and colluvial deposits (Bell 1983). Both samples of the upper tertiary fill contained non-apical fragments of the Roman introduction, *Helix aspersa.* The uppermost sample (0-18cm) contained a single specimen of *Cernuella virgata*, a medieval introduction (Kerney 1966), which still retained its periostricum and is therefore considered and is probably intrusive here. The tertiary fill of the ditch is probably Roman or earlier. The long barrow ditches infilled rapidly and were almost totally full by Roman times. Indeed much of the ditch seems to have been filled by the time the 'mortuary' enclosure was constructed.

Neolithic 'Mortuary' Enclosure - 2921 (Fig. 80)

A 'mortuary' enclosure with 'bracket-shaped' ditches was constructed in the Final Neolithic/Early Bronze Age at the eastern end of the long barrow by which time the ditches of the long barrow had almost completely silted up (Davies *et al.* 1986). The ditch fill of the 'mortuary' enclosure consists of laminated, coarse rubble primary fills, overlain by a fine, almost stone-free, silty horizon akin to the deposits described in the ditches at Mount Pleasant and the Conquer Barrow (Wainwright 1979). The ditch was sampled in two columns. Column 2b sampled the upper fills whilst column 2a concentrated on the primary fill, only the latter is considered here, column 2b is discussed later as it deals with sediments that are essentially Bronze Age in date.

It is clear that the 'mortuary' enclosure was constructed in an open and dry downland environment because of the lack of any evidence for regeneration of the vegetation from the mollusc sequence in the long barrow ditch fill - see above. Indeed the primary fills from the 'mortuary' enclosure produced an open country assemblage (70%) in which

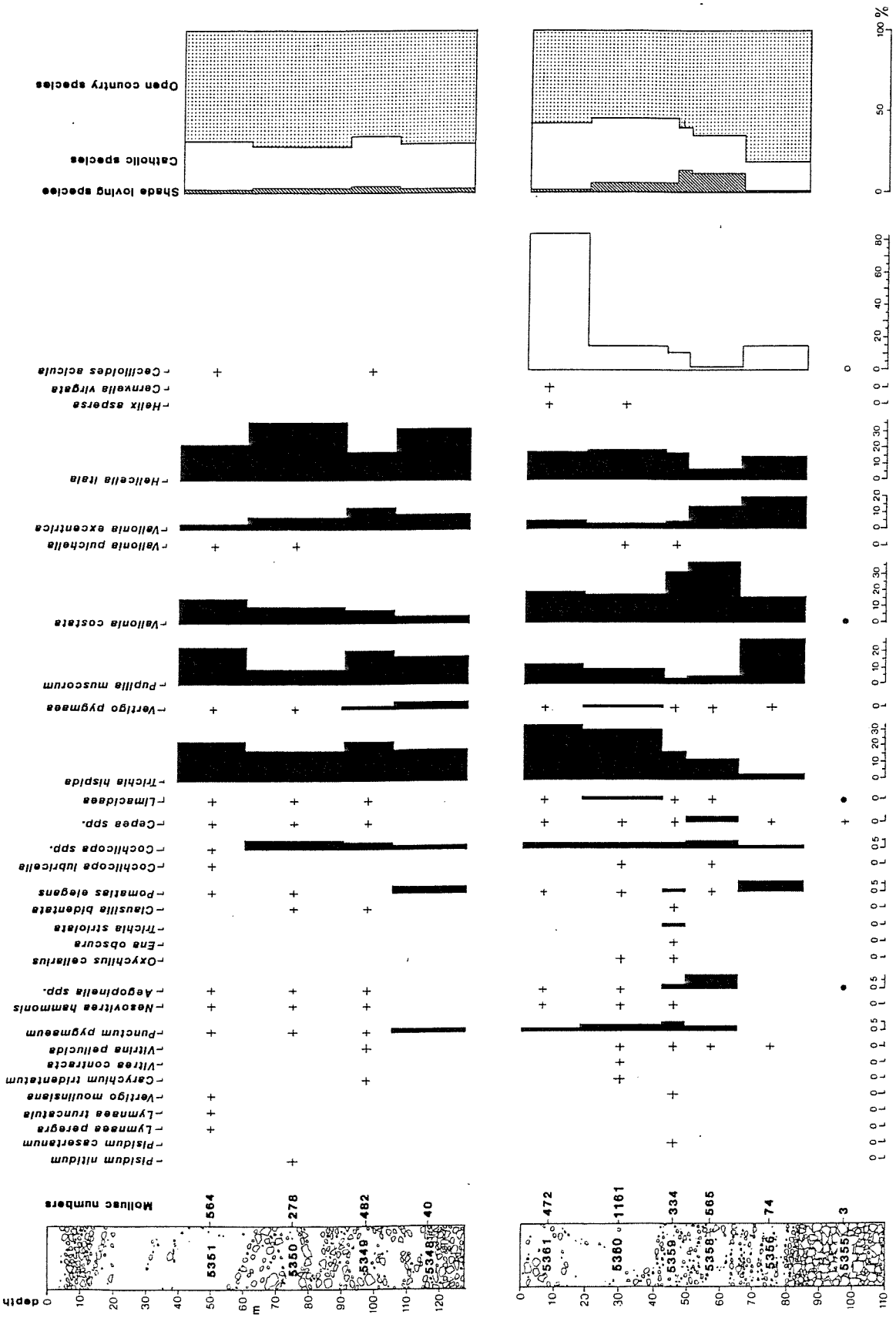


Figure 81. Alington Avenue; mollusc histogram from the long barrow mortuary enclosure ditches.

the obligatory calcicole *Helicella itala* was most numerous probably partially because of the extremely lime rich deposits and the environment provided by the construction of the enclosure (Fig. 81). The high proportions of *Pupilla* and *Pomatias elegans* can also be attributed to the bare-earth and disturbed environments provided by this construction. The other prominent species are *Trichia hispida* and the Vallonias. The presence of a relatively high percentage of *Trichia* and the fact that *V. excentrica* is more abundant than *V. costata* suggests intermittently disturbed habitats, possibly arable, The major components of the primary fill assemblages (*Trichia*, *Helicella*, *Pupilla* and the Vallonias) are typical elements of prehistoric arable and pastoral faunas. The top of the coarse primary fill (60-90cm) displays an increase in *V. costata* and *Helicella itala* to the detriment of *Trichia* and *Pupilla*. This may indicate a more complete, stable vegetation cover of short, grazed grassland. A single specimen of *Pisidium nitidum* was noted in this context. This is a fresh- and brackish-water slum species. The overlying deposits also reflect open habitats; a reduction in the percentage of *Pomatias elegans* and *Helicella itala* being due to some stabilisation and reduction of calcium carbonate (chalk) in the local environment, while the continued importance of *Trichia*, *Pupilla* and *Vallonia excentrica* indicates arable/pastoral environments. Although there is a dramatic contrast between the coarse primary fills and the fine silty 'aeolian' deposits overlying them, this is not reflected in the mollusc assemblage which is still predominantly that of open country (68.1%) suggesting short grazed grassland and perhaps arable habitats. The finer sediments, however, display an increase in mollusc numbers at the base of the tertiary fill (38 - 60cm) indicating a more stable micro-habitat.

Early Bronze Age 'Waisted' Barrow - 2300 (Fig. 80)

The 'waisted' enclosure is probably broadly contemporary with the Fordington Fields bowl barrow (Bellamy 1992). The ditch consisted of two conjoining circles at the west end of the long barrow cutting its southern ditch *c.* 2m from its western terminal. The ditches are steep-sided and flat-bottomed, *c.* 1.0 - 1.25m deep and 2.5m wide. The ditch fills were strongly asymmetrical indicating the presence of an external bank. The primary fills were typically composed of loose chalk rubble overlain by a highly calcareous silty loam with few stones. The upper

fills were coarser textured and contained more stones.

Once again all the assemblages are characteristic of xerophilous open downland (Fig. 82); shade-loving species never occupy more than 3.3% of the assemblage, and are not represented at all in most samples. The assemblage has a restricted taxonomic range and its principal components are *Trichia hispida*, *Pupilla*, *Helicella itala* and the Vallonias. The basal primary fill is dominated by *H. itala*, which decreases up profile as *Pupilla* increases significantly. This represents dry but fairly broken land which may be due either to the habitats provided by the construction of the enclosure or to arable contexts, or a combination of both. The secondary fills are marked by less stoniness, higher shell numbers and the occurrence of *Monacha cantiana* and *Helix aspersa* which are both considered to be Roman introductions (Kerney 1966). In the tertiary fills *Vallonia excentrica* increases, becoming the most numerous species; the assemblage is typical of ploughwash and arable contexts. At 25 - 39cm the Introduced Helicellids *Cernuella virgata* and *Candidula intersecta* appear, marking the onset of Kerney's mollusc biozone 'f', i.e. medieval (1977).

Bronze Age Farming: Column 2b; upper ditch fill of the 'Mortuary' Enclosure - 2921

'Wind blown' deposits in the Bipartite Ring-Ditch

A column of three samples (column 2b) and a single sample from the top of column 2a, taken from the upper silty deposits of the Neolithic 'mortuary' enclosure are discussed here because they are considered to be broadly Bronze Age in date. The restricted open country assemblage remains fairly uniform throughout the top 58cm of this feature (Fig. 82). *Trichia hispida* and *Pupilla muscorum* are most numerous with the *Vallonia excentrica* and *Helicella itala* constituting most of the rest of the assemblage. Once again the assemblages can be interpreted as those of essentially arable contexts. The aeolian deposits seem to have accumulated comparatively rapidly and coincide with the occurrence of *Lymnaea truncatula* and *Lymnaea peregra* (in the basal deposits;- 38-60cm) which are fresh- and brackish water species that inhabit small bodies of water, but are tolerant to their drying up. *Vertigo moulinsiana*, which occurs in this assemblage, also prefers moist habitats. This component of the assemblage probably reflects the

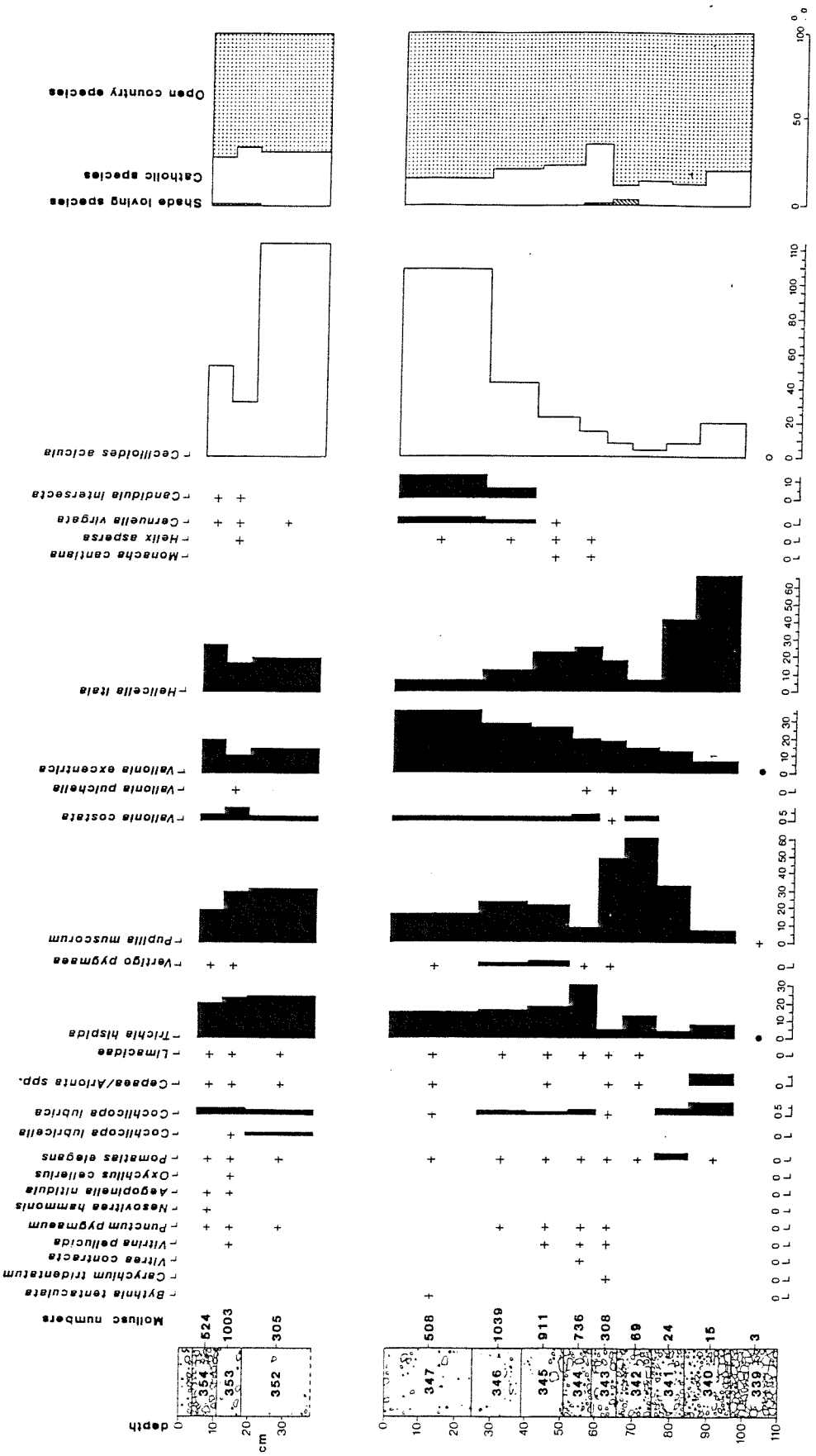


Figure 82. Alington Avenue; mollusc histogram from Final Neolithic/Early Bronze Age aeolian deposits in the 'mortuary' enclosure ditch and Bronze Age barrow.

micro-habitat of the ditch and indicates a period when temporary puddles may have existed in both ditches.

A thin lens of, predominantly, small and medium rounded chalk pieces sealed the aeolian deposits in the mortuary enclosure ditch. The mollusc assemblage shows a decrease in individuals other than which there is little change in the fauna. The deposit indicates higher energy conditions, perhaps ploughwash. The occurrence of *Helix aspersa* suggests that this lens may Roman.

Discussion

There is no evidence at Alington Avenue for pre-monument woodland in the Neolithic. The establishment of open grassland environments indicates that woodland clearance was undertaken some time prior to the erection of the long barrow. The long barrow was not, therefore, the first significant archaeological activity here; a situation paralleled at the Maiden Castle bank barrow (Evans and Rouse 1992b). Similarly the molluscan evidence from Flagstones (Section 7.3), Mount Pleasant (Evans and Jones 1979) and Maumbury Rings (Evans 1976, 29) indicates clearance prior to, rather than for, the monuments.

By the Final Neolithic/Early Bronze Age and the construction of the 'mortuary' enclosure the mollusc evidence is more conclusively suggestive of arable environments. This is corroborated by Staines' soil analysis (forthcoming), where he suggests that the high $CaCO_3$ content (61%) in the fill of the Mortuary enclosure ditch is a result of intensive local arable activity. There is an apparent lack of survival of primary woodland faunas here and in the Dorchester region. This could be either due to long, stable woodland conditions providing less calcareous, and thus less favourable environments for shell preservation; or to extensive soil erosion on the slopes removing the primary woodland contexts. The latter has been argued by Bell *et al.* (1991) for the Winterbourne Steepleton sites at Cowleaze and colluvial deposits at Loscombe. The truncation of such contexts on slopes and valley bottoms is one being repeatedly observed elsewhere in southern Britain (Bell 1983; Bell and Allen 1985; Allen 1984a; 1988a; 1992a). At Alington, the lack of any shade-loving species in the earliest contexts suggests that a long period of stable grassland preceded the

construction of the long barrow. In the later periods however, truncation by erosion and arable activity is seen.

A continuation of arable environments is indicated by the assemblages from the Bronze Age round barrow ditch. This contrasts with analysis from the barrow at Fordington Farm (Allen 1992c) where pasture and grazed grassland was evident and with more scrubby conditions at Mount Pleasant at this time. However, during the Bronze Age the environment became more homogeneous. The mollusc assemblages indicate extreme xerophile conditions and intensive arable activity.

The silty nature of the Bronze Age tertiary fills of the 'mortuary' enclosure and round barrow ditch fills is striking, and is paralleled in those recorded at the Conquer Barrow, Mount Pleasant. The aeolian silt is derived from soils which existed in the immediate vicinity. Calcareous downland soils are ubiquitously silt rich - *c.* 60% - (Hodgson 1967, 131) which is probably a remnant of the insoluble silt sized mineral fraction originating from loessic deposits (Catt 1977). This is significant because the erodibility of soils is dependent upon their mineral skeleton and structure. Certain fractions (particle sizes) within the mineral skeleton are more susceptible to erosion, especially well-sorted sands and silts (Butzer 1974); the most erodible soils being those with a silt content of 40 - 60% (Morgan 1979, 29). Thus the chalkland soils are potentially highly erodible but the more important factor to consider here is soil structure, promoted by clay content, organic matter, soil fauna and the presence of divalent calcium cations. These characteristics are depleted under intensive agricultural regimes which physically break down the soil, reducing the divalent cation content by leaching and depleting the organic content (Albrecht 1956) while a little organic matter may be under lost under poorly managed cereal cultivation. Thus intensive agricultural regimes may deplete soil structure leading to extensive deflation. The aeolian deposits in these features can be seen as a product of extensive Bronze Age agriculture. Indeed, although these are arable contexts, good shell preservation and the relatively high mollusc numbers may be in part attributed to the particle size composition and highly calcareous nature of these deposits. The evidence indicates long term, intensive agricultural conditions.

In the later prehistoric and Romano-British periods more extensive field systems were laid out incorporating the round barrow; this implies its survival as an earthwork at this time. The Mollusca from the upper ditch fill of the round barrow included species introduced in the Roman and medieval periods, which corroborates this suggestion. The Iron Age and Romano-British ditches revealed typical open country assemblages, as seen throughout the Bronze Age. There are, however, more shade-loving elements, indicating very localised regeneration of shrubbier species, specifically those associated with field edges.

In summary, the molluscs indicate continuous farming activity on the ridge, preceding the first archaeological structures. Arable farming can was extremely intensive during the Bronze Age, but less so after the formal delineation of the enclosures and field systems in the Late Iron Age and Roman periods. the post-Bronze Age evidence seems to indicate more pastoral activity at Alington Avenue itself. This mixed agrarian activity continued until the present day. It is evident that the present day Upton Series calcareous silty rendzinas at Alington Avenue are a result of prehistoric farming on the landscape.

7.7 NEOLITHIC POST PITS AT GREYHOUND YARD, DORCHESTER

The Neolithic features

Excavations were conducted within the centre of *Durnovaria* prior to development on the Greyhound Yard site. The site lies at *c.* 46m OD and is situated on the west side of a shallow sloping combe, running into the floodplain of the River Frome at the east gate of the Roman town. These excavations revealed medieval deposits beneath which was extensive evidence of the Roman town (Woodward *et al.* 1985). The earliest features, however, belonged to the Neolithic and consisted of an arc of 21 post-pits exposed for 50m and were severely truncated by Roman terracing. THe pits were of considerable dimensions and a shallow ditch cut into the Middle Chalk (Fig. 83). The post-pits were ovate in plan with a maximum depth of 2.5m. All had a vertical eastern face and a sloping ramp to the west. The infill of the pits was consistent with the erection of large vertical timbers of mature oak 0.9 - 1.2m in diameter, wedged against the eastern edge with rammed chalk. The upper fills of of each post-pipe contained a brown earth.

The arc is postulated to be a portion of a complete ring some 380 meters in diameter. Little prehistoric pottery was recovered, but small sherds of Peterborough Ware and Grooved Ware were recovered from the soils of the post-pipes. A series of radiocarbon dates indicate a date of destruction of *c.* 2800 - 2500 cal BC (Table 49).

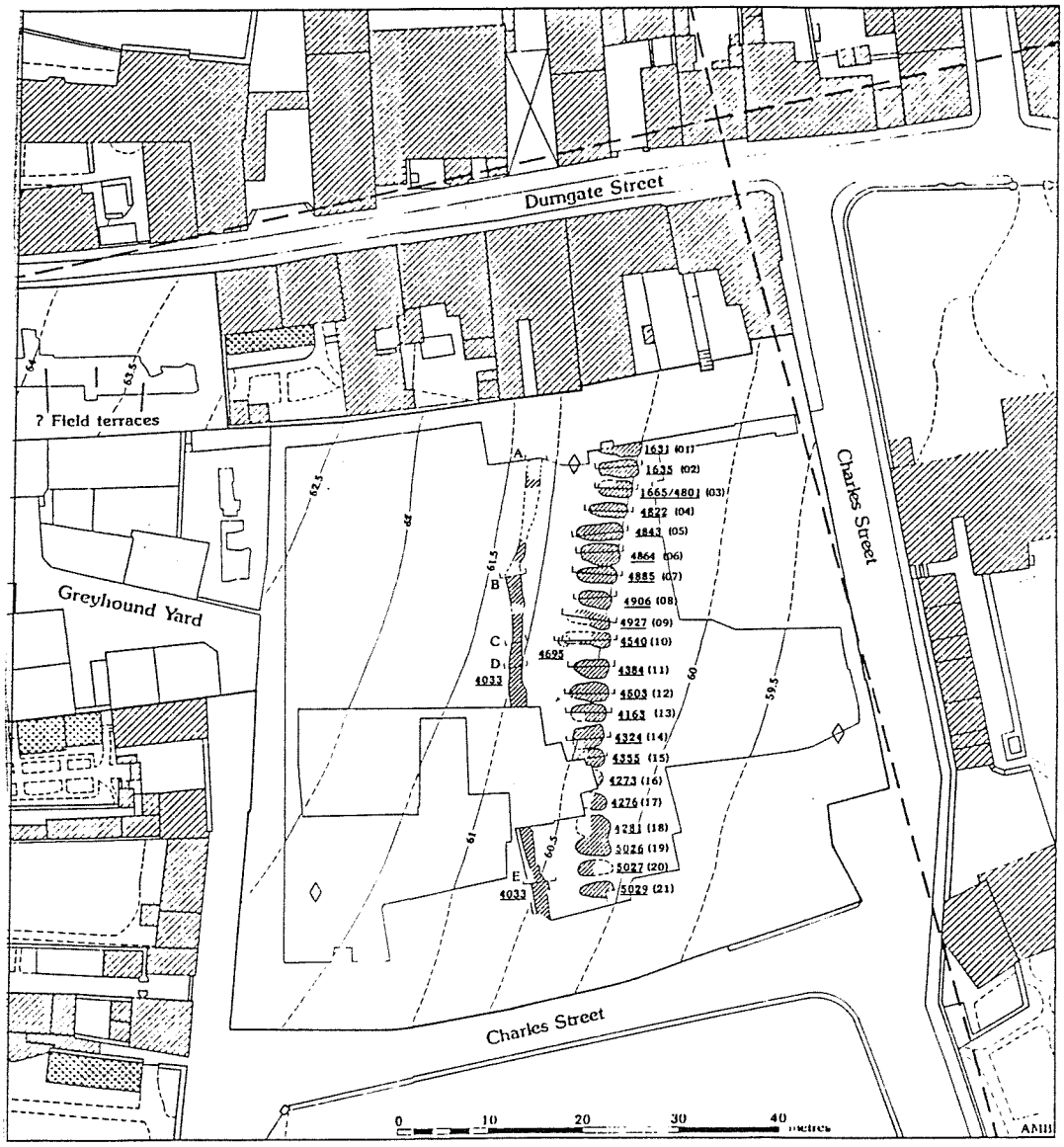


Figure 83. Greyhound Yard; plan of the Neolithic post pit arc.

This Neolithic post-pit monument is situated in the River Frome valley unlike many of its contemporary monuments which are situated on the chalk in more prominent, 'upland', locations. If the arc constitutes a portion of a complete circle *c.* 380m in diameter (Woodward *et al.* 1985), then it is evident that the portion of the monument excavated is

on the upslope side and is almost the furthest sector from the river. This local topographical point must be borne in mind when considering the environmental evidence discussed below.

Mollusc analysis

Two adjacent Neolithic post-pits (1631 and 1635) on the northern side of the excavations (Fig. 83) were sampled for Mollusca and the sample locations are illustrated in figure 84.

Molluscs were well preserved and were surprisingly abundant in most contexts (Table 45), however the secondary precipitation of calcium carbonate coated many of the shells making identification, even to family level in some cases, very difficult. Most of the calcium carbonate coatings were removed by techniques developed by the writer (Allen 1986b). Due to the extremely large numbers of *Vitrea*, differentiation was not made between the two species; *V. contracta* and *V. crystallina*, though most seemed to be the former.

Neolithic post-pits and sampled contexts

The basal mollusc assemblage [611] was extracted from a thin lens of burnt and reddened (5YR 6/8) ashy silt loam with many fine charcoal flecks at the base of post-pipe 1647. The reddened chalk pieces and the nature of the lens show that the burning was *in situ*. Further, of the 371 molluscs extracted, 339 shells (i.e. >91%) displayed obvious grey discoloration due to burning. Thus this assemblage is contemporary with the construction of the monument and reflects the pre-monument environment. The assemblage is dominated by shade-loving species according to Evans' ecological groups (1972, 194-6) and is characterised by abundant *Discus rotundatus*, *Oxychilus cellarius* and *Vitrea* spp., associated with *Carychium tridentatum*, *Trichia striolata*, *Cochlicopa* spp. and *Helicella itala*. The predatory Zonitids (*Discus*, *Trichia* and *Carychium*) are commonly associated with decaying plant material, particularly deciduous woodland leaf litter. The rupestral species *Acanthinula aculeata* and *Balea perversa* were also present and may indicate the presence of tree and shrub species. The Vitreas, *Trichia striolata* and *Cochlicopa* spp. are tolerant of more open scrubby conditions. One interesting and significant aspect of the assemblage is the presence of the fresh and brackish water species, namely;

Figure 84. Greyhound Yard; sections of the post pits samples showing the location of the samples.

Pisidium nitidum (4), *Pisidium casertanum* (1) and *Carychium minimum* (1). All of these examples, and the *Pisidium* spp., were burnt. Although they only represent 2% of the assemblage, at least three species of *Pisidium* are present, all slum species which live in marsh or poor water conditions. *P. nitidum* is tolerant of marsh but not stagnant water and puddles as is *P. personatum* (Ellis 1978), while *P.*

casertanum is the commonest and most widely distributed freshwater bivalve, tolerating all types of fresh and brackish water habitat.

It seems likely that this assemblage represents open scrub, perhaps even a secondary woodland with tall lush grassland and scrub environments. The marsh and slum species representing the moister habitats on the Frome floodplain possibly attributable to occasional floods. It is possible that turf or reeds from nearer the river were burnt in the post-pipe prior to the insertion of the timber post.

The ramp fill, consisting of a coarse chalk rubble contained no molluscs. This was because the chalk rubble had been excavated for the ramp and pit had then been used to backfill and support the post. On field examination none of the tip lines of finer material seemed to contain molluscs either.

Seven samples were analysed from post-pipe fills of the two post-pipes (1647 and 1639). With the exception of sample 606, which came from chalk rubble and only produced two molluscs, all the samples came from a mixed silty loam with chalk fragments and produced large numbers of Mollusca, up to 2996 (i.e. 1498 per kg). This unusually high abundance of shells and their incorporation into the post-pipe is discussed below. The assemblage also displayed a large taxonomic range averaging 27 taxa per sample and does show similarities with the pre-monument assemblage; they are predominately shade loving species. However, the Vitreas and *Carychium tridentatum* are most numerous. *Carychium*, although common in deciduous woodland, can also tolerate areas of scrub and tall lush grassland, whilst the Vitreas are found wherever there is a modicum of shelter (Evans 1972, 187) and both have definite affinities with the catholic groups. Together these two taxa never comprise less than 29% of the assemblage and more commonly represent *c.* 48%. Other prominent species include *Cochlicopa* spp., *Aegopinella pura*, *A. nitidula* and *T. hispida*. With the exception of *Cochlicopa* spp., which are catholic species, the other molluscs are classified as shade-loving by to Evans' ecological groups (1972, 194-6). Nevertheless, as with *Carychium* and *Vitrea* all of these species are common in tall ungrazed grassland (Cameron and Morgan-Huws 1975; Kerney and Cameron 1979) where the lush vegetation provides a shady micro-habitat.

Feature	1631					1635			
Samples	611	606	607	608	610	612	613	614	633
Context	1656	1658	1653	1642	1640	1907	1906	1946	1905
Weight (g)	2000	2000	2000	2000	2000	2000	2000	2000	2000
Mollusca									
Pomatias elegans (Müller)	-	-	-	1	-	1	-	-	-
Carychium minimum Müller	1	-	-	18	4	17	8	12	8
Carychium tridentatum (Risso)	7	-	1	116	57	227	191	501	24
Carychium spp.	4	-	-	44	27	204	127	414	25
Cochlicopa lubrica (Müller)	3	-	1	18	6	7	4	36	10
Cochlicopa lubricella (Porro)	1	-	1	1	2	5	9	3	1
Cochlicopa spp.	18	-	-	75	33	134	179	357	53
Vertigo cf. *pygmaea* (Draparnaud)	2	-	-	3	4	2	2	4	20
Pupilla muscorum (Linnaeus)	3	-	+	30	22	12	21	31	96
Vallonia costata (Müller)	5	-	-	10	9	13	7	27	203
Vallonia pulchella (Müller)	8	-	2	48	25	20	42	81	6
Vallonia excentrica Sterki	2	-	2	2	-	-	-	6	45
Vallonia excentrica/pulchella	-	-	4	-	-	13	-	-	-
Vallonia spp.	2	-	-	19	1	-	1	5	27
Acanthinula aculeata (Müller)	1	1	1	33	15	98	103	89	10
Ena montana (Draparnaud)	-	-	-	-	-	-	-	1	-
Ena obscura (Müller)	-	-	-	5	4	19	24	25	1
Punctum pygmaeum (Draparnaud)	6	-	1	38	12	48	38	84	-
Discus rotundatus (Müller)	82	-	-	89	45	173	135	247	84
Vitrina pellucida (Müller)	5	-	-	5	5	25	14	26	2
Vitrea spp. undiff.	59	-	11	228	96	389	481	416	19
Nesovitrea hammonis (Ström)	-	-	2	20	14	4	11	21	8
Aegopinella pura (Alder)	4	-	2	60	17	127	94	185	11
Aegopinella nitidula (Draparnaud)	33	-	1	48	21	64	50	94	45
Oxychilus cellarius (Müller)	63	1	4	100	44	78	77	70	19
Oxychilus alliarius (Miller)	-	-	-	1	-	-	-	-	-
Limacidae	2	-	-	13	13	2	48	61	16
Cecilioides acicula (Müller)	-	-	-	8	3	-	-	-	4
Cochlodina laminata (Montagu)	-	-	-	1	2	2	2	4	-
Macrogastra rolphii (Turton)	-	-	-	-	-	5	2	3	-
Balea perversa (Linnaeus)	-	-	-	1	-	1	2	9	-
Clausilia bidentata (Ström)	1	-	-	11	2	4	12	22	17
Clausiilidea	-	-	-	1	-	2	-	-	-
Helicella itala (Linnaeus)	33	-	-	12	33	18	24	47	64
Asfordia granulata (Alder)	-	-	-	3	-	-	-	-	-
Trichia striolata (C. Pfeiffer)	18	-	3	46	19	55	26	64	66
Trichia hispida (Linnaeus)	5	-	1	9	17	43	19	33	501
Cepaea nemoralis (Linnaeus)	-	-	-	2	1	2	2	1	1
Cepaea spp.	3	-	1	7	3	-	-	17	23
Fresh- Brackish-water Mollusca									
Pisidium casertanum (Poli)	1	-	-	1	-	-	-	-	-
Pisidium nitidum Jenyns	4	-	-	-	-	-	-	-	-
Pisidium spp.	1	-	-	-	-	-	-	-	-
Taxa	25	2	15	33	26	29	27	29	24
Shannon Index (*H'*)	2.44	0.69	2.45	2.83	2.89	2.63	2.57	2.68	2.41
TOTAL	**371**	**2**	**38**	**1118**	**553**	**1838**	**1771**	**2996**	**1405**

Table 45. Greyhound Yard; Land mollusc data.

Acanthinula aculeata which also represents a significant proportion of the assemblages, is a rupestral species common in woodland, although Evans records its occurrence in quite open grassy glades in Wytham Wood, Berkshire, and the author has noted it in rough pasture and hawthorn sere on the South Downs, though never far from sheltered habitats. Similarly, *D. rotundatus*, which consistently represents *c.* 12% of the assemblage, is a common woodland species but also occurs in hedgerows and hawthorn sere (pers. obs.).

Other woodland species, such as *Ena montana*, *E. obscura* and the Clausillids, are present in low numbers. The final component of these assemblages is that attributed to open country. Up to seven species are present, although the most abundant is *Vallonia pulchella* which prefers moist habitats and is often found in marshes.

Although these assemblages are predominantly shade-loving as defined by Evans, many of the species present also inhabit more catholic, or even open, environments. The overall picture is one of open tall lush grassland vegetation with some shrubs, either the result of earlier clearance or the modified floodplain environment. Open country species such as *Helicella itala* and *Vertigo pygmaea* would co-exist with the more mesic species in these semi-open conditions.

The upper post-pipe fill contains a weathering cone filled with a decalcified brown earth which represents erosion of the local argillic to typical brown earths into the hollow produced by the rotting timber post. Beneath this layer, but above the post-pipe fill, was a calcareous lens with abundant small and medium chalk pieces. The mollusc assemblage [633] from this layer contrasted significantly with those discussed above in that it showed a marked increase in catholic and open country species. In particular *Trichia hispida* was dominant. Both *Vallonia excentrica* and *V. costata* became more significant to the detriment of *V. pulchella* and were associated with increased numbers of *Pupilla muscorum*, *Vertigo pygmaea* and *Helicella itala*, all of which indicate drier, more open conditions. The presence however, of *C. tridentatum*, *A. nitidula*, *T. striolata* and *D. rotundatus*, suggest that highly xerophilous conditions did not prevail. It is therefore likely that the environs were open, possibly pasture with tall grasses.

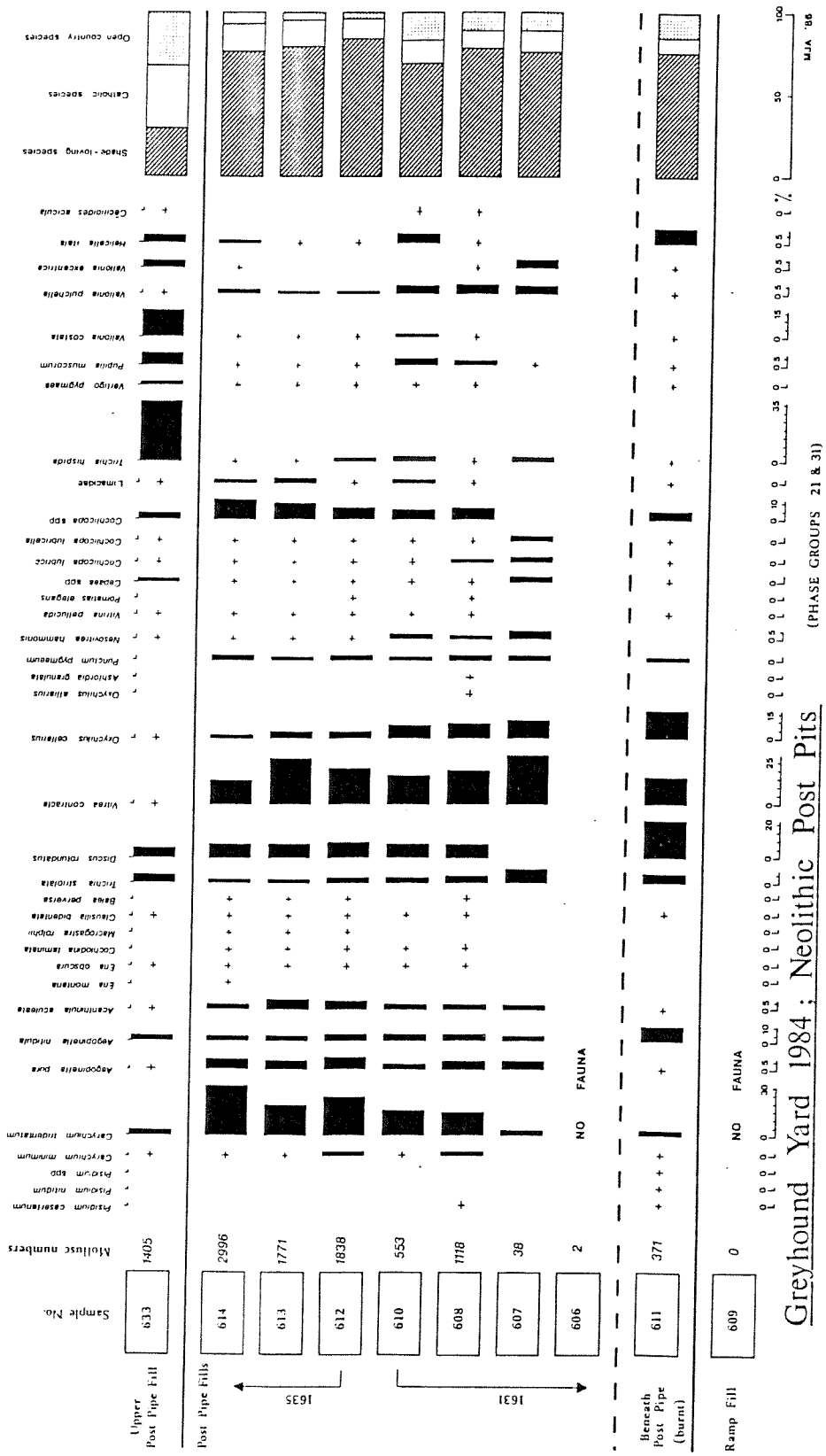


Figure 85. Greyhound Yard mollusc histogram.

To ascertain whether there was significant similarity between the main post-pipe assemblages and whether this group was significantly different from the pre-monument post-pipe assemblage [611] and the weathering cone fill [633], correlation coefficients were calculated using Statgraphics. The results are recorded in table 46. For probabilities of 0.001, coefficients greater than 0.572 are significant. The analysis demonstrated that most of the assemblages in the post-pipe [607, 608, 610, 612, 613 and 614] produced probabilities in excess of 0.001 (i.e. 1 in 1000) indicating a true similarity between assemblages of this replicate series. The coefficients between this group and the pre-monument assemblage [611] on the whole exhibited, probability levels of greater than 0.01, indicating significant similarity but not total parity. Finally the upper post-pipe assemblages were significantly at variance, with many very low coefficients.

Thus the comparison between the the pre-monument assemblage and those in the post-pipe indicates similarity but not true comparability and suggest that they originate from very similar environments, though not necessarily the same one. Finally the upper post-pipe fill belongs to a very different fauna.

Taphonomy of the assemblages

As indicated above, the major problem of these assemblages is their origin and the taphonomy of the contexts from which they were obtained. Indeed the mollusc evidence aids interpretation of the decay processes of the monument and the infilling of the post-pipes.

The basal, burnt sample indicates burning, perhaps of a turf or reeds. It is evident that the burnt lens occurred in the post-pit prior to the insertion of the oak timber and backfilling. This assemblage therefore represents the immediate pre-monument environment and burning may have been associated with shrub and valley floor clearance for the construction of the monument.

It is, however, the assemblages in the post-pipe fill that pose most problems. It is clear from both the high numbers of molluscs and the large taxonomic range that the assemblages originate from an old land

surface and probably one without previous substantial human disturbance. The marked similarity of the assemblages within the post-pipe indicate a common, source for the shells. Further, the shells must have become incorporated into the post-pipe after the timber had rotted but before soil erosion plugged the central depression with non-calcareous brown earth deposits. The hypothetical destruction and deposition processes have been determined, but the precise contexts from which the Mollusca originate is more uncertain.

	633	614	613	612	610	608	607	611
633	**1.000**	.0340	.0025	.0518	.1296	.0160	-.0104	.0907
	(.0000)	(.8439)	(.9884)	(.7644)	(.4513)	(.9263)	(.9520)	(.5990)
614	.0340	**1.000**	**.8410**	**.9316**	**.8353**	**.8098**	.2658	.3726
	(.8439)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.1172)	(.0252)
613	.0025	**.8410**	**1.000**	**.9575**	**.9250**	**.9535**	**.6701**	.5570
	(.9884)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0004)
612	.0518	**.9316**	**.9575**	**1.000**	**.9271**	**.9401**	.5392	.5378
	(.7644)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0007)	(.0007)
610	.1296	**.8353**	**.9250**	**.9271**	**1.000**	**.9584**	**.6128**	**.7092**
	(.4513)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0001)	(.0000)
608	.0160	**.8098**	**.9535**	**.9401**	**.9584**	**1.000**	**.7109**	**.6916**
	(.9263)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)
607	-.0104	.2658	**.6701**	.5392	**.6128**	**.7109**	**1.000**	.4975
	(.9520)	(.1172)	(.0000)	(.0007)	(.0001)	(.0000)	(.0000)	(.0020)
611	.0907	.3726	.5570	.5378	**.7092**	**.6916**	.4975	**1.000**
	(.5990)	(.0252)	(.0004)	(.0007)	(.0000)	(.0000)	(.0020)	(.0000)

Table 46. Greyhound Yard; Coefficient and significance levels of the mollusc data. Significance levels are in brackets. Probability of 0.01 - values of s >0.572 in bold type are significant.

Once the timber was placed in the post-pit and the ramp backfilled with chalk rubble it is possible the top was sealed with a topsoil and a bank of turf. After the monument fell into disuse the exposed timbers were burnt off and rotted *in situ*. It is likely that soil and turves from the old land surface then collapsed into the post-pipe, thus the assemblages should reflect the pre-monument environment. Indeed the post-pipe fill assemblages are similar to the pre-monument burnt

assemblage. It is, alternatively, possible that the soil around the posts during the life of the monument eroded into the post-pipe which would reflect the environment of monument and immediate post-monument.

Discussion and conclusions

It is unfortunate that as no buried soils associated with the monument survived, all the molluscan evidence was obtained from the post-pits. The origin and formation processes involved in the post-pipe fills are briefly discussed above in order to understand the problems of the origin of the Mollusca. Nevertheless the molluscan evidence provides a basic outline of the environmental sequence of the post-pit moment, further evidence of the subsequent environmental change is provided by Staines' work on the soils.

The monument was built on the Frome floodplain which, survived as open, scrubby woodland with lush grass and rush type vegetation. This vegetation was modified for and during construction. The proximity of the river made for moist, locally wet, environments on the floodplain. The fact that the mollusc evidence indicates open scrubby woodland prior to the Late Neolithic monument indicates either that this was secondary woodland that had regenerated from earlier clearance activity or that mesic environment existed as a result of the river environment. The vegetation was cleared for the construction of the massive Neolithic post monument. Although there is no evidence for the conditions during the life of the monument, by comparison with others in the area, this was probably open, short grassland, but how long such conditions prevailed is unknown. After the monument had fallen into disuse and the timbers were burnt to ground level and open conditions were maintained. The evidence suggests environments ideal for grazing, but prior to the erosion of the brown earth creating the upper post-pipe fill, there is no evidence for tillage on this site.

This lowland location therefore, does not seem to indicate the intensity of land use shown by contemporary sites in the region. It is possible that whilst large areas of the chalk upland such as that around Flagstones, Alington Avenue, Maumbury Rings and Mount Pleasant were put into cultivation, the valley remained an area primarily as thoroughfare and for pastoral activity.

7.8 MAIDEN CASTLE FARM

Summary of excavations

To the south of Maiden Castle Road (Fig. 87) the south-western half of a ring-ditch (52027) shown as a soil mark was excavated and a further three, previously unrecorded, ring-ditches were stripped. The four ring-ditches form a linear, north-west to south-east alignment, all above the 70m OD contour and each no more than 30m apart on a low spur.

Molluscan analysis

Samples were examined from three of the four ring-ditches investigated. Two spot samples were provided by the excavator from lower and upper fills of ring-ditches 52034 and 52045 whilst a contiguous column of samples was taken from ring-ditch 02027 by the writer. Samples were taken with aim of determining the immediate pre- and post-monument environment.

Ring-ditch 02027

A contiguous column of five samples was taken from the northern section of the ditch. The basal fills only were sampled (Fig. 86), in order to determine the nature of the immediate environs in which the barrow was constructed. Unfortunately no buried soil existed beneath the extensively plough damaged monument which only survived as a badly eroded ring-ditch. Furthermore, no turves or humic horizons derived from an old land surface were noted in any of the ditch sections. The results of analysis are presented in figure 87 and table 47.

The basal samples contained only a few shells but these were predominantly open country species. Lack of shells in these highly calcareous deposits is probably due to the rapid filling of the ditch with coarse chalk pieces and the generally unconducive micro-habitat for snail life. The lower secondary fills (context 02007) were predominantly a fine calcareous loam, although containing a high proportion of chalk pieces. Stoniness decreased up the profile and, conversely, mollusc numbers increased significantly. The assemblages displayed a very restricted taxonomic range dominated by *Helicella itala*, *Vallonia costata*, *Pupilla muscorum* and *Trichia hispida* (Fig. 87). This basic assemblage is typical of very open xerophilous conditions. *H. itala* which occurs in very high proportions (29%) is

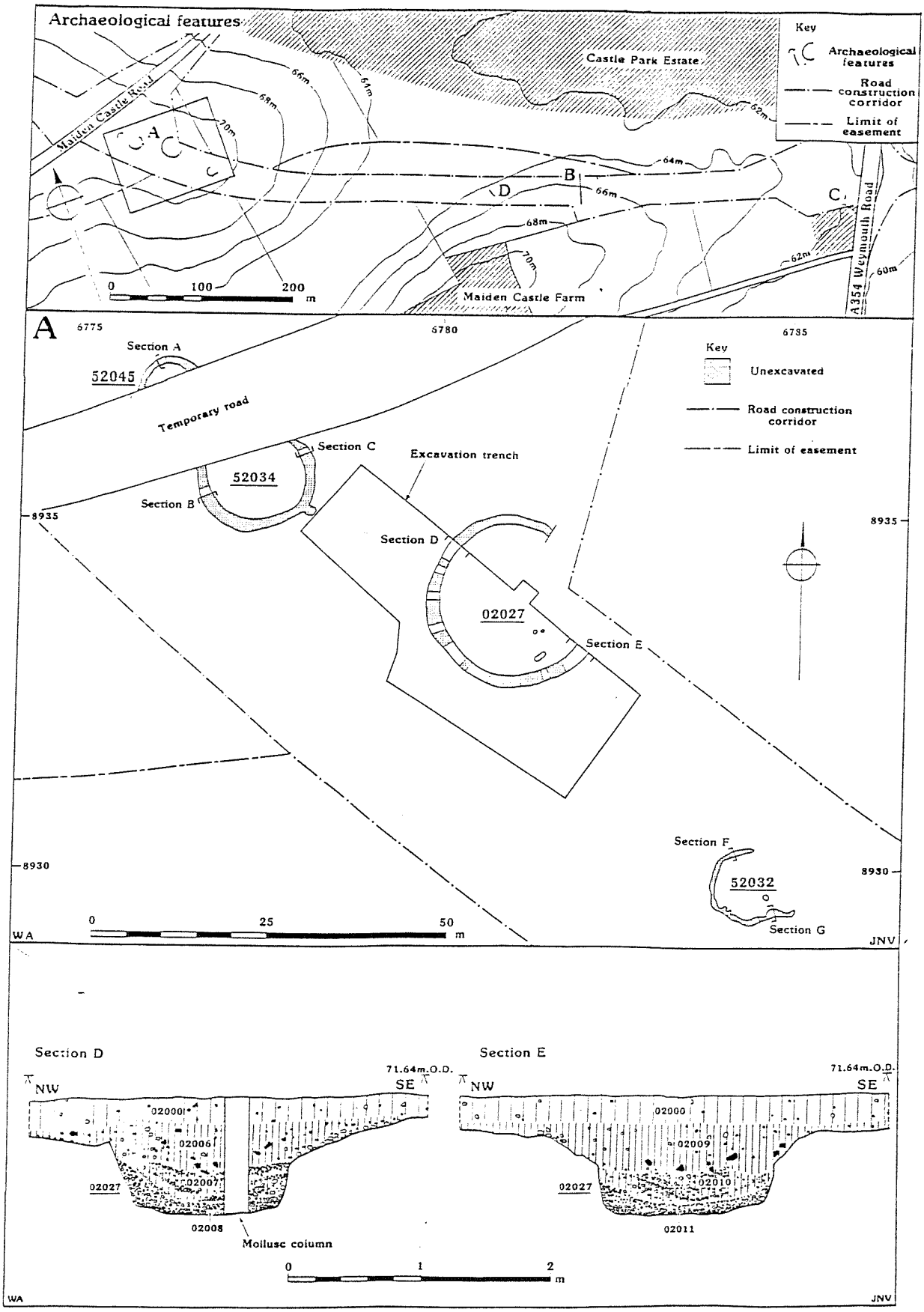


Figure 86. Maiden Castle Farm; Location, excavated features and ditch section of ring ditch 02027 showing the mollusc sample column.

\Ring-ditch	¦----------2027---------¦					¦-2034--¦		¦-2045--¦	
\Sample	1	2	3	4	5	15	16	17	18
\Context	2008	¦--2007-¦		¦-2005--¦		2037	2036	2047	2046
\Depth (cm)	74	67	58	49	39	L.	U.	L.	U.
\	-92	-74	-57	-58	-49	Fill	Fill	Fill	Fill
\ Wt. (g)	2000	2000	2000	2000	2000	1000	1000	1000	1000
MOllUSCA									
Pomatias elegans (Müller)	1	+	2	3	1	-	+	-	-
Cochlicopa lubrica (Müller)	-	-	-	-	-	-	1	-	-
Cochlicopa spp.	-	-	1	4	6	-	-	1	-
Vertigo pygmaea (Draparnaud)	-	-	-	11	8	-	-	-	-
Pupilla muscorum (Linnaeus)	1	2	13	80	97	1	2	1	1
Vallonia costata (Müller)	-	-	-	6	32	-	-	-	-
Vallonia excentrica Sterki	2	3	14	92	53	-	2	5	3
Punctum pygmaeum (Draparnaud)	-	-	-	-	1	-	-	-	-
Vitrina pellucida (Müller)	-	-	-	-	-	-	-	-	1
Limacidae	-	-	1	1	4	-	-	-	-
Cecilioides acicula (Müller)	12	5	31	435	241	-	4	51	72
Candidula intersecta (Poiret)	-	-	-	-	1	-	-	-	-
Cernuella virgata (da Costa)	-	-	1	-	-	-	-	-	-
Helicella itala (Linnaeus)	2	4	18	83	62	-	5	6	7
Trichia hispida (Linnaeus)	-	3	12	94	101	-	9	8	4
Cepaea spp.	-	-	-	+	-	-	-	-	-
Anisus leucostoma (Millet)	-	-	-	1	-	-	-	-	-
Taxa	4	4	8	10	11	1	5	5	5
Shannon Index (*H'*)	1.33	1.25	1.65	1.63	1.74	0.00	1.33	1.36	1.37
TOTAL	**6**	**12**	**62**	**375**	**366**	**1**	**19**	**21**	**16**
Magnetic Susceptibility	6	6	16	32	34	-	-	-	-

Table 47. Maiden Castle Farm; Land mollusc and magnetic susceptibility data from the ring ditches.

probably the most characteristic open country species (Evans 1972, 180) and prefers the hottest and driest habitats (Boycott 1934) while *V. excentrica* is the most xerophile of its genus (Thomas 1977b). These two species account for approximately 50% of the assemblages. also significant is the high numbers of *Pupilla muscorum* which survives in open grassland and bare-earth habitats. The palaeo-molluscan fauna therefore indicates a very open landscape and cultivated fields. The occurrence of a single stray specimen of *Anisus leucostoma* is of particular interest. It is a fresh-brackish water species that lives in ponds, marshes and wet ditches, and although it can resist temporary drier conditions (Ellis 1969) it cannot be seen as a part of the ditch assemblage. It must therefore have been brought in to the site, perhaps on the foot of a bird as commonly suggested for such stray

species (e.g. Thomas 1977c) or perhaps with manuring or mulching material for the arable fields.

The molluscan evidence indicates that the barrow was constructed in a very open, probably arable, landscape. Most of the ditch infill can be attributed to natural weathering augmented by ploughwash from the adjacent tilled fields. Although there are indications of minor changes in the faunal composition with *T. hispida* becoming more abundant at the expense of *H. itala* (Fig. 87), the overall impression is of continuous open, dry, arable conditions prevailing at least during the accretion of the basal deposits. The single occurrences of Introduced Helicellids (*Cernuella virgata* and *Candidula intersecta*) are probably intrusive as some mixing is indicated by the very high numbers of the burrowing species *Cecilioides acicula* (Table 47).

SITE 5: MAIDEN CASTLE FARM
Ring-ditch 02027

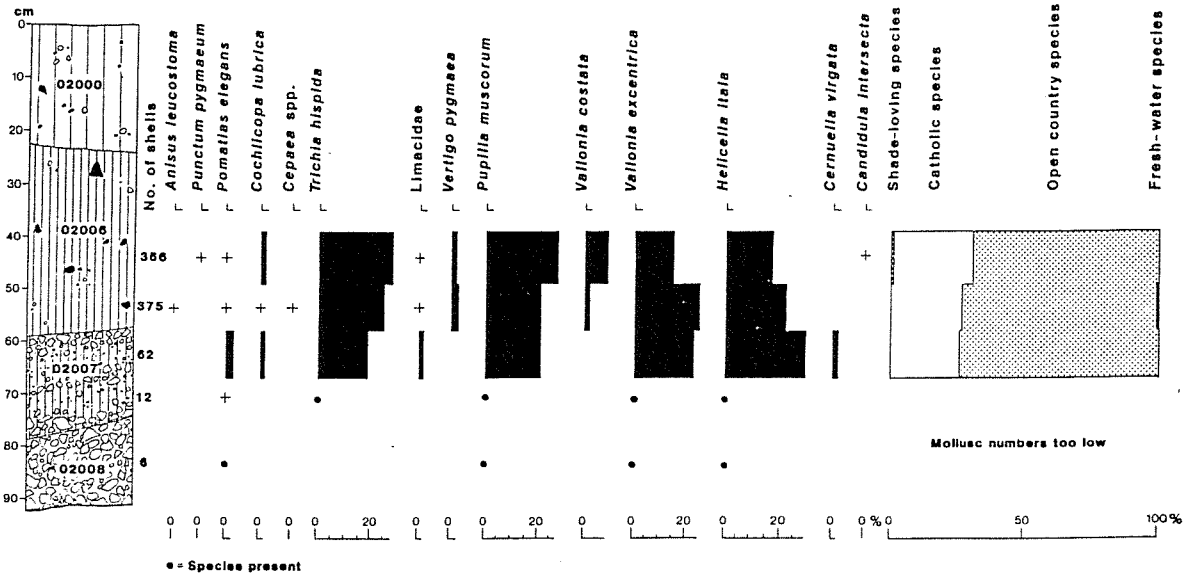


Figure 87. Maiden Castle Farm; Mollusc histogram from the barrow ditch.

Ring-ditches 52034 and 52045

Samples from the lower and upper fills of each of the ring-ditches were examined (Table 47). The mollusc assemblages were impoverished. Nevertheless, the predominant species described above from ring-ditch 02027 seem also to be the main species recorded here. Although very small assemblages, the evidence suggests that these few shells indicate

the same or similar assemblages to those recovered from wholly excavated ring-ditch (02027). Thus we can suggest that neither of these ring-ditches was built significantly earlier, when a more wooded landscape prevailed (Evans 1972). Further, it seems probable that they were constructed and stood in the same open arable conditions.

Magnetic susceptibility

The magnetic susceptibility profile from ring-ditch 02027 showed a decrease of 34 SI Units $x10^{-8}$ SI\Kg to 6 at the base. Measurements from the other ring-ditches were consistent with this. No significant palaeo-environmental interpretation can be made from this data.

Summary

It is evident that all the ring-ditches were built in a very open, intensively arable landscape, and were sited on thin eroded soils. The ditches rapidly became infilled and the monuments may even have been damaged by prehistoric ploughing.

7.9 MAIDEN CASTLE ROAD

Summary of the prehistoric features

The site lies on the north side of Maiden Castle Road opposite the ring-ditches (Section 7.8). Excavations were concentrated upon an series of soil-marks running east-west along the Lanceborough barrow ridge (Figs 58 & 59). Area excavation of *c.* 2,550m^2 revealed a large Late Iron Age and Romano-British settlement. However, a number of earlier prehistoric features were recovered which included tree-root hollows. The earliest phase of activity was a series of shallow intercutting scoops creating an irregular hollow, 02287, *c.* 8m across.

Molluscan analysis

A Late Neolithic\Early Bronze Age quarry feature and a number of Romano-British linear ditches were sampled and this was augmented by spot samples from a tree hollow provided by S. Staines. Soil analyses were also conducted on the same tree hollow sample (Staines pers. comm.). The results of molluscan analysis are presented in table 48.

\Feature	Tree	Tree	Tree	¦-2287--¦		2237	2239	¦-2241--¦		2303	2302	2243
\Sample	A	B	C	14	13	6	7	8	9	11	12	10
\Context	A	B	C	2280	2275	2355	2246	2356	2247	511	509	2249
\Depth (cm)	-	-	-	16	0	Base	Base	Base		Base	Base	Base
\				-46	-16	Fill	Fill	Fill		Fill	Fill	Fill
\ Wt. (g)	1000	1000	1000	600	1000	1000	1000	1000	1000	1000	1000	1000
MOLLUSCA												
Cochlicopa lubrica (Müller)	-	-	-	-	1	-	-	-	-	-	-	-
Cochlicopa spp.	-	-	-	-	-	-	1	-	-	1	1	2
Vertigo pygmaea (Draparnaud)	-	-	-	-	5	-	-	-	-	-	2	1
Pupilla muscorum (Linnaeus)	-	1	-	12	26	22	24	32	-	4	-	5
Vallonia costata (Müller)	-	-	-	-	11	-	2	-	-	-	4	-
Vallonia excentrica Sterki	6	3	-	23	113	6	24	18	7	33	45	10
Punctum pygmaeum (Draparnaud)	-	-	-	-	1	-	-	-	-	-	-	-
Discus rotundatus (Müller)	-	-	-	-	-	-	-	-	1	-	-	2
Aegopinella nitidula (Draparnaud)	-	-	-	-	-	-	-	-	-	-	-	3
Oxychilus cellarius (Müller)	-	-	-	-	-	-	-	-	1	-	-	1
Limacidae	3	-	-	-	2	-	-	1	-	-	-	-
Cecilioides acicula (Müller)	167	113	178	37	183	45	43	19	94	178	147	28
Candidula intersecta (Poiret)	-	-	-	-	-	-	-	-	-	3	-	-
Candidula spp.	-	-	-	-	-	-	-	-	-	-	3	-
Cernuella virgata (da Costa)	-	-	-	1	-	-	-	-	-	-	-	1
Helicella itala (Linnaeus)	6	1	-	6	24	2	21	4	+	5	15	3
Trichia hispida (Linnaeus)	2	1	3	12	60	8	17	10	5	31	45	29
Cepaea hortensis (Müller)	-	-	-	-	-	-	-	-	-	-	-	1
Cepaea/Arianta spp.	-	-	-	-	-	-	-	-	-	-	-	1
Helix aspersa (Müller)	-	-	+	-	-	-	-	-	+	-	-	-
Anisus leucostoma (Millet)	-	-	-	-	-	-	-	-	-	1	-	-
Taxa	4	4	1	5	9	4	6	5	4	7	7	11
Shannon Index (*H'*)	1.29	1.24	0	1.35	1.47	1.09	1.50	1.23	1.09	1.24	1.32	1.74
TOTAL	**17**	**6**	**3**	**54**	**243**	**38**	**89**	**65**	**14**	**78**	**115**	**59**
Magnetic Susceptibility	46	20	7	21	15	13	22	10	15	39	40	36

Table 48. Maiden Castle Road; Land mollusc and magnetic susceptibility data.

Tree hollows

Three samples from feature 02491 thought to be a tree hollow, were analysed. Few shells were recovered from the samples and none could be classified as shade-loving. All three depauperate assemblages were typical open country ones; if the feature was a tree hollow then the mollusc assemblages did not represent faunas of a wood or shrubby environment.

Late Neolithic\Early Bronze Age quarry; 02287

Two samples were taken from the earliest prehistoric feature from this site. The lower sample, of earlier prehistoric date, produced a limited assemblage of predominantly open country species dominated by

Vallonia excentrica. The upper sample, probably later prehistoric or Romano-British in date, yielded over 240 shells, predominantly open country species and again dominated by *V. excentrica.* Although separated by a considerable period of time these two assemblages represent similar, if not identical, environments.

Summary

Even from the later Neolithic\Early Bronze Age this area was one of extensive agricultural activity. Short-turfed grassland of intensively grazed pasture existed, which gave way to a more intensive arable regimes.

7.10 DISCUSSION OF THE MOLLUSC EVIDENCE

This discussion primarily confines itself to the molluscan evidence reported in the previous Sections. A broader appraisal of the landscape is given in Section 7.11.

Within the excavations on the Dorchester chalk as a whole, there was a lack of preserved buried old land surfaces, even beneath the colluvial sequences at Middle Farm and Fordington Bottom. When such contexts were preserved, at Maiden Castle for instance, they were almost devoid of shells (Evans and Rouse 1991b).

The molluscan data from which general statements of land-use can be made is now fairly extensive (see previous Sections). It is, however, surprising that despite the wealth of mollusc data (nearly 60,000 molluscs from 167 samples taken from ten sites) from this research alone, even though it included relatively early contexts (e.g. Early Neolithic pit 00221 at Flagstones), it is not possible to prove the existence of a former woodland on the basis of this evidence. From the entire area the existence of primary woodland has only been conclusively argued from a few samples from the recent work on the Maiden Castle project (Evans and Rouse 1991a and b). This is a testimony both to the incompleteness or our data set (despite its size), and to the intensity and wide-spread nature of the early human activity within the landscape.

Site & context	Material	Determination BP		cal BC 1 s	cal BC 2 s
FLAGSTONES					
Pit 00221	C	4960 ± 80	(HAR-9161)	3930-3962	3970-3542
Burial on base of ditch	H	4490 ± 70	(HAR-9158)	3345-3039	3370-2920
Basal ditch fill	A	4450 ± 90	(OxA-2322)	3338-2926	3370-2910
Burial cut into ditch	H	4210 ± 110	(OxA-2321)	2919-2619	3091-2494
Basal ditch fill	A	4030 ± 100	(HAR-8578)	2863-2460	2889-2300
Central burial	H	3560 ± 70	(HAR-9159)	2028-1782	2133-1740
MIDDLE FARM					
Round house	C	4800 ± 70	(OxA-2382)	3692-3393	3776-3380
Burial in ditch	H	3200 ± 90	(HAR-9160)	1599-1411	1690-1268
ALINGTON AVENUE					
Long barrow basal ditch	B	4450 ± 80	(HAR-8579)	3335-2928	3370-2910
Burial in barrow ditch	H	3810 ± 120	(HAR-9662)	2460-2044	2580-1920
GREYHOUND YARD TIMBER MONUMENT					
Post-pit 1631	C	4140 ± 90	(HAR-6689)	2888-2583	2920-2470
Post-pit 1635	C	4090 ± 70	(HAR-6687)	2870-2506	2889-2470
Post-pit 1631	C	4080 ± 70	(HAR-6688)	2867-2502	2886-2470
Post-pit 1635	C	4020 ± 80	(HAR-6686)	2855-2466	2875-2340
Post-pit 4885	A	4020 ± 80	(HAR-6663)	2855-2466	2875-2340
MAIDEN CASTLE					
Inner ditch primary fill	C	5030 ± 80	(OxA-1337)	3964-3708	4000-3690
Inner ditch secondary fill	B	4730 ± 80	(OxA-1143)	3643-3374	3700-3350
Inner ditch final fill	B	4360 ± 80	(OxA-1141)	3094-2911	3330-2782

KEY B = animal bone, C = charcoal, H = human bone

Table 49. ^{14}C determinations for Neolithic and Bronze Age sites in the Dorchester area.

The lack of evidence for woodland from the molluscs is essentially the result of three factors;

i) a paucity of dated Early Neolithic sites

ii) a lack of suitable contexts and soils as a result of later activity and erosion

iii) the probability of most of the area supporting typical brown earths or argillic (humic) brown earths which, even if they supported mollusc life, are unlikely to preserve shells.

Early mollusc faunas are, therefore, only likely to be preserved in areas of activity and within features where the addition of chalk will increase the possibility of shell preservation as is the case at the Maiden Castle causewayed enclosure (Evans and Rouse 1991b, 120) and at Flagstones (pit 00221).

It is evident that the earliest recorded activity at Maiden Castle, i.e. the construction of the causewayed enclosure, is broadly contemporary with pit 00221 from Flagstones (Table 49 and Fig. 88). The significant variation is therefore, not the date of the activity, but the status of the landscape. Maiden Castle supported primary woodland, but at Flagstones open, albeit long grassy, conditions existed. The presence of such an environment indicates continued human activity in the area prior to that associated with the Early Neolithic pit. Once woodland was cleared locally the 'island' of clearing was invaded (colonised) by both grasses and open country snails which may have travelled a relatively long distance from another open source-environment, possibly the river valleys, through presumably, primary woodland (cf. Thomas 1985). From this we might be able to infer that at least some clearance of the woodland at Flagstones occurred some considerable time prior to the activity associated with pit 00221 (3970 - 3542 cal BC). This supports the hypothesis of early woodland clearance, possibly of relatively large areas, which can certainly be attributed to the Early Neolithic if not the late Mesolithic. However, differentiating between the two may be a semantic, not an archaeological, argument. The possibility, therefore, of limited and localised Mesolithic clearances can be entertained especially when discussing this data with the artifactual and other evidence. A small collection of Mesolithic flakes including a possible microlith, a

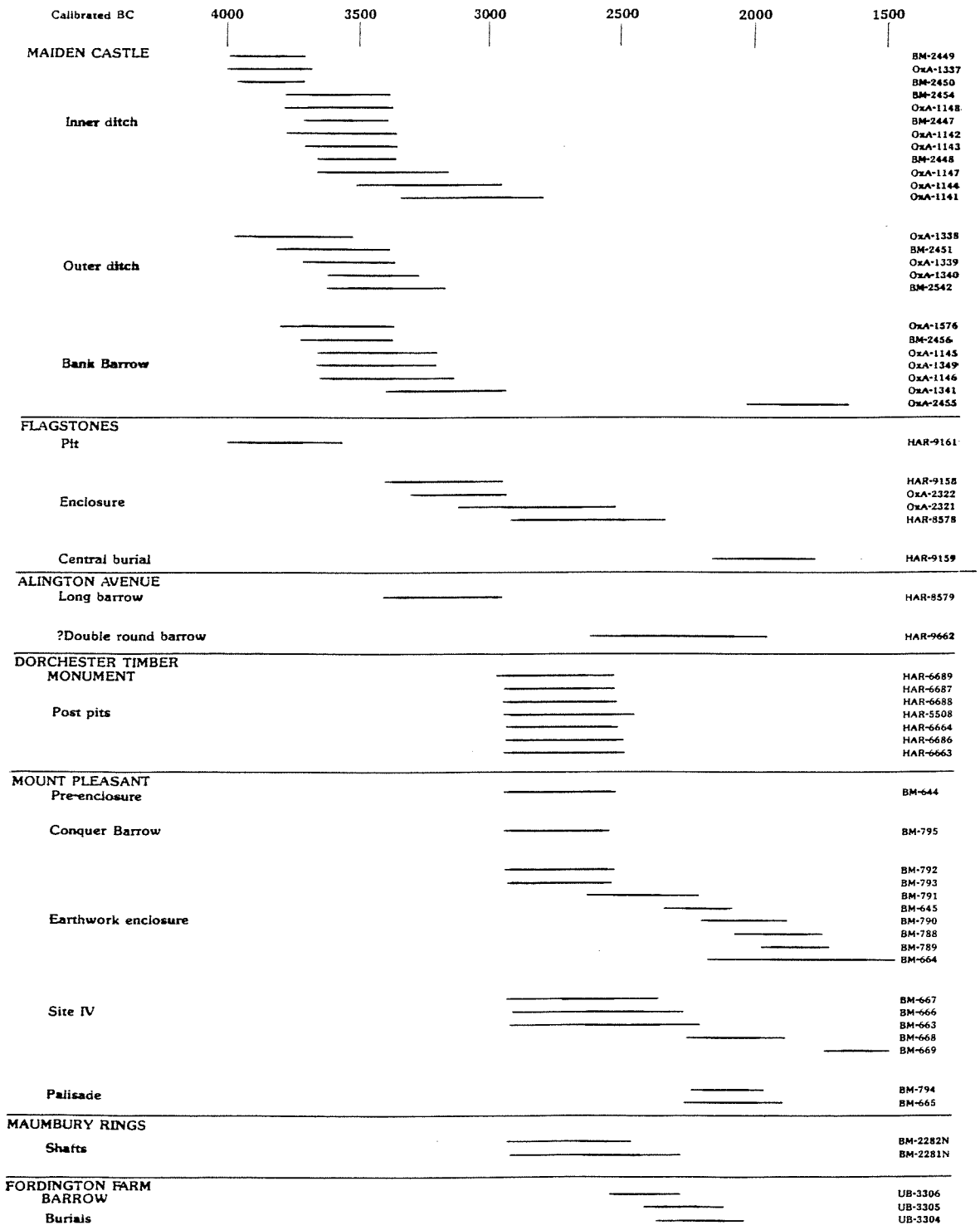


Figure 88. Radiocarbon chart for the Neolithic and Bronze Age sites.

retouched blade segment and a tanged blade were found associated with a concentration of arrowheads (seven transverse and one leaf) at Stinsford on the Frome floodplain, which Woodward (1991a, 129) suggests is evidence of pre-4200 BC Mesolithic 'base camp' type activity.

Woodland clearance and pasture (4000 - 3350 BC)

Clearance may have been fairly large-scale and progressive and can be detected in early contexts from Flagstones (pre 3750 BC) to Middle Farm (*c.* 3500 BC). The result of clearance seems to have been large erosion events washing soil from the hill slopes and removing soils from the valley bottoms, as seen by the truncation of early Holocene horizons at both Middle Farm and Fordington Bottom. Following clearance, stabilisation occurred with the colonisation of long grasses (Flagstones pit 00221) which were, by the later Neolithic, grazed to a typical, short downland turf. Judging from the environmental evidence alone very few copses, let alone extensive woods seem to have existed. The only exception to this is the evidence from Maiden Castle where clearance was localised. Nevertheless large oak trees were used at Greyhound Yard, and later, Mount Pleasant, but these need not necessarily have come from the chalk. By this time large tracts of downland were under pasturage with limited, localised areas of tillage. Even the limited cultivation of the silty, typical to calcareous brown earth soils may have led to erosion (cf. Allen 1988a; 1992a, Staines 1991; Macphail 1991), and the creation of thinner calcareous soils (calcareous brown earths and rendzinas) over the hilltops in some areas (e.g. Alington Avenue - Flagstones), and colluvial accumulation in the valley bottoms (Middle Farm and Fordington Bottom).

Pasture (3350 - 2500 BC)

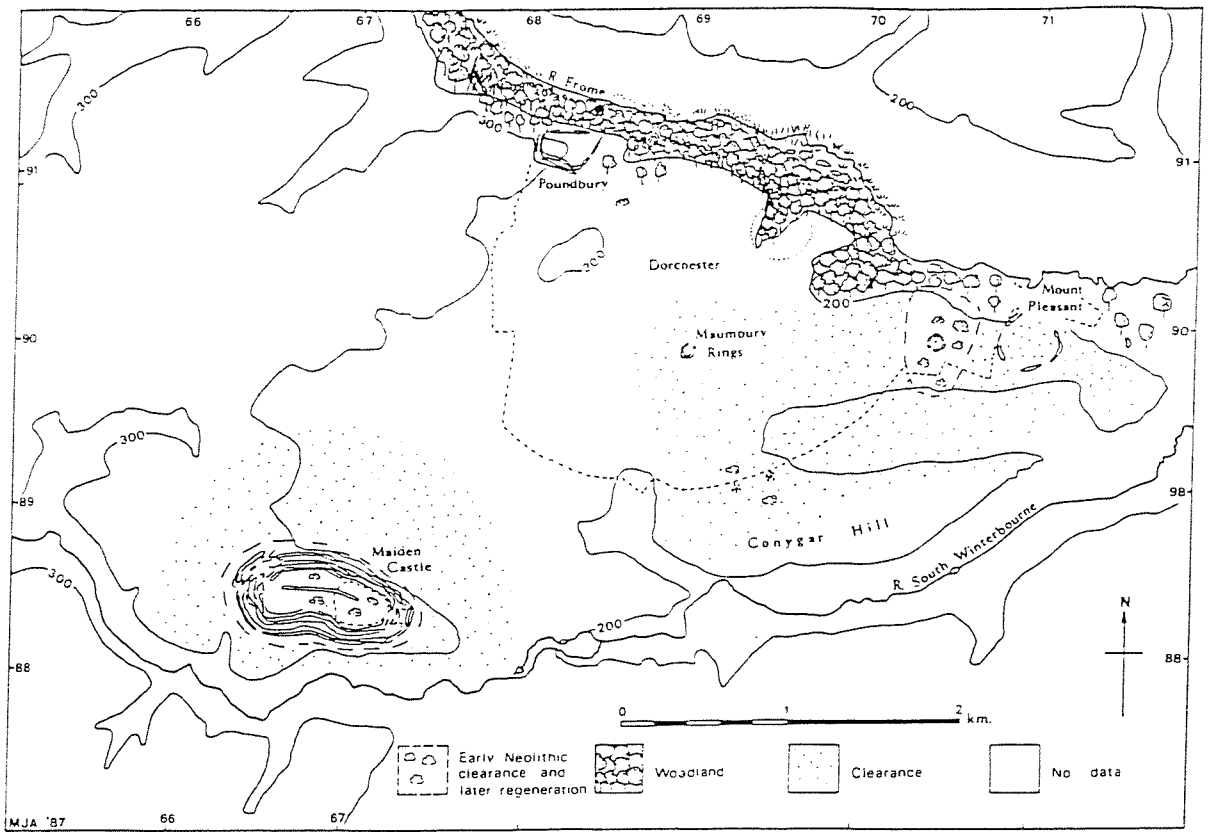
In the Middle to Late Neolithic a tract of grazed grassland was established on the Alington ridge, for the contemporary monuments of Flagstones and the Alington long barrow (*c.* 3300 - 3000 cal BC see Table 49) were constructed, and existed, in grazed grassland. Unlike Maiden Castle, this grassland was long established and fairly extensive. No evidence of woodland regeneration has been detected from these monuments, and the only evidence in the central lowland zone of Neolithic woodland regeneration is at Mount Pleasant. Woodland regeneration, dating to about 2500 BC was limited and restricted to

part of the site only. It is unlikely that this woodland existed after the substantial re-organisation of the site by Beaker communities (*c.* 2000 BC). Limited episodes of local tillage have been detected at both Alington and Flagstones.

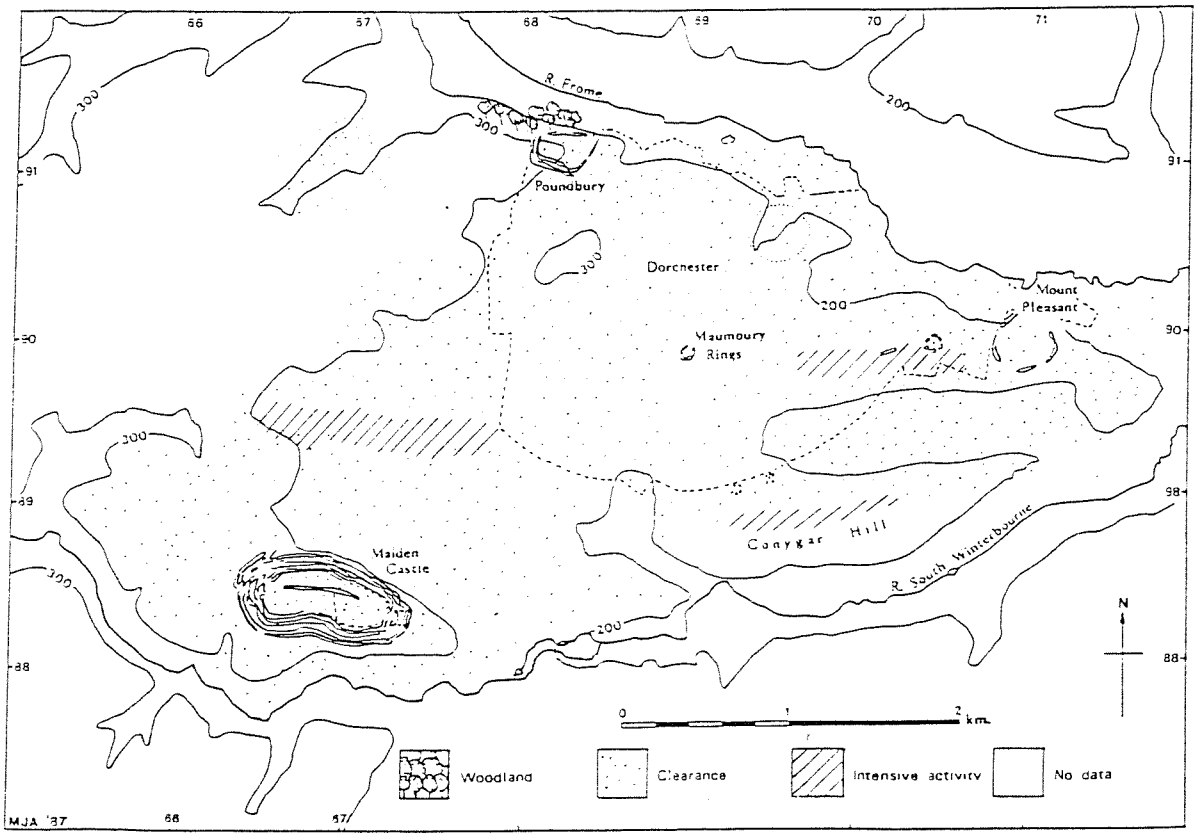
A second phase of monument building, at the beginning of the Late Neolithic (*c.* 2750 BC), provides a series of molluscan sequences which show a predominantly pastoral landscape. At Maumbury and Mount Pleasant short grassland is evidenced and this pasture extended over Flagstones, but the localised tillage at Alington Avenue can be seen to continue. The post monument at Greyhound Yard does, however, indicate the existence of large tress, presumably not far away, but the on-site evidence is of scrubby, regenerated open secondary woodland and lush grassland, but this is probably partially attributable to its location on the Frome floodplain. Interestingly this coincides with regeneration of localised woodland habitats at Maiden Castle. Nevertheless, the main picture is of clearance and established grassland prior to the construction of the monuments.

Pasture and tillage (2500 - 1800 BC)

Evidence for localised tillage is recorded at Alington Avenue in the later Neolithic, but large scale arable farming is indicated by the Early Bronze Age to both the east and west of Dorchester. Maiden Castle provides evidence of localised cultivation in a predominantly open landscape in the Beaker period. Although few other Beaker contexts have been satisfactorily analysed within the central lowland zone, these also are primarily associated with tillage. It is likely, for instance, that the Beaker occupation site at Middle Farm was associated with tillage on the local slopes, which may have contributed to the truncation of earlier soils. Once again the main exception is a communal monument; that of Mount Pleasant (see below) where pasture existed. By the Early Bronze Age and the construction of a number of round barrows (Flagstones, Alington Avenue, Maiden Castle Farm and the Conquer barrow) tillage was widespread; the only recorded exception being Fordington Farm which remained as localised pasture into the Iron Age (Allen 1991c). At Alington, tillage was particularly intensive and it may have been from here that much of the wind blown silts recorded in the main enclosure ditch of Mount Pleasant originated.



MID NEOLITHIC



LATE NEOLITHIC/EARLY BRONZE AGE

Figure 89. Hypothetical reconstruction of the Dorchester landscape.

In the Early Bronze Age, therefore, cultivation was both widespread and extensive. The landscape was a mosaic of cultivated land and pasture.

Extended tillage (1800 - 1500-> BC)

Throughout the Bronze Age, however, cultivation became more extensive; to such an extent that fields may have impinged upon earlier barrows leading to localised erosion of the monuments. Extensive ploughed areas are indicated by the colluvial and molluscan sequences at Middle Farm and Fordington Bottom. There is a hint that manuring of the fields was not undertaken exclusively with domestic rubbish as is often asserted (Bowen 1961; Fenton 1981) but may have been augmented with vegetation and organic muds from the local rivers as seen by the incorporation of fresh- and brackish-water Mollusca into dry open contexts (see Flagstones, Conygar Hill, Alington and Maiden Castle Farm and Fordington Farm).

Widespread agriculture with open, dry field ditches, bounding fields with shallow, predominantly calcareous, rendzina soils, existed throughout the Iron Age and Roman periods. Erosion of even relatively thin soils continued under the long term tillage; which by this time had occurred for several millennia. Both tillage and grazing are indicated, though the latter seems more prevalent. Some areas (e.g. Flagstones) were less intensively used for a limited period enabling longer grass to grow temporarily.

Mixed farming

A mixed agrarian landscape existed in the medieval period with some of the previously dry open ditches being replaced by hedged ditches and banks. There is less evidence of the extensive tillage seen in prehistory, and probably more of the downland put down to pasture.

7.11 SUMMARY OF THE DORCHESTER ENVIRONS

The large number of environmental analyses within the Dorchester environs was concentrated in a comparatively small area of downland, but are complemented by previous work on the major monuments (Mount Pleasant, Maiden Castle and Maumbury Rings), so that a more complete and integrated picture of the landscape can be seen. In addition to

the molluscan and sediment analyses there is a comprehensive suite of other archaeological information, now including soils analysis (Staines 1991), fairly good faunal information (Bullock and Allen forthcoming; Reilly forthcoming) as well as ceramic and artifact distributions (cf. Woodward 1991a; Sharples 1991; and Smith *et al.* forthcoming). This intensively studied area provides a higher resolution of information allowing the evolution of land-use to be modelled and further interpretative detail to be presented. The fact that nearly 60,000 shells were identified from ten separate sites within a very small area of only 35 km^2 provided a density of data greater than any of the other study areas in this thesis. This has enabled a more detailed reconstruction of this area (Fig. 89) not obtainable in the previous studies areas.

It is, however, pertinent here to re-state the nature of the area as detailed earlier. The chalklands around Dorchester consist of a wide open plain which is bisected by the River Frome. The downlands are sharply defined north of Dorchester by the River Frome and its floodplain. Immediately north of the Frome the undulating chalk is locally capped with Plateau Gravels. These deposits are more extensive to the east of Dorchester at the confluence of the Frome and Winterborne where extensive area of Reading Beads are also mapped. In extending interpretation over this region we must include the potential and contributions of the adjacent land and be aware of the relatively limited understanding we have of the landscape and environment to the north of the River Frome. It may also be significant that the clay rich areas probably played a more important rôle but one which was not investigated being outside the route of the By-pass.

Modifying the wildwood (pre 4000 BC)

Evidence for extensive Early Neolithic clearance of the post-glacial woodland can be inferred at least along the Alington ridge (Fig. 89). The molluscan evidence indicates clearance at some considerable time prior to 3750 BC. Further, the lack of woodland in a number of Early Neolithic contexts has been taken to indicate that this clearance may have been both larger than the extremely localised clearances suggested at Maiden Castle and occurred prior to the Early Neolithic. Indications of clearances of late Mesolithic date are not uncommon

(Kinnes 1988, 3), but that they may have been fairly large on the chalklands is now more evident and can be seen by a number of implied localised Mesolithic clearances on the chalk at, for instance, Strawberry Hill (Section 6.2; Hedges *et al.* 1992) and Stonehenge (Section 6.4).

Landscape:

Woodland clearance and landscape management (4000 - 500 BC)
The understorey vegetation encouraged by clear-felling would include a number of food plants (Mellars 1975) and undoubtedly also a number of grasses, among them cereals. Cultivation of wild or introduced cereals within, initially localised, but eventually clear-felled areas is likely. The widespread increase in cultivation from the 4th millennium can be seen as a result of a number of factors, among them are the fertility of the soils and the climatic amelioration (late Atlantic). Continued crop success resulted in an increased reliance on cereals as a main vegetable food, permanence of settlement and increased population as Harris outlined in his 'Alternative Pathways' paper (Harris 1977). Indeed, this evidence for the early establishment of successful agricultural communities confirms Evans *et al.*'s hypothesis that causewayed enclosures can only be constructed after the establishment of sufficient numbers of such communities in any one region (Evans *et al.* 1988, 82).

The widespread clearance of the remaining woodland occurred progressively through the Neolithic and was virtually completed by the Final Neolithic/Beaker period (Fig. 89). Clearance can be seen to have been progressive with the exception of limited woodland regeneration on the hilltops of Maiden Castle and Mount Pleasant. The situation at Maiden Castle is particularly interesting as, contrary to theories that causewayed enclosures lie in the centre of regions or defined territories (Drewett 1978), it has been postulated that Maiden Castle was situated outside the main settlement zone on the boundary of the territory of the community where it could be a used as a focus not only 'for the organisation of internal community relationships but also the relationships between communities' (Evans *et al.* 1988, 82). The centre of the settlement and agricultural land is therefore, precisely that area of chalk of the central lowland zone bisected by the Dorchester

By-pass (Fig. 58) as evidenced by the sites investigated along it. The postulated peripheral location of Maiden Castle has major implications for our perception of this landscape. The fact that it is located away from the centre of primary activities of the community indicates that the woodland regeneration recorded during the later Neolithic period (Evans *et al.* 1988) was not a widespread phenomenon. The evidence presented here suggests that large portions of the landscape remained open and thus perhaps the woodland was confined to the hilltop of Maiden Castle itself, temporary abandonment creating a small copse on the knoll. One could envisage Maiden Castle in the later Neolithic rather as Danebury looked in the 1970s even to the extent of being sited within a very open agricultural landscape!

Whereas in earlier periods the population had access to arable, pasture and woodland, the large-scale clearance of trees, accomplished by the Late Neolithic-Final Neolithic for intensive agricultural use of the landscape, led to the availability of only restricted areas of woodland on the chalk. Only Maiden Castle (temporarily), and perhaps the steeper chalkland slopes leading onto the Frome floodplain, contained any significant woodland. It is probably regeneration from these steeper slopes that can be seen at Mount Pleasant during the Final Neolithic and Beaker period *c.* 2500 - 1800 cal BC.

It is likely, though not explicitly proven, that the clay areas to the east of Dorchester would have remained forested far longer than its chalkland counterpart, and thus would have been a major source of timber. If the populations residing within this area were separate communities then they had a resource which could be traded for agricultural produce from the chalklands. If so, then it is possible to invoke social and economic links between such communities during the Neolithic.

Land-use:

Managing a food resource and procurement (4000 - 500BC)
In the earlier Neolithic (4000 - 3500 cal BC), the archaeological evidence for activity in the central lowland zone is limited to the pits at Flagstones, clearance at Middle Farm and the Maiden Castle causewayed enclosure. However, the open landscape suggested by the

environmental evidence implies more widespread use of the area. Wheat and barley were cultivated at Flagstones and the presence of *Galium aparine* suggests that they might have been autumn sown (Straker forthcoming). Legumes (peas/vetch etc) may also have been cultivated. The molluscan evidence indicates localised, disturbed, probably tilled, areas suggesting cultivation of small plots of land. Cereals have also been recovered from Early Neolithic contexts at Maiden Castle (Jones and Palmer 1991) and are implied from the peat sequences at Rimsmoor at *c.* 3800 - 3500 cal BC (Waton 1982b; Waton and Barber 1987). Although the mollusc evidence indicates disturbed ground or tillage , this probably took the form of small plots of land rather than formalised fields, it is likely that the cultivars only supplemented wild resources which may have been systematically collected. Clearance of woodland promotes the growth of fruit-bearing shrubs, as well as providing browse for cattle, the most common animal remains. At both Flagstones and Maiden Castle wild species were not important, or at least their remains were not disposed of in the areas excavated. The predominant species were cattle pig and sheep. Open woodland probably provided suitable browse for cattle, pannage for pigs as well as a variety of fruits and berries. The impetus for woodland clearance can be seen to be primarily for occupation, building, pasture and browse rather than for cultivation.

Pasture *(3350 - 2500 BC)*

By the second phase of monument building in the Middle Neolithic (3300 - 3000 cal BC) pasture was well established along the Alington ridge at least as seen at Flagstones enclosure and Alington long barrow. There is no indication of widespread cultivation, nor is there any evidence of field systems. Grazed grassland seems to be the predominant feature of an increasingly open landscape; livestock (cattle, pigs and sheep) probably being more important than the cultivars.

Large areas of downland had been cleared and were under varying degrees of pasture by the time of the third phase of monument building in the later Neolithic (3rd millennium cal BC). Light grazed grassland is suggested at Conygar Hill, but more intensively grazed, short-cropped grassland at Flagstones, Fordington Farm, Mount Pleasant and Maumbury

Rings. It is difficult to ascertain how representative the small faunal assemblages are from many of these non-domestic monuments. Nevertheless, although cattle are generally predominant, pigs are relatively important, especially at Conygar and Mount Pleasant. Although pigs have been interpreted as an indication of woodland, they will benefit from clearance and the increased food diversity this brings. Further, their occurrence at these two non-domestic sites may not be typical of domestic practices. Localised, larger scale tillage is evident by this time. Although no 'fields' have been identified, disturbed contexts indicative of localised tillage are seen at Alington Avenue and Flagstones. They are are associated with small quantities of cereal remains from the lower fills of the ditches, which were subsequently ploughed and filled with ploughwash.

Tillage: the onset of arable farming *(2500 - 1500 BC)*

By the Final Neolithic/Early Bronze Age (i.e. 2300 - 1500 cal BC), within an increasingly open environment, clearance had initiated and cultivation had encouraged colluviation in dry valleys, for example at Middle Farm, here associated with Beaker pottery, and possibly in Fordington Bottom. In both these cases limited cultivation of areas of brown earth soils may be suggested and was certainly taking place on Maiden Castle (Sharples 1991).

The absence of evidence for Neolithic or Early Bronze Age 'field' boundaries is consistent with evidence from elsewhere in the Dorchester environs. This is probably because fields had not been formally delineated by the construction of field boundaries. Early Bronze Age boundaries have been suggested at Poundbury (Green 1987, 26) and Alington Avenue (Woodward 1988, 7), but these must remain both tentative and ambiguous. A boundary ditch in the base of Fordington Bottom is, however, more likely to be of this date. During this period (late 3rd-early 2nd millennium cal BC) it is evident that agriculture became a significant component of food procurement for the first time. The combination of increased sedentism, the lack of wildwood, and its associated wild fruit and animals, may have resulted in a largely farmed landscape.

The increase in scale of agriculture and tillage led to higher rates of

erosion including localised severe episodes. These can be seen at Middle Farm and may explain the truncation of the earlier soils in the valley bottom. The tops of hills and ridges, in particular, suffered badly from erosion. It is interesting, and probably significant, that these possibly less productive, areas were the location of barrows and linear cemeteries in the early 2nd millennium cal BC. Admittedly this location of barrows is common, but perhaps it is more than coincidental that it is precisely these areas that may have been agriculturally less productive than the gentle slopes and valley bottoms.

Soil thinning would be particularly marked along the intensively tilled ridges. One manifestation of this may be the loss of soil structure with a potential for serious aeolian erosion. Indeed from the whole area only two sites produced aeolian deposits: Mount Pleasant (Evans and Jones 1979) and Alington Avenue (Section 7.6); both located on the eastern (probably down wind) end of the 'Alington Ridge'. Efforts may have been made to improve the soils on the slopes and hilltops by manuring including by importing river-derived soil or vegetation.

Arable landscape *(1500 - 500 BC)*

Nevertheless, from the 2nd millennium cal BC onwards, not only was there increasing arable, but structured field systems are seen (Woodward 1991a, 152). The earliest consist of linear ditches or lynchets/terraces on the sides and floors of dry valleys. By the middle of the 2nd millennium cal BC they are seen to be set out around the heads of a dendritic pattern of valleys encompassing the deeper acidic silty clay loam soils over Plateau Drift on the ridges to the west of Dorchester, the deeper moderately calcareous soils in the colluviated dry valleys, and the thinned calcareous rendzina soils on the valley sides and chalk ridges to the east of Dorchester. Evidence of these field systems was recovered from below Conygar Hill, Middle Farm, Bridport Road Ridge, Fordington Down and Fordington Bottom. In addition evidence from other excavations and from aerial photography has allowed the identification of four further groups set out to the north and east of Maiden Castle (Woodward 1991), and a fifth which may exist in and around the combe in which the Dorchester post monument was positioned (Woodward *et al.* 1993).

Most of the colluvial sequences at both Fordington Bottom and Middle Farm belong to this period; they are significantly more calcareous and indicate the erosion of thinner more chalky soils. Much of the central lowland zone may have been tilled. Although there is evidence from soil and molluscan evidence as well as the field boundaries for intensive cultivation, the products of cultivation (carbonised remains) are fairly sparse. As in preceding periods wheat and barley were grown. By contrast, there are considerably larger faunal assemblages. Red deer, which have been represented in earlier periods mainly by antlers used as picks, are insignificant. The lack of further use of antler picks may indicate the use of metal or other alternatives, as well as being consistent with the interpretation of a largely deforested landscape. Sheep and cattle increase in numbers; sheep dominate and this is consistent with the large areas of particularly short grazed grassland indicated by the molluscan evidence. The Middle and Late Bronze Age sheep from Middle Farm suggests particularly large animals and this has been suggested as possible evidence for flocks of sheep being brought into this area (Bullock and Allen forthcoming). Most of the herds seem to have been for meat rather than their dairy products.

The evidence indicates large scale, extensive, managed and systematic farming of the downland with much of the area under crop and planned stock control and husbandry.

Extension of field systems would have led to a reduction in available cultivable land, and therefore possibly competition for land. This may may explain the mid-later Bronze Age physical delimitation of individual fields and of possibly the construction of 'ranch boundaries' (cf. Bowen 1978). Assuming land was passed down through extended family groups, then those farming units which started expansion first, or continued to do so more aggressively, would end up with a larger area of defined farmland once the whole agricultural area became spoken for. During a period of pressure and competition for a declining resource, those with larger 'estates' may wield more 'power' over farming units with smaller, almost unviable plots. Here therefore the archaeological consequence of soil erosion may have been to change the face of the landscape and prehistoric farming. Further, it is even

possible that one of the consequences led to hierarchical, stratified societies postulated by some archaeologists during the Iron Age (Cunliffe 1982).

In order to retain a viable agricultural regime the population might have been better off relocating on more fertile soils in the region. However, the investment of time and energy and inertia in terms of physical settlement attributes would lead a community to continue to invest in their current landscape rather than move. Continued tillage and intensive grazing regimes depleted the organic and nutrient levels to such an extent that during the Iron Age cereal farming was largely unviable and although sheep were undoubtedly predominant they were noted to be significantly smaller possibly as a result of lack of nutrition (Bullock and Allen forthcoming). During the Iron Age it is likely that significant quantities of grain were not grown locally but were imported. For the first time this valuable resource can be seen to be stored in pits and granaries and it is perhaps no coincidence that it is during this period that we see the occurrence of defendable hillforts.

Stored grain was obviously more vulnerable to theft than that in the fields. Trade and exchange with peripheral communities was established or strengthened. As mentioned above grain may be bought in together with timber and pottery. Meat, diary products and textiles were probably produced on the downlands and available for trade and exchange.

<u>A change in farming</u> *(500 BC ->)*

During the later Iron Age continued tillage and intensive grazing regimes had led to depletion in soil depth and possibly to 'exhausted' soils. Although some new field systems were created (e.g. on the Bridport Road ridge) significant changes are evident and the pattern of fields changed. The tilled areas at Flagstones which existed from the 2nd millennium cal BC revert to longer, only lightly grazed grassland. More stable conditions are also suggested in Fordington Bottom, again perhaps land on the valley sides and on the Down was taken out of cultivation. Further evidence for this is the increase of false oat-grass (*Arrhenatherum elatius*) which can grow in abandoned arable land

which is only lightly grazed. This was not a universal picture, however, as the land surrounding the Fordington Farm barrow was taken out of pasture for the first time in a millennium and tilled. If this is representative it may indicate a reduction in the overall cereal cultivation. If so then it would be coincidental with a change in the crop composition. Spelt wheat was recorded for the first time (Flagstones) as well as the free-threshing form of bread wheat (*Triticum aestivum*), oats and hulled six-row barley. The depletion in soils is also generally coincidental with a change in cultivars; from bread wheats to barley. The latter is considerably more tolerant of poorer soil conditions. Further, the strong contrast in the weed taxa and the presence of heath bent grass (*Sieglingia decumbens*) which prefers acid soils may indicate that some of the cereals were not grown locally.

New technology in the form of more effective ploughs appear and there is some indication that there is a temporary increase in tillage during the Romano-British period. What is most striking is the spatial contrast in the evidence. Along the Southern Dorchester By-pass the evidence during the Romano-British period is one of general cultivation and livestock farming. Indications that some changes were a result of the demands of the Roman town is suggested by the faunal evidence (Bullock and Allen forthcoming). Within Fordington Bottom, however, a much richer and higher level of farming is depicted by the faunal and seed evidence. This may be a result of more formalised farming on a Roman estate, as opposed to that undertaken by the native populations in the surrounding area.

PART THREE

The Study and Interpretation of the Prehistoric chalk landscape of Southern England:

Review and Discussion

Review of
colluvium and palaeo-environmental data
and discussion of the
archaeological implication

"False facts are highly injurious to the progress of science, for they often endure long; but false views, if supported by some evidence, do little harm, for everyone takes a salutary pleasure in proving their falseness"

Charles Darwin
The Descent of Man, Chapter 6

Chapter Eight

The Study and Interpretation of the Prehistoric Chalkland Landscape of Southern England

Review and Discussion

> *"...the barrier between site and environment is only one of many that may impede an understanding of human action within past environments."* (Jones 1985, 123).

In the introduction to this thesis (Chapter 1) I presented the rationale that guided its main research objectives. This stated my belief that palaeo-environmental information can be used not only to support archaeological interpretation but can also provide reasons and mechanisms for cultural decisions and action. In this chapter I will pursue this rationale further in the light of the data I have now analysed and presented in Chapters 4, 5, 6 and 7. I will argue that my work goes some way to fulfilling the objectives advocated almost a decade ago by Bob Smith (1985, 321) where he argued that a "new archaeological approach to the prehistory of chalkland valleys ... [should be] ... closely integrated with ecological research". Since Smith wrote this important article we can also see that environmental studies in archaeology have come of age. This can be judged by their contribution to the various parent disciplines from which the techniques, methods and interpretations were once borrowed. The contribution which this thesis makes is not only contained in the details of each study, but also in the wider implications and overall patterns that stem from the analysis of such a large corpus of data. This broader overview is based on the initial statements of the main research aims (p.2-3). These are now used to provide the basic topics with which to discuss the results of this work.

The Environmental data considered

One of the major challenges and incentives of this work was to use studies of colluvium and environmental analyses to interpret human action in the landscape. However, before we consider some of these

issues (Sections 8.1, 8.2 and 8.3 below) it is necessary to briefly review any biases inherent within the data-base so that caution and restraint can be exercised when looking at regional or temporal comparisons. These biases can be detailed under ecological, sampling and interpretative themes. Recognition of the limitations of the data-base is vital in determining the value of relative sets of information. Problems can be identified and suggestions put forward as to how these may be resolved in the future.

The size and nature of this data-base has not only led to the recognition of some of the limitations of mollusc analysis but has also shown that archaeologists may well be contributing more to the field of molluscan ecology than their biological counterparts.

As the expectations of molluscan analysis grew, following Evans' seminal publications (1972) and the more regular use of land snails analysis (cf. Allen 1988a; Bell 1983; Evans 1990; O'Connor 1977; Thomas 1977a; 1977b; 1977c), so pressure was placed upon those analysts to increase the resolution of their interpretations. Although this is an inviting challenge, the examination of the fundamental concepts of assemblage formation (taphonomy) initially by Thomas (1985) and subsequently by Carter (1987 and 1990), has now largely established the limitations of interpretation for mollusc assemblages, especially those within buried soil horizons. Nevertheless, the exponential increase in molluscan data itself has led to greater interpretative potential in other directions. Instead of examining specific interpretations of individual sample sequences, the opportunity now exists of comparing various regions and periods.

Mollusc ecology and analysis

The increase in routine molluscan analyses now enables archaeologists to increase the level of interpretative power such analysis has. Evans in 1972 was able to demonstrate two fundamental points;

i) that some species have changed their ecological preferences and

ii) that specific man-made habitats have changed significantly.

Increasing numbers of palaeo-molluscan studies have enabled a better understanding of interactions between certain species. Through comparisons of well dated mollusc assemblages from archaeological

contexts, improvements can be made in our understanding of snail ecology. It is now environmental archaeologists who are providing the driving force behind the investigation of mollusc habitat ecology, rather than the botanists, ecologists and malacologists who have concentrated on aspects of population ecology, and feeding requirements. Indeed, in recent years there has been a tendency for environmental archaeologists (including molluscan specialists) to discuss, and undertake, limited modern ecological studies and experiments (see Robinson, ed. 1990) or examine the former distribution of particular species with the aim of understanding their ecological requirements (Allen *et al.* in press).

Although the potential now exists for detailed examination of the recorded occurrences of individual species and assessment of their ecological and genetic behaviour, this has not been explored within the context of this work. Molluscan analysis here has been undertaken as a means to an end, rather than in a critical attempt to improve or define the parameters of the discipline.

Towards the regional analysis of molluscan assemblages: prospects and problems

One of the widely recognised limitations of molluscan analysis is that faunas may only refer to very localised environments. For example Evans (1972, 87) highlighted Sparks' pertinent comment (1969) that "...human beings usually take a wider view of environment than snails, so that conclusions drawn from the latter are valid for only small sections of the human environment". In some instances mollusc faunas may represent very localised habitats, confined to an individual feature (pit) or ditch edge vegetation. Even at best such evidence cannot compete with the spatial dimension available from palynological studies which may indicate the presence of arboreal species tens of miles away (cf. Dimbleby 1985). Nevertheless, the existence of very specialised and restricted open country faunas with low species diversity may represent an environment of several hectares rather than several metres as is the case with faunas from more diverse habitats. It is the predominance of these specialised faunas indicative of open dry grassland and arable habitats that has enabled me throughout this work to address the regional dimension.

One way of improving the interpretative base of molluscan analysis, and thus land-use reconstruction, is through analysis of a number of dated sequences within a defined chalkland area. This is what Evans attempted in 1975 for his very general environmental reconstructions of southern England in his book *The Environment of Early Man in the British Isles.* The main criticisms levelled at his interpretations have concerned the limited number of sites he analysed, and that most of the molluscan evidence originated from buried soils beneath barrows. I have suggested that downland may have been cleared specifically for designated barrow cemeteries (Allen *et al.* in press). Thus it is possible that Evans' work shows a disproportionate amount of open downland because of his sampling strategy.

Many of the molluscan analyses presented here have been conducted within small confined regions (e.g. Dorchester area - Chapter 7) and are often restricted to occupation sites which may specifically reflect the open country environment produced by human habitation and activity. Such sampling bias is combated in part by dry valley studies. Nevertheless, caution must be exercised in any regional or comparative review. Although Evans and Williams, in their review of mollusc data from archaeological sites along the M3 (1991), have argued that a number of analyses within a specific region cannot necessarily be used to compile a view of the landscape as whole, this belies the fact that regional and temporal trends can be detected, even in their own data, and such trends can then be compared with those from other regions. In this way a broad picture of landscape evolution and land-use history of the southern downlands can be painted. Moreover, in various locations, data from colluvium and molluscan analysis can be augmented by palynological studies. This is particularly relevant on the Isle of Wight where Scaife's work has provided the basis of a regional environmental review (Scaife 1980a; 1982a; 1987a). The only other area where direct comparison is available is the Itchen valley, near Winchester, where the sample location at Winnall Moor (Waton 1982a, 1986) lies just off the chalk and close to a number of archaeological sites (Winnall and Easton Lane).

In this thesis emphasis has been placed on undertaking large numbers of analyses within several small defined regions. This has been

beneficial in interpreting land-use (see below). However, the failing of this approach has been the paucity, in particular, of early (Mesolithic and Neolithic) contexts from all the study areas to allow inter-regional comparison. To improve upon our knowledge generally such studies need to be repeated across the downlands and a rigorous search made specifically for Mesolithic and Neolithic sites.

The results of this thesis have been hampered by the detailed ecological and synecological data for some of the specialised assemblages and requirements of specific species. The acquisition of such data would undoubtedly be beneficial to the discipline and it is becoming increasingly obvious that archaeologists will have to undertake this research rather than await its arrival from biologists and malacologists. Indeed, studies such as those conducted by Chappell *et al.* (1971) on trampled grasslands, Cameron and Morgan-Huws (1975) on grassland succession habitats and Evans and Jones (1975) on rock-rubble habitats have been fundamental to our understanding of modern and ancient faunas. The paucity of such studies is a hindrance to further progress within the discipline of molluscan studies in archaeology.

Certainly a clearer understanding of the ecology of modern mollusc faunas and their vegetational habitat preference would have increased the level of interpretation available. Where limited studies were undertaken (Barton, Bedfordshire - Allen 1991b) they were found to be highly profitable. Similarly, although we have now gone a long way towards understanding some of the mechanisms of erosion and deposition and can identify them in colluvial sequences, more, especially modern, analogies are required. On the other hand, the data-base, particularly that for the Mollusca, has a wealth of untapped potential. It has increased the known distribution of a number of species, particularly on the Isle of Wight. Studying the past distribution of some species (e.g. *Acicula fusca*) might enable a better understand of its ecological requirements. Such investigations were, unfortunately, beyond the remit of this research although I did carry out limited work was in this field (Allen 1991b) while this research was being undertaken.

8.1 REVIEW OF THE ARCHAEOLOGICAL VALUE OF COLLUVIAL STUDIES

Studies of colluvium have progressed tremendously in the past decade and their rôle in both archaeological and palaeo-environmental endeavour is no longer in question. the occurrence of colluvium is associated with human activity, more specifically tillage, and in this sense colluvium has been considered a "man-made soil" (Allen 1988a). The occurrence of post-glacial erosion on the chalk (cf. Godwin 1967; Talyor 1966)is no longer denied (Evans 1972; Limbrey 1975; Bell 1981a; Allen 1988a). Although Butzer (1972) believed that early agriculture land use did not produce side-effects such as accelerated runoff, soil erosion gullying and gradual loss of soil moisture attendant upon the destruction of removal of humus, it is now evident that this is exactly what early agricultural practices did do. Climatic explanations that were so popular (cf. Vita-Finzi 1969; Bintliff 1977 and even Kerney *et al.* 1964, 190) have now been largely discarded and are outlined in Section 1.5 of this thesis and discussed in more detail below. However, climatic vagary and increased levels of precipitation would have been significant, especially as it has now been discerned that colluviation is largely a process of fluvial overland flow (Chapter 2) rather than one of soil creep, rain splash and mass movement.

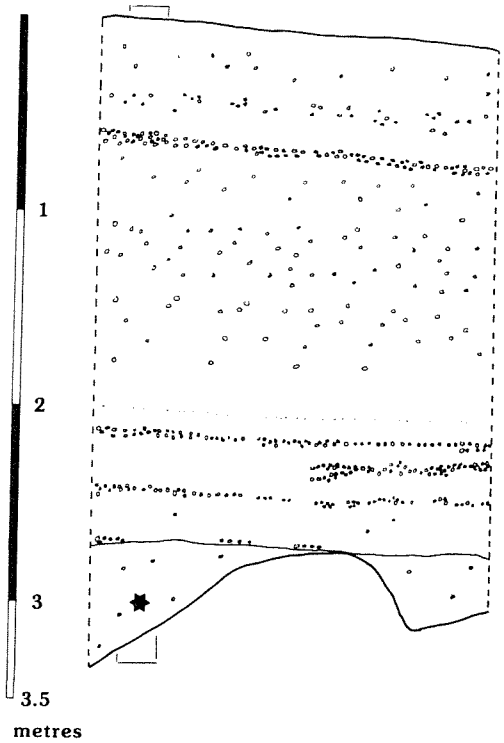
Although the initial aim of this research was primarily one of reconstructing the history of human activity and land-use, studies of colluvial deposits inevitably lead to an attempt to understand and interpret past soil erosion events and regimes. To do this it has been necessary to understand soil erosion in detail and study this as a topic in its own right (Chapter 2). Via an archaeological approach, erosion events have been dated and related to known cultural horizons and thus some extent of the antiquity and longevity of these episodes can be established. Such dated deposits have then been attributed to general land-use activities and cultural practices using palaeo-environmental investigations such as molluscan studies and soil micromorphology (for example see Macphail's descriptions in Chapters 4 and 6 of this thesis and Bell 1983; Allen 1988a). In this way a large data-base of archaeologically documented histories of soil erosion in the past has been accumulated. These now constitute a relatively large corpus of broadly dated colluvial sequences which has allowed not only

a general overview to be prepared (see below) but also the recognition of common patterns in colluvial sequences. The resulting interpretations and data are of use in reconstructing the archaeological landscape and land-use patterns, and are also possibly of use to soil scientists and geographers. Studies of soil erosion via the combination of an archaeological and palaeo-environmental perspective has allowed a comprehension of past soil erosion mechanisms, soil change and degradation, which can be used to place both modern soils and modern erosion within a temporal framework. Thus, just as study and observation of modern erosion regimes and analogous deposits are essential in an understanding of past soil erosion, so the recording and recognition of past events may enable us to determine the reasons and mechanisms of erosion applicable today (e.g. Bell 1986; Evans, R. 1992).

Nature, and diversity of deposits

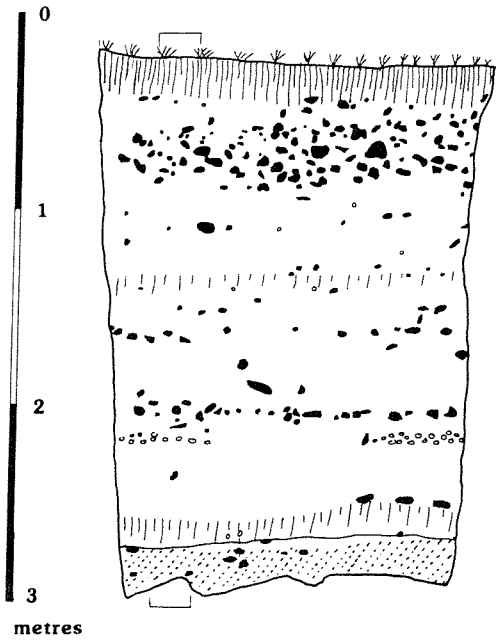
Despite modern modelling and prediction programmes (e.g. Quine and Walling 1992), recent work continues to emphasise the fact that we are still not in a position to predict the nature or occurrence of colluvium on the chalklands (Allen 1988a; 1991a; 1992a). Potential receptor sites are often too topographically subtle to be recognised on even detailed contour surveys (e.g. 1:25000 OS series), though they can usually be located in the field. Even so, on the slopes of Strawberry Hill, a combe on the northern scarp of Salisbury Plain, was so small that it could not be recognised in the field; yet when trenched by a JCB over 3m of deposits were revealed (Figs 51 & 90). Conversely, other larger well-defined valleys, notably the Seven Sisters, Sussex and numerous valleys around Stonehenge Bottom (Chapter 6, p268-270; Richards 1990, 210-211), produced no colluvium despite being located in areas of suitable topography and known intensive prehistoric activity. Superficially it would appear that the occurrence, depth and type of deposits bears little direct relationship to valley and slope morphology and the intensity of past land-use. Whether deposits survive in any particular location appears to depend more on the nature of past erosive episodes rather than site topography. Locations that have the potential to receive deposits may subsequently be the source of material for later erosive episodes. There is the potential for net removal of material; large single events may remove decades, possibly

Strawberry Hill, Wiltshire



DEPOSITS	DATE
	Medieval
	—
ploughwash	Roman
	—
OLS	Early Iron Age
rilling	—
erosion of brown earth	L Neo-EBA
truncation - clearance	—
	Mesolithic-Neo
Ditch	✸ shell - 6820 BP charcoal - 9350 BP

Newbarn Combe, Isle of Wight



gravel fan	Medieval
	—
	Roman
stabilisation	Iron Age
ploughwash	—
	Bronze Age
rilling	
	—
stablisation	L Neo-EBA
truncation	—

Figure 90. Colluvial sequences at Strawberry Hill and Newbarn Combe with dates of deposition and interpretation of erosional events.

centuries, of sediment accumulation.

The nature of the deposits preserved is a combination of a large number of factors of which slope and valley morphology play a part. The local soils, i.e. the source material for the deposits, provide one set of variables. Particle size, structure, organic matter content and stoniness contribute to their erodibility and the composition of the final deposit. Soils, however, cannot be seen as a constant through time or space. Human activities such as forest clearance, soil tillage and intensive grazing will change nutrient and organic matter levels, and soils may be continually thinned by erosive processes. Many valleys contain a number of different soil types (e.g. Moffat and Cope 1984) and thus soil should not be viewed as an homogeneous blanket over the surface. Climate and the occurrence of individual storm or drought events in prehistory are unrecorded variables, the evidence for which is sometimes inferred from the nature and composition of colluvial sequences (Allen 1991a). It is because of these variables that it is not yet possible to produce accurate predictive models incorporating the complex relationships of slope morphology, pedological variation, climatic vagary and past land-use, though this has been achieved on the chalk landscape to some extent by Harris and Boardman (1990).

Products of erosion

It is not surprising that a number of different types of deposit can be recognised (see Fig. 91), often with sequences varying considerably in a single valley system, let alone from area to area. Perhaps one of the main contributions of this study is the field record of a range of different types of deposits allowing description and characterisation of four main groups of colluvial deposit:

1a. Unsorted calcareous colluvium
1b. Unsorted weakly or non-calcareous colluvium
2. Sorted or banded colluvium
3. Flint horizons (e.g. gravel fans)
4. Lenses of chalk pieces

Less common, but also recognised in the current studies, are sorted, or banded, usually weakly calcareous colluvium, stone-free (not worm worked) horizons and silty marls.

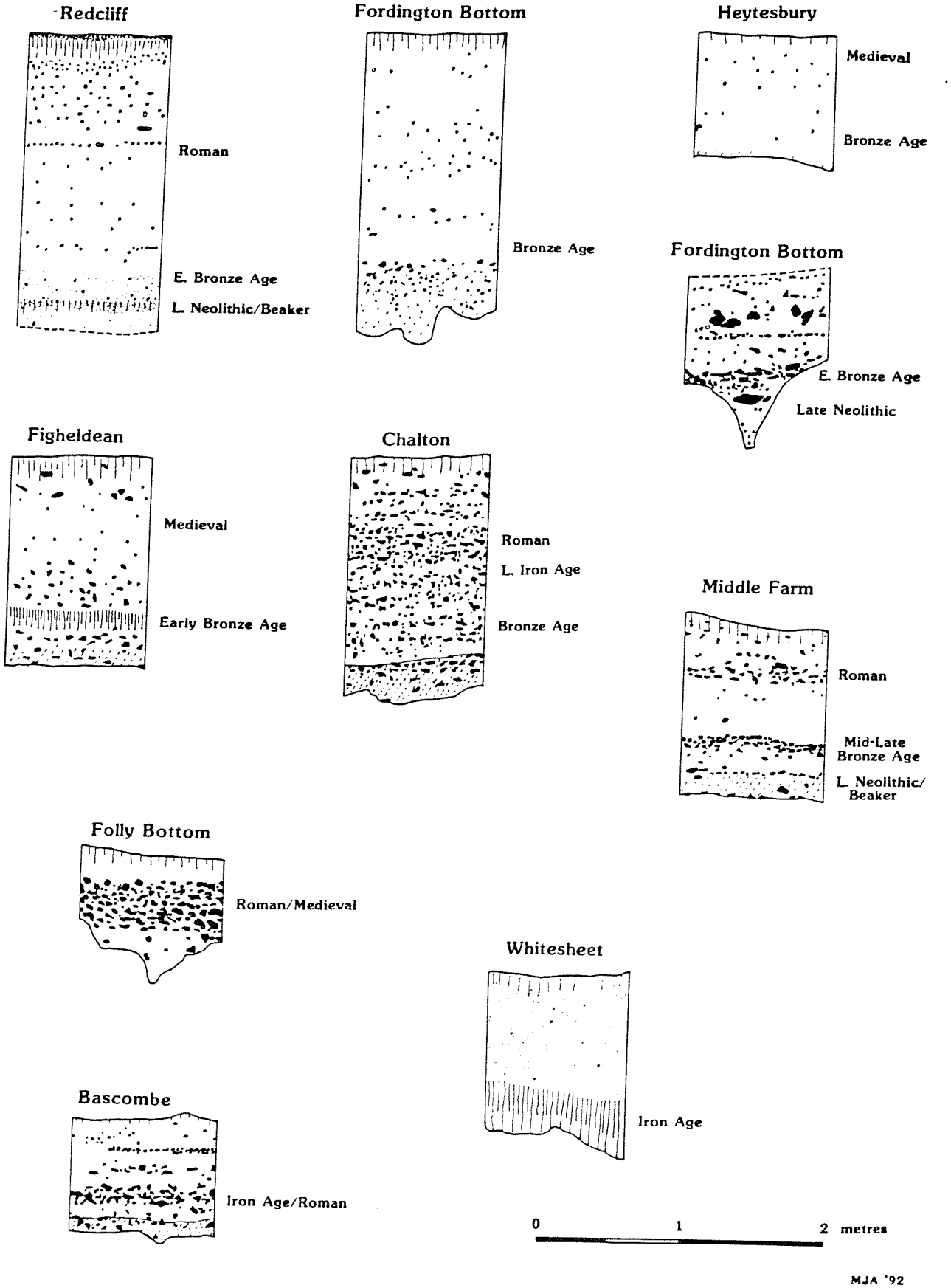


Figure 91. A representative selection of colluvial deposits investigated in southern England.

These categories can be divided into those which usually comprise most of the deposit and those which occur as discrete, relatively thin horizons within finer grained colluvial sequences. With the aid of modern analogues (Boardman and Robinson 1985; Stammers and Boardman 1984; Boardman 1984a; 1988; 1992; Evans, R. 1980 1992; Allen 1988a; 1991a) and palaeo-environmental investigations some interpretation and re-interpretation of the more regularly observed deposits can be suggested. The main deposits are usually fine grained material (silty clays to silty loams) with varying quantities of very small to medium-sized chalk pieces and small to medium flints. Organic matter is low (in 86% of those measured by the writer organic carbon was less than 1.2% cf. Moffat and Cope 1984) and magnetic susceptibility rarely exceeds 35 $x10^{-8}$ SI/Kg. Often these deposits are in excess of one metre in depth. They are generally unsorted although some zonation can sometimes be detected and they often show an increase in chalk pieces and calcium carbonate content and a decrease in magnetic susceptibility up profile.

Unsorted deposits (Fig. 91) are heavily reworked soil material and frequently occur in lynchets, for example Stepleton lynchet, Hambledon Hill (Bell and Allen 1985), Fordington Bottom (Chapter 7) and the Newbarn lynchet (Chapter 5), but they have also been recorded in a number of dry valleys - Strawberry Hill (Fig. 51), Newbarn Combe (Fig. 32), and Limpet Run (Fig. 41) as well as footslope deposits such as Heytesbury (Barnes and Allen 1990). The unsorted nature of the deposits is thought to be a result of both erosion and post depositional reworking.

Banded or well sorted deposits are less common (Table 50), but the distinction between one 'band' and a deposit containing sorted material may be largely a semantic one. Such sequences (e.g. Middle Farm, Dorchester; Figs 61 & 91) indicate varying scales of erosional episodes and pulsed inputs of material rather than an almost continual accretion. The variation between highly calcareous and weakly calcareous, often more clay rich, deposits is largely a product of the presence of former thicker soils and/or Clay-with-flints (Hodgson *et al.* 1967).

In general, calcareous colluvium tends to produce molluscan assemblages dominated by *Helicella itala*, *Trichia hispida* and the Vallonias and are considered to be largely a product of tillage. The fact that they are very localised and probably washed from only one or two fields is borne out by their predominant occurrence in lynchets. The restricted origin of the eroded material is also seen at Middle Farm, Dorchester (Allen forthcoming a) where the fills of archaeological features (ditches and post-holes) dug through Clay-with-flints on the plateau were almost devoid of land snails due to the local acidity. The valley deposits only 150m away, although containing very few chalk pieces and superficially seeming to be non-calcareous, produced high mollusc numbers (over 600 shells per kilogram). Here colluviation is taking place largely from the thin soils on the chalk slope and not from the Clay-with-flints on the plateau. Although these unsorted deposits are very localised, there is evidence that they can be re-worked over longer distances (see for example, Duxmore, below).

The two most commonly observed discrete horizons are flint horizons and lenses of chalk pieces (Table 50). The origin of these has been discussed previously (Chapter 2) and is summarised here. Flint horizons generally consist of medium to large flints often representing up to 70% of the sediment. They are predominantly nodular with a number of smaller fractured flint pieces. Although several scenarios have been invoked for the deposition of flint nodules, including their accumulation as a result of rolling downslope aided by cattle or sheep (Bell 1981a), it is now clear that most of these deposits are the result of gullying events (Stammers and Boardman 1984). Where such archaeological deposits have been excavated in plan (Ashcombe Bottom, Fig. 10) or orientation has been measured e.g. Ashcombe Bottom (Chapter 4) and Middle Farm (Chapter 7), they show that they have originated from the valley side and can be compared with gravel fans (cf. Boardman 1984; Stammers and Boardman 1984). Gullying upslope results in large volumes of soil and stones being stripped from the slopes and washed away; the stones are dropped at breaks of slope, while the finer material is transported further down the valley. Such high energy events have a considerable erosive force and are known to remove large quantities of colluvium from valley floors (Boardman 1988). Such deposits have been noted predominantly in footslope locations (i.e. on

SITE	Truncation of E.Holocene soil (latest date)	Buried soil/ stabilisation horizons	Flint horizons Gravel fans	Flint horizons lavant deposits	Chalk fans (? rill erosion)	Unsorted calcareous hillwash	Unsorted weakly calcareous hillwash	Well sorted, banded hillwash
SUSSEX Ashcombe Bottom (TQ 380 106)	Late Neolithic	Final Neo-EBA	Middle BA	-	1960's	-	Final Neo -MBA	-
Grey Pit (TQ 434 090)	Neolithic	Final Neo-EBA	BA - Roman	-	-	EBA -> Roman	-	-
HAMPSHIRE Compton (SU 475 264)	BA	BA	-	-	-	BA ->	-	-
Bascombe (SU 721 166) Bell 1981b; 1983	pre Iron Age	-	-	IA/Roman	-	-	Iron Age -> Med	
Chalton (SU 729 160) Bell 1981b; 1983	pre BA	-	-	-	-		BA -> Med	
ISLE OF WIGHT Redcliff (SZ 625 8555)	Neolithic/EBA	LNeo/EBA	-	-	-	LNeo/Beaker -> Roman/Med	-	-
Newbarn Combe & Newbarn Lynchet (SZ 4355 8618)	Neolithic/EBA LBA	?1. EBA 2. IA/Roman -	Medieval	- -	BA/IA -	EIA -> Med LBA/EIA ->Med	EBA -> EIA	- -
Duxmore (SZ 563 874)	EBA	-	Roman	-	-	LBA -> Med	IA -> Roman	-
Gore Cliff (SZ 493 763) Preece 1980	Roman	-	-	-	-	Roman -> Med	-	-
WILTSHIRE Strawberry Hill (ST 996 528)	L Neo/EBA	Early Iron Age			Early Iron Age	L Neo -> Roman	-	-
Durrington Walls (SU 152 436) Wainwright 1971	Neolithic	??? Iron Age	-	-	-	Late Neo ->	-	-
Figheldean (SU 148 468)	Neolithic/EBA	relict LNeo/EBA	-	-	-	BA -> Med	-	-
Whitesheet Hill (ST 802 352)	LBA/EIA	Mid Iron Age	-	-	-	IA -> Med calcareous marl	-	-
Folly Bottom (SU 173 424)	pre Roman	-	-	Roman/Med	-	-	-	-
DORSET Middle Farm (SY 672 902)	LNeo/Beaker	EBA	Mid-Late BA	-	-	-	EBA -> Med	
Fordington Bottom (SY 665 908)	LNeo/EBA	prob. BA	EBA	-	Roman	EBA -> Med	EBA and BA	IA and Roman
Hambledon environs 1 Combe Bottom, (ST 8565 1190) 2 Stepleton Lynchet (ST 8579 1165) Bell & Allen 1985	Pre Iron Age Pre Iron Age	- -	- -	- -	- -	Iron Age - Med Iron Age - Med	- -	- -

Table 50. Presence and date or recorded depositional and stabilisation events in colluvial sequences in southern England.

the edge of the valley floor). No chronological hypothesis can be given for their occurrence: they have been recorded from earlier Bronze Age deposits at Fordington Bottom, Dorchester; Middle Bronze Age at Middle Farm, Dorchester; Roman levels at Duxmore Combe, Isle of Wight and Medieval horizons at Newbarn Combe, also on the Isle of Wight.

Thin (up to 4cm) horizons of abundant, very small and small chalk

nodules have been recorded from a number of sites (Table 50) and have been discussed by both Bell (1981a; 1992) and Allen (1991a). When such an horizon was excavated in plan at Strawberry Hill, it was associated with a quantity of sherds of an Early Iron Age carinated bowl and showed a series of 'fingers' of chalk running downslope (Fig. 52), analogous to those recorded from *c.* AD 1960 horizons at Ashcombe Bottom (Chapter 4) and to chalk fan deposits observed from modern erosion episodes (Allen 1992a, fig 4.5). I suggest these chalky lenses often represent chalk fan deposits, probably originating from rilling of the A and A/C horizons within an arable field. Perhaps we can see the pottery here being moved locally and preferentially downslope during fluvial erosion in the mode predicted for such material in Chapter 2, p32-33.

The interpretation of the stone-free horizons that have been recorded from a number of sites is more problematic. They have been discussed by Bell (1981a) and in general terms in Chapter 2 of this thesis and more specifically when they have been encountered in the colluvial deposits studied at Ashcombe Bottom (Chapter 4), Newbarn Combe (Chapter 5) and Strawberry Hill (Chapter 6). A good example of some of the problems of interpretation that these horizons offer is seen at Strawberry Hill. A series of stone-free and stony horizons was located near the base of the 3.6m colluvial sequence (Fig. 90). Although in the field these sequences were interpreted as earthworm-worked horizons and seem to represent stabilisation and cessation of erosion, soil micromorphological evidence cast doubt on this. Richard Macphail suggests that this stone-free horizon was a colluvial slurry that originated from an intensively cultivated rendzina soil (see sample 49, p.261). The overlying chalky stone horizon is a probably part of a similar erosion event and indicates sorting of the soil material prior to deposition (i.e. rilling of Ah horizons) rather than post-depositional reworking by worms. These deposits in turn were rapidly buried, preventing biological reworking *in situ* or mixing by cultivation. In other cases (e.g. Bourne Valley, Sussex) Macphail *et al.* (1987) have shown that a stone-free horizon is a result of *in situ* biological reworking and pedogenesis.

If the chalky and stone-free horizons discussed above are to be

preserved they must be buried rapidly and deeply enough to prevent mixing by biological activity and cultivation. This is also true for the burial of soils. If each sediment increment is thin and the recurrence rate is low, then a soil horizon will be reworked biologically or by cultivation and not buried and sealed. Only the lower portion of the soil profile is continually removed from the biologically active or cultivation layer. The consequence of total biological reworking and/or mixing by cultivation of such horizons would be to produce the typically homogeneous, calcareous colluvium, commonly observed. This then forces us to consider the origin of the main colluvial layers seen in valley locations. Are these the result of rilling and sorting, as described earlier, which have subsequently been humanly (i.e. by tillage) or biologically reworked, or are they the result of other processes of soil removal from the slopes without sorting, such as sheetwash (cf. Boardman and Bell 1992)? In order to answer such questions soil micromorphological studies are required; such ideas cannot be tested through field description or by molluscan analyses alone.

Spatial variation and colluvial diversity

It is perhaps not surprising then, that significant variation in deposits is noted. In a few instances multiple trenching of a single valley has revealed considerable spatial variation within the deposits. Eight sections through the centre of the 2.3km long valley floor at Fordington Bottom, Dorchester (Fig. 91) showed that gravel fans were highly localised and fine-grained Post-glacial deposits varied in thickness between 1.2m and 2.3m over a distance of less than 250m. At Duxmore, Isle of Wight, five trenches were excavated by David Tomalin in a narrow scarp combe less than 60m wide and 200m long (Fig. 92). No two trenches were alike or produced the same sequence even though though the majority were less than 15m apart. Deposits at the head of the combe were shallow and non-calcareous whereas those on the combe floor were deep and highly calcareous. Gravel fans were recognised in at least two of the five trenches. Two separate fans were recorded, temporally separated and with the origins of their runoff at right angles to each other. Material in the younger and coarser fan had been washed down the valley axis while the earlier fan originated from the valley side.

Within a single small combe, a highly complex and varied erosion history can be envisaged, such that any particular location within the valley may have been both a receptor and transport site. There is no evidence to suggest that any particular deposit type (e.g. flint horizons) is confined to, or even occurs predominantly within, any chronological period. Nor can such deposits be consistently linked with specific episodes such as the first tillage of an area. However, a single event can also produce a number of spatially discrete deposits. At Duxmore the deeper deposits near the mouth of the combe were not only more calcareous than elsewhere, but the whole sequence was more homogeneous. This suggests perhaps, greater amounts of reworked material and thus erosion of colluvial deposits themselves. In contrast, higher up the valley more discrete horizons relating to specific events or periods could be discerned.

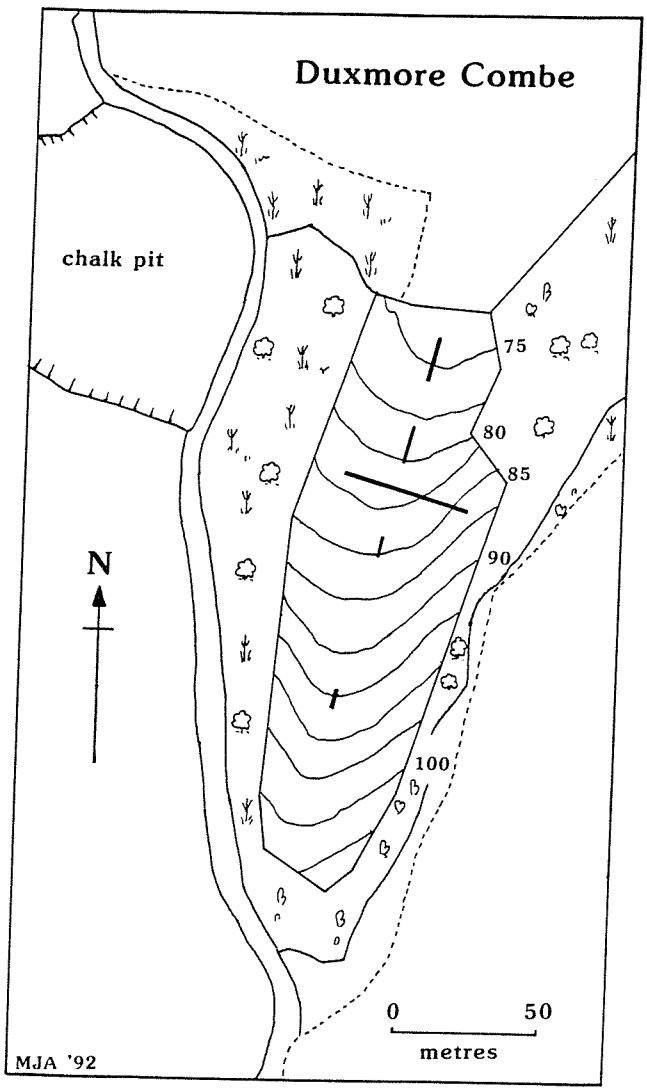


Figure 92. Plan of Duxmore Combe.

The lateral and temporal variations in the deposits are particularly noteworthy as they force one to question whether a single valley section is ever truly representative. Most of the investigations presented here are only based on single sections, although at Ashcombe Bottom (Chapter 4 and Allen 1984a; Macphail 1992) several soil types were recognised within a single valley transect.

Interpreting past land-use using colluvial deposits

Dated episodes of colluvium have been used to produce a generalised scheme for the evolution of the chalk landscape and soil patterning (cf. Bell 1981a; 1983). On a localised scale, recent studies (summarised above) may also help to explain episodes of pulsed inputs of colluvium, but on a regional or extra-regional scale they contribute to the examination of issues such as climatic change and land-use patterns. The main contribution of archaeology to erosion studies is the potential of dating erosion episodes and linking them with specific human activities. Specific spatial relationships with archaeological sites and past activity can also be seen, as Bell demonstrated at Itford (Bell 1983). The major lateral variation not only enable us to question whether single sections are representative, but also shows that small relict fragments of earlier colluvial layers may be preserved within a valley and are unlikely to be found by a single trench in the valley.

Former Holocene soils

Dry valley sites have been thought to be obvious locations for the investigation and palaeo-environmental analysis of Neolithic (or earlier) buried soils. Unfortunately, however, this has proved not to be the case as *in situ* preserved soils of this date are rarely found in these locations.

An understanding of the former Holocene soils on the chalklands is required for the reconstruction of past human activity. It is also directly relevant to the erodibility, vegetational and agricultural potential of the landscape. In some cases buried soils from which palaeo-environmental information has been obtained have been found in dry valleys (e.g. Pitstone, Buckinghamshire; Evans 1966; Evans and Valentine 1974). These occurrences are, however, rare as many sites show removal or truncation of the early Holocene soils (see Figs 90 & 91). Where they survive, they do so only in subsoil hollows or as pedo-relicts as indicated by soil micromorphological investigations (e.g. Ashcombe Bottom, Section 4.2; Macphail 1992).

Soil micromorphological data (Macphail *et al.* 1987; Macphail 1992) and field records indicate that the early Holocene soils on the chalk may

have been fairly thick brown earths or calcareous brown earths (cf. Limbrey 1978). They are often devoid of molluscs thus robbing us of this set of palaeo-environmental information. In locations where field interpretation has suggested the existence of basal old land surfaces, analysis has often indicated that they were colluvial rather than developed *in situ* soils. This was the case at Newbarn Combe, Isle of Wight (Chapter 5), which produced a weakly calcareous, non-snail-bearing, deposit in the bottom of the valley (Fig. 91). It was evident, however, that it was not *in situ* but was derived from the severely eroded former Holocene soil. Similarly the basal deposits at Strawberry Hill, Wiltshire, which were sealed by over 3m of colluvium, proved to be of a colluvial origin (Chapter 6).

Evidence for former Holocene soils is, therefore, scarce, which in itself indicates a significant erosion and truncation of these horizons. Most colluvial sequences show deposits of at least Bronze Age date and thus the removal of the probably loessic brown earth soils (Macphail 1992; Allen 1988a) was evidently prior to this date. Truncation of the former basal soils can be seen to have been severe and extensive; at Fordington Bottom, the basal deposits frequently comprised extensive gravel fans which sealed a Late Neolithic or Early Bronze Age ditch. A humic basal buried soil at the foot of Whitesheet Hill proved to be of Iron Age date indicating total removal of all previous soils and deposits before stabilisation and pedogenesis. The lack of these early Holocene soils provides evidence of a long-term episode of erosion but, to date, the re-deposition of this material has not been evident, except perhaps in the larger alluvial deposits such as those reported by Scaife and Burrin (1983; 1985; 1992). The cause of this erosion is blamed on early forest clearance, but the reason for such continued and wholesale erosion is often not fully explained, although it might have required only one major episode of erosion to truncate the early Holocene soil from any one site.

Evidence of prehistoric land-use

Molluscan analysis has been used to define different local environments within a single valley catchment and recognise varying, possibly cyclical land-use regimes. Two main observations can now be made. (1) The typically unsorted, calcareous, colluvium is usually equated with

arable activity and the mollusc assemblages reflect this (e.g. Fowler and Evans 1967; Thomas 1977b; Bell 1983). (2) Short, grassland episodes can be identified. Scaife tentatively suggested a cyclical pattern of rotational arable and pasture from pollen evidence on the Isle of Wight (Scaife 1984) but there was no corroborative evidence. molluscan studies by Bell (1983) on the South Downs were not able to confirm this. Now, however, molluscan analysis of a shallow calcareous footslope deposit below Knook Horse Hill, Heytesbury, Wiltshire (Allen in Barnes and Allen 1990) has demonstrated this possibility. The fluctuation of two groups of species, those typical of disturbed arable contexts (*Pomatias elegans*, *Helicella itala* and *Vallonia excentrica*) and those associated with grassland areas (*Carychium tridentatum*, *Pupilla muscorum* and *Vallonia costata*), suggest alternating arable and pasture, perhaps of a rotational farming regime. The composition of these assemblages would repay further ecological investigation.

At Figheldean in the Avon Valley, Wiltshire (Allen and Wyles 1993), Fordington Bottom, Dorset (Chapter 7) and Newbarn Combe, Isle of Wight (Chapter 5) molluscan analysis of colluvial sequences indicated that two different environments may have existed contemporaneously in the valley. In these cases it has been suggested that pasture existed in the valley bottom and was contemporary with arable land on the adjacent slopes, from which most of the soil material is derived. If this is so, then the products of erosion have been carried from, and through, arable fields and transported over grassland before being deposited in the centre of the valley. This system seems to have been reversed by the medieval period, for often field systems are seen on valley floors and pasture occurred on the valley sides. This is also often the case today. Here we can suggest that erosion and deposition has influenced the location of human settlement and farming. Early farming communities seem to have located settlement in the valley bottoms or at the base of slopes which afford some shelter as well as the valley providing a routeway. Tillage was conducted on the gentler slopes and hilltops. However, by the later prehistoric period, extensive tillage and erosion resulted in thin rendzinas which were less profitable to till on the valley sides, while thicker soils existed in the valley bottoms. As a consequence settlement and farming locations may have been reversed; settlement was relocated onto the gentle slopes and

plateaux and tillage conducted on the valley floors.

Published analysis and synthesis of colluvial deposits (Bell 1986; 1992; Allen 1988; 1991; 1992) and research presented in this thesis contradict the statement made, surprisingly, by Karl Butzer (1972) in where he argued "... *that early agricultural land use did not provoke its more unpleasant side-effects such as accelerated run-off, seasonally accentuated stream discharge, soil erosion gullying and gradual loss of soil moisture attendant upon the destruction or removal of humus. At any rate both archaeological and geological evidence to this effect are absent.*" Archaeological evidence, at least, can now claim to have shown the early agriculture did affect the landscape in all and every way that Butzer argued it did not!

Environmental systems, thresholds and landscape sensitivity

The response of soils to pressures exerted by human activities is complex. In an attempt to understand at what point erosion might occur it may be useful to consider briefly the concepts of environmental thresholds and landscape sensitivity which have been successfully deployed by Burrin and Scaife (1988) for alluvial deposits. This may enable us to address a number of questions. An environmental system can withstand a series of pressures caused by external changes. However, eventually these changes will approach the environmental threshold, which once breached, may result in erosion. Erosion and soil thinning result in a changed environmental system (Fig. 93). Vegetation clearance and the onset of new activities are probably greater contributing factors to erosion than continued ongoing processes such as tillage.

In key figure (Fig. 93) a hypothetical series of events are depicted based upon much of the data summarised in table 50. A variety of erosional events are depicted to illustrate a hypothetical history of sedimentation and soil degradation. Stable conditions are portrayed by the flat portions of the graph, and de-stabilisation, caused by either a single activity (or events) or the continuation of, for instance, tillage, is depicted by the steeper portions of the graph. As a series of events occur, so a hypothetical colluvial sequence is postulated and a change from thicker brown earth soils to thin grey rendzinas mapped.

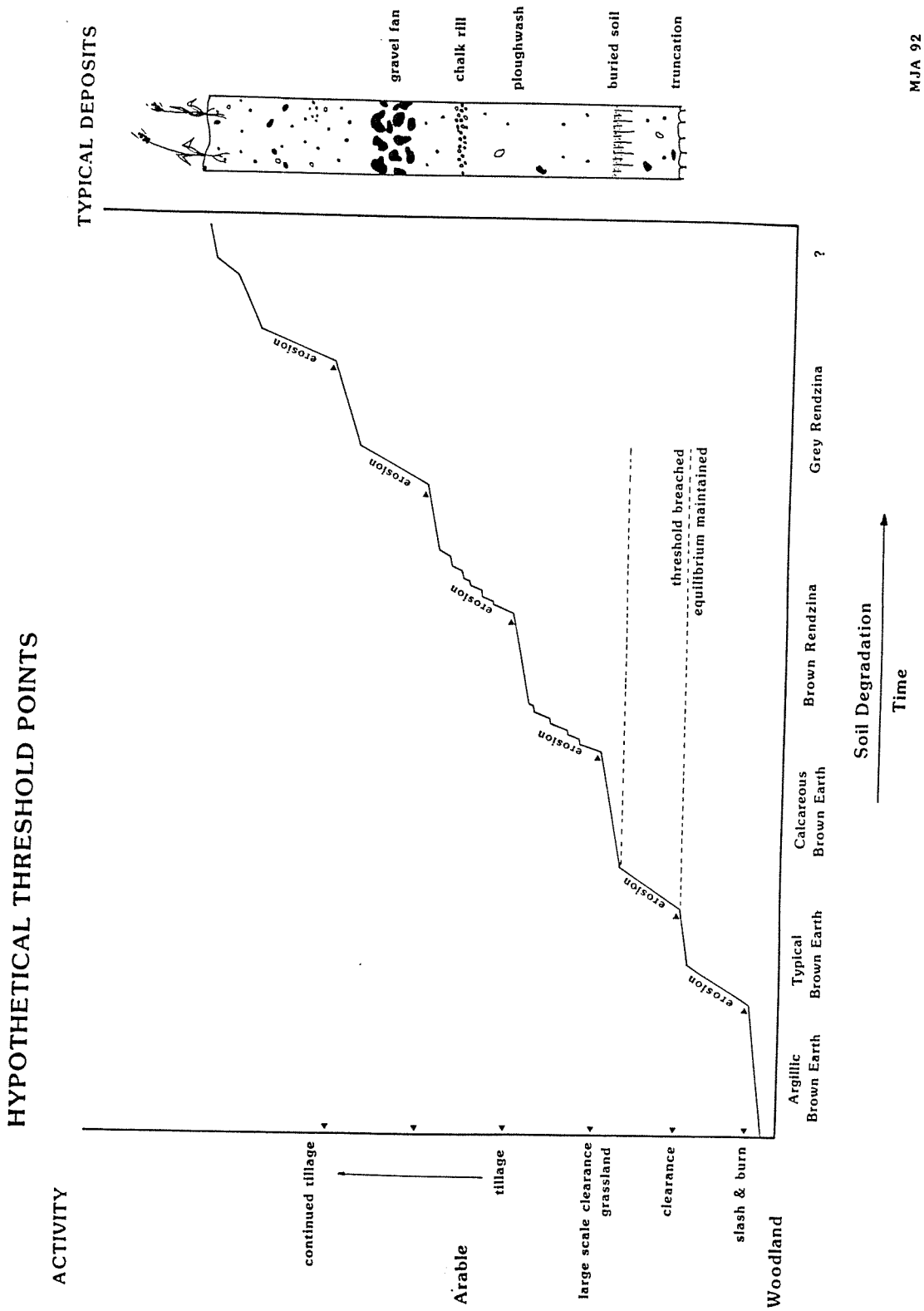


Figure 93. Thresholds; schematic figure of hypothetical environmental thresholds and resultant deposits.

What is now required is full evaluation of this hypothetical model using empirical data (see Table 50 for examples) and analysis of environmental system thresholds.

Chronology of erosion

Initial clearance of the assumed climax Atlantic forest on the chalk would have resulted in a dramatic change in the environmental system. Soil would not only be disturbed but would lie unprotected from precipitation and wind. The lack of vegetation cover would decrease evapo-transpiration, increase the local ground-water levels and increase runoff making the soil particularly susceptible to erosion. This may explain the truncation of the early Holocene soils as observed in many valley sequences (Table 50 and Fig. 91) which seems to have occurred in or by the Bronze Age. Truncation may, however, have been associated with the preparation of ground for cultivation and subsequent tillage which was widespread by the Bronze Age. It is, therefore, still not certain whether we have to infer catastrophic events as a result of woodland clearance or repeated smaller scale erosional episodes associated with tillage to explain the removal of the early Holocene soils from valley locations.

Colluvium is fairly widespread in the Bronze Age (Table 50), and the lack of basal soils indicates earlier (probably Neolithic) erosion. The major reason for this occurrence is the virtually wholesale clearances for settlement and farming in the Bronze Age. In the mid to later Bronze Age further erosion episodes have been recognised which have been attributed to winter sowing (Chapter 2; Allen 1988a) as detailed by Jones (1981) and Reynolds (1981). This evidence for Bronze Age and earlier erosion is contrary to Bradley's initial thought that colluviation was largely an Iron Age or later phenomenon (Bradley 1978a, 41 and 123). Colluvium does, however, become significantly more calcareous in Roman and post-Roman deposits, indicating thinning of the soils and in some sequences, such as Strawberry Hill, Newbarn Combe, (Fig. 91) and Gore Cliff (Preece 1980) the Roman and post-Roman deposits are also appreciably thicker as well as more calcareous.

The occurrence of chalk lenses and gravels fans, however, seems to have no chronological significance (Table 50). It has been argued that

winter sowing, in particular, is more likely to cause the formation of gravel fans (Boardman and Robinson 1985) and Allen (1988a) has suggested that such practices may have occurred as early as the Middle Bronze Age.

Recent work in the Dorchester area (Smith *et al.* forthcoming; Chapter 7) has prompted the suggestion that soil erosion can be seen to influence human action. Soil erosion has been causally linked to changes in agricultural regimes. Furthermore, the consequence of soil erosion may have had profound effects upon farming practices and the use of whole landscapes. Thus to a large extent the present day soil pattern and archaeological landscape is a legacy of prehistoric mis-management.

Discussion

A number of investigations have been detailed which are aimed at determining land-use history in relation to colluviation and human action. However, I have also attempted to fit this approach within the broader remit of soil studies and the conceptual issues of landscape thresholds and equilibria. In so doing I have tried to show how closely related all these disciplines are within the context of soil erosion studies. Studies of soil erosion from an archaeological perspective enable some basic statements to be made.

1) Chalkland colluvium is largely a result of fluvial (i.e. sheet-wash, rill and gully) erosion episodes rather than continual process of soil creep.

2) Former early Holocene woodland soils in Wessex were highly erodible and suffered severe erosion and truncation upon clearance of vegetation by past human populations.

3) The establishment of tillage led to episodes of erosion. Continued tillage which resulted in soil thinning ultimately played a rôle in the pattern of past settlement and farming location, if not practices.

4) We are still not in a position to determine the precise mechanisms of prehistoric erosion nor have we yet been able to determine whether

many of the homogeneous prehistoric colluvial deposits are the result of gradual incremental erosion or the biological reworking and physical mixing by cultivation of a pulsed, and thus layered, colluvial sequence.

5) Past erosion events were highly complex even within a single landscape unit and resulted in significant local diversity. Colluvial deposition systems can be likened to alluvial systems, and thus the statement "it can be suggested from this diverse pattern and magnitude of valley response through space and time that caution needs to be exerted in archaeological assessment, interpretation and significance of such environmental change" (Burrin and Scaife 1988, 212) equally well applies to colluvium.

It is now over 30 years since Michael Kerney undertook his initial work on chalkland dry valley deposits. These were followed by the major contributions of John Evans and Martin Bell. The studies detailed here stem from their initial research. We now have a much greater understanding of chalk derived colluvium and a larger data-base and are starting to be able to use colluvial and erosion studies as an interpretive medium for past land-use reconstruction and human ecology. Both regional and temporal models can be constructed by combining elements of the archaeological palaeo-environmental discipline with those more traditionally based in soil science and geography and also those of mathematical and theoretical modelling. Studies from the archaeological sciences can now offer both temporal and interpretative data to their companion disciplines of geography and soil science and are therefore able to contribute to the understanding of landscape processes rather than just drawing on perceived wisdom. Perhaps soil geographers can now turn to archaeological scientists, just as we in the past have turned to them.

8.2 RECONSTRUCTING LAND-USE HISTORY; CULTURAL DECISION OR ENVIRONMENTAL POSSIBILISM

The extensive set of dry valley data and molluscan information from the chalklands allows a fairly comprehensive review of the prehistoric land-use and environmental history of this area which was last formally

reviewed by Evans in 1975. Having established the local interpretive value of colluvial deposits, and seen that broad patterns can be detected within erosion episodes (Section 8.1 above), one of the main strengths of these data is that they can now be used to review and discuss the chalk of southern England on a regional basis using the case studies. This is what Evans (1971a; 1975) attempted in his work, but in the early 1970s his interpretations were, by necessity, broad and generalised due to the paucity of data. Bell, however, showed that colluvial studies can adequately be used for local interpretation, but now the combination of a number of colluvial studies with molluscan studies and numerous other sites in five separate regions enables a regional and inter-regional review for the chalklands of southern England (cf. Fig. 1).

The review utilises a model of the chalkland development which is based on Bell's local interpretative formula for colluvium. This was applied collectively in this research, to provide a regional picture in the way Evans attempted (*op cit.*) from molluscan sequences. This regional review of landscape and land-use from colluvium and Mollusca now has considerably more data to allow inter- and extra-regional comparison. The details of interpretation within each region vary due to the size of each study area (Fig. 1), the number of analytical studies and the overall density of sample locations within that region. However, taken together they form a powerful tool for more detailed regional interpretation. Regional synchroneity or non-synchroneity of colluvial, environmental and cultural events can be examined (Section 8.3). The regional scale of this review will enable the effect of climate to be tested. If climate was the primary cause in inducing or accelerating colluvial events then regional synchroneity would be expected.

The environmental data set has vastly increased and improved over the past decade and the analysis undertaken during this research (most of which are presented here) contributes a further fifteen dry valley and colluvial sequences, together with nearly 30 new detailed molluscan analyses. The sequences have varying degrees of detail and molluscan analysis includes a data-base of over 120,000 identified snails. This study in essence confirms Evans' broad landscape synthesis. Moreover,

the considerable detail provided by this new data set permits some explanation of the mechanisms involved. The reader is therefore referred back to Evans (1975) for the background, but to the model below (Section 8.3) for the reasons for the development and change. However, before considering and proposing a model for the evolution and development of land-use on the chalklands and its implication for the Beaker Period in southern England, a few other points that have been recognised from this research and which relate to the earlier prehistoric periods need to be briefly.

The chalkland wildwood and the *Pinus* question

The non-calcareous, or weakly calcareous, brown earths (brown forest soils) of the chalklands of southern England supported an Atlantic climatic optimum woodland. The evidence for the composition of this woodland is relatively poor and has been inferred from general palynological studies in southern England (Scaife 1987a). Principal among these are the detailed palynological studies in locations adjacent to the Downs such as those of the Ouse valley near Lewes (Thorley 1971; 1981), Winnall Moors, Winchester, Hampshire (Waton 1982a; 1986) and Gatcombe Withy Beds, Isle of Wight (Scaife 1980a; 1987b). There is little molluscan evidence for this wildwood, or of its clearance, because of the paucity of suitable contexts and the fact that non-calcareous, early Holocene, soils do not preserve mollusc shells. That deciduous woodland predominated in the Atlantic is rarely disputed and even molluscan evidence can confirm an extensive, probably unmodified, climax woodland (mollusc zone d^1) existed on the chalklands at Balksbury in the Andover area (Allen in press).

However, the suggestion that Pine (*Pinus sylvestris*) was as significant a portion of the Boreal woodland on the Downs as it was elsewhere is thought to be more controversial. It has been argued that pine could not survive on the thin chalkland soils as it tends to suffer from chlorosis, a condition arising from its inability to obtain sufficient magnesium in the presence of calcium carbonate. Yet pine has been suggested as a major component of the chalkland Boreal woodland (Allen 1988a) and dated charcoal evidence from the recent studies now confirms this hypothesis (Table 51). It is evident that with the thicker less calcareous soils postulated, there is no reason

The occurrence of *Pinus* on the chalk	
Pine charcoal radiocarbon dates	
SITE and context	Determination BP
STRAWBERRY HILL	
In ditch fill	9350 ± 120 (OxA-3040)
ITFORD BOTTOM	
In tree hollow	8770 ± 85 (BM-1544)
STONEHENGE CAR PARK	
In post-pits	9130 ± 180 (HAR-455)
	8090 ± 140 (HAR-456)
In pit	8880 ± 120 (GU-5109)
Pine charcoal occurrences	
ASHCOMBE BOTTOM	
In tree hollow	*c.* 7950
GREY PIT	
In basal palaeosol	*c.*? 6500
Pine from pollen diagrams	
THE BROOKS	
	prior to 7250
GATCOMBE WITHY BEDS	
	c. 8000

Table 51. The dates of occurrence of pine on the chalk.

why large stands of *Pinus sylvestris* could not have existed on the chalk. Pine charcoals have been recovered from Mesolithic contexts (Table 51; Fig. 94) at Strawberry Hill, Stonehenge and Itford Bottom, Sussex. Palynological evidence from locations immediately adjacent to the chalk also record pine probably growing on the chalk in the Boreal e.g. Vale of the Brooks, Lewes at prior to 7250 BP (Thorley 1971; 1981) and Gatcombe Withy Beds, Isle of Wight at *c.* 8000 BP (Scaife 1980a; 1987b). Further, pine seems to have existed well into the Flandrian on other lithologies in southern England and is recorded in Iron Age contexts at Wytch Farm (Cameron and Scaife 1988; Allen and Scaife 1991).

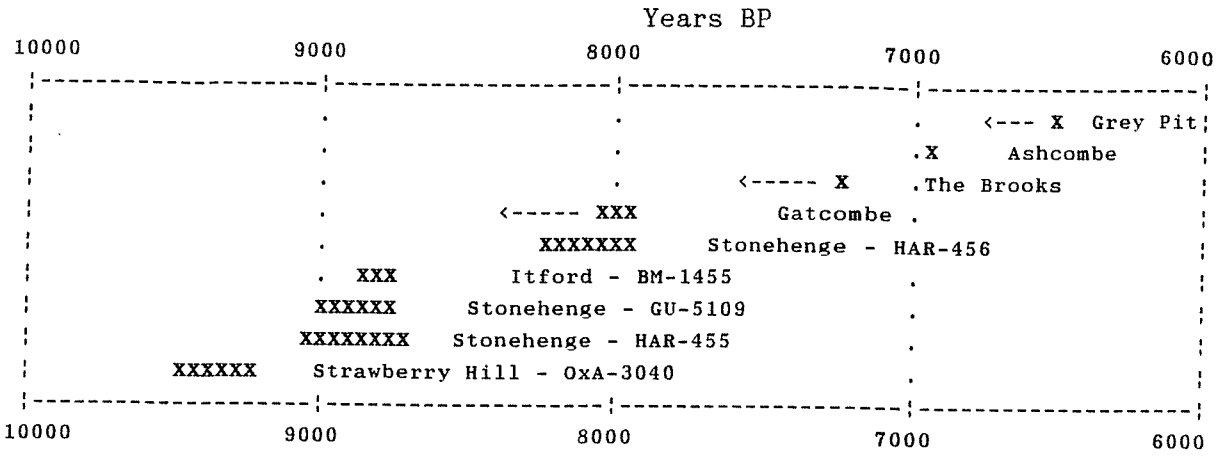


Figure 94. The occurrence of evidence for pine on the chalk.

This study has produced little evidence either for primary woodland or for the modification of such woodlands by Mesolithic populations (cf. Whittle 1978). However it has been suggested that limited clearance in this woodland was occurring, possibly as early as 7400 BC at Strawberry Hill (Chapter 6). Early clearance is evidenced at Ashcombe Bottom, Itford Bottom, and Stonehenge (all from the occurrence of pine charcoal) and is inferred in the Dorchester area (Chapter 7). Despite the limited evidence for Mesolithic and Early Neolithic periods the evidence from the later Neolithic onwards is such that not only can full detailed landscape interpretations be provided for many areas but also a model for landscape evolution and land-use evolution can be postulated.

Mesolithic activity on the chalklands

Only on the Salisbury Plain have a few individual investigations (e.g. Strawberry Hill and Stonehenge car park - Chapter 6) produced significant direct evidence for Mesolithic activity on the chalklands in the form of features, although activity is evidenced at Cherhill (Evans and Smith 1983) and the Avebury area (Evans *et al.* 1994) and as such is inferred in the Dorchester Environs (Chapter 7) and reported under colluvium at Itford Bottom (Bell 1983). In most of these cases this is either the occurrence of charcoals (coincidentally pine) dating to the earlier Mesolithic or Pre-boreal or evidence of longevity of stable grassland in the Neolithic from which some Mesolithic woodland clearance is inferred.

The clearance inferred suggests significant later Mesolithic activity not fully represented in artifact recovery, again evidence from radiocarbon dates from earlier pits and post-pits at Stonehenge (8880 ± 120 BP GU-5109; 8090 ± 140 BP HAR-456; 9130 ± 180 BP HAR-455) and a ditch at Strawberry Hill (9350 ± 120 BP OxA-3040; 6820 ± 120 BP OxA-3041) support this.

The reasons for woodland clearances of Mesolithic date have been discussed (Dennell 1983; Mellars 1975) and caution expressed as to their use for human exploitation of wild ungulate population (Edwards and Ralston 1984) and even their anthropogenic origin (e.g. Moore 1982). The dates quoted above are from archaeological features and it is difficult to refute an anthropogenic origin. The relatively high level of human activity from the Early Neolithic in the Dorchester landscape, and the nature of the clearances, confirms that felling must have occurred in the Mesolithic and was due to human action; it was not as a result of natural causes as Boyd (1982a; 1982b) and Moore (1982) have suggested for some other early 'clearance' evidence. Some of the principal reasons suggested for clearances were for from settlement *per se*, but also to improve browsing for wild ungulates (cattle and deer) and encourage the spread of a diverse understorey vegetation. Both deer and cattle would be attracted to the clearings and facilitate herding and, in particular, the 'management' of deer hunting (Dennell 1983).

A model for the development of the chalkland landscape

A review of all five study areas enables a common pattern of land-use history to be seen in each of the study areas. This pattern is summarised and presented as model for the development and evolution of the chalk landscape and land-use for southern England. Such a model is only now possible as a result of the level of analysis conducted not only within each area, but over five areas spatially separated across some 200 kilometres (*c.* 125 miles) of the southern English chalklands. The model is presented here and its environmental and archaeological implications discussed in Section 8.3 below.

This model operates on the premise that the landscape, and human society within that landscape, co-evolve (as illustrated in the summary

of the Dorchester Environs - Chapter 7). As changes occur within the landscape (whether anthropogenically induced or enhanced is irrelevant) human populations are cognizant of change and communities adapt their farming and life style as appropriate.

The following, ten-step model is more or less self explanatory and can be used as the basis for providing further detailed and complex interpretive and social comment for the more detailed study areas. The model of landscape development is devoid of *detailed* chronological indicators as the sequence of events is broadly applicable to the whole of the southern chalklands. That is not to say however, that all events occurred simultaneously.

The model is one of human action and adaptation to a changing landscape; the changes of which can be seen as a direct result of human operation. The model hinges on two aspects;

1) that soil erosion and the its consequences are the key to landscape change and human response, and

2) that the environment in which man operates is a fundamental determinant of his actions rather than cultural decisions or self determination; that is so say the model is principally one of environmental possibilism (see Chapter 1, p12).

Step 1

Localised clearance of the climax woodland. These clearances may have been for a number of reasons of which providing an area for habitation was only one. Felling of woodland would locally increase floral diversity and create a glade which could for example, attract herds of deer. Thus the creation and maintenance of the glade, allows the management of deer (and other animals) for hunting. The consequence of clearance may have been some localised soil degradation, especially on the steeper slopes, before the taller herbaceous vegetation and shrubs colonised the clear-felled area.

Step 2

Localised tillage, possibly and small-scale agricultural regimes. The

rich humic brown forest soils would give high crop yields, produce a good tilth and be easily managed with a simple hoe. The knowledge that the woodland soils of the 'Downs' were fertile, easily tilled and thus ideal for small scale farming led to increased sedentism and dependence upon the crop resources. This in turn would lead to larger, more permanent clearances within the woodland. Limited soil degradation may occur, within the larger clearances and tilled areas.

Step 3

As sedentism became more pronounced, larger areas were cleared of woodland specifically for tillage, as opposed to pasture and settlement. The large scale clearance of woodland and its almost immediate transition to tilled soils led to large scale erosion of the highly susceptible loessic, brown earths. Many of these primary large scale erosion events were of such great magnitude that valley soils are gullied out. Increased runoff, as a result of deforestation, might temporarily have resulted in floors of valleys becoming winter bournes, i.e. temporarily inundated with flowing surface water. Valley soils and sediments may have been stripped out into larger, alluvial, systems.

Step 4

Increased permanent sedentism and larger investment in permanent settlements and monuments. Clearance on a larger scale occurs and open downland for settlement, pasture and agriculture is established.

Step 5

Intensification of agriculture (sometimes involving both spring and autumn sowing of cereals) led to both widespread and massive soil erosion. Long term erosion occurred; that is, continual small scale events interspersed with larger events resulting in net overall soil degradation. The result was that the thick brown earths were rapidly thinned resulting in the genesis of brown calcareous earths and eventually shallow rendzinas.

Step 6

The reduction in soil depth was commensurate with a reduction in soil nutrients and fertility and thus crop yields. Falling yields may have made it necessary to cultivate larger areas simply to maintain overall

crop output constant. An expansion of the area under cultivation and possibly more rigorous demarcation of fields occurred as a result of pressure on, and competition for, arable land. Although the option existed for the population to move to more fertile and fruitful areas, the investment in settlement and the landscape prohibited this and thus action was taken within the existing framework.

Step 7

Soil thinning continued to make agriculture increasingly difficult and it is likely that crop yields for individual fields or farms dropped to such an extent as to make return from the land "unprofitable". Indeed, occasional total failure of some crops might not have been surprising. As a result a pastoral economy (cattle and sheep) became more predominant. Total food production was not achieved and grain was imported and traded along with timber and other items from areas off the chalk. A larger trade and exchange base was developed (salt, pots, timber etc.) and thus a the inception of integrated complex societies may have occurred and the chalklands could not survive in isolation.

NOTE: Steps 8 to 10 generally occur after the Bronze Age (and thus outside the remit of this research) hence they are presented in outline only.

Step 8

Trade and exchange with areas further afield became established; specialised centres were developed; the downlands produce dairy products, textiles and meat and imported some grain. Grain was an important, and so precious commodity, but one which was readily transportable. It therefore required storage and protection.

Step 9

Complex societies led to the potential for social hierarchy and defended, communal centres.

Step 10

Pastoralism was predominant, although limited areas on the valley floors were potentially cultivable due to increased soil depth in these locations.

8.3 ARCHAEOLOGICAL AND ENVIRONMENTAL IMPLICATIONS OF THE MODEL; CULTURE vs. ENVIRONMENT

The basic model outlined above has some profound implications for the environmental and cultural interpretation of human activity and action in the Beaker period. The interpretative value of the model is discussed in two parts. The first using environmental parameters (climate and the changing landscape) and the second being cultural parameters (Beaker culture and land-use), though these two parameters are not individually totally separate.

Environmental parameters

Settlement patterns on the chalk and the archaeological record; Late Neolithic - Early Bronze Age

The severity and ubiquity of erosion in the past is readily evident, as shown in both the review of such processes in Chapter 2 and the detailed studies and excavations presented in part two of this thesis. That such deposits are widespread is no longer in question, nor is the fact that they can and do bury and obscure archaeological sites. Such factors must be always be considered when attempting to assess the distribution and location of prehistoric activity on this and probably most other lithologies. Obviously the more ancient and ephemeral sites (Neolithic, Final Neolithic and Beaker domestic sites) are less likely to survive than their contemporaneous 'monumental' sites.

The hilltops and slopes from which soil is eroded reveal artifacts which may be recovered through archaeological survey (e.g. Schofield ed. 1991). Soil thinning increases artifact density (Fig. 3), and thus it seems likely that our distributions may be biased towards these areas. Nevertheless, it is the river valleys, dry valleys and footslope locations, rather than hilltops and slopes, that offer more hospitable sites for settlement and domestic activity. They are often more sheltered from the elements, situated along communication routes and nearer sources of water. These areas are more suited to settlement and Final Neolithic and Beaker sites seem frequently to be situated in these locations (Brook, Kent; Holywell Combe, Kent; Ashcombe Bottom, Sussex; Belle Tout, Sussex; Kiln Combe, Sussex; and Middle Farm, Dorset etc.), and may be related to a 'clear new wave of non-local take up of

land on the Downs' in the Late Neolithic (Smith 1985, 264). But, Middle and Late Bronze Age sites although they are located within valleys, are situated more often on valley sides (e.g. Black Patch, Sussex; Itford Hill, Sussex and Mile Oak, Sussex) or at the top of slopes (e.g. Middle Farm, Dorset; Thorny Down, Wiltshire). Perhaps this change in settlement pattern may be viewed as a direct consequence of soil erosion? If Late Neolithic, Final Neolithic and Beaker settlements were sited on the floors of valleys or footslope, then intensive tillage leading to the thinning of the soils may make some of the slopes and hilltops unviable for further cereal cultivation. The hilltops may then not have been used for cultivation, but for pasture or allocated for ritual and burial activity. By the Early Bronze Age prime areas for cultivation were the valley bottoms and therefore settlements were terraced in the valley side, enabling maximum use of the thicker valley soils, and pasture and settlement on the slopes and hilltops.

Have settlement patterns been affected by changes in the water-table?

It has been suggested that water-table changes in the past account for changes in settlement pattern. Indeed even examination of 17th and 18th century maps of many downland areas reveals that many of the temporary streams were more extensive than now. Consequently this expands the areas of 'watered downland' (cf. Cunliffe 1984, 475) that was probably available to prehistoric communities. Although we know from historical maps that streams were once more abundant on the chalk and they often extended further up the valley floors than at present.

Nevertheless settlement and normal agricultural processes occurred in valley bottoms from the Mesolithic onwards and indicates that they were terrestrial environments. The presence of Middle Bronze Age wells at Wilsford (Ashbee *et al.* 1990) and Belle Tout (Bradley 1974; Stevens 1979; Drewett 1982) indicate that at these locations the water-table was not significantly dissimilar to that of today. If the downland valleys were former pleistocene fluvial courses then this must pre-date the settlement and the evidence of human activity; i.e. pre Flandrian. It was specifically the attainment of this type of information that drove workers such as Sparks and Lewis (1957) to investigate the

Hertfordshire valleys at Pegsdon and, later, Kerney (1963; Kerney *et al.* 1964) to investigate those on the Kent and Sussex chalk.

Temporal & regional variation of land-use; the model applied

Were the 'Beaker folk' different or special?

The series of steps identified in the model enable some markers to be placed within the land-use history of each region examined. It is not however the aim of this model to attempt to identify every step in each study area, nor is that readily possible. What follows therefore is a brief examination of the occurrence of some of the major landscape developments across southern England with the aim of supporting or negating my claim of a varying time-scale of change between regions despite a common overall landscape and land-use development (Allen 1988a, 83-84)

Some caution must be exercised in any comparison of this type, because the detail provided by each study area is not identical and in some cases not strictly comparable. The Dorchester environs have a high density of data and thus the integrity of the local land-use history is good; reasonable confidence can be placed on trends detected as the area comprises less than 17km^2 and encompasses over 16 analysed sites. The Isle of Wight on the other hand comprises *c.* 42km^2 of chalkland from which only two major studies have been undertaken, but are complemented by another seven sites. Where sites are not within close proximity, then overall interpretation cannot necessarily be considered for a landscape (cf. Evans and Williams 1991). Nevertheless the identification of consistently dated trends can to some extent overcome this and provide a general picture of a region rather than a detailed interpretation of the land-use history of an individual landscape.

For each area it is generally possible to assess or infer the occurrence and approximate date of initial localised clearance (steps 2-3), the onset of open downland conditions (step 4) and the creation of a predominantly open arable landscape (step 5). Crude though this is, it does allow some broad inter-regional comparison and provides some markers of the rate of landscape development in each location. Even a cursory examination of the information summarised in figure 95 shows that not only is there significant difference in time between the

onset of these land-use events, but also of the rate of clearance and creation of extensive arable landscapes. Evans' broad interpretations may not be as universal as originally postulated (1975).

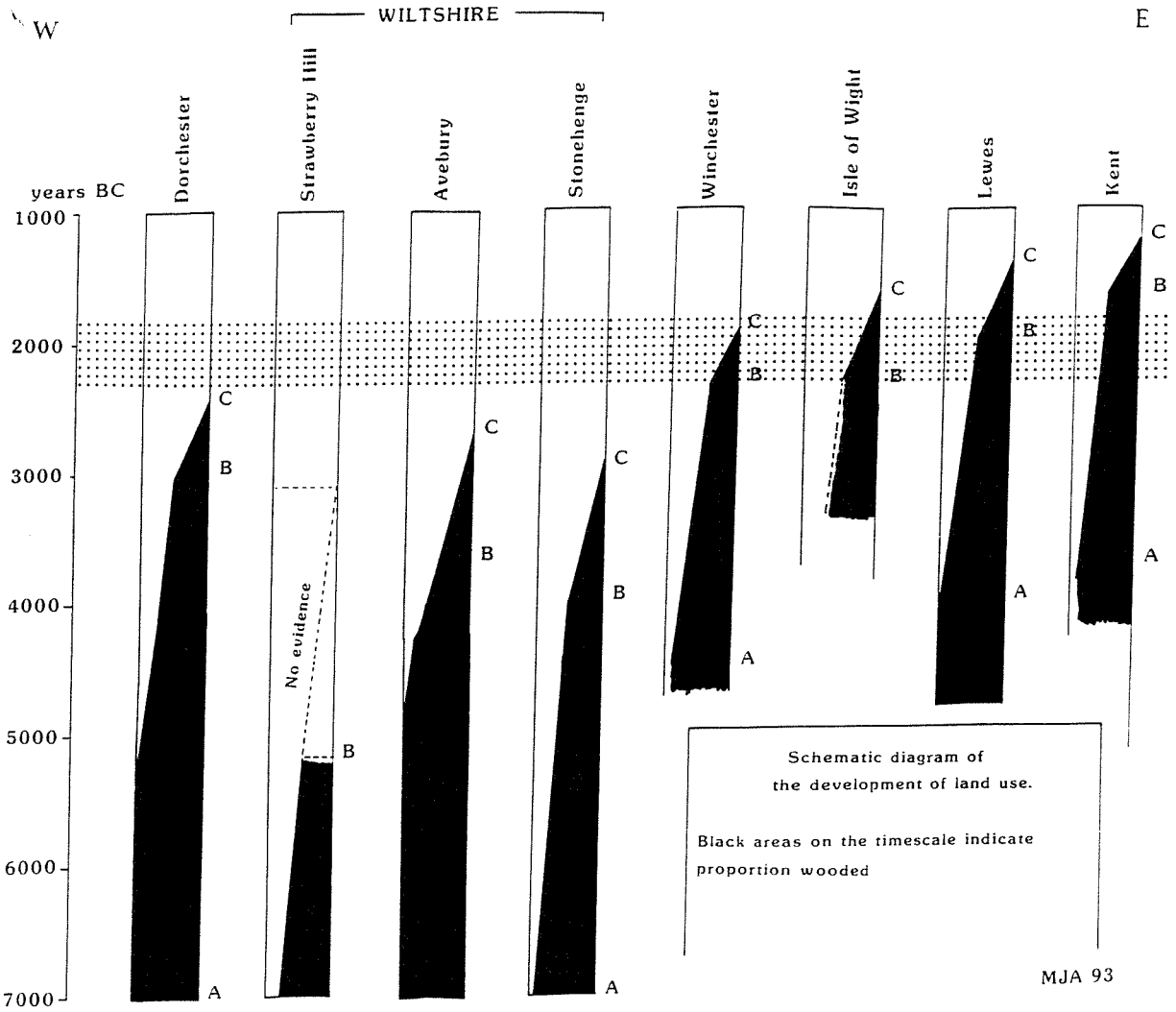


Figure 95. Schematic representation of the development of land-use.

The earliest clearances have been recorded in Central Wiltshire. Mesolithic clearances on the Downs are evident at Stonehenge, Strawberry Hill and in the Avebury region. The clearance of woodland, including pine, at Strawberry Hill, may have been for the activities associated with the digging of at least one ditch. A fairly open landscape can be seen by 5000 BC, by which time soil thinning, or degradation, was pronounced, whereas at Stonehenge, the fact that two post-holes both produced pine charcoal and both date to the earlier Mesolithic, albeit separated by nearly 1000 radiocarbon years, is

probably not coincidental. While detailed studies in the Stonehenge environs indicate initial clearance at *c.* 7000 BC, large-scale, and almost wholesale clearance was undertaken by, or during, the Late and Final Neolithic (Allen *et al.* 1990) i.e. *c.* 3100 BC. This agrees with recent mollusc evidence from beneath barrows on the King Barrow Ridge (Allen and Wyles 1994).

By about 3500 BC soil degradation had also occurred in the Avebury region as evidenced by rendzinas beneath many of the monuments and calcareous ditch fills (Ashbee *et al.* 1979; Evans 1990). Ard marks beneath South Street long barrow also indicate thin rendzina soils in the Early Neolithic. This is in accord with the indications of Mesolithic activity, unless the hypothesis presented within this thesis and suggested by other authors (cf. Limbrey 1978), that thicker soils existed on the chalk, was not a universal scenario!

It is inferred that some clearance within the Dorchester environs occurred at least in the later Mesolithic. It is not known how extensive such clearance was. The fact that secondary woodland was established by *c.* 3700 BC at Flagstones indicates clear fell and regrowth. This, together with the evidence for large-scale clearance seen in the Neolithic, makes it likely that Mesolithic clearances were not all restricted to just small localised clear-fell areas. Unfortunately, however, there is no direct evidence for Mesolithic clearance here. Indeed some localised woodland clearance was seen at Maiden Castle about 3900 BC, but this was probably of primary, rather than secondary woodland.

As discussed earlier the limited regeneration of vegetation at both Maiden Castle and Mount Pleasant is considered to be a localised, rather than landscape, phenomenon. As with the Wiltshire regions, final larger scale tillage in the landscape can be seen largely before the end of the Late Neolithic and thus prior to the Beaker period.

The chalklands of Winchester, the Isle of Wight, eastern South Downs and Kentish North Downs all indicate initial clearances (steps 2-3) at about 4000 BC. They show progressively later larger-scale clearance and establishment of wholesale agricultural regimes. What is

particularly interesting is not only the fact that clearances get later as one moves eastwards, but also that step 4, i.e. the initiation of major arable practices, can all be seen to occur during the Beaker period. Furthermore, the rate of change (i.e. progression through the landscape development steps) can be seen to be faster the later it starts. In other words the time from initiating large scale cultivation (step 4) to the completion of such a landscape is considerably less in the south east than that observed in Wiltshire and Dorset. The fact that other communities have already trodden the route may reduce the slope of the learning curve; if so then fairly widespread trade and travel can be postulated in order to facilitate the communication of such information and ideas.

Was climatic change a major influence in landscape development?

One of the most significant topics that this research can address, by view of the spatial distribution of the study areas, is that of climatic change (Section 1.5). The basis of this thesis is that humans had a major impact on the landscape, and that the evolution of the chalk landscape is primarily a consequence of human action rather than natural or climatic phenomena.

Climate has often been seen as having a pivotal influence on valley sedimentation and has been argued by many writers as a cause for increased alluvial and colluvial sedimentation (see p.10). Climatic change, however, would not be manifest in any colluvial deposits until the actions of human populations (such as cutting down trees, preparing large areas for cultivation or tilling large areas) act as a trigger and make the landscape more vulnerable to responding to climatic variations. Only once the landscape is made more vulnerable can any change (whether human land-use or climatic change) be manifest in colluvial deposits or other stratigraphic or palaeo-environmental markers. Nevertheless, the initiation of major colluvial events, if a climatically induced, would be temporally clustered, and colluviation would be a spatially predicable and consistent process over the southern chalklands (see p.15). As has already been demonstrated, we can detect no common period or periods of colluviation (Table 50) thus climate does not seem to have a fundamental rôle in colluviation and

this confirms Bell's (1981a; 1982; 1985) conclusions which were not testable as they were based on such a spatially restricted area.

Although colluviation cannot, therefore, be linked to climatic cause, changes in land-use might. If climatic change was prevalent then change in land-use would be seen synchronously across southern England. Analysis of the landscape by steps of development outlined in the model and summarised graphically in figure 95 demonstrate that change is not synchronous. Development in land-use and farming occurs asyncronously across the chalklands and does not even follow a consistent pattern from east to west. The pattern of landscape evolution and land-use development is more typical of cultural choice than natural phenomena.

Archaeological parameters

Implications of the model; archaeological theory and interpretation

The strength and resolution of interpretation within each study area is based on the density of data-sets. Unlike Evans' (1975) interpretations which were based on a few sites from which he extrapolated general conclusions for the all of the southern England, we are now in the fortunate position to have five areas from this research and the recently published work in the Upper Kennet, Avebury (Evans *et al.* 1994) for a relatively large number of dated environmental data-sets have been assimilated. As the resolution of interpretation relies not on the number of those data-sets, but the density within the chalklands of each area a simple recalculation of a quasi-confidence rating can be made (Table 52). The density of data-sets within each area of chalklands is calculated and multiplied by 100 to give a relative information factor or data-set content factor which gives us the level of data behind the resolution of interpretation of each area. It is as a result of the increased density of dated environmental data-sets that enable high resolution landscape interpretation such as those presented for the Dorchester environs in figure 89. Until recently this level of data was unparalleled. The realisation that the landscape is a mosaic (Putnam and Wratten 1985; Wiens 1976) and that environmental data-sets comprising soil, colluvium and molluscan evidence reflect only a limited area requires that

environmental interpretations are either confined to the site specific, or that the area (i.e. landscape) for which an interpretation is based is realistic (i.e. density of such data-sets is significant; preferably with a 'confidence factor' greater than 20). Perhaps too, it is important to note spaces within any study area where no data has been obtained (cf. figure 89) and to reduce the ares of landscape evaluation to increase the resolution, significance and archaeological importance of those interpretations.

	No. of data sets	Km^2 chalk in study area	density (data-sets/ Km^2)	Confidence Factor density x100
LEWES	9	106	0.085	8.5
ISLE OF WIGHT	9	64	0.140	14.1
STRAWBERRY HILL	1	10	0.100	10.0
STONEHENGE	13	54	0.240	24.1
DORCHESTER	12	35	0.343	34.3
AVEBURY	13	130	0.100	10.0
WINCHESTER	3	16	0.187	18.7
KENT	3	1500	0.002	0.2

Table 52. Density of data-sets in the study areas and the calculation of a 'confidence factor'.

The confidence level of the general interpretations of the development of land-use (Fig. 95) is graphically displayed by using the confidence factor (Table 52) as the basis for the width of each study area represented in figure 96.

Implications and Avenues

Apart from the diachronic development and use of the chalklands, two other traits can be extracted from this data. The first is that early clearances and Mesolithic activity on the chalklands, although found in areas of prominent archaeological monuments, are not confined to them. In fact their discovery in areas of known and obvious monuments is as a result of initial archaeological interest in the later monuments which

has resulted in the accidental discovery of earlier, sometimes major episodes of Mesolithic activity.

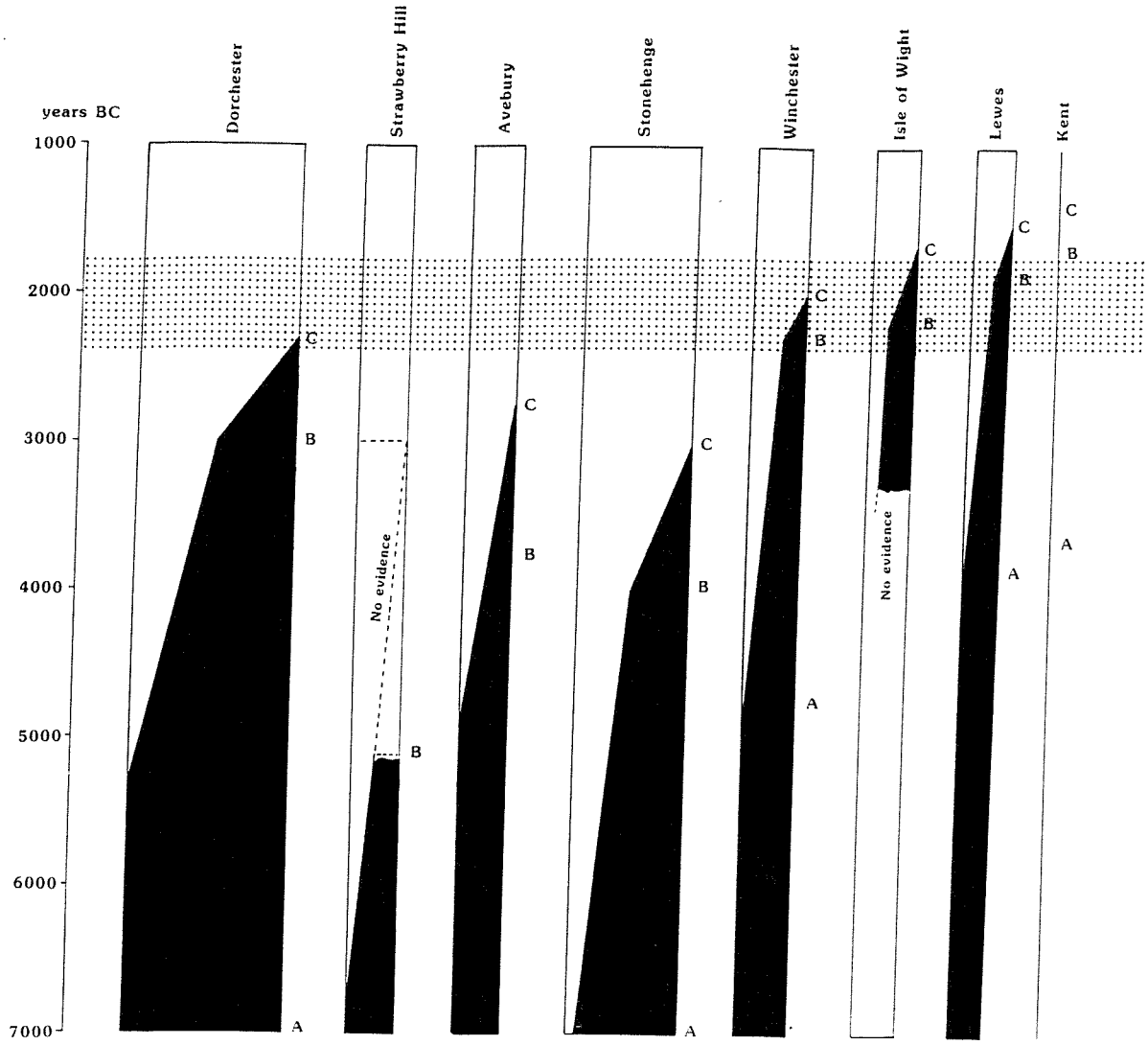


Figure 96. Weighted, schematic representation of the development of land-use. The width of the bars is directly proportional to the confidence factor (Table 52), i.e. density of data-sets.

The second is one that can only be touched upon here, but probably deserves more attention the future. It is certainly noteworthy that the areas in which steps 2 to 5 are completed prior to *c.* 2500 BC, are all ones in which the Grooved Ware tradition is pre-eminent; Stonehenge environs: Durrington Walls, Coneybury Henge and King Barrow Ridge (Cleal with Raymond 1990); Avebury region: Windmill Hill and Beckhampton Avenue (Smith 1965); Dorchester: Mount Pleasant (Wainwright 1979) and Maiden Castle (Longworth 1979; Cleal 1991). Furthermore, the Grooved Ware potters were all part of long-established agricultural

communities. Elsewhere in southern England, i.e. Hampshire, Sussex and Kent, sites which produced Grooved Ware are not common, but these areas do not seem have well established agricultural communities in the Late Neolithic. Communities in the sout east based on an a relatively large-scale agricultural economy are coeval with the Final Neolithic and Early Bronze Age (Beaker period), another epoch characterised by well-made and highly decorated ceramic vessels. This is particularly significant in that it contrasts markedly with one of the older traditional views that Beaker populations were nomadic pastoralists (Curwen 1954, 155; Curwen 1927) as Bell has pointed out previously (1981a, 412), and this study underlines. Interestingly in the past archaeologists have, all too often, in describing the Beaker period or 'Beaker folk', only detailed their cultural attributes and not considered their way of life (e.g. Childe 1940); such criticisms can even be levelled at Megaw and Simpson (1979) four decades later! Only Bradley (1978b) has attempted to briefly examine the environment of the Late Neolithic - Early Bronze Age to examine if cultural changes are reflected in a broad review of the environmental evidence (see page 15 of this thesis).

The Beaker Phenomenon

The 'Beaker culture' has fascinated archaeologists not just because a series of social and technological changes can be seen in pottery production and decoration which are undoubtedly aesthetically pleasing, but also in the accompanying cultural assemblages (flint tool kits; wrist guards etc.) and monuments. The radical change in pottery and site form has led to controversy as to whether this was due to an immigration of people, or just of ideas, from the continent. What is not in doubt is that a marked change is recorded in the artifactual and physical remains making the period easy to distinguish and classify. But is this increase in social accoutrements accompanied by comparable changes in the economy? Examination of direct economic evidence, that is plant remains and faunal assemblages, is difficult due to the paucity of settlement sites of later Neolithic and Beaker periods, as well as the impoverished assemblages recovered from the few sites that do exist. This thesis therefore has investigated the broad landscape, rather than changes in crops or livestock, and does to some extent allow the examination of major changes in the 'landscape' between the

Late Neolithic to Final Neolithic and Early Bronze Age which we might traditionally argue accompanies the Beaker 'invasion'.

From the Stonehenge environs project, for instance, 365 litres of soil were processed from eight different sites of Early Neolithic to Late Bronze Age date. This produced 568 carbonised fragments of which nearly 200 were hazel nut fragments (Carruthers 1990, table 133). Although barley (both *Hordeum vulgare* var *nudum*, naked six-row barley and *Hordeum vulgare*, hulled six-row barley) was seen in large numbers for the first time in Beaker contexts, they were all from the ditch of the Coneybury Henge which Carruthers suggests may be of ritual significance (*op. cit.*, 250), rather than representative of a typical domestic assemblage. The plant remain assemblages here are, therefore too small to examine change. Similarly the faunal assemblages 'were too small for individual detailed analysis' (Maltby 1990, 249) and again no significant change can be detected in the Beaker period, but there were no Beaker occupation sites excavated within the study area.

In the Dorchester environs, the plant remains were scant, and faunal assemblages from Late Neolithic to Early Bronze Age, too small to provide any detail. In the Lewes area, despite the flotation of in excess of 1,300 litres of soil at Ashcombe Bottom only one plant remain was recovered (also coincidentally *Hordeum* sp.; p.106) and bone did not survive. Hinton's review of plant remains from Sussex as a whole (Hinton 1984), also does not show any major developments that occur in the Final Neolithic/Beaker period. The Isle of Wight did not produce suitable contexts for the retrieval of this material.

Despite the paucity of direct economic evidence (plant remains and faunal assemblages) it is clear that the environmental evidence (land snails, colluvium and soils) do not show any major change in the general landscape, or of farming activities, which can be attributed to the Beaker period (Fig. 95). In all the study areas it is clear that no major change, discontinuity or introduction, within the agricultural economy can be seen at about this time. An increase in agricultural activity can certainly be detected, but no great changes that can be paralleled with the influx of new ceramics, artifacts and site types. Examining both the Stonehenge area (Richards 1990) and the Dorchester

By-pass sites (Smith *et al.* forthcoming) there is no major change in either the proportions and species of domesticates present, or in the types of crops. Other areas have not enough evidence to allow serious comparison to be made. It seems therefore that the Beaker phenomenon is an influx of cultural ideas (i.e. fashion, cf. Burgess and Shennan 1976), but not of economic ones. It may however, be argued that larger, organised and successful farming economies allowed the community time to indulge in other pursuits (i.e. potting, jewellery making etc) other than food procurement.

The exploration of apparently unrelated and equivocal relationships, such as ceramic traditions and environmental/socio-economic standing, may be fruitful. Unless such avenues are opened and we take bold steps down them, little progress will be made in the profession. It is by the marriage of two such sub-disciplines that we are likely to make greater steps in the understanding of how past communites used, and lived off, their landscape resources..

8.4 SOME CONCLUSIONS ... AND THE WAY FORWARD?

This research has covered a lot of ground; from the technical aspects and application of magnetic susceptibility to the ecology of land snails, and from the theoretical and empirical aspects of soil erosion to ceramic tradition and farming populations. Contributions have been made in a number of areas and with varying degrees of significance; the more pertinent are summarised here.

Landscape change; man or nature?

It is evident that although the environment (i.e. climate, soils, vegetation etc.) determine the scope of activities, it is human action, not climate and natural phenomena that are dominant in changing the face of the landscape. The landscape and human society interactively co-evolve. The activities of human populations, such as woodland clearance and farming, however unwittingly, significantly change the parameters of the landscape in which they live (the soils, vegetation, fauna and indirectly the microclimate). It is these activities hold primacy over change caused by natural phenomena and thus it is human action that provides *the* fundamental force in landscape change. This

falls within the definition of environmental possibilism (Hardesty 1977) in that the environment may limit and modify, but does not cause, human behaviour (Bell and Walker 1992, 8). This ecological approach emphasises the separateness of people from nature which is demonstrated by this research.

The Chalklands: an isolated topographical unit?

In attempting to interpret the land-use history of the chalklands it became increasingly evident that one cannot examine these lithological areas in isolation. Although they provide a topographical and lithologically convenient unit for study, prehistoric populations were not confined to them. The major river valleys that dissect the downlands provide access to and through the higher ground and themselves provide areas and locations for farming and settlement. The areas adjacent to the chalk include greensands, brickearths and clays; each lithology supporting its own soils, vegetation and resources with which prehistoric people could have complemented the resources from the downlands. It is unlikely that they did not use these resources and the fact that the suite of lithologies was important is shown not only in the hypothesis presented in the Dorchester area but, more graphically for instance, by the division of the Saxon parish boundaries in East Sussex (Fig. 97). The parishes are long strips enabling each to share a portion of all the local lithologies. So although one of the strengths of this study is in confining investigations to the calcareous chalklands so allowing extra regional comparison, this is also one of its weaknesses.

The chalklands are one of the best studied areas in Britain and we often like to think the best understood too. The lack of domestic structures and the suggestion that archaeologists have been looking in the wrong place - "on the tops of the Downs where in general both the barrows and causewayed enclosures lie, rather than in the valley bottoms" (Simpson in Megaw and Simpson 1979, 86) is not new. In fact, Simpson had the foresight to say "If this is so it is not surprising that few domestic sites have been recovered in view of the enormous accumulation of hill wash and other material that would have built up over the past 5,000 years in the valley bottoms over such settlement sites" (*op. cit.*). This statement was, at the time, based on few facts

and although Bell's research (1981a; 1983) certainly went some way to confirming this statement, we can be sure that Simpson's foresight was correct. The fact that many sites are buried beneath colluvial and alluvial deposits cannot be in doubt. We just need the time, chance and finances to be able to excavate some properly; quite a daunting task if they are buried beneath 2 metres of colluvium! It is an exciting prospect to realise that there are a large number of sites, possibly even whole categories of structures, that we have not previously recorded. The possibility of fairly good preservation should not be discounted.

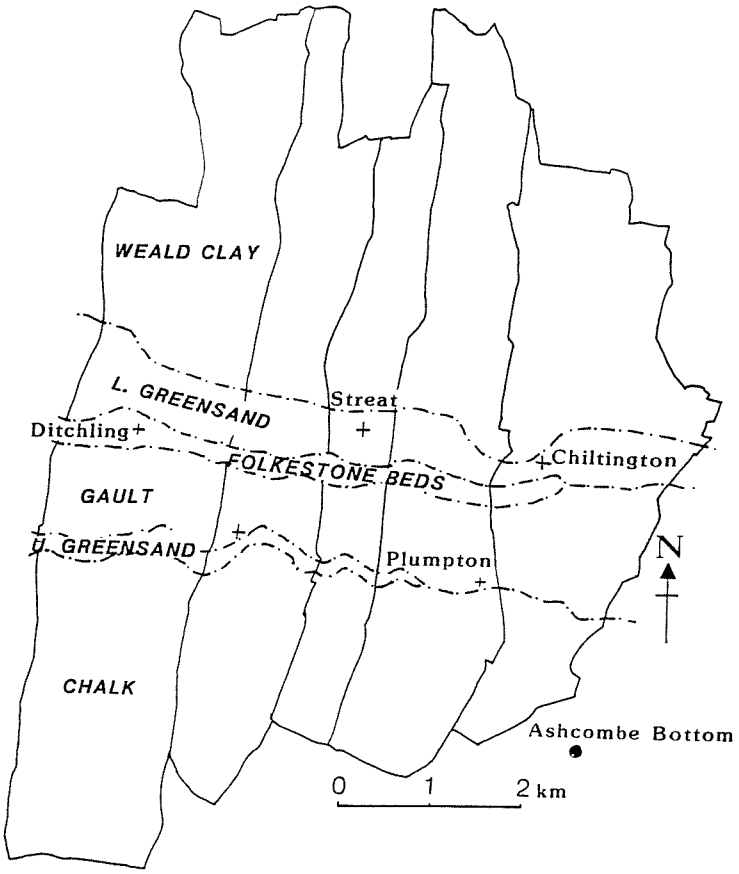


Figure 97. Parish boundaries in East Sussex accommodate chalk, greensand and clay lithologies.

Settlement related to former soils

It was postulated that deeper loess soils which were more widespread (Limbrey 1975) might have been specifically selected by early farmers

(Bell 1981, 419). As these soils were predominantly in the eastern chalklands of Kent (Catt 1978) and the evidence of earlier farming in the western chalklands (see above), this now, cannot be seen to be so.

Settlement migrated from the Downs in the later prehistoric and earlier historic periods. This move away from the downlands used to be considered to be due to the introduction of more advanced ploughs (Curwen 1954). But as we now know that prehistoric ards were capable of dealing with even the most tenacious deposits such as Rhaetic Clay (Everton and Fowler 1978) we should question this. It is perhaps not the inability to plough the claylands with ards, but an inability to continue to get good crop yields from a failing soil resource that eventually led to migration from the chalk Downs. Thus "not only does soil type begin to exert an influence on settlement patterns, but man becomes a predominant factor in soil development..." (Evans 1975, 135), and this development (or degradation) subsequently plays a major rôle in man's activities, settlement and subsistence patterns.

I hope that I have not been guilty of suggesting that the prehistoric farmers were profligate with their pedological resource. This, I believe is far from the truth. They were presumably competent farmers: they survived, but they were beaten (if at all) by the continual attrition and over-exploitation of their pedological resource. This process occurred over many generations and over many centuries (if not millennia), unlike todays chalkland agricultural disasters (Boardman 1984) which can bee seen to have occurred within a single generation if not decade. The studies of pedological response to tillage over long periods of time are potentially useful in predicting modern responses in present day fields. Through archaeology we can, perhaps, contribute a little to saving our downland and proposing more sensible farming polices, field sizes, ploughing regimes etc; but who will listen?

Archaeological answers by palaeo-environmental enquiry

As an environmental archaeologist it is particularly satisfying to be able to provide some further information of more strictly cultural problems through palaeo-environmental investigations. The fact that no agricultural economic innovation can be seen to accompany the Beaker culture may be significant and warrants more detailed enquiry.

Archaeologists may, all too often, be too pre-occupied with aesthetically pleasing artifacts, or with the nature of some of the more spectacular sites, to really enquire about how the communities existed from day to day. Large monumental sites are atypical; their construction and location tells us that, and presumably for any such site there are countless domestic farmsteads. There is a need to record and study the every-day domestic sites more than some of the communal, ritual or elitist locations. Perhaps the sad story of a young schoolboy is pertinent here. Whilst studying history he was removed from the class because he objected that he "didn't want to know all about the kings and queens...what were the real people were doing!" Those 'real' people were farmers and workers; their farm houses or domestic sites were probably valley located and they attempted to establish farming practices on large estates, rather than small scale farms.

A further goal now is to examine such sites and further investigate the ideas that established agriculturalists were the producers of Grooved Wares and later Beaker ceramics. Is there a real causal relationship between these groups of people, their pottery and agricultural superiority? Is the temporal and spatial distribution of the first 'estate' farmers and the occurrence of initially Grooved Ware, and latterly Beaker, populations a real one?

I was always taught, that an archaeologist, " must be a Jack of all trades; and master of *all*" (R.A. Lewis); if I have not succeeded in mastering them all, at least perhaps I have shown the importance of understanding more than just one specialisation within our discipline. The more detailed understanding of specialist areas is important, but so too is being able to place the information within the broader context of human ecology; I hope that I have been able to do that. The ideas here will, I hope, act as a springboard, or food for thought and promote further research. If that occurs, then this work will have a been success regardless of whether the ideas and interpretations are proved right or wrong.

EPILOGUE

As a result of this research, and that of Martin Bell, the potential of colluvium to provide palaeo-environmental sequences, and bury archaeological sites has been brought to the attention of field and curatorial archaeologists. Through lectures, informal discussion and published work derived from this, and other, research (Allen 1988a; 1991a and 1992a; Bell 1983; Bell and Boardman (eds) 1992) colluvium is now recognised as an archaeologically significant component within the landscape by both archaeological units and by archaeological officers within county planning departments. Colluvial studies have therefore now formally entered the archaeological and planning procedures. County Archaeological Officers in southern England have recently included stipulations in archaeological evaluation briefs (part of the planning permission/consent process), that the potential for the presence of colluvium, as with any archaeological deposits, must be ascertained, and consideration given to the possibility of buried archaeological sites/artifact scatters. The palaeo-environmental value of such deposits is widely acknowledged.

It is perhaps no coincidence that the county archaeological offices already providing reference to colluvium (and alluvium) in briefs are those from the Isle of Wight, Hampshire, Wiltshire, Dorset and Kent.

Thus this research, even prior to completion, has already made a small contribution to present archaeological practice.

It is ten years since Martin Bell completed his thesis on colluvium in Sussex. This thesis has demonstrated that colluvium is an ideal medium for the study of human land-use, and the combination of a number of studies enable a regional synthesis. In 10 years hence, colluvial studies will be a standard part of archaeological endeavour. Perhaps too, we can hope that that regional interpretations will be based on more detail and that where evidence is non-existent, then landscape reconstruction maps more regularly show this. The resolution of detail and confidence factors are important in giving value and credence to interpretation.

APPENDICES

APPENDIX 1: SOIL MAPPING UNITS and SOIL SERIES 430

1.1 Soil mapping units within the study area 431

1.2 Summary of soil groups and soil Series mapped in the study area 434

APPENDIX 2: LEWES AREA SOIL DESCRIPTIONS 435

2.1 Soil descriptions; Ashcombe Bottom 436

2.2 Soil descriptions; Malling Down 441

2.3 Soil descriptions; Grey Pit 443

APPENDIX 3: ISLE OF WIGHT SOIL DESCRIPTIONS 445

3.1 Soil descriptions; Newbarn Combe 446

3.2 Soil descriptions; Limpet Run 453

APPENDIX 4: SALISBURY PLAIN SOIL DESCRIPTIONS 455

4.1 Soil descriptions; Strawberry Hill 456

Appendix One

Soil Mapping Units and Soil Series

APPENDIX ONE

SOIL MAPPING UNITS AND SOIL SERIES WITHIN THE STUDY AREA

NOTE:-

Soil Group - the major broad pedological class (Brown soils)
Soil subgroup - the soil type (typical brown earth)
Soil Association - these are not part of the hierarchy of classification, but defined for the purposes of the 1:250,000 map; they are broad mappable groupings of series' and include soils of different groups and subgroups. - *Soil Associations in capital letters are named after the soil series that form extensive, often dominant, components of most delineations. More variable associations are shown in lower case letters; they have a number of inextensive and dissimilar soils and are named after the series which characterise them best*
Soil Series - within soil subgroups a further subdivision are soil series

(after Mackney *et al.* 1983)

APPENDIX 1.1: SOIL MAPPING UNITS WITHIN THE STUDY AREA (and their associated soil Series and subgroup)

Soil associations and their included soil series
as used used in *Soil Survey of England and Wales*:
Sheet 6, South East England, 1:250,000 (Jarvis *et al.* 1984) and
Sheet 5, South West England, 1:250,000 (Findlay *et al.* 1984)

341 ICKNIELD ASSOCIATION (over chalk)

341 Icknield	**- Humic rendzinas**
343 Andover	- brown rendzinas
514 Millington	- colluvial brown calcareous earths
511 Coombe	- typical brown calcareous earths
342 Upton	- grey rendzinas

342a UPTON 1 ASSOCIATION (over chalk)

342 Upton	**- Grey rendzinas**
343 Andover	- brown rendzinas
341 Icknield	- humic rendzinas
511 Panholes & Coombe	- typical brown calcareous earths

342b UPTON 2 ASSOCIATION (over chalk)

342 Upton	**- Grey rendzinas**
342 Wantage	- grey rendzinas
511 Blewbury	- typical brown calcareous earths

342c WANTAGE 1 ASSOCIATION (over chalk)

342 Wantage	**- Grey rendzinas**
344 Gore	- colluvial rendzinas
342 Upton	- grey rendzinas

342d WANTAGE 2 ASSOCIATION (over chalk)

342 Wantage	**- Grey rendzinas**
511 Swaffham Prior	- typical brown calcareous earths

343f NEWMARKET 1 ASSOCIATION (chalk & chalky drift)

343 Newmarket	**- Brown rendzinas**
343 Elvedon	- brown rendzinas

343g Newmarket 2 Association (chalk & chalky drift)

343 Newmarket	**- Brown rendzinas**
511 Swaffham Prior	- typical brown calcareous earths
511 Soham	- typical brown calcareous earths
571 Moulton	- typical argillic brown earths
343 Rudham	- brown rendzinas

343h ANDOVER 1 ASSOCIATION (over chalk)

343 Andover	**- Brown rendzinas**
511 Panholes and Coombe	- typical brown calcareous earths
342 Upton	- grey rendzinas
571 Charity	- typical argillic brown earths

343i ANDOVER 2 ASSOCIATION (chalk & Clay-with-flints)

343 Andover	**- Brown rendzinas**
571 Garston	- typical argillic brown earths
581 Carstens	- typical paleo-argillic brown earths
571 Charity	- typical argillic brown earths

511c PANHOLES ASSOCIATION (chalk)

511 Panholes	**- Typical brown calcareous earths**
343 Andover	- brown rendzinas
571 Charity	- typical argillic brown earths

511d Blewbury Association (chalk)

511 Blewbury	**- Typical brown calcareous earths**
513 Winterbourne	- stagnogleyic brown calcareous earths
511 Yatesbury	- typical brown calcareous earths
342 Wantage	- grey rendzinas

511e SWAFFHAM PRIOR ASSOCIATION (chalky drift and chalk)

511 Swaffham Prior	**- Typical brown calcareous earths**
511 Soham	- typical brown calcareous earths
343 Newmarket and Rudham	- brown rendzinas
571 Moulton	- typical argillic brown earths

511f COOMBE 1 ASSOCIATION (chalky drift and chalk)

511 Coombe	**- Typical brown calcareous earths**
511 Panholes	- typical brown calcareous earths
343 Andover	- brown rendzinas
571 Charity	- typical argillic brown earths
514 Millington	- colluvial brown calcareous earths

511g COOMBE 2 ASSOCIATION (chalky drift and chalk)

511 Coombe	**- Typical brown calcareous earths**
342 Wantage and Upton	- grey rendzinas
511 Panholes	- typical brown calcareous earths

571 CHARITY 1 ASSOCIATION (flinty silt drift)

571 Charity	**- Typical argillic brown earths**
581 Carstens and Bilting	- typical paleo-argillic brown earths

571m CHARITY 2 ASSOCIATION (flinty and chalky drift over chalk)

571 Charity	**- Typical argillic brown earths**
571 Garston	- typical argillic brown earths
511 Panholes and Coombe	- typical brown calcareous earths
343 Andover	- brown rendzinas

581d CARSTENS ASSOCIATION (Plateau drift and Clay-with-flints)

581 Carstens	**- Typical paleo-argillic brown earths**
571 Charity	- typical argillic brown earths
581 Givendate and Winchester	- typical paleo-argillic brown earths

APPENDIX 1.2: SUMMARY OF SOIL GROUPS AND SERIES MAPPED IN THE STUDY AREA

3 LITHOMORPHIC SOILS; (3.4) ***RENDZINAS***

3.41 *Humic rendzinas*
Icknield Series

3.42 *Grey rendzinas*
Upton Series
Wantage Series

3.43 *Brown rendzinas*
Andover Series
Newmarket Series
Elvedon Series

3.44 *Colluvial rendzinas*
Gore Series

5 - BROWN SOILS; (5.1) ***BROWN CALCAREOUS (CALCARIC) EARTHS***

5.11 *Typical brown calcareous earth*
Coombe Series
Panholes Series
Blewbury Series
Yatesbury Series
Swaffham Prior Series
Soham Series

5.14 *Colluvial brown calcareous (calcaric) earth*
Millington Series

5 - BROWN SOILS; (5.4) ***BROWN EARTHS***

5.41 *Typical brown earths*
5.47 *Colluvial brown earths*

5 - BROWN SOILS; (5.7) ***ARGILLIC BROWN EARTHS - LUVIC BROWN EARTHS***

5.71 *Typical argillic brown earths (Typical luvic brown soils)*
Charity Series
Garston Series

5 - BROWN SOILS; (5.8) ***PALEO-ARGILLIC BROWN EARTHS - PELOLUVIC ...***

5.81 *Typical paleo-argillic brown earths (Typical peloluvic brown soils)*
Carstens Series
Givendate and Winchester Series

Appendix Two

Lewes Area Soil Descriptions

APPENDIX TWO
SOIL DESCRIPTIONS OF COLLUVIUM IN THE LEWES AREA
(CHAPTER FOUR)

APPENDIX 2.1: SOIL DESCRIPTIONS FROM ASHCOMBE BOTTOM

Soil descriptions from the tree hollow (Fig. 12)

Context No. (and depth)	Description
Layer 1 0 - 15cm	Dark brown (7.5Y 4/4) silty clay; rare small subangular flints; rare small chalk pieces with a concentration of fine chalky particulate material (layer 1a) with some secondary carbonate deposition on the vertical, horizon boundaries; medium blocky structure; 0.5% very fine macropores and 2% medium macropores; not obviously calcareous. The clear irregular boundary formed cylindrical hollows, possibly former root holes.
Layer 2 15 - 26cm	Light yellowish brown (10YR 6/4) highly calcareous silty clay loam; abundant small rounded chalk pieces; medium granular structure; sharp smooth boundary.
Layer 3 26 - 39cm	Yellowish brown (10YR 5/6) highly calcareous silty clay and rare medium flints; weak subangular blocky structure; sharp wavy boundary.
Layer 20 39cm +	Very pale brown marl matrix with chalk and some flint nodules. Periglacial solifluction material.

Soil description trench 1 at 2m (Fig. 11)

Context No. (and depth)	Description
Layer 1 0 - 11cm	Dark brown (10YR 3/3) humic silt loam; largely stone-free (worm sorted); medium to coarse granular structure; many fine fibrous roots. Colluvial brown earth.
Layer 2 7 - 11cm	Dark brown (10YR 3/3) silt loam; predominantly a number of intermittent lenses of abundant small rounded and subrounded chalk pieces; rare medium flints; many fine fleshy rootlets; sharp wavy boundary.
Layer 4 11 - 33cm	Very dark greyish brown (10YR 3/2) humic silty loam; rare very small chalk pieces; rare medium angular flints; strong fine prismatic peds; 0.5% fine and medium macropores; 0.1% medium to coarse macropores; possible mole/small mammal burrow; gradual wavy boundary.
Layer 7 33 - 70cm	Dark yellowish brown (10YR 4/4) silty clay loam; essentially non-calcareous; rare medium to large flints; patchy distribution of few to common medium and small chalk pieces locally abundant and subangular in localised lenses; weak coarse blocky structure; 0.1% fine fibrous roots, 2% medium to coarse macropores - including vertical earthworm burrows stained with organic matter and very dark greyish brown (10YR 3/2) soil material from the overlying layer (layer 4); becoming predominantly more stony at base (63-70cm; layer 7a); occasional localised and intermittent lenses of abundant small to medium chalk pieces; clear wavy boundary.
Layer 9 70 - 81cm	Dark yellowish brown (10YR 3/6) silty clay loam; almost stone-free (1% stones); weak vertical medium prismatic peds; 0.1% medium to fine macropores; clear to gradual smooth boundary. Putative old land surface with ard marks on upper, ?truncated surface.

Layer 10 81 - 90cm	Dark yellowish brown (10YR 4/6 to 10YR 4/4 with depth) weakly calcareous silty clay to silty clay loam; few subrounded small to medium chalk pieces; rare angular flint; few fleshy, very fine rootlets; 1% medium macropores - many vertical (?ancient earthworm burrows); firm medium to coarse blocky structure; sharp undulating boundary.
Layer 11 90 - 109cm	Pockets of strong - dark brown to reddish brown (7.5YR 3/4 - 7.5YR 3/4 to 5YR 4/4) clay/silty clay; rare very small chalk pieces; rare medium angular and subangular flints; strong medium angular to blocky structure; 2-5% very fine macropores; illuvial clay on inter-ped surfaces (hand lens); shrinks on drying; sharp irregular boundary. Probably a Bt horizon of a truncated typical argillic brown earth.
Layer 20 109cm +	Very pale brown (10YR 8/3) to pale yellow (2.5Y 7/4) marl matrix with medium-large subangular and subangular subrounded chalk pieces cemented within the matrix; patches of wholly cortical flint nodules.

Soil description trench 1 at 7.6m (layers 6 and 8)

Context No.	Description
Layer 6	Dark yellowish brown (10YR 4/6) silty loam; few medium and rare large flints; rare small and medium chalk pieces; weak coarse blocky structure; 2-5% medium to coarse macropores; clear wavy boundary.
Layer 8	Dark yellowish brown (10YR 4/4) silty clay loam becoming slightly redder in hue and more clay rich with depth; few medium to large nodular flints; little chalk; probably non calcareous or only weakly calcareous; 1% medium and fine macropores; firm medium subangular blocky structure; sharp wavy boundary.

Soil description of gravel fan (layer 5) at 4.8m

Context No.	Description
Layer 5	Dark yellowish brown (10YR 4/4) silty clay loam with abundant large, medium and small wholly cortical and angular flints; rare medium rounded chalk pieces; weak subangular blocky structure; clear smooth boundary. The flints were well packed, but no obvious structure could be seen in them; 178 were measured for orientation.

Soil description trench 1 over 1945 army trenches

Context No. (and depth)	Description
Layer 1 0 - 26cm	Dark brown (10YR 3/3) humic silt loam; largely stone-free (worm sorted) but becoming stonier and shallower up slope; obviously calcareous; coarse granular structure; many fine fibrous roots. Colluvial brown earth/brown rendzina.
Layer 14 26 - 47cm	Dark brown (10YR 3/3) silty clay loam; common small chalk pieces; many medium flints; common very fine fibrous roots; weak medium subangular blocky structure; 2% medium macropores; abrupt wavy boundary. This calcareous colluvium seals and post-dates the backfilled 1945 trenches.

Soil description trench 2 at 54.45m

Context No. (and depth)	Description
Layer 31 0 - 13cm	Dark brown (10YR 3/3) humic loam topsoil supporting grass, bracken fern (*Pteridium*) and cow parsley; almost stone-free, rare medium flints; weak medium to coarse granular structure; common medium fibrous roots (*Pteridium* rhizomes) abrupt to clear wavy boundary.

Appendix 2 - Soil descriptions in the Lewes Area

Layer 32 13 - 50cm	Dark yellowish brown (10YR 4/4 to 10YR 3/4) silt loam to non-calcareous; no chalk pieces; common fine fibrous and very fine fleshy roots; few medium fibrous roots; 0.5% fine and medium macropores; weak medium - coarse prismatic structure; gradual wavy boundary.
Layer 33 50 - 97cm	Yellowish brown (10YR 5/4 to 10YR 5/6) silty loam to silty clay loam; common large flint nodules; common medium and large angular flints; rare medium and large flint nodules; weak coarse prismatic structure; 1% medium macropores; sharp irregular boundary.
Layer 11 97 - 104cm	Pockets of reddish brown (7.5YR 3/4 - 7.5YR 3/4) silty clay; rare medium angular and subangular flints; strong medium angular to blocky structure; 2-5% very fine macropores; some yellowish brown (10YR 5/4) (illuvial/translocated) silt on inter-ped surfaces and very fine macropores; shrinks on drying; sharp irregular boundary. Probably a Bt horizon of a truncated typical argillic brown earth.
Layer 20 104cm +	Pale yellow (2.5Y 7/4) marl matrix with medium to large subangular and subrounded chalk pieces cemented within the matrix; patches of wholly cortical flint nodules; a number of solution pockets and hollows.

APPENDIX 2.2: SOIL DESCRIPTIONS FROM GREY PIT

General descriptions of soils at sampling point (rapidly taken while sampling up a 40ft., unsecured ladder)

Context No. (and depth)	Description
Layer 1 0 - 10cm	Very dark greyish brown (10YR 3/2) humic silty loam; weak medium to coarse granular structure; many fine fibrous roots; almost stone-free; calcareous; abrupt smooth boundary. Turf.
Layer 2 10 - 30cm	Brown (10YR 5/3) highly calcareous silt loam; almost white in places as a result of pseudomycelium; weak medium granular structure; common small rounded chalk pieces; rare medium flints; 5% medium to coarse macropores, many are vertical earthworm burrows containing very dark greyish brown (10YR 3/2) humic silty loam from above; diffuse wavy boundary. Brown rendzina.
Layer 3 30 - 50cm	Yellowish brown (10YR 5/8) silty clay; fine subangular blocky structure; many small and very small rounded chalk pieces; rare small and medium flints; clear wavy boundary.
Layer 5 50 - 80cm	Light yellowish brown (10YR 6/4) silty clay grading to a dark yellowish brown (10YR 4/4); fine blocky to subangular blocky structure; many small chalk pieces grading to few - common small chalk pieces at base; clear smooth boundary.
Layer 6 80 - 89cm	Brown (7.5YR 4/2) silt loam; firm coarse granular structure; few stones - except occasional discontinuous lenses of small and very small chalk pieces; abrupt smooth boundary.
Layer 7 89 - 102cm	Brown (7/5YR 4/4) silty clay; subangular blocky structure; few very small and small chalk pieces; clear wavy boundary.

Layer 8 102 - 116cm	Dark brown (7.5 YR 3/2) silty clay loam with few fine mottles of dark reddish brown (5YR 3/4); weak fine subangular to very coarse crumbly granular structure; rare chalk pieces and occasional flints; sharp broken boundary.
Layer 9 116cm +	Loose large and medium subangular chalk pieces set in a matrix of very small rounded chalk pieces or patches of marl; few medium to large marcasite/iron pyrites nodules and stains noted.

APPENDIX 2.3: SOIL DESCRIPTIONS FROM MALLING HILL

Soil descriptions at mollusc column 1 (Fig. 26)

Context No. (and depth)	Description
Context 1 0 - 17cm	Dark greyish brown (10YR 4/2) calcareous silty loam; few small chalk pieces; fine friable subangular blocky structure; many fine fibrous roots; sharp smooth boundary. Colluvial brown earth/brown rendzina.
Context 2 17 - 23cm	Greyish brown (10YR 5/2) silty clay loam; fine subangular structure; common medium chalk pieces, rare flints; sharp smooth boundary.
Context 5 23 - 57cm	White (2.5YR 8/2) to pale yellow (2.5YR 8/4) marl with a calcareous silty matrix (not unlike Coombe Deposits); common medium subangular to rounded chalk pieces, rare large subangular chalk pieces; rare flint nodules; no structure apparent; sharp smooth boundary.
Context 6 57 - 108cm	Light brownish grey (10YR 6/2) silty clay; fine subangular blocky structure; common small and medium chalk fragments, rare flints; highly calcareous, displays pseudomycelium on inter ped and weathered surfaces; mollusc fragments observed throughout context; clear wavy boundary.
Context 9 108 - 120cm	Dark greyish brown (10YR 4/2) humic silt loam; coarse granular to fine subangular blocky structure; almost stone-free; shells noticed; broken boundary over chalk but clear wavy boundary over colluvium (context 9). This has the field appearance of a buried soil or turf horizon (typical/brown rendzina).
Context - 128 - 140cm	Regolith. Weathered brecciated chalk fragments.

Soil descriptions at mollusc column 2 (Fig. 26)

Context No. (and depth)	Description
Context 3 32 - 66cm	Large and medium angular and subangular chalk rubble with little matrix; abrupt smooth boundary.
Context 4 66 - c.97cm	Yellowish brown (10YR 5/6) silty clay; many medium and large chalk pieces, rare flints; no structure observed; sharp smooth boundary.
Context 5 97 - 134cm	Calcareous chalk marl (see descriptions above: column 1)
Context 6 134 - 143cm	Light brownish grey (10YR 6/2) silty clay; fine subangular blocky structure; common to abundant small chalk pieces, common medium chalk pieces; clear wavy boundary.
Context 8 143 - 149cm	Dark greyish brown (10YR 4/2) silt loam; fine subangular structure; essentially stone-free; highly calcareous; many fine to medium macropores; clear wavy boundary. This has the field appearance of a buried soil or turf horizon (typical/brown rendzina).
Context 9 149 - 180cm	Yellowish brown (10YR 5/4) silty clay loam; medium subangular blocky structure; many small and medium subangular chalk fragments, rare medium flints; sharp broken boundary over chalk, abrupt smooth boundary over context 10.
Context 10 180 - 191cm	Brown (10YR 4/3) humic silty clay; coarse granular to fine subangular blocky structure; stone-free. Discontinuous, probably an old land surface/buried soil horizon - typical (humose) rendzina.
Context - 191 - 203cm	Regolith (see description above).

Appendix Three

Isle of Wight Soil Descriptions

APPENDIX THREE
SOIL DESCRIPTIONS OF COLLUVIUM ON THE ISLE OF WIGHT
(CHAPTER FIVE)

APPENDIX 3.1: SOIL DESCRIPTIONS FROM NEWBARN COMBE

Soil descriptions from mollusc column in trench 1a at 0.00 (Figs 32 + 33)

Context No. (and depth)	Description
Layer 1 0 - 30cm	Dark greyish brown (10YR 4/2) humic loam; largely stone-free, few small subangular chalk pieces, rare flints; strong coarse granular ped structure and displays evidence of extensive earthworm supporting grazed grassland.
Layer 14 30 - 70cm	Gravel fan of abundant to extremely abundant large flints, many nodular and partially cortical; in a brown (10YR 5/3) silty loam matrix; clear smooth boundary.
Layer 16 70 - 100cm	Light yellowish brown (10YR 5/6) calcareous clay loam; fine subangular blocky structure; common to many small chalk pieces, few medium and large flint nodules; clear smooth boundary.
Layer 11 100 - 110cm	Yellowish brown (10YR 5/4) calcareous silty clay loam; medium subangular blocky structure; many small chalk pieces, rare flints; clear wavy boundary.
Layer 17 110 - 140cm	Greyish brown (10YR 5/2) silty clay loam; moderate to strong, fine to medium prismatic structure; rare flints, rare chalk pieces, few medium chalk pieces; 2-5% very fine and fine macropores; gradual smooth boundary. Possible stabilisation horizon, buried old land surface.
Layer 12 140 - 160cm	Brown (10YR 5/3) silty loam; weak medium subangular structure; many to common small chalk pieces; gradual wavy boundary. Possibly an earthworm worked horizon.

Appendix 3 - Soil descriptions of colluvium on the Isle of Wight

Layer 19 160 - 175cm	Brown (7.5YR 4/4) silty loam; weak medium subangular blocky structure; virtually stone-free silty loam; sharp smooth boundary.
Layer 20 175 - 200cm	Strong brown (7.5YR 3/4) silty clay loam; moderate fine subangular blocky structure; 2% fine and medium macropores; relatively stony, common medium flints, rare chalk pieces; gradual smooth boundary.
Layer 13 200 - 230cm	Dark brown (7.5YR 4/2) silty clay loam; strong medium subangular to angular blocky structure; 2-5% very fine and fine macropores; some coatings noted on inter-ped surfaces (hand lens); almost stone-free, chalk stones absent but few medium and large nodular flints; abrupt smooth boundary. Buried soil (probably A horizon of a typical brown earth).
Layer 21 230 - 245cm	Dark brown (7.5YR 3/2) silty clay; weak to moderate coarse subangular blocky structure; 0.5% fine macropores; almost stone-free, no chalk pieces, common medium flints; abrupt to smooth boundary. Probably B horizon of typical brown earth.
Layer 15 245 - 260cm	Dark brown (7.5YR 3/4) clay loam with fine reddish brown (5YR 5/4) mottles; weak coarse subangular blocky to medium prismatic structure; illuvial clay on inter-ped surfaces (hand lens) few medium flints; sharp irregular boundary.
Layer 22 260cm +	Pale yellow (2.5YR 8/4) to light grey (10YR 7/1) chalky marl mud matrix; some small and medium chalk pieces; zones of cemented small chalk pieces.

Appendix 3 - Soil descriptions of colluvium on the Isle of Wight

Soil description of the lynchets deposits in trench 1b at 46.00m (Fig. 34)

Context No. (and depth)	Description
Layer 1 0 - 18cm	Greyish brown (10YR 5/2) humic loam; few small subangular chalk pieces, rare flints; strong coarse granular ped structure and displays evidence of extensive earthworm working; mollusc shell fragments noted. Brown rendzina supporting grazed grassland.
Layer 2 18 - 75cm	Light yellowish brown (10YR 5/4) calcareous silty loam; weak subangular blocky structure; common medium and small subrounded to rounded chalk pieces, highly calcareous; earthworm burrows and medium vertical macropores (root channels) common; gradual smooth boundary. Main lynchet colluvium.
Layer 3 75 - 98cm	Brown (7.5YR 4/4) silty clay loam; vertical prismatic structure; many medium flints, some small chalk pieces; sharp smooth boundary.
Layer a 98 - 164cm	Reddish brown (5YR 5/4) silty loam; weak small to medium to subangular structure; many small and medium chalk pieces, some flints; clear smooth boundary. Pleistocene involution with infilled with relict soil material.
Layer b 164 - 180cm	Yellowish red (5YR 5/6) silty clay; moderate to strong fine prismatic structure; few small and medium chalk pieces; 0.2% fine and medium macropores; sharp to abrupt smooth boundary. Possible Allerød soil in involution hollow.
Layer c 180cm +	Weathered chalk

Appendix 3 - Soil descriptions of colluvium on the Isle of Wight

Soil descriptions of putative tree hollow in trench 1b (Fig. 34)

Context No.	Description
Layer 4a	Dark brown (7.5YR 4/4) silt loam; abundant small and medium chalk pieces; smooth clear boundary.
Layer 4b	Dark brown (10YR 4/3 to 7.5YR 4/2) clay loam; subangular blocky structure; many small chalk pieces, some large nodular flints; sharp broken boundary. Subsoil hollow; possibly a tree throw hollow.

Soil description of negative lynchet in trench 1b at 38m (Fig. 34)

Context No. (and depth)	Description
Layer 1 0 - 26cm	Greyish brown (10YR 5/2) humic loam; few small subangular chalk pieces, rare flints; strong coarse granular ped structure and displays evidence of extensive earthworm working; mollusc shell fragments noted. Brown rendzina supporting grazed grassland.
Layer 2 26 - 44cm	Light yellowish brown (10YR 6/4) silty loam; weak subangular blocky structure; common medium and small subrounded to rounded chalk pieces, highly calcareous; earthworm burrows and medium vertical macropores (root channels) common; gradual smooth boundary. Main lynchet bank colluvium.
Layer 5 44 - 70cm	Yellowish brown (10YR 5/4) silty loam; coarse granular structure; few small chalk pieces; abrupt broken boundary.

Soil description of Bank and ditch deposits in trench 1b (Fig. 35)

Context No.	Description
Bank	
Layer 9	Yellowish brown (10YR 5/4) silt loam; with common medium and large nodular flints with some chalk pieces; clear smooth boundary. Bank
Layer 10	Brownish yellow (10YR 6/6) calcareous silty loam; weak subangular structure; common small and medium chalk pieces, few to common medium flints, clear to gradual smooth boundary.
Layer 11	Yellowish brown (10YR 5/4) to light yellowish brown (10YR 6/4) silty clay loam; medium subangular blocky structure; few to many small chalk pieces, rare flints; clear wavy boundary.
Ditch	
Layer 8	Brown (7.5YR 5/4) silty loam; common small and many medium and large chalk pieces, some medium flints; obviously calcareous; *Helix aspersa* noted; sharp smooth to broken boundary. Primary ditch fill.
Layer 7	Brown (7.5YR 5/4) to yellowish brown (10YR 5/4) silty loam; few common chalk pieces, common medium and few to many large flints; *Ostrea edulis* noted; clear smooth boundary.
Layer 6	Brown (10YR 5/3) to greyish brown (10YR 5/2) humic silty loam; coarse granular structure to fine subangular blocky peds; virtually stone-free; clear to gradual smooth boundary.

Appendix 3 - Soil descriptions of colluvium on the Isle of Wight

Soil descriptions from mollusc column in trench 2 at 0.00 (Fig. 36)

Context No. (and depth)	Description
Layer 50 -6 - 22cm	Dark grey (10YR 3/1) humic plough soil; medium - coarse subangular blocky structure; common very small chalk pieces; medium-coarse blocky structure; clear smooth boundary.
Layer 51 22 - 35cm	Dark grey (10YR 3/1) to dark greyish brown (10YR 3/2) humic silty loam; regular strong coarse blocky structure; virtually stone-free, few chalk pieces; clear - diffuse smooth boundary. Base of modern plough soil, reminiscent of long term, heavily worm-worked grassland soil.
Layer 52 35 - 55cm	Greyish brown (10YR 6/3) silty loam; lens of abundant medium and large cortical flint nodules; clear smooth boundary. Lens of flints at base of plough over hillwash, a gravel fan.
Layer 53 55 - 72cm	Brownish yellow (10YR 6/6) to yellowish brown (10YR 5/6) silty clay loam; medium subangular blocky structure; common small and very small chalk pieces, rare flints, gradual smooth boundary.
Layer 54 72 - 90cm	Yellowish brown (10YR 5/4) silty clay loam; fine to medium subangular blocky structure; many small and very small chalk pieces, rare flints; clear smooth boundary.
Layer 55 90 - 115cm	Dark grey (10YR 4/1) silty clay; moderate fine subangular blocky structure; virtually stone-free rare chalk pieces, few medium flints; 2-5% very fine and fine macropores; clear smooth boundary. Possibly the upper horizon of an old land surface.
Layer 56 115 - 131cm	Dark grey (10YR 4/1) to very dark greyish brown (10YR 3/2) silty clay; moderate to strong subangular medium blocky structure; few fine and medium diffuse to clear mottles; common medium flints; rare chalk pieces; 0.5-2% very fine macropores; sharp smooth boundary. Possibly a relict old land surface.

Appendix 3 - Soil descriptions of colluvium on the Isle of Wight

Layer 57 131 - 143cm	Dark brown (7.5YR 4/4) to strong brown (7.5YR 4/6) silt loam; strong subangular blocky to prismatic structure; 2-5% fine macropores; no chalk pieces, very few flints; clear to abrupt wavy and broken boundary.
Layer 58 143cm +	Yellow (10YR 7/6) chalky marl; abundant small and medium chalk pieces; with lenses of silt/fine sand laminations within the calcareous marl matrix.

APPENDIX 3.2: SOIL DESCRIPTIONS FROM LIMPET RUN, REDCLIFF

Soil descriptions from mollusc column in cliff face (Fig. 41)

Note: no munsell notation was recorded in the field at the cliff edge.

Context No. (and depth)	Description
Context 1 -4 - 16cm	Humic silt loam; weak medium granular structure; essentially stone-free; clear smooth boundary. Calcareous - colluvial brown earth.
Context 2 16 - 24cm	Silty loam; slightly humic fine subangular blocky structure; common to many small and medium flints, many are rounded beach pebbles, few chalk pieces; gradual wavy boundary.
Context 3 24 - 56cm	Silty clay loam; medium subangular blocky structure; common small and medium chalk pieces, few to common medium flints; clear smooth boundary.
Context 4 56 - 70cm	Silty clay loam; weak fine subangular blocky structure; essentially stone-free; abrupt smooth boundary. Possibly an earthworm-worked horizon.
Context 5 70 - 150cm	Calcareous buff, silty clay loam; medium subangular blocky to prismatic structure; many small and medium chalk pieces, becoming less stony and less calcareous with depth; abrupt to clear smooth boundary. Main colluvial episode.
Context 6 150 - 170cm	Silty clay loam to silty clay; moderate fine to medium subangular blocky structure; few small and medium chalk pieces, with a thin band of stones at the top of this layer which may indicate earthworm working; clear smooth boundary.
Context 7 170 - 190cm	Calcareous silty clay; with medium subangular blocky structure; 1% fine macropores; many small and medium chalk pieces; clear smooth boundary. Possibly a truncated buried soil.

Appendix 3 - Soil descriptions of colluvium on the Isle of Wight

Context 8 190 - 200cm	Slightly calcareous silty clay; moderate to strong medium subangular blocky structure; 2% fine macropores; essentially stone-free, but few medium chalk pieces; gradual smooth boundary. Possibly the B horizon of a palaeosol.
Context 9 200 - 280cm	Light grey (5Y 6/1) sandy silt loam marl; almost stone-free, few small and very small rounded chalk pieces, rare greensand pieces, occasional flints and localised lenses of small-very small chalk 'pea-grit' pieces (context 9a); gradual to diffuse wavy boundary. Probably Pleistocene melt-water deposits.
Context 10 280cm +	Light olive grey (5Y 6/2) glauconitic and marly sands; soft and stone-free; moist, loosely consolidated; easily cut with trowel and spade.

Appendix Four

Salisbury Plain Soil Descriptions

APPENDIX FOUR
SOIL DESCRIPTIONS OF COLLUVIUM ON THE SALISBURY PLAIN
(CHAPTER SIX)

APPENDIX 4.1: SOIL DESCRIPTIONS FROM STRAWBERRY HILL

Soil descriptions from mollusc column (Figs 51 and 53)

Context No. (and depth)	Description
Layer 1 0 - 30cm	Pale brown (10YR 6/3) silty loam; strong fine and medium subangular blocky structure; coarse common small rounded chalk pieces and rare medium rounded chalk pieces; abundant fine roots; earthworm channels noted; clear wavy boundary. Calcareous brown earth.
Layer 2 30 - 40cm	Light yellowish brown (2.5YR 6/4) very calcareous silty loam; subangular blocky structure; many (15%) small rounded chalk pieces; few medium to fine rootlets; abrupt smooth boundary.
Layer 3 40 - 50cm	Light yellowish brown (2.5YR 6/4) silty loam; clearly calcareous accounting for very light colour; weak subangular blocky structure; medium macropores 5%, occasional vertical earthworm burrows, very few fine roots; virtually stone-free, rare very small rounded chalk pieces; clear smooth boundary. Possible stand-still phase.
Layer 4 50 - 56cm	A thin lens of abundant very small and small rounded/sub-rounded chalk pieces in a light yellowish brown (2.5YR 6/4) silty loam; abrupt smooth boundary. Possible rill deposits.
Layer 5 56 - 100cm	Light yellowish brown (2.5YR 6/4) highly calcareous silty loam/silty clay loam; subangular blocky structure, medium macropores 2%; many (10%) small rounded chalk pieces, very few flints in this layer or anywhere in the sequence; gradual wavy boundary. Upper Main Colluvium.

Appendix 4 - Soil descriptions of colluvium on the Salisbury Plain

Layer 6 100 - 170cm	Brown (10YR 5/3) calcareous silty clay loam; subangular blocky structure; common small and very small rounded chalk pieces; gradual wavy boundary. Lower Main Colluvium.
Layer 7 170 - 195cm	Brown (10YR 5/3) calcareous silty clay loam; weak subangular blocky structure; few small stones; abrupt wavy boundary. Calcareous stone-free colluvium.
Layer 8 195 - 203cm	Dark greyish brown (10YR 4/2) calcareous silty clay, small subangular/prismatic structure; 2% macropores; stone-free; clear smooth boundary at its base and an abrupt boundary at its upper surface, possibly indicating truncation. Stone-free colluvium.
Layer 9a 203 - 206cm	Chalk stone lens with abundant to many small and very small chalk pieces in a brown/dark brown (10YR 4/3) silty clay; clear wavy boundary.
Layer 9b 206 - 210cm	Brown/dark brown (10YR 4/3) silty clay; medium blocky structure; stone-free; clear wavy boundary. Stone-free horizon.
Layer 10 210 - 230cm	Brown (10YR 5/3) to greyish brown (10YR 5/2) silty clay, weak subangular blocky structure; rare small stones and chalk flecking, with stony lenses, generally becoming more stony towards base (context 10a); clear wavy boundary. Humic colluvium and stone lenses.
Layer 11 230 - 256cm	Dark greyish brown (10YR 4/2) silty clay; prismatic/ subangular structure; common small chalk pieces, contains charcoal fragments; gradual wavy boundary. Transported soil.
Layer 12 256 - 266cm	Dark greyish brown (10YR 4/2) silty clay; subangular blocky structure; many small chalk pieces; abrupt wavy boundary. Basal humic colluvium.
Ditch 15	
Layer 14 266 - 310cm	Dark greyish brown (10YR 4/2) silty clay; medium prismatic peds; common to many small chalk pieces, some fragments and flecks of charcoal; sharp smooth boundary.

Layer 13 310cm +	Pale yellow (2.5YR 8/4) silty clay marl, a chalky matrix of soft 'cheese-like' consistency with chalk pieces and occasional stony pockets. Periglacial solifluction material.

BIBLIOGRAPHY

BIBLIOGRAPHY

Albrecht, W.A. 1956. Physical, chemical and biological changes in the soil community. In W.L. Thomas *et al.* (eds), *Man's Role in changing the Face of the Earth.* Chicago: University, 648-673.

Alexander, J., Ozanne, P.C. and Ozanne, A. 1960. Report on the investigation of a round barrow on Arreton Down, Isle of Wight. *Proceedings of the Prehistoric Society* 60, 263-302.

Allcroft, A.H. 1924. *Downland Pathways* London: Methuen & Co. Ltd.

Allen, L. 1982. A study of the chronological development of the Bishopstone lynchet by least squares analysis of the distribution of datable artefacts. *Sussex Archaeological Collections* 120, 207-208.

Allen, M.J. 1982. The concept of least-squares analysis in archaeology. Unpub. MS -available in Barbican House Museum, Lewes.

Allen, M.J. 1983. Sediment analysis and archaeological data as evidence of the palaeoenvironments of early Eastbourne: the Bourne Valley excavation. Unpub. B.Sc. dissertation, Institute of Archaeology, London University.

Allen, M.J. 1984a. *Ashcombe Bottom Excavation; first interim report.* Lewes: Archaeological Group.

Allen, M.J. 1984b. Ashcombe Bottom excavations. *Sussex Archaeological Society Newsletter* 44.

Allen, M.J. 1986a. Magnetic susceptibility as a potential palaeoenvironmental determinant. *Circaea* 4, 18-20.

Allen, M.J. 1986b. A cleaning technique for land molluscs from archaeological contexts. *Circaea* 4, 51-53.

Allen, M.J. 1988a. Archaeological and environmental aspects of colluviation in South-East England. In W. Groenmann-van Waateringe and M. Robinson (eds), *Man-Made Soils.* Oxford: British Archaeological Reports, Int. Series 410, 69-92.

Allen, M.J. 1988b. Aspects of chalk landscape evolution in the Beaker period in southern England. Unpub. MPhil/PhD upgrading paper, University of Southampton.

Allen, M.J. 1989a. Land Snails. In Fasham, P.J., Farwell, D.J. and Whinney, R.J.B. *The archaeological site at Easton Lane, Winchester*. Hampshire Field Club and Archaeological Society Monograph 6, 134-140.

Allen, M.J. 1989b. A new site and further finds from Cuckoo Bottom. *Lewes Archaeological Group Newsletter* 89, 2-4

Allen, M.J. 1989c. Cuckoo Bottom. *Lewes Archaeological Group Newsletter* 91, 5.

Allen, M.J. 1990a. Chapter 17; Magnetic Susceptibility. In Bell, M.G., *Excavations at Brean Down, Somerset*. English Heritage Archaeological Report No. 15, 197-202.

Allen, M.J. 1990b. The molluscan evidence. In Howard, S., A double ring ditched, Bronze Age Barrow at Burford Farm, Pamphill. *Proceedings of the Dorset Natural History and Archaeological Society* 111 (1990), 49-52.

Allen, M.J. 1990c. Land mollusca (Wilsford Down, North Kite). In Richards, J.C., *The Stonehenge Environs Project*. English Heritage Archaeological Report No. 16, 191-192.

Allen, M.J. 1991a. Analysing the landscape: a geographical approach to archaeological problems. In A.J. Schofield (ed.), *Interpreting Artefact Scatters; contributions to ploughzone archaeology*. Oxbow Monograph 4, 39-57.

Allen, M.J. 1991b. Land Snails, The vegetational history at Barton. In Clark, R.H., Excavations at Barton Ring Ditches: landscape history and archaeology. *Bedfordshire Archaeology* 9, 4-24

Allen, M.J. 1991c. Landscape history of the Pyecombe barrow. In Butler, C., The excavation of a Beaker Bowl Barrow at Pyecombe, West Sussex. *Sussex Archaeological Collections* 129, 21-23.

Allen, M.J. 1992a. Products of erosion and the prehistoric land-use of the Wessex chalk. In M.G. Bell and J. Boardman (eds), *Past and Present Soil Erosion: archaeological and geographical perspectives*. Oxbow Books, 37-52.

Allen, M.J. 1992b. Landscape history: the molluscan evidence. In Gingell, C.J., *The Malborough Downs: a Later Bronze Age Landscape and its Origins*. Wiltshire Archaeological and Natural History Society Monograph 1, 145-149.

Allen, M.J. 1992c. The environmental history. In Bellamy, P.S., The excavations of Fordington Farm Round Barrow. *Proceedings of the Dorset Natural History and Archaeological Society* 113 (1992), 123-126.

Allen, M.J. forthcoming a. The landscape history, environment and land-use of the chalklands to the east of Lewes. Sussex Archaeological Collections.

Allen, M.J. forthcoming b. Environmental history. In Allen, M.J., Morris, M., and Clark, R.H., A Bronze Age barrow at Buckskin, Basingstoke. Proceedings of the Prehistoric Society.

Allen, M.J., in press. Land Mollusca. In Wainwright, G. J. and Davies, S.M., Excavations at Balksbury. English Heritage Monograph.

Allen, M.J., Bloomfield, C., Macphail, R.I. and Wyles, S.F. in press. A record of soil and molluscan changes resulting from landuse management at Butser Archaeological Farm: some preliminary results. Butser Archaeological Farm Year Book 1992.

Allen, M.J. and Clark, R.H. 1991. Prehistoric landscape history of the Chilterns. In Clark, R.H., Excavations at Barton Ring Ditches: landscape history and archaeology. *Bedfordshire Archaeology* 9, 20-21.

Allen, M.J., Entwistle, R. and Richards, J. 1990. Molluscan studies. In Richards, J.C., *The Stonehenge Environs Project*. English Heritage Archaeological Reports No. 16, 253-258.

Allen, M.J. and Fennemore, A.V. 1984. Field boundary ditch, Cuckoo Bottom, Lewes. *Sussex Archaeological Collections* 122, 207-208.

Bibliography

Allen, M.J., Heaton, M.J. and Richards, J.C. forthcoming. Durrington Barrow G3. Wiltshire Natural History and Archaeological Magazine.

Allen, M.J. and Macphail, R.I. 1985. Review and discussion of magnetic susceptibility and micromorphology: examples of Hazelton Long Cairn, Gloucestershire and Seaford Head Hillfort, Sussex. *Ancient Monuments Laboratory Report* No. 4583.

Allen, M.J. and Macphail, R.I. 1987. Micromorphology and magnetic susceptibility studies: their combined rôle in interpreting archaeological soils and sediments. In N. Fedoroff, L.M. Bresson and M.A. Courty (eds), *Soil Micromorphology*. Plaisair: Association Française pour l'Etude du Sol. 669-676.

Allen, M.J., Morris, M. and Clark, R.H. in press. 'A Bronze Age barrow at Buckskin, Basingstoke', *Proceedings of the Prehistoric Society*.

Allen, M.J. and Scaife, R.G. 1991. The exploitation of the flora and fauna and its impact on the natural and derived landscape. In Cox, P.W. and Hearne, C.M. *Redeemed from the Heath; the archaeology of the Wytch Farm Oilfield (1987-90)*. Dorset Natural History and Archaeological Society Monograph Series No. 9, 216-220.

Allen, M.J. and Wyles, S.F. 1993. The land-use history: the molluscan evidence. In Graham, A. and Newman, C., Excavations of Iron Age and Romano-British enclosures in the Avon Valley. *Wiltshire Archaeological and Natural History Magazine* 86, 45-50.

Allen, M.J. and Wyles, S.F. 1994. The contemporary land-use and landscape of the King Barrows as evidence by the buried soils and molluscs. In Cleal, R.M.J. and Allen, M.J., Investigations of tree-damaged barrows on King Barrow Ridge, Amesbury. *Wiltshire Archaeological and Natural History Magazine* 87, 76-81.

ApSimon, A.M. 1962. The prehistoric pottery. In Rahtz, P.A., Neolithic and Beaker Sites at Downton. *Wiltshire Archaeological Magazine* 58, 116-141.

Bibliography

ApSimon, A.M., Donovan, D.T. and Taylor, H. 1961. The stratigraphy and archaeology of the Late-Glacial and Post-glacial deposits at Brean Down, Somerset. *Proceedings of the University of Bristol Spelaeological Society* 9, 67-136.

Ashbee, P. 1970. *The Earthern Long Barrow in Britain.* London.

Ashbee, P., Bell, M.G. and Poudfoot, E. 1989. *Wilsford Shaft: excavations 1960-62.* English Heritage Archaeological Report No. 11.

Ashbee, P., Smith, I.F. and Evans, J.G., 1979. Excavation of three Long Barrows near Avebury, Wiltshire. *Proceedings of the Prehistoric Society* 45, 207-300.

Avery, B.W. 1980. *Soil Classification for England and Wales. (Higher categories).* Soil Survey Technical Monograph No. 14, Harpenden.

Avery, B.W. 1990. *Soils of the British Isles.* CAB (Commonwealth Agricultural Bureau) International, Wallingford.

Avery, B.W., Stephen, I., Brown, G. and Yaalon, D.H. 1959. The origin and development of Brown Earths on clay-with-flints and coombe deposits. *Journal of Soil Science* 10, 177-195.

Barker, H., Burleigh, R. and Meeks, N. 1971. British Museum natural radiocarbon measurements VII. *Radiocarbon* 13, 103-113.

Barnes, I. and Allen, M.J. 1990. *Codford-Heytesbury A36 road improvement; archaeological evaluation.* Wessex Archaeology Internal Report.

Barrett, B.W. and Chatfield, J.E. 1978. Valley deposits at Juniper Hall, Dorking: a physical and ecological analysis with emphasis on the sub-fossil land snail fauna. *Field Studies* 4, 671-692.

Basford, H.V. 1980. *The Vectis Report; a survey of Isle of Wight archaeology.* Isle of Wight Archaeological Committee.

Bedwin, O. 1978. The excavation of a Romano-British farmstead at Ranscombe Hill, South Malling, East Sussex, 1976. *Sussex Archaeological Collections* 116, 241-255.

Bell, M.G. 1976. The excavation of an early Romano-British site and Pleistocene landforms at Newhaven. *Sussex Archaeological Collections* 114, 218-305.

Bell, M.G. 1977. Excavations at Bishopstone. *Sussex Archaeological Collections* 115.

Bell, M.G. 1978. Saxon Sussex. In P.L. Drewett (ed.), *Archaeology of Sussex to 1500 AD*. London: CBA Research Report 29, 64-69.

Bell, M.G. 1981a. Valley sediments as evidence of prehistoric land-use: a study based on dry valleys in south east England. Unpub. Ph.D. thesis, London University, Institute of Archaeology.

Bell, M.G. 1981b. Valley sediments and environmental change. In M. Jones and G.W. Dimbleby (eds), *Environment of Man: the Iron Age to the Anglo-Saxon period*. Oxford: British Archaeological Reports, British Series 87, 75-91.

Bell, M.G. 1981c. Seaweed as a prehistoric resource. In D. Brothwell and G. Dimbleby (eds), *Environmental aspects of coasts and Islands*. Oxford: British Archaeological Reports S94, 117-126.

Bell, M.G. 1982a. Preliminary report on the study of valley sediments as evidence of prehistoric land-use. In Drewett, P., *The Archaeology of Bullock Down, Eastbourne, East Sussex; the development of a landscape*. Sussex Archaeological Society Monograph 1, 9-13.

Bell, M.G. 1982b. The effects of land-use and climate on valley sedimentation. In A.F. Harding (ed.), *Climatic change in later prehistory*. Edinburgh: University Press, 127-142.

Bell, M.G. 1983. Valley sediments as evidence of prehistoric land-use on the South Downs. *Proceedings of the Prehistoric Society* 49, 119-150.

Bell, M.G., 1986. Archaeological evidence for the date, cause and extent of soil erosion on the chalk. *Journal of the South East Soils Discussion Group* 3, 72-83.

Bell, M.G. 1990a. *Brean Down excavations 1983-1987*. English Heritage Archaeological Report No. 15.

Bell, M.G. 1990b. Sedimentation rates in the primary fills of chalk-cut features. In D.E. Robinson (ed.), *Experimentation and Reconstruction in Environmental Archaeology*. Oxford: Oxbow Books, 237-248.

Bell, M.G. and Allen, M.J. 1985. Valley sediments and molluscs from around Hambledon Hill, Dorset. Unpub. MS. for R. Mercer.

Bell, M.G. and Boardman, J. (eds), 1992. *Past and Present Soil Erosion: archaeological and geographical perspectives*. Oxbow Books.

Bell, M.G. and Jones, J. 1990a. Land Mollusca, W2 (1981) Coneybury 'Anomaly'. In Richards, J.C., *The Stonehenge Environs Project*. English Heritage Archaeological Report No. 16, 157-158

Bell, M.G. and Jones, J. 1990b. Land Mollusca (Coneybury Henge). In Richards, J.C. *The Stonehenge Environs Project*. English Heritage Archaeological Report No. 16, 154-158.

Bell, M.G. and Shackleton, J. 1982. Land Mollusca from Coneybury Henge, Wiltshire. *Ancient Monuments Laboratory Report* No. 3639.

Bell, M.G. and Walker, M.J. 1992. *Late Quaternary Environmental Change: physical and human perspectives*. Harlow: Longman Scientific & Technical.

Bell, M.G., Watson, N. and Jones, J. 1991. The land molluscs from Winterbourne Steepleton. In Woodward, P.J. *The South Dorset Ridgeway: Survey and Excavations 1977-1984*. Dorset Natural History and Archaeological Society Monograph Series 8, 114-117.

Bellamy, P.S. 1992. The excavations of Fordington Farm Round Barrow. *Proceedings of the Dorset Natural History and Archaeological Society* 113 (1992), 107-132.

Bennett, H.H. 1939. *Soil Conservation*. London: McGraw-Hill.

Biggar, J.T.M. 1973. Surface finds on Houndean/Ashcombe field (TQ 389099). *Sussex Archaeological Collections* 111, 111.

Biggar, J.T.M. 1975. Surface finds on Houndean/Ashcombe field (TQ 389 099). *Sussex Archaeological Collections* 113, 186.

Biggar, J.T.M. 1978. A field survey of Houndean-Ashcombe and other Downland fields west of Lewes, 1972-1975. *Sussex Archaeological Collections* 116, 143-153

Biggar, J.T.M. 1980. Field Walking near Lewes. *Sussex Archaeological Collections* 118, 366-367.

Biggar, J.T.M. 1984. Fieldwalking at Glynde near Lewes, East Sussex, 1979-82. *Sussex Archaeological Collections* 122, 214-216.

Binford, L. and Binford, S. 1966. A preliminary analysis of functional variability in the mousterial of levallois facies *American Anthropologist* 68, 238-295.

Bintliff, J. 1977. *Natural environment and human settlement in Prehistoric Greece*. Oxford: British Archaeological reports, Int. Series 28.

Bintliff, J. 1982. Climatic change, archaeology and Quaternary science in the eastern Mediterranean region. In A.F. Harding (ed.), *Climatic change in later prehistory*. Edinburgh: University Press, 143-161.

Bintliff, J. 1992. Erosion in the Mediterranean Lands: a reconsideration of pattern, process and methodology. In M.G. Bell and J. Boardman (eds), *Past and Present Soil Erosion: archaeological and geographical perspectives*. Oxbow Books, 125-131.

Bibliography

Boardman, J. 1984a. A morphometric approach to soil erosion on agricultural land near Lewes, East Sussex. In C.T. Lukehurst and R.L. Grant (eds), *Issues in Countryside Research*. Kingston: Polytechnic, Kingston/Brighton Research Papers, 1-10.

Boardman, J. 1984b. Erosion on the South Downs. *Soil and Water* 12, 19-21.

Boardman, J. 1985. Using the land. *New Ground* 5, 10.

Boardman, J. 1986. The context of soil erosion. *SEESOIL* 3, 2-13.

Boardman, J. 1992. Current erosion on the South Downs: implications for the past. In M.G. Bell and J. Boardman (eds), *Past and Present Soil Erosion: archaeological and geographical perspectives*. Oxford: Oxbow Books, 9-19.

Boardman, J. and Robinson D.A. 1985. Soil erosion, climatic vagary and agricultural change on the Downs around Lewes and Brighton, autumn 1982. *Applied Geography* 5, 243-258.

Boiffin, J. and Bresson, L.M. 1987. Dynamiques de formation des croutes superficielles: apport de l'analyse microscopique. In N. Fedoroff, L.M. Bresson and M.A. Courty (eds), *Soil Micromorphology*. Plaisair: Association Française pour l'Etude du Sol. 393-399.

Bonney, D. 1972. Early Boundaries in Wessex. In P.J. Fowler (ed.), *Archaeology and the Landscape*. London: John Baker, 168-186.

Bowen, H.C. 1961. *Ancient Fields*. London: British Society for the Advancement of Science, 35-61.

Bowen, H.C., 1978. 'Celtic' fields and 'ranch' boundaries in Wessex. In S. Limbrey and J.G. Evans (eds), *The effect of Man on the Landscape: the lowland zone*. London: CBA Research Report 21, 115-123.

Bowen, H.C. and Fowler, P.J. (eds). 1978. *Early Land Allotment*. Oxford: British Archaeological Reports, British Series 48.

Boycott, A.E. 1934. The habitats of land Mollusca in Britain. *Journal of Ecology* 22, 1-38.

Boyd, W.E. 1982a. Sub-surface formation of charcoal and its possible relevance to the interpretation of charcoal remains. *Quaternary Newsletter* 37, 6-8.

Boyd, W.E. 1982b. Sub-surface formation of charcoal: an unexplained event in peats. *Quaternary Newsletter* 38, 15-16.

Bradley, R.J. 1967. A Late Bronze Age occupation site at Upwaltham. *Sussex Notes and Queries* 16, 1-38.

Bradley, R.J. 1970. The excavation of a Beaker settlement at Belle Tout, East Sussex, England. *Proceedings of the Prehistoric Society* 36, 312-379.

Bradley, R.J. 1974. A chalk-cut shaft at Belle Tout. *Sussex Archaeological Collections* 112, 156.

Bradley, R.J. 1976. Maumbury Rings, Dorchester: the excavations of 1903 - 1913. *Archaeologia* 105, 1-98.

Bradley, R.J. 1978a. *The Prehistoric Settlement of Britain.* London: Routledge & Kegan Paul.

Bradley, R.J. 1978b. Colonization and land use in the Late Neolithic and Early Bronze Age. In S. Limbrey and J.G. Evans (eds), *The effect of Man on the Landscape: the lowland zone.* London: CBA Research Report 21, 95-102.

Bradley, R.J. 1982. Belle Tout - Revision and re-assessment. In Drewett, P.L., *The Archaeology of Bullock Down, Eastbourne. East Sussex: the development of a landscape.* Sussex Archaeological Society Monograph 1, 12-20.

Brailsford, J. 1948. Excavations at Little Woodbury, Wiltshire (1938-39) Part II: The Pottery. *Proceedings of the Prehistoric Society* 1, 1-18.

Bridges, E.M. and Davidson, D.A. 1982. Agricultural uses of soil survey data. In E.M. Bridges and D.A. Davidson (eds.), *Principles and applications of soil geography.* Longman, 171-215.

Briggs, D. 1977. *Soils; sources and methods in geography.* London: Butterworths.

Bullock, A.E. and Allen, M.J. forthcoming. Animal Bone, in Smith, R.J.C., Healy, F., Allen, M.J., Morris, E and Barnes, I. Excavations along the route of the Dorchester By pass. English Heritage Monograph Series.

Bullock, P. and Murphy, C.P. 1979. Evolution of a palaeo-argillic brown earth (Paleudalf) from Oxfordshire, England. *Geoderma* 22, 225-253.

Burchell, J.P.T. and Piggott, S. 1939. Decorated prehistoric pottery from the bed of the Ebbsfleet, Northfleet, Kent. *Antiquaries Journal* 19, 405-420.

Burgess, C. 1986. 'Urnes of no small variety': Collared Urns Reviewed. *Proceedings of the Prehistoric Society* 52, 339-351.

Burgess, C. and Shennan, S. 1976. The Beaker Phenomenon: some suggestions. In C. Burgess and R. Miket (eds), *Settlement and Economy in the Third Millenia B.C.* British Archaeological Reports 33, 309-331.

Burleigh, R. and Kerney, M.P. 1982. Some chronological implications of a fossil molluscan assemblage from a Neolithic site a Brook, Kent, England. *Journal of Archaeological Science* 9, 29-38.

Burrin, P.J. 1985. Holocene alluviation in south east England and some implications for palaeohydrological studies. *Earth Surface Processes and Landforms* 10, 257-271.

Burrin, P.J. and Scaife, R.G. 1984. Aspects of Holocene sedimentation and floodplain development in southern England. *Proceedings of the Geologists' Association* 85, 81-96.

Burrin P.J. and Scaife, R.G. 1988. Environmental thresholds, catastrophe theory and landscape sensitivity: their relevance to the impact of man on valley alluviations. In Bintliffe, J.L., Donaldson, D.A., and Grant, E.G. (eds), *Conceptual Issues in Environmental Archaeology*, Edinburgh University Press, 211-232.

Burstow, G.P. and Holleyman, G.A. 1957. Late Bronze Age settlement on Itford Hill. *Proceedings of the Prehistoric Society* 23, 167-212.

Burstow, G.P. and Holleyman, G.A. 1964. Excavations at Ranscombe Camp 1959-1960, *Sussex Archaeological Collections* 102, 55-67.

Butler, C. 1991. The excavation of a Beaker Bowl barrow at Pyecombe, West Sussex. *Sussex Archaeological Collections* 129, 1-28.

Butzer, K.W. 1964. *Environment and Archeology: an introduction to Pleistocene geography*. Chicago: Aldine.

Butzer, K.W. 1974. Accelerated soil erosion: a problem of man-land relationships. In I.R. Manners and M.W. Mikesell (eds), *Perspectives on Environment*. Washington: Association of American Geographers, 57-78.

Butzer, K.W. 1982. *Archaeology as Human Ecology: method and theory for a contextual approach*. Cambridge: University Press.

Cameron, N. and Scaife, R.G. 1988. The pollen record. In Cox, P.W., Excavation on Furzey Island, Poole Harbour Dorset, 1985. *Proceedings of the Dorset Natural History and Archaeological Society* 110, 65-72 (49-72.)

Cameron, R.A.D. 1973. Some woodland mollusc faunas from southern England. *Malacologia* 14, 355-370.

Cameron, R.A.D. 1978. Interpreting buried land-snail assemblages from archaeological sites - problems and progress. In D. Brothwell, K.D. Thomas and J. Clutton-Brock (eds), *Research Problems in Zooarchaeology*. London: Institute of Archaeology Occasional Paper 3, 19-23.

Cameron, R.A.D. and Morgan-Huws, D.I. 1975. Snail faunas in the early stages of a chalk grassland succession. *Biological Journal of the Linnean Society* 7, 215-229.

Cameron, R.A.D. and Redfern, M. 1976. *British Land Snails*. Linnean Society of London: Academic Press.

Canti, M. 1983. Soils and sediments from two dry valleys in Oxfordshire. Unpub. M.Sc thesis, Department of Soil Science, University of Reading.

Carruthers, W.J. 1990. Carbonised plant remains. In Richards, J.C. *The Stonehenge Environs Project.* English Heritage Archaeological Report No. 16, 250-252.

Carter, S.P. 1987. The reconstruction of land snail death assemblages. Unpub. Ph.D. thesis, University of London, Institute of Archaeology.

Carter, S.P. 1990. The stratification and taphonomy of shells in calcareous soils: implications for land snail analysis in archaeology. *Journal of Archaeological Science* 17, 495-507.

Case, H. 1977. The Beaker Culture in Britain and Ireland. In R. Mercer (ed.), *Beakers in Britain and Europe.* Oxford: British Archaeological Reports, Supp. Series 26, 71-101.

Catt, J.A. 1977. Loess and coversand. In F.W. Shotton (ed.), *British Quaternary Studies: recent advances.* Oxford: Clarendon Press, 221-229.

Catt, J.A. 1978. The contribution of loess to soils in lowland Britain. In S. Limbrey and J.G. Evans (eds), *The effect of Man on the Landscape: the lowland zone.* London: CBA Research Report 21, 12-20.

Catt, J.A. 1979. Distribution of loess in Britain. *Proceedings of the Geologists' Association* 90, 93-95.

Champion, T.C. 1982. The Bronze Age in Kent. In P.E. Leach (ed.), *Archaeology in Kent to AD 1500.* London: CBA Research Report 48, 31-39.

Chappell, H.G., Ainsworth, J.F., Cameron, R.A.D. and Redfern, M. 1971. The effect of trampling on a chalk grassland ecosystem. *Journal of Applied Ecology* 8, 869-882.

Childe, V.G. 1940 (1952 edn.) *Prehistoric communities of the British Isles.* London; W & R Chambers Ltd., 91-118.

Bibliography

Chowne, P. 1988. Interim report on the Western link Road, Bradford Peverell, Dorset. *Proceedings of the Dorset Natural History and Archaeological Society* 109 (1987), 125-126.

Christie, P.M. 1964. A Bronze Age round barrow on Earl's Farm Down, Amesbury. *Wiltshire Archaeological and Natural History Magazine* 59, 30-45

Christie, P.M. 1970. A round barrow on Greenland Farm, Winterbourne Stoke. *Wiltshire Archaeological and Natural History Magazine* 65, 64-73.

Clark, A.J. 1983. The testimony of the topsoil. In G.S. Maxwell (ed.), *The Impact of Aerial Reconnaissance on Archaeology*. London: CBA Research Report 49, 128-135.

Clark, M.J. and Small, R.J. 1982. *Slopes and Weathering*. Cambridge: Cambridge University Press.

Clark, S.H.E. 1988. Molluscan analysis and downland ecology at Malling Hill, near Lewes, Sussex. Unpub. Undergraduate dissertation (Ancient History and Archaeology), University of Wales, St. David's University College, Lampeter.

Clarke, D.L. 1970. *Beaker Pottery of Great Britain and Ireland*. Cambridge: University Press.

Cleal, R.M.J. 1982. A re-analysis of the ring-ditch site at Playden, East Sussex. *Sussex Archaeological Collections* 120, 1-17.

Cleal, R.M.J. 1991. The earlier prehistoric pottery, in Sharples, N.M., *Maiden Castle; excavations and field survey 1985-6* English Heritage Archaeological Report No. 19, 171-185.

Cleal, R.M.J. and Allen, M.J. 1994. Investigations of tree-damaged barrows on King Barrow Ridge, Amesbury. *Wiltshire Archaeological and Natural History Magazine* 87, 54-84.

Cleal, R.M.J. (with Raymond, F.) 1990. The prehistoric pottery. In Richards, J.C. *The Stonehenge Environs Project*. English Heritage Archaeological Report No. 16, 233-246.

Collis, J. 1968. Excavations at Owslebury, Hampshire: an interim report. *Antiquaries Journal* 48, 18-31.

Copson, C.K. 1989. Fordington Farm Round Barrow. *Proceedings of the Dorset Natural History and Archaeological Society* 110 (1988), 144.

Corbet, G. and Ovenden, D. 1980. *Mammals of Britain and Europe.* London: Collins.

Cornwall, I.W. 1953. Soil science and archaeology with illustrations from some British Bronze Age monuments. *Proceedings of the Prehistoric Society* 19, 129-147.

Cornwall, I.W. 1958. *Soils for the Archaeologist.* London: Phoenix.

Courty, M.A., Goldberg, .P and Macphail, R.I. 1989. *Soils and Micromorphology in Archaeology.* Cambridge: Cambridge University Press.

Crabtree, K. 1971. Overton Down experimental earthwork, Wiltshire 1968. *Proceedings of the University of Bristol Spelaeological Society* 12, 237-244.

Crabtree, K. 1990. Experimental earthworks in the United Kingdom. In D.E. Robinson (ed.), *Experimentation and Reconstruction in Environmental Archaeology.* Oxford: Oxbow Books, 225-235.

Cunliffe, B.W. 1978. *Iron Age Communities in Britain.* (2nd edn.) London: Routledge & Kegan Paul.

Cunliffe, B.W. 1982. Settlement, heirarchy and social change in southern Britain in the Iron Age, *Analecta Praehitorica Leidensia* 15, 161-187.

Cunliffe, B.W. 1984. *Danebury an Iron Age hillfort in Hampshire.* London: CBA Research Report 52.

Cunnington, M.E. 1923. *The Early Inhabited Site at All Cannings Cross.* Devizes.

Curwen, E. 1939. Blunted axe-like implements. *Proceedings of the Prehistoric Society* 5, 196-201.

Curwen, E. and Curwen, E.C. 1927. Excavations in the Caburn, near Lewes. *Sussex Archaeological Collections* 68, 1-56.

Curwen, E.C. 1927. Prehistoric agriculture in Britain. *Antiquary* 1, 261-289.

Curwen, E.C. 1930. Wolstonbury. *Sussex Archaeological Collections* 71, 237-245.

Curwen, E.C. 1954. *The Archaeology of Sussex*. London: Methuen Ltd. 2nd edn.

Curwen, E.C. and Hatt, G. 1961. *Plough and Pasture; the early history of farming*. New York: Collier Books.

Dalrymple, J.B. 1958. The application of soil micromorphology to fossil soils and other deposits from archaeological sites. *Journal of Soil Science* 9, 199-209.

Darwin, C. 1881. *The formation of vegetable mould through the action of worms with observations of their habits*. 247. London: John Murray, pub. 1904.

Davidson, D.A., Carter, S.P. and Quine, T.A. 1992. An evaluation of micromorphology as an aid to archaeological interpretation. *Geoarchaeology* 7, 55-65.

Davies, S.M., Stacey, L.C. and Woodward, P.J. 1986. Excavations at Alington Avenue, Fordington, Dorchester, 1984/85: Interim Report. *Proceedings of the Dorset Natural History and Archaeological Society* 107, 101-110.

Dearing, J.A., Elner, J.K. and Happey-Wood, C.M. 1981. Recent sediment flux and erosional processes in a Welsh upland lake-catchment based on magnetic susceptibility measurements. *Quaternary Research* 16, 356-372.

Dennel, R.W. 1983. *European Economic Prehistory: a new approach*. London: Academic Press.

Dexter, A.R. 1976. Internal structure of tilled soil. *Journal of Soil Science* 27, 267-278.

Dexter, A.R. 1979. Prediction of soil structure produced by tillage. *Journal of Terramechanics* 16, 117-127

Dimbleby, G.W. 1971. Pollen analysis. In Wainwright, G.J. and Longworth, I.H., *Durrington Walls: Excavations 1966-68*. Research Report of the Society of Antiquaries 27, 332-334.

Dimbleby, G.W. 1976. Climate, soils and man. *Philosophical Transaction of the Royal Society, London* B.275, 197-208.

Dimbleby, G.W. 1985. *The Palynology of Archaeological Sites*. London: Academic Press.

Dimbleby, G.W. and Evans, J.G. 1974. Pollen and land-snail analysis of calcareous soils. *Journal of Archaeological Science* 1, 117-133.

Dines, H.G., Crookall, R. and Stubblefield, C.J. 1933. *Geology of the country around Reigate and Dorking*. London: Memoirs of the Geological Survey of Great Britain.

Dines, H.G., Holmes, S.C.A. and Robbie, J.A. 1954. *Geology of the country around Chatham*. London: Memoirs of the Geological Survey UK. Sheet Memoir 272.

Drewett, P.L. 1970. The excavation of two round barrows and associated fieldwork on Ashey Down, Isle of Wight, 1969. *Proceedings of the Hampshire Field Club* 27, 33-56.

Drewett, P.L. 1975a. The excavation of an oval burial mound of the third millennium bc at Alfriston, East Sussex, 1974. *Proceedings of the Prehistoric Society* 41, 119-152.

Drewett, P.L. 1975b. A Neolithic pot from Selmeston, East Sussex. *Sussex Archaeological Collections* 113, 193-194.

Drewett, P.L. 1977. The excavation of a Neolithic causewayed enclosure on Offham Hill, East Sussex, 1976. *Proceedings of the Prehistoric Society*, 43, 201-242.

Drewett, P.L. 1978. Neolithic Sussex. In P.L. Drewett (ed.), *Archaeology in Sussex to AD 1500.* London: CBA Research Report No 29, 23-29.

Drewett, P.L. 1980. Neolithic pottery in Sussex. *Sussex Archaeological Collections* 118, 23-30.

Drewett, P. 1982. *The Archaeology of Bullock Down, Eastbourne, East Sussex; the development of a landscape.* Sussex Archaeological Society Monograph 1.

Edwards, K.J. 1982. Man, space and the woodland edge: speculations on the detection and interpretation of human impact in pollen profiles. In M.G. Bell and S. Limbrey (eds), *Archaeological Aspects of Woodland Ecology.* Oxford: British Archaeological Reports: Int. Series 146, 5-22.

Edwards, K.J. and Ralston, I.B.M. 1984. Post-glacial hunters, gatherers and vegetational history in Scotland. *Proceedings of the Society of Antiquaries, Scotland* 114, 15-34.

Ellis, A.E. 1951. Census distribution of British non-marine Mollusca. *Journal of Conchology* 23, 171-244.

Ellis, A.E. 1969. *British Snails.* Oxford: Clarendon Press.

Ellis, A.E. 1978. *British Freshwater Bivalve Mollusca.* Linnean Society, London: Seminar Press

Ellis, C., 1983. Dry-valley fills at Asham and the Devils Dyke. *Excursion Guide, Fourth International Flint Symposium.* Brighton: Polytechnic, 9-23.

Ellis, C. 1985. Flandrian molluscan biostratigraphy and its application to dry valley deposits in East Sussex. In N.R.J. Fieller, D.D. Gilbertson and N.G.A. Ralph (eds), *Palaeoenvironmental Investigations: Research Design, Methods and Data Analysis.* Oxford: British Archaeological Reports, Int. Series 226, 157-165.

Ellis, C. 1986. The postglacial molluscan succession of the South Downs dry valleys. In G. de G. Sieveking and M.B. Hart (eds), *The Scientific Study of Flint and Chert.* Cambridge: University Press, 175-194.

Ellison, A. 1978. The Bronze Age in Sussex. In P.L. Drewett (ed.), *Archaeology in Sussex to AD 1500*. London: CBA Research Report 20, 30-37.

Ellison, A. 1980. The Bronze Age. *Sussex Archaeological Collections* 118, 31-41.

Entwistle, R. 1990a. Statistical appraisal. In Allen, M.J., Entwistle and Richards, J., Molluscan studies. In Richards, J.C., *The Stonehenge Environs Project*. English Heritage Archaeological Report No. 16, 254.

Entwistle, R. 1990b. Land mollusca (Lesser Cursus) In Richards, J.C., *The Stonehenge Environs Project*. English Heritage Archaeological Report No. 16, 88-93.

Entwistle, R. 1990c. Land mollusca (Amesbury 42 long barrow). In Richards, J.C., *The Stonehenge Environs Project*. English Heritage Archaeological Report No. 16, 105-109.

Evans, J.A. (Sir John) 1897. *The ancient stone implements of Great Britain* 2nd edn.

Evans, J.G. 1966. Late-glacial and post-glacial subaerial deposits at Pitstone, Buckinghamshire. *Proceedings of the Geologists' Association* 77, 347-363.

Evans, J.G. 1967. The stratification of Mollusca in chalk soils and their relation to archaeology. Unpub Ph.D. thesis, University of London, Institute of Archaeology.

Evans, J.G. 1968. Periglacial deposits on the chalk of Wiltshire. *Wiltshire Archaeological and Natural History Magazine* 63, 12-29.

Evans, J.G. 1970. Interpretation of land snail faunas. *Bulletin of the London Institute of Archaeology* 8 & 9, 106-116.

Evans, J.G. 1971a. Habitat change on the calcareous soils of Britain: the impact of Neolithic man. In D.D.A. Simpson (ed.), *Economy and Settlement in Neolithic and Early Bronze Age Britain and Europe*. Leicester: University Press, 27-73.

Evans, J.G. 1971b. Notes on the environment of early farming communities in Britain. In D.D.A. Simpson (ed.), *Economy and Settlement in Neolithic and Early Bronze Age Britain and Europe*. Leicester: University Press, 11-26.

Evans, J.G. 1971c. Durrington Walls: the pre henge environment. In Wainwright, G.J. and Longworth, I.H., *Durrington Walls: Excavations 1966-68*. Research Report of the Society of Antiquaries 27, 329-337.

Evans, J.G. 1972. *Land Snails in Archaeology*. London: Seminar Press.

Evans, J.G. 1975. *The Environment of Early Man in the British Isles*. London: Paul Elek.

Evans, J.G. 1978. *An Introduction to Environmental Archaeology*. London: Paul Elek.

Evans, J.G. 1984. Stonehenge - the environment in the Late Neolithic and Early Bronze Age and a Beaker burial. *Wiltshire Archaeological and Natural History Magazine* 78, 7-30.

Evans, J.G. 1990. Notes on some Late Neolithic and Bronze Age events in long barrow ditches in southern and eastern England. *Proceedings of the Prehistoric Society* 56, 111-116.

Evans, J.G, French, C. and Leighton, D. 1978. Habitat change in two Late-glacial and Post-glacial sites in southern Britain: the molluscan evidence. In S. Limbrey and J.G. Evans (eds), *The effect of Man on the Landscape: the lowland zone*. London: CBA Research Report 21, 63-75.

Evans, J.G. and Jones, H. 1973. Subfossil and modern land-snail faunas from rock rubble habitats. *Journal of Conchology* 28, 103-129.

Evans, J.G. and Jones, H. 1979. The land Mollusca. In Wainwright, G.J., *Mount Pleasant, Dorset: Excavations 1970-1971*. London: Society of Antiquaries Research Report 37 190-213.

Evans, J.G. and Rouse, A. 1991a. The river valleys of the South Winterbourne and Frome. In Sharples, N.M., *Maiden Castle; excavations and field survey 1985-6.* English Heritage Archaeological Report No. 19, 15-17.

Evans, J.G. and Rouse, A. 1991b. The land Mollusca. In Sharples, N.M. *Maiden Castle; excavations and field survey 1985-6.* English Heritage Archaeological Report No. 19, 118-125.

Evans, J.G., Rouse, A. and Sharples, N. 1988. The landscape setting of causewayed camps: recent work on the Maiden Castle enclosure. In J.C. Barrett and I.A. Kinnes (eds), *The Archaeology of context in the Neolithic and Bronze Age: recent trends.* Sheffield: J.R. Collis. 73-78.

Evans, J.G. and Smith, I.F. 1983. Excavations at Cherhill, North Wiltshire 1967. *Proceedings of the Prehistoric Society* 49, 101-109.

Evans, J.G. and Valentine, K.W.G. 1974. Ecological changes induced by prehistoric man at Pitstone, Buckinghamshire. *Journal of Archaeological Science* 1, 343-351.

Evans, J.G. and Williams, D. 1991. Land Mollusca from the M3 archaeological sites - a review. In Fasham P.J and Whinney, R.J.B., *Archaeology and the M3; the watching brief, the Anglo-Saxon settlement at Abbots Worthy and retrospective sections.* Hampshire Field Club and Archaeological Society Monograph 7, 113-142.

Evans, J.G., Limbrey, S., Máté, I, and Mount R. 1993. An environmental history of the Upper Kennet Valley, Wiltshire, for the last 10,000 years. *Proceedings of the Prehistoric Society* 59, 139-196.

Evans, R. 1980. Mechanics of water erosion and their spatial and temporal controls: an empirical viewpoint. In M.J. Kirkby and R.P.C. Morgan (eds), *Soil Erosion.* Chichester: John Wiley 109-128.

Evans, R. 1990. Erosion in England and Wales - the present, the key to the past. In M.G. Bell and J. Boardman (eds), *Past and Present Soil Erosion* Oxford: Oxbow Books, 53-66.

Everton, R. and Fowler, P.J. 1978. Pre-Roman ard-marks at Lodge Farm, Alveston, Avon: a method of analysis. In H.C. Bowen and P.J. Fowler (eds) *Early Land Allotment*. Oxford: British Archaeological reports, Britsh series 48, 179-185.

Favre, J. 1927. Les mollusques post glaciaires et actuels du Bassin de Genève. *Mém. Soc. Phys. et Hist. Nat. Genève* 40, 171-434.

Findlay, D.C., Colborne, G.J.N., Cope, D.W., Harrod, T.R., Hogan, D.V. and Staines, S.J. 1984. *Soils and their use in South West England*. Soil Survey of England and Wales, Bulletin No. 14.

Fisher, P.F. and Macphail, R.I. 1985. Studies of archaeological soils and deposits by micromorphological techniques. In N.R.J. Fieller, D.D. Gilbertson and N.G.A. Ralph (eds), *Palaeoenvironmental Investigations: research design, methods and data analysis*. Oxford: British Archaeological Reports, Int. Series 258, 93-125.

Foley, R. 1981a. A model of regional archaeological structure. *Proceedings of the Prehistoric Society* 47, 19-40.

Foley, R. 1981b. Off-site archaeology: an alternative approach for the short sited. In I. Hodder, N. Hammond and G. Issac (eds), *Pattern in the Past; essays in honour of David Clarke*. Cambridge: University Press, 157-183.

Forcart, L. 1965. New researches on *Trichia hispida* (Linnaeus) and related forms. *Proceedings of the European Malocological Congress* 1, 79-89.

Fowler, P.J. 1963. The archaeology of Fyfield and Overton Downs, Wiltshire. *Wiltshire Archaeology and Natural History Magazine* 58, 342-350.

Fowler, P.J. and Evans, J.G. 1967. Plough-marks, lynchets and early fields. *Antiquity* 61, 289-301.

Gardiner, J.P. 1988. The composition and distribution of Neolithic surface flint assemblages in central southern England. Unpub. Ph.D. thesis, University of Reading.

Gater, J.A. 1979. Flooding and flood deposits in Britain: some implications. Upub. BA dissertation, Department of Archaeological Science, University of Bradford.

Gebhardt, A. 1990. Evolution du paleopaysage agricole dans le nord-ouest de la France: apport de la micromorphologie. Unpub. thèse, Université de Rennes.

Gibson, A.M. 1982. *Beaker domestic sites; a study of domestic pottery of the third and early second millennia BC in the British Isles.* Oxford: British Archaeological Reports, British Series 102.

Gingell, C.J. 1988. Twelve Wiltshire round barrows. Excavations in 1959 and 1961 by F. de M and H.L. Vatcher. *Wiltshire Archaeological and Natural History Magazine* 82, 19-76.

Gingell, C.J. 1992. *The Malborough Downs: a Later Bronze Age Landscape and its Origins.* Wiltshire Archaeological and Natural History Society Monograph 1.

Gingell, C.J. and Lawson, A.J. 1984. The Potterne project: excavation and research at a major settlement of the Late Bronze Age. *Wiltshire Archaeological and Natural History Magazine* 78, 31-34.

Godwin, H. 1940. Pollen analysis and the forest history of England and Wales. *New Phytologist* 39, 370-400.

Godwin, H. 1944. Age and origin of the 'Breckland' heaths of East Anglia. *Nature* 154, 6.

Godwin, H. 1967. Strip lynchets and soil erosion. *Antiquity* 41, 66-67.

Godwin, H. 1975. *The History of the British Flora.* (2nd edn.) Cambridge: Cambridge University press.

Goodman, D. 1975. The theory of diversity-stability relations in ecology. *The Quarterly Review of Biology* 50, 237-266.

Gordon, D. and Ellis, C. 1985. Species composition parameters and life tables: their application to detect environmental change in fossil land molluscan assemblages. In N.R.J. Fieller, D.D. Gilbertson and N.G.A. Ralph (eds), *Palaeoenvironmental Investigations: research design, methods and data analysis.* Oxford: British Archaeological Reports, Int. Series 258, 157-174.

Gordon, P. and Shakesby, R. 1973. Study of the valley infill, Rake Bottom, Butser Hill. *The South Hampshire Geographer* 6, 10-20.

Goudie, A. 1986. *The Human Impact on the Natural Environment.* (2nd edn.) Oxford: Basil Blackwell.

Green, C.M. 1977. The Roman pottery. In Bell, M.G., Excavations at Bishopstone, Sussex. *Sussex Archaeological Collections* 115, 152-178.

Green, C.M. 1978. The pottery. In Bedwin, O., The excavation of a Romano-British farmstead at Ranscombe Hill, South Malling, East Sussex, 1976. *Sussex Archaeological Collections* 116, 245-253.

Green, C. Sparey, 1979. Dorchester - Two Barrows. *Proceedings of the Dorset Natural History and Archaeological Society* 101, 135.

Green, C. Sparey, 1991a. A colluvial deposit below Melbury Hill, Compton Abbas. *Proceedings of the Dorset Natural History and Archaeological Society* 113, 167.

Green, C. Sparey, 1991b. Deposits of colluvium and burnt flint in the Frome Valley, Frampton Dorchester. *Proceedings of the Dorset Natural History and Archaeological Society* 113, 167.

Green, H.S. 1980. *Flint Arrowheads of the British Isles.* Oxford: British Archaeological Reports 75, pp 108 & 114.

Green, H.S. 1984. Flint arrowheads: typology and interpretation. *Lithics* 5, 19-43.

Gregory, D. 1984. Fieldwalking at Malling Hill, TQ425110. *Lewes Archaeological Group Newsletter* 68, 1.

Gregory, D. 1985. Malling Hill TQ425110, field walk 4th November 1984. *Lewes Archaeological Group Newsletter* 73, 1.

Grinsell, L.V. and Sherwin, G.A. 1940. Isle of Wight barrows. *Proceedings of the Isle of Wight Natural History and Archaeological Society* 3, 179-222.

Groube, L. 1981. Black-holes in British prehistory: the analysis of settlement distributions. In I. Hodder, N. Hammond and G. Issac (eds), *Pattern in the Past; essays in honour of David Clarke*. Cambridge: University Press, 185-209.

Hadfield, J.I. 1981. The excavation of a medieval kiln at Barnett's Mead, Ringmer, East Sussex. *Sussex Archaeological Collections* 119, 89-106.

Hall, N.W. 1987. An application of micromorphology to evaluating the distribution and significance of soil erosion by water. In N. Fedoroff, L.M. Bresson and M.A. Courty (eds), *Soil Micromorphology*. Paris: Association Française pour l'Etude du Sol, 437-443.

Hamilton, S. 1977. The Iron Age pottery. In Bell, M.G., Excavations at Bishopstone, Sussex. *Sussex Archaeological Collections* 115, 83-117.

Hammond, F.W. 1980. The interpretation of archaeological distribution maps: biases inherent in archaeological fieldwork. *Archaeo-Physika* 7, 193-216.

Hardesty, D.L. 1977. *Ecological Anthropology*. New York: John Wiley.

Harding, P. 1992. The Flint. In Gingell, C.J. *The Malborough Downs: a Later Bronze Age Landscape and its Origins*. Wiltshire Archaeological and Natural History Society Monograph 1, 123-133.

Harris, D.R. 1977. Alternative pathways toward agriculture. In C.A. Reed (ed.), *Origins of Agriculture*. 179-243. The Hague: Mouton.

Harris, T. and Boardman, J. 1990. A rule-based expert system approach to predicting waterbourne soil erosion. In Boardman, J., Foster, I.D.L. and Dearing, J. (eds), *Soil Erosion on Agricultural Land*. Chichester: Wiley, 401-412.

Harrison, R.J. 1980. *The Beaker Folk: Copper Age archaeology in Western Europe.* London: Thames and Hudson.

Harrison Reed, A. 1979. Accelerated erosion of arable soils in the United Kingdom by rainfall and run-off. *Outlook on Agriculture* 10, 41-48.

Harrison Reed, A. 1983. The erosion risk of compaction. *Soil and Water* 11, 29-33.

Hawkes, C.F.C. 1939a. The Caburn pottery and its implications. *Sussex Archaeological Collections* 80, 217-268.

Hawkes, C.F.C. 1939b. The Excavations at Quarley Hill, 1938. *Proceedings of the Hampshire Field Club and Archaeological Society* 14, 136-94.

Healy, F. 1983. Brief report on retouched pieces among the Kiln Combe flints. In Bell, M.G., Valley sediments as evidence of prehistoric land-use on the South Downs. *Proceedings of the Prehistoric Society* 49, (mf.7-9) 119-150.

Healy, F. 1986. Shopping around for the right model: a rejoinder. *Lithics* 7, 30-33.

Hedges, R.E.M., Housley, R.A., Bronk, C.R and Van Klinken, G.J. 1992. Radiocarbon dates from the Oxford AMS system: *Archaeometry* datelist 14. *Archaeometry* 34, 141-159.

Hibbert, F.A., Switsur, V.R and West, R.G. 1971. Radiocarbon dating of Flandrian pollen zones at Red Moss, Lancashire. *Proceedings of the Royal Society, London* B. 177, 161-176.

Hinton, P.M. 1984. Seeds from archaeological excavations: results from Sussex. *Sussex Archaeological Collections* 122, 3-11.

Hodgson, J.M. 1967. Soils of the West Sussex coastal plain. *Bulletin of the Soil Survey of Great Britain.* 3.

Hodgson, J.M. 1976. *Soil Survey Field Handbook.* Harpenden: Soil Survey Technical Monograph No. 5.

Hodgson, J.M., Catt, J.A. and Weir, A.H. 1967. The origin and development of clay-with-flints and associated soil horizons on the South Downs. *Journal of Soil Science* 18, 85-102.

Hodgson, J.M., Rayner, J.H. and Catt, J.A. 1974. The geomorphological significance of clay-with-flints on the South Downs. *Transactions of the Institute of British Geographers* 61, 119-124.

Holgate, R. 1988. Further investigations at the later Neolithic domestic 'camp' at Bullock Down, near Eastbourne, East Sussex. *Sussex Archaeological Collections* 126, 21-30.

Holleyman, G.A. and Curwen, E.C. 1935. Late Bronze Age lynchet-settlements on Plumpton Plain. *Proceedings of the Prehistoric Society* 1, 16-38.

Hurlbert, S.H. 1971. The nonconcept of species diversity: a critique and alternative parameters. *Ecology* 52, 577-586.

IGS. 1974. British Geological Survey, Geological Survey of Great Britain (England and Wales) Lewes, Sheet 319 - Solid and Drift Edition.

IGS. 1984. British Geological Survey, Geological Survey of Great Britain (England and Wales) Brighton & Worthing, Sheet 318/333 - Solid and Drift Edition.

Imeson, A.C. and Jungerius, P.D. 1976. Aggregate stability and colluviation in the Luxembourg Ardennes; an experimental and micromorphological study. *Earth Surface Processes* 1, 259-271.

Imeson, A.C. and Vis, M. 1984. Seasonal variations in soil erodibility under different land-use types in Luxembourg. *Journal of Soil Science* 35, 323-331.

Jarvis, M.G., Allen, R.H., Fordham, S.J., Hazelden, J., Moffat, A.J., and Sturdy, R.G. 1984. *Soils and their use in South East England.* Soil Survey of England and Wales, Bulletin No. 15.

Jennings, S. and Smyth, C. 1982. A preliminary interpretation of coastal deposits from East Sussex. *Quaternary Newsletter* 37, 12-19.

Jones, D.K.C. 1971. The Vale of the Brooks. In R.B.G. Williams (ed.), *A Guide to Sussex Excursions.* Institute of British Geographers Conference (Jan. 1971), 43-46.

Jones, M. 1981. The development of crop husbandry. In Jones, M. and Dimbleby, G. (eds), *The Environment of Man: the Iron Age to Anglo-Saxon Period.* Oxford: British Archaeological Reports, British Series 87, 93-127.

Jones, M. 1985. Archaeobotany beyond subsistence reconstruction, in Barker, G. and Gamble C. (eds), *Beyond Domestication in Prehistoric Europe: investigations in subsistence archaeology and soil complexity.* London Academic Press, 107-128.

Jones, M. and Palmer, C. 1991. Plant resources. In Sharples, N.M., *Maiden Castle; excavations and field survey 1985-6.* English Heritage Archaeological Report No. 19, 129-139.

Jongerius, A. 1970. Some morphological aspects of regrouping phenomena in Dutch soils. *Geoderma* 4, 311-331.

Jongerius, A. 1983. Micromorphology in agriculture. In P. Bullock and C.P. Murphy (eds), *Soil Micromorphology.* A B Academic Publishers, Berkhamsted. 111-138.

Kell, Rev. E. 1863. Accounts of an urn found on Bembridge Down, of excavations on Arreton Down & of the Farringford coin hoard. *Journal of the British Archaeological Association* 129-131, 306-307.

Kenward, H.K. 1978. *The Analysis of Archaeological Insect Assemblages: a new approach.* The Archaeology of York, Fascicle 19.1 London: CBA/York Archaeological Trust.

Kerney, M.P. 1963. Late-glacial deposits on the Chalk of south-east England. *Philosophical Transactions of the Royal Society, London* B. 246, 203-254.

Kerney, M.P. 1965. Weicheslian deposits in the Isle of Thanet, East Kent. *Proceedings of the Geologists' Association* 76, 269-274.

Kerney, M.P. 1966. Snails and man in Britain. *Journal of Conchology* 26, 3-14.

Kerney, M.P. 1968. Britain's fauna of land Mollusca and its relation to the Post-Glacial Thermal Optimum. *Symposium of the Zoological Society of London* 22, 273-291.

Kerney, M.P. 1976a. A list of the fresh and brackish-water Mollusca of the British Isles. *Journal of Conchology* 29, 26-28.

Kerney, M.P. 1976b. *Atlas of the non-marine Mollusca of the British Isles.* Monks Wood: Institute of Terrestrial Ecology.

Kerney, M.P. 1976c. Two Post-glacial molluscan faunas from South-West England. *Journal of Conchology* 29, 71-73.

Kerney, M.P. 1977. A proposed zonation scheme for Late-glacial and Postglacial deposits using land Mollusca. *Journal of Archaeological Science* 4, 387-390.

Kerney, M.P., Brown E.H. and Chandler, T.J. 1964. The Late-Glacial and Post-Glacial history of the chalk escarpment near Brook, Kent. *Philosophical Transactions of the Royal Society, London* B.248, 135-204.

Kerney, M.P. and Cameron, R.A.D. 1979. *A Field Guide to the Land Snails of Britain and North-west Europe.* London: Collins.

Kerney, M.P. and Carreck, J.N. 1954. Notes on some Holocene chalk rainwashes at Cudham and Keston, near Downe, Kent. *Proceedings of the Geologists' Association* 65, 338-344.

Kerney, M.P., Preece, R.C. and Turner, C. 1980. Molluscan and plant biostratigraphy of some Late Devensian and Flandrian deposits in Kent. *Philosophical Transactions of the Royal Society, London* B 291, 1-43.

Kinnes, I. 1988. The cattleship potemkim: the first Neolithic in Britain, in Barrett, J.C. and Kinnes, I.A. (eds), *The Archaeology of context in the Neolithic and Bronze Age: recent trends.* Sheffield: L.R. Collis. 2-8

Kirkby, M.J. and Morgan, R.P.C. (eds), 1980. *Soil Erosion.* London: Wiley.

Kwaad, F.J.P.M. 1977. Measurements of rainsplash erosion and the formation of colluvium beneath deciduous woodland in the Luxembourg Ardennes. *Earth Surface Processes*. 2, 161-173.

Kwaad, F.J.P.M. and Mücher, H.J. 1977. The evolution of soils and slope deposits in the Luxembourg Ardennes near Wiltz. *Geoderma* 17, 1-37.

Kwaad, F.J.P.M. and Mücher, H.J. 1979. The formation and evolution of colluvium on arable land in Northern Luxembourg. *Geoderma* 22, 173-192.

Lamb, H.H. 1968. The climatic background to the birth of civilisation. *Advancement of Science* 25, 103-120.

Lamb, H.H. 1977. *Climate: present, past and future vol 2: climatic history and the future*. London: Methuen.

Le Borgne, E. 1955. Susceptibilité magnéttique anormale du sol superficiel. *Annales de Géophysique* 11, 399-419

Le Borgne, E. 1960. Influence du feu sur les proprietés magnétiques du sol. *Annales de Géophysique* 16, 159-195.

Lewis, R. 1973. Malling. *Lewes Archaeological Group Newsletter* 16, 2.

Liddell, D.M. 1934. A Report of the Hampshire Field Club's Excavations at Meon Hill. *Proceedings of the Hampshire Field Club and Archaeological Society* 13, 7-54.

Limbrey, S. 1975. *Soil Science and Archaeology*. London: Academic Press.

Limbrey, S. 1978. Changes in the quality and distribution of soils of lowland Britain. In S. Limbrey and J.G. Evans (eds), *The effect of Man on the Landscape: the lowland zone*. London: CBA Research Report 21, 21-27.

Longworth, G. and Tite, M.S. 1977. Mössbauer and magnetic susceptibility studies of iron oxides in soils from archaeological sites. *Archaeometry* 19, 3-14.

Longworth I.H. 1970. The Secondary Series in the Collared Urn tradition in England and Wales. In J. Filip (ed.), *Actes du VIIIe Congrès international des sciences préhistoriques et protohistoriques, Prague 1966*, 662-665

Longworth, I.H. 1979. The Neolithic and Bronze Age pottery. In Wainwright, G.J., *Mount Pleasant, Dorset: Excavations 1970-1971*. London: Society of Antiquaries Research Report 37, 75-124.

Longworth, I.H. 1984. *Collared Urns of the Bronze Age in Great Britain and Ireland*. Cambridge: University Press.

Mackney, D., Hodgson, J.M., Hollis, J.M. and Staines, S.J. 1983. *Legend for the 1:1250,000 Soil Map of England and Wales; a brief explanation of the constituent soil associations*. Harpenden: Soil Survey of England and Wales.

Macphail, R.I. 1981. Micromorphological examination. In Bell, M.G., Valley sediments as evidence of prehistoric land-use: a study based on dry valleys in south east England. 363-366. Unpub. Ph.D. thesis, London University, Institute of Archaeology.

Macphail, R.I. 1983. Micromorphological report on Chalton B layer 3. In Bell, M.G., Valley sediments as evidence of prehistoric land-use on the South Downs. *Proceedings of the Prehistoric Society* 49, microfiche 55-57.

Macphail, R.I. 1987a. A review of soil science in archaeology in England. In H.C.M. Keeley (ed.), *Environmental Archaeology: a regional review, vol. 2*. Historic Buildings and Monuments Commission for England, Occasional Paper No. 1, 322-377.

Macphail, R.I. 1987b. The soil micromorphology of tree subsoil hollows. *Circaea* 5, 14-17.

Macphail, R.I. 1991. The archaeological soils and sediments. In Sharples, N.M., *Maiden Castle; excavations and field survey 1985-6* English Heritage Archaeological Report No. 19, 106-118.

Macphail, R.I. 1992. Soil micromorphological evidence of ancient soil erosion. In M.G. Bell and J. Boardman (eds), *Past and Present Soil Erosion: archaeological and geographical perspectives*. Oxford: Oxbow Books, 197-215.

Macphail, R.I., Courty, M.A. and Gebhardt, A. 1990. Soil micromorphological evidence of early agriculture in north-west Europe. *World Archaeology* 22, 53-69

Macphail, R.I. and Goldberg, P. 1990. The micromorphology of tree subsoil hollows: their significance to soil science and archaeology. In L. Douglas (ed.), *Soil Micromorphology: a basic and applied science*. Elsevier, Amsterdam, 431-440.

Macphail, R.I., Romans, J.C.C. and Robertson, L. 1987. The application of micromorphology to the understanding of Holocene soil development in the British Isles; with special reference to early cultivation. In N. Fedoroff, L.M. Bresson and M.A. Courty (eds), *Soil Micromorphology*. Paris: Association Française pour l'Etude du Sol, 647-656.

Macphail, R.I. and Scaife, R.G. 1987. The geographical and environmental background. In J. Bird and D.G. Bird (eds), *The Archaeology of Surrey to 1540*. Guildford: Surrey Archaeological Society, 31-51.

Magurran, A.E. 1988. *Ecological Diversity and Its Measurement*. London: Chapman and Hall.

Maltby, M. 1990. The exploitation of animals in the Stonehenge Environs in the Neolithic and Bronze Age. In Richards, J.C. *The Stonehenge Environs Project*. English Heritage Archaeological Report No. 16, 247-249.

Martin, P.S. 1963. *The Last 10,000 years*. Tuscon: University of Arizona Press.

Mills, N. 1985a. Sample bias, regional analysis and fieldwork in British archaeology. In C. Haselgrove, M. Millett and I. Smith (eds), 1985. *Archaeology from the Ploughsoil; studies in the collection and interpretation of field survey data*. Sheffield: J. Collis, 39-47.

Mills, N. 1985b. Geomorphology and settlement studies in archaeology. In N.R.J. Fieller, D.D. Gilbertson and N.G.A. Ralph (eds), *Palaeoenvironmental Investigations; research design, methods and data analysis.* Oxford: British Archaeological Reports, Int. Series 258, 175-206.

Mellars, P. 1975. Ungulate populations, economic patterns and the Mesolithic landscape. In J.G. Evans, S. Limbrey and H. Cleere (eds), *The Effects of Man on the Landscape: the Highland Zone.* London: CBA Research Report 11, 49-56.

Megaw, J.V.S., 1976. Gwithian, Cornwall: some notes on the evidence for Neolithic and Bronze Age settlement. In C. Burgess and R. Miket (eds), *Settlement and Economy in the Third and Second Millennia BC.* Oxford: British Archaeological Reports, British Series 33, 51-79.

Megaw, J.V.S. and Simpson, D.D.A. (eds), 1979. *Introduction to British Prehistory.* Leicester: University Press.

Megaw, J.V.S., Thomas, A.C. and Wailes, B. 1961. The Bronze Age settlement at Gwithian, Cornwall; preliminary report on the evidence for early agriculture. *Proceedings of the West Cornwall Field Club* Series II, 5, 200-215.

Melville, R.V. and Freshney, E.C. 1982. *British Regional Geology: The Hampshire Basin and adjacent areas.* (4th ed.). London: HMSO.

Mercer, R. (ed.), 1977. *Beakers in Britain and Europe.* Oxford: British Archaeological Reports, Supp. Series 26.

Moffat, A.J. and Cope, D.W. 1984. The Hampshire Chalklands. In M.G. Jarvis and D.C. Findlay (eds), *Soils of the Southampton District.* Southampton: British Association of Soil Science, 82-116.

Moore, P.D. 1982. Sub-surface formation of charcoal: an unlikely event in peat. *Quaternary Newsletter* 38, 13-14.

Morgan, R.P.C. 1979. *Soil erosion and conservation.* Longman

Morris, E.L. 1991. Ceramic Analysis and the Pottery from Potterne. In Middleton, A. and Freestone, I. (eds.), *Recent Developments in Ceramic Petrology*. British Museum Occasional Paper 81, 277-287.

Morris, E.L. forthcoming a. The Pottery. In Green, F.J., Excavations at the Presbytery, La Sagesse Convent, Romsey.

Morris, E.L. forthcoming b. The Fabrics. In Lawson, A.J. *et. al.*, *Excavations at Potterne* (Wiltshire Archaeological Society Monograph.

Morris, M.G. 1968. Differences between the invertebrate faunas of grazed and ungrazed chalk grassland II: the faunas of sample turves. *Journal of Applied Ecology* 5, 601-611.

Mücher, H.J. 1974. Micromorphology of slope deposits: the necessity of classification. In G.K. Rutherford (ed.), *Soil Microscopy, proceedings of the 4th International working meeting on soil micromorphology*. Ontario, 553-556.

Needham, S. 1987. The Bronze Age. In J. Bird and D.G. Bird (eds), *The Archaeology of Surrey to 1540*. Guildford: Surrey Archaeological Society, 97-137

Newell, R.S. 1931. Barrow 85, Amesbury (Goddard's List). *Wiltshire Archaeological and Natural History Magazine* 45, 253-261.

Norris, N.E.S. 1956. Romano-British Cremations and Saxon inhumations at South Malling, Lewes. *Sussex Archaeological Collections* 94, 10-12.

Norris, N.E.S. and Hockings, E.F. 1953. Excavations at Balsdean Chapel, Rottingdean. *Sussex Archaeological Collections* 91, 53-68.

Oades, J.M. and Townsend, W.N. 1963. The detection of ferromagnetic minerals in soils and clays. *Journal of Soil Science* 14, 179-187.

O'Conner, T.P. 1977. Land Mollusca from the settlement. In Bell, M.G., Excavations at Bishopstone. *Sussex Archaeological Collections* 115, 267-273.

Oldfield, F. 1982. Sediment - Landscape linkages in the esturine catchment system of Chespeake Bay, USA. Paper presented at Temporal Studies of Erosion on Sediment Movements: New Developments, conference at Lanchester Polytechnic 12-12-82.

Oldfield, F., Dearing, J.A., Thompson, R. and Garret-Jones, S. 1978. Some magnetic properties of lake sediments and their possible links with erosion rates. *Polskie Archrwum Hydrobiologii* 25, 321-331.

Oldfield, F., Krawieki, A., Maher, B., Taylor, J.J. and Twigger, S. 1985. The role of mineral magnetic measurements in archaeology. In N.R.J. Fieller, D.D. Gilbertson and N.G.A. Ralph (eds), *Palaeoenvironmental Investigations: research design, methods and data analysis*. Oxford: British Archaeological Reports, Int. Series 258, 29-53.

Osborne White, H.J. 1921. *A short account of the Geology of the Isle of Wight*. London: Memoirs of the Geological Survey of Great Britain (HMSO).

Osborne White, H.J. 1924. *The Geology of the country near Brighton and Worthing*. London: Memoirs of the Geological Survey of Great Britain.

Osborne White, H.J. 1925. *The Geology of the country around Malborough*. London: Memoirs of the Geological Survey of Great Britain.

Osborne White, H.J. 1926. *The Geology of the country near Lewes*. London: Memoirs of the Geological Survey: England, explanation of sheet 319 (HMSO).

Osborne White, H.J. 1928. *The Geology of the country near Ramsgate and Dover*. London: Memoirs of the Geological Survey of Great Britain.

O'Shea, E.W. 1983. Field walking at Malling Hill, TQ424108. *Lewes Archaeological Group Newsletter* 65.

O'Shea, E.W. 1974. Malling Hill, TQ424112. *Sussex Archaeological Society Newsletter*, 12, 47.

Parry, M.L. 1981. Evaluating the impact of climatic change. In C. Delano Smith and M. Parry (eds), *Consequences of Climatic Change.* Department of Geography University of Nottingham, 3-16.

Peart, M. 1982. Tracing suspended sediment sources by means of natural magnetic properties of sediments and soils. Paper presented at Temporal Studies of Erosion on Sediment Movements: New Developments, conference at Lanchester Polytechnic 12-12-82.

Pielou, E.C. 1975. *Ecological Diversity.* New York: Wiley.

Pitcher, W.S., Shearman, D.J. and Pugh, D.C. 1954. The loess of Pegwell Bay, Kent. *Geological Magazine* 91, 308-314.

Pitt-Rivers, A.H.L.F. 1881. Excavations at Mount Caburn Camp near Lewes. *Archaeologia* 46, 423-495.

Pitty, A.F. 1978. *Geography and Soil Properties.* Cambridge: University Press.

Poole, H.F. 1926. Flint arrow-head types of the Isle of Wight. *Proceedings of the Isle of Wight Natural History and Archaeological Society* 1, 436-443.

Poole, H.F. 1927. An undisturbed early neolithic site near Sandown, I.W. *Proceedings of the Hampshire Field Club* 10, 25-34.

Poole, H.F. 1929. Stone axes found in the Isle of Wight, Part I. *Proceedings of the Isle of Wight Natural History and Archaeological Society* 1, 625-658.

Poole, H.F. 1930. Stone axes found in the Isle of Wight, Part II. *Proceedings of the Isle of Wight Natural History and Archaeological Society* 2, 27-38.

Poole, H.F. 1936. An outline of the mesolithic flint cultures of the Isle of Wight. *Proceedings of the Isle of Wight Natural History and Archaeological Society* 2, 551-581.

Poole, H.F. 1938. The stone age in the Isle of Wight. *Proceedings of the Isle of Wight Natural History and Archaeological Society* 3, 33-47.

Poole, R.W. 1974. *An Introduction to Quantitative Ecology.* Tokyo: McGraw Hill.

Potter, T.W. 1976. Valleys and settlement: some new evidence. *World Archaeology* 8, 207-219.

Preece, R.C. 1979. The molluscan fauna of an early Postglacial tufa at Totland, Isle of Wight. *Journal of Conchology* 30, 35-42.

Preece, R.C. 1980a. *An Atlas of the Non-Marine Mollusca of the Isle of Wight.* Isle of Wight County Museum Service Natural History Series 1.

Preece, R.C. 1980b. The biostratigraphy and dating of a Postglacial slope deposit at Gore Cliff, near Blackgang, Isle of Wight. *Journal of Archaeological Science* 7, 256-265.

Preece, R.C. 1981. The value of shell microsculpture as a guide to the identification of land Mollusca from Quaternary deposits. *Journal of Conchology* 30, 331-337.

Preece, R.C. 1986. Faunal remains from radiocarbon dated soils within landslip debris from the Undercliff, Isle of wight, Southern England. *Journal of Archaeological Science* 13, 189-200.

Preece, R.C. 1987. Biostratigraphy and environmental archaeology of the post-glacial slope deposits on Gore Cliff, Isle of Wight. In K.E. Barber (ed.), *Wessex on the Isle of Wight, Field Guide.* Cambridge: Quaternary Research Association, 150-153.

Preece, R.C. 1992. Dry valleys in Kent. In M.G. Bell and J. Boardman (eds), *Past and Present Soil Erosion: archaeological and geographical perspectives.* Oxford: Oxbow Books, 175-183.

Putnam, R. and Wratten, S. 2985. *Principles of Ecology.* Croom Helm.

Quine, T. and Walling, D. 1992. Patterns and rates of contemporary soil erosion derived using caesium-137: measurement, analysis and archaeological significance. In M.G. Bell and J. Boardman (eds), *Past and Present Soil Erosion: archaeological and geographical perspectives.* Oxford: Oxbow Books, 185-196.

Rahtz, P.A. 1962. Neolithic and Beaker Sites at Downton, near Salisbury, Wiltshire. *Wiltshire Archaeological Magazine* 58, 116-141.

Raikes, R. 1967. *Water, weather and prehistory.* London: John Baker.

Reid, C. 1899. *The geology of the country around Dorchester.* Memoirs of the Geological Survey, England and Wales 328.

Reilly, K. forthcoming. Animal Bone (Fordington Bottom). In Smith, R.J.C., Healy, F., Allen, M.J., Morris, E and Barnes, I., Excavations along the route of the Dorchester By-Pass. English Heritage Monograph Series.

Reynolds, P.J. 1981. New approaches to familiar problems. In Jones, M. and Dimbleby, G. (eds), *The Environment of Man: the Iron Age to Anglo-Saxon Period*, British Archaeological Reports, British Series 87, Oxford, 19-49.

Richards, J.C. 1990. *The Stonehenge Environs Project.* English Heritage Archaeological Report No. 16.

Richardson, K.M. 1951. The Excavation of Iron Age Villages on Boscombe Down West. *Wiltshire Archaeological Magazine* 54, 123-168.

Robinson, D.E. (ed.), 1990. *Experimentation and Reconstruction in Environmental Archaeology* Oxford: Oxbow Books.

Rowley-Conwy, P. 1982. Forest grazing and clearance in temperate Europe with special reference to Denmark: an archaeological view. In M.G. Bell and S. Limbrey (eds), *Archaeological Aspects of Woodland Ecology.* Oxford: British Archaeological Reports, Int. Series 146, 199-216.

Russell, M. 1982. Chaldon: Beaker pottery (TQ 342 549). *Surrey Archaeological Society Bulletin* 179.

Scaife, R.G. 1980a. Late Devensian and Flandrian palaeoecological studies in the Isle of Wight. Unpub. Ph.D. thesis, Kings College, University of London

Scaife, R.G. 1980b. Pollen analysis. In Basford, H.V., *The Vectis Report; a survey of Isle of Wight archaeology*. Isle of Wight Archaeological Committee. 56-59.

Scaife, R.G. 1982a. Late-Devensian and early Flandrian vegetational changes in southern England. In M.G. Bell and S. Limbrey (eds), *Archaeological Aspects of Woodland Ecology*. Oxford: British Archaeological Reports, Int. Series 146, 57-74.

Scaife, R.G. 1982b. An early Bronze Age record of *Vicia faba*, L. (horsebean) from Newbarn Down, Isle of Wight. Ancient Monuments Laboratory Report No. 3501.

Scaife, R.G. 1984. Gallibury Down, Isle of Wight - pollen analysis of a Bronze Age downland palaeosol. *Ancient Monuments Laboratory Report* No. 4240.

Scaife, R.G. 1987a. A review of later quaternary plant microfossil and macrofossil research in southern England; with special reference to environmental archaeological evidence. In H.C.M. Keeley (ed.), *Environmental Archaeology: a regional review, vol. 2*. Historic Buildings and Monuments Commission for England, Occasional Paper No. 1, 125-203.

Scaife, R.G. 1987b. The Late-Devensian and Flandrian vegetation of the Isle of Wight. In K.E. Barber (ed.), *Wessex and the Isle of Wight; field guide*. Cambride: Quaternary Research Association, 156-180.

Scaife, R.G. and Burrin, P. 1983. Floodplain development and vegetational history of the Sussex High Weald and some archaeological implications. *Sussex Archaeological Collections* 121, 1-10.

Scaife, R.G. and Burrin, P.J. 1985. The environmental impact of prehistoric man as recorded in the upper Cuckmere valley at Stream Farm, Chiddingly. *Sussex Archaeological Collections* 123, 27-34.

Scaife, R.G. and Burrin, P.J. 1992. Archaeological inferences from alluvial sediments: some findings from southern England. In S. Needham and M.G. Macklin (eds), *Alluvial Archaeology in Britain.* Oxford: Oxbow Books, 75-91.

Schofield, A.J. 1986. The 'ASDA' factor: core reduction, resource stress and the nature of lithic assemblages in central-southern England. *Lithics* 7, 17-29.

Schofield, A.J. 1987. Putting lithics to the test; non-site analysis and Neolithic settlement of southern England. *Oxford Journal of Archaeology* 6, 269-286.

Schofield, A.J. 1988. The interpretation of surface lithic collections: case studies from southern England. Unpub. Ph.D. thesis, University of Southampton, Department of Archaeology.

Schofield, A.J. (ed.), 1991. *Interpreting Artefact Scatters; contributions to ploughzone archaeology.* Oxbow Monograph 4.

SEESOIL, 1986. *Soil Erosion.* C.P. Burnham and J.I Pitman (eds), Journal of the South East England Soils Discussion Group SEESOIL 3.

Shackley, M.L. 1976. The Danebury project: an experiment in site sediment recording. In D.A. Davidson and M.L. Shackley (eds), *Geoarchaeology.* London: Duckworth, 9-21.

Shakesby, R.A. 1975. *An Investigation into the origin of the deposits in a chalk dry valley of the South Downs, Southern England.* Edinburgh: University Press, Department of Geography, Research Discussion Paper 5.

Sharples, N.M. 1991 *Maiden Castle; excavations and field survey 1985-6.* English Heritage Archaeological Report No. 19.

Shennan, S.J. 1988. *Quantifying Archaeology.* Edinburgh: University Press.

Sherwin, G.A. 1936. Archaeological finds. *Proceedings of the Isle of Wight Natural History and Archaeological Society* 2, 613-615.

Small, R.J. 1958. The origin of Rake Bottom, Butser Hill. *Proceedings of the Hampshire Field Club* 21, 22-30.

Smith, A.G. 1970. The influence of Mesolithic and Neolithic man on British vegetation: a discussion. In D. Walker and R. West (eds), *Studies in the Vegetational History of the British Isles*. Cambridge: University Press, 81-96.

Smith, I.F. 1965. *Windmill Hill and Avebury; excavations by Alexander Keiller 1925-1939*. Oxford: Clarendon Press.

Smith, R.J.C., Healy, F., Allen, M.J., Morris, E and Barnes, I. forthcoming. Excavations along the route of the Dorchester By-pass 1986-8. English Heritage Monograph Series.

Smith, R.W. 1984. The ecology of Neolithic farming systems as exemplified by the Avebury region of Wiltshire. *Proceedings of the Prehistoric Society* 50, 99-120.

Smith, R.W. 1985. Prehistoric Human Ecology in the Wessex Chalklands with special reference to evidence from valley. Unpub. Ph.D. thesis, University of Southampton, Department of Archaeology.

Sparks, B.W. 1957. The non-marine Mollusca of the interglacial deposits at Bobbitshole, Ipswich. *Philosophical Transactions of the Royal Society, London* B.241, 33-44.

Sparks, B.W. 1960. Appendix II: Land Mollusca. In Alexander, J., Ozanne, P.C. and Ozanne, A., Report on the investigation of a round barrow on Arreton Down, Isle of Wight. *Proceedings of the Prehistoric Society* 60, 299-301.

Sparks, B.W. 1961. The ecological interpretation of quaternary non-marine Mollusca. *Proceedings of the Linnaean Society of London* 172, 71-80.

Sparks, B.W. 1969. Non marine Mollusca and archaeology, in D. Brothwell and E. Higgs (eds) *Science in Archaeology*. London: Thames & Hudson. 395-406.

Sparks, B.W. and Lewis, W.V. 1957. Escarpment dry valleys near Pegsdon, Hertfordshire. *Proceedings of the Geologists' Association* 68, 26-38.

Southwood, T.R.E. 1978. *Ecological Methods*. London: Chapman and Hall.

Staines, S.J. 1991 The soils. In Woodward, P.J., The landscape survey. In Sharples, N.M., *Maiden Castle; excavations and field survey 1985-6*. English Heritage Archaeological Report No. 19, 12-15.

Staines, S.J. forthcoming. The soils. In Davies, S.M., Heaton, M.J. and Woodward, P.J., Excavations at Alington Avenue, Fordington, Dorchester. Dorset Natural History and Archaeological Society Monograph Series.

Stammers, R.L. and Boardman, J. 1984. Soil erosion and flooding on downland areas. *Surveyor*, 164, 8-11.

Stevens, L. 1979. A chalk-cut shaft at Belle Tout, Eastdean (TV 557 956). *Sussex Archaeological Collections* 117, 260.

Straker, V. forthcoming. The plant remains. In Smith, R.J.C., Healy, F., Allen, M.J., Morris, E and Barnes, I., Excavations along the route of the Dorchester By-pass. English Heritage Monograph Series.

Stone, P.G. 1912. Down pits in the Isle of Wight. *Proceedings of the Society of Antiquaries*. 2nd Series 24, 65-78

Stott, A. and Douglas, I. 1982. Total sediment analysis of reservoir deposits. Paper presented at Temporal Studies of Erosion on Sediment Movements: New Developments, conference at Lanchester Polytechnic 12-12-82.

Tauber, H. 1965. Differential pollen dispersion and the interpretation of pollen diagrams. *Danmarks Geologiske Undersøgelse* II, 89, 1-69.

Tauber, H. 1967. Investigations of the mode of pollen transfer in forested areas. *Review of Palaeobotany and Palynology* 3, 277-286.

Taylor, C.C. 1966. Strip lynchets. *Antiquity* 40, 277-284.

Taylor, L.R. 1978. Bates, Williams and Hutchinson - a variety of diversities. In L.A. Mound and N. Warloff (eds), *Diversity of Insect Faunas; 9th Symposium of the Royal Entomological Society*. Oxford: Blackwell, 1-18.

Thomas, J. 1990. Silent Running: the ills of environmental archaeology. *Scottish Archaeological Review* 7, 2-7.

Thomas, K.D. 1975. Appendix V: Land Mollusca and the environment of the Alfriston barrow. In Drewett, P.L., The excavation of an oval barrow mound of the third millennium bc at Alfriston, East Sussex, 1974. *Proceedings of the Prehistoric Society* 41, 148-150.

Thomas, K.D. 1977a. The land Mollusca from the enclosure on Offham Hill. In Drewett, P.L., The excavation of a Neolithic causewayed enclosure on Offham Hill, East Sussex, 1976. *Proceedings of the Prehistoric Society*, 43, 234-239.

Thomas, K.D. 1977b. A preliminary report on the Mollusca from the Lynchet section. In Bell, M., Excavations at Bishopstone. *Sussex Archaeological Collections* 115, 258-264.

Thomas, K.D. 1977c. The Mollusca from an Iron Age pit at Winklebury. In Smith, K., The Excavation of Winklebury Camp, Basingstoke, Hampshire. *Proceedings of the Prehistoric Society* 43, 70-74.

Thomas, K.D. 1978. Population studies on molluscs in relation to environmental archaeology. In D. Brothwell, K.D. Thomas and J. Clutton-Brock (eds), *Research Problems in Zooarchaeology*. London: Institute of Archaeology Occasional Paper 3, 9-19.

Thomas, K.D. 1982. Neolithic enclosures and woodland habitats on the South Downs in Sussex, England. In M.G. Bell and S. Limbrey (eds), *Archaeological Aspects of Woodland Ecology*. Oxford: British Archaeological Reports: Int. Series 146, 147-170..

Thomas, K.D. 1985. Land snail analysis in archaeology: theory and practice. In N.R.J. Fieller, D.D. Gilbertson and N.G.A. Ralph (eds), *Palaeobiological Investigations: research design, methods and data analysis*. Oxford: British Archaeological Reports, Int. Series 266, 131-175.

Thomas, W.R. and Foin, T.C. 1982. Neutral hypotheses and patterns of species diversity: fact or fiction?. *Palaeobiology* 8, 44-55.

Thompson, R., Battarbee, R.W., O'Sullivan, P.E. and Oldfield, F. 1975. Magnetic susceptibility of lake sediments. *Limnology and Oceanography* 20, 687-698.

Thorley, A. 1971. Vegetational history in the Vale of the Brooks. In R.B.G. Williams (ed.), *A Guide to Sussex Excursions*. Institute of British Geographers Conference (Jan. 1971), 47-50.

Thorley, A. 1981. Pollen analytical evidence relating to the vegetational history of the Chalk. *Journal of Biogeography* 8, 93-106.

Timmins, W. 1991. The environmental analysis of palaeosols with examples from the Isle of Wight. Unpub. Undergraduate dissertation. St. David's University College, Lampeter, University of Wales.

Tite, M.S. 1972. The influence of geology on the magnetic susceptibility of soils on archaeological sites. *Archaeometry* 14, 229-236.

Tite, M.S. and Mullins, C. 1971. Enhancement of the magnetic susceptibility of soils on archaeological sites. *Archaeometry* 13, 209-219.

Tolstoy, P. and Fish, S.K. 1975. Surface and subsurface evidence for community size at Coapexco, Mexico. *Journal of Field Archaeology* 2 97-104.

Tomalin, D.J. 1975. Re-appraisal of a collared urn and other pottery from barrow 8, Ashey Down, Isle of Wight. *Proceedings of the Hampshire Field Club* 30 (for 1973), 31- 34.

Tomalin, D. J. 1979. Barrow excavation in the Isle of Wight. *Current Archaeology* 68, 273-274.

Tomalin, D.J. 1980a. Neolithic. In Basford, H.V., *The Vectis Report; a survey of Isle of Wight archaeology*. Isle of Wight Archaeological Committee. 15-17.

Tomalin, D.J. 1980b. The early Bronze Age. In Basford, H.V., *The Vectis Report; a survey of Isle of Wight archaeology*. Isle of Wight Archaeological Committee. 17-25.

Tomalin, D.J. 1983. British Biconical Urns: their character and chronology and their relationship with indigenous Early Bronze Age ceramics. Unpub Ph.D. thesis, University of Southampton, Department of Archaeology.

Tomalin, D.J. 1987. *Roman Wight: a guide catalogue to "The Island of Vectis, very near Britannia"*. Isle of Wight County Council.

Tomalin, D.J. 1988. Armorican Vases à Anses and their occurrence in southern Britain. *Proceedings of the Prehistoric Society* 54, 203-221.

Tomalin, D.J. 1989. An early Roman cliff-top salt-working site at Redcliff Battery, Sandown, Isle of Wight. *Proceedings of the Isle of Wight Natural History & Archaeological Society* 9, 91-120.

Toms, H.S. 1912. Excavations at the Beltout valley entrenchments. *Sussex Archaeological Collections* 55, 41-55.

Toms, H.S. 1922. Long Barrows in Sussex. *Sussex Archaeological Collections* 63, 157-65.

Toms, H.S. 1926. Valley entrenchments east of the Ditchling Road. *Brighton and Hove Archaeologist* 3, 42-61.

Toms, H.S. 1927. Miscellaneous earthworks near Brighton. *Sussex Archaeological Collections* 68, 178-197.

Valentine, K.W.G. 1973. The identification, lateral variation and chronology of three buried palaeocatenas in lowland England. Unpub. Ph.D. thesis, University of Reading.

Valentine, K.W.G. and Dalrymple, J.B. 1976. The identification of a buried palaeosol developed in place at Pitstone, Buckinghamshire. *Journal of Archaeological Science* 4, 541-553.

Vatcher, F. de M. and Vatcher, H.L. 1973. Excavations of three postholes in Stonehenge car park. *Wiltshire Archaeological and Natural History Magazine* 68, 57-63.

Vita-Finzi, C. 1969. *The Mediterranean valleys: geological changes in historical times.* Cambridge: Cambride University Press.

Wagstaff, J.M. 1981. Buried assumptions: some problems of the "Younger Fill" raised by recent data from Greece. *Journal of Archaeological Science* 8, 247-264.

Wainwright, G.J. 1972. The excavation of a Neolithic settlement on Broome Heath, Ditchingham, Norfolk. *Proceedings of the Prehistoric Society* 38, 1-97.

Wainwright, G.J. 1979. *Mount Pleasant, Dorset: Excavations 1970-1971, incorporating an account of excavations undertaken at Woodhenge in 1970.* London: Society of Antiquaries Research Report 37.

Wainwright, G.J. and Longworth, I.H. 1971. *Durrington Walls: Excavations 1966-1968* London: Society of the Antiquaries Research Report No. 29.

Waldén, H.W. 1976. A nomenclatural list of the land Mollusca of the British Isles. *Journal of Conchology* 29, 21-25.

Waton, P.V. 1982a. Man's impact on the Chalklands: some new pollen evidence. In M.G. Bell and S. Limbrey (eds), *Archaeological Aspects of Woodland Ecology.* Oxford: British Archaeological Reports, Int. Series 146, 75-91.

Waton, P.V. 1982b. A palynological study of the impact of man on the landscape of central southern England, with special reference to the chalklands. Unpub. Ph.D. thesis, Department of Geography, Southampton: University.

Waton, P.V. 1986. Palynological evidence for early permanent woodland on the chalk of central Hampshire. In G. de G. Sieveking and M.B. Hart (eds), *The Scientific Study of Flint and Chert.* Cambridge: University Press, 169-174.

Waton, P.V. and Barber, K.E. 1987. Rimsmoor, Dorset: biostratigraphy and chronology of an infilled doline. In K.E. Barber (ed.), *Wessex and the Isle of Wight; field guide.* Cambridge: Quaternary Research Association, 75-80.

Wessex Archaeology, 1990. Littlecote Estate, Wiltshire; archaeological evaluation. Unpub. fieldwork report.

West, R.G. 1968. *Pleistocene Geology an Biology with especial reference to the British Isles.* London: Longman.

Wheeler, R.E.M. 1943. *Maiden Castle, Dorset.* London: Society of Antiquaries Research Report 12.

Whittle, A.W.R. 1978. Resources and population in the British Neolithic. *Antiquity* 52, 34-42.

Wiens, J.A. 1976. Population reposnses to patchy environments. *Annual Revue Ecol. System.* 7, 81-120.

Williams, D. and Milles, A. 1987. Snails by numbers. *Circaea* 5, 18-19.

Williams, R.B.G. 1971. Aspects of the geomorphology of the South Downs. In R.B.G. Williams (ed.), *A Guide to Sussex Excursions.* Institute of British Geographers Conference (Jan. 1971) 35-42.

Wilson, A.E. 1939. Excavations at Caburn, 1938. *Sussex Archaeological Collections* 80, 193-213,

Wing, A.S. 1980. An analysis of the pollen fallout at Wellingham peat bog near Lewes, East Sussex and a consideration of some its climatic and historical implications. Unpub. 1st degree project. Sussex University.

Weir, A.H., Catt, J.A. and Madgett, P.A. 1971. Postglacial soil formation in the loess of Pegwell Bay, Kent (England). *Geoderma* 5, 131-149.

Wood, P. and Whittington, G. 1959. Further excavation of strip lvnchets north of the Vale of Pewsey in 1958. *Wiltshire Archaeological and Natural History Magazine* 57, 322-338.

Woodward, P.J. 1988. Pictures of the Neolithic: discoveries from Flagstones House excavations, Dorchester, Dorset. *Antiquity* 62, 265-274.

Woodward, P.J. 1991a. *The South Dorset Ridgeway: Survey and Excavations 1977-1984.* Dorset Natural History and Archaeological Society Monograph Series 8.

Woodward, P.J. 1991b. The landscape survey, in Sharples, N.M. *Maiden Castle; excavations and field survey 1985-6.* English Heritage Archaeological Report No. 19, 9-34.

Woodward, P.J., Davies, S.M. and Graham, A.H. 1985. Excavations on the Greyhound Yard Car Park, Dorchester, 1984. *Proceedings of the Dorset Natural History and Archaeological Society* 106, 99-106.

Woodward, P.J., Davies, S.M. and Graham, A.H. 1993. *Escavatiosn at the Old Methodist Chapel and Greyhound Yard, Dorchester, 1981 - 1984.* Dorset Natural History and Archaeological Society Monograph Series 12.

Woodward, P.J., Jenkins, V. and Davies, S. 1987. Excavations and survey at Fordington Farm and the Trumpet Major: an interim note. *Proceedings of the Dorset Natural History and Archaeological Society* 108 (1987), 169-171.

Woodward, P.J. and Smith, R.J.C. 1988. Survey and excavation along the route of the Southern Dorchester By-pass, 1986-1987 - an interim note. *Proceedings of the Dorset Natural History and Archaeological Society* 109 (1988), 79-89.

Wooldridge, S.W. and Linton, D.L. 1933. The loam-terrains of South East England and their relation to its early history. *Antiquity* 7, 297-310.

Worssam, B.C. 1963. *Geology of the country around Maidstone.* London: Memoirs of the Geological Survey of Great Britain.

Yates, T.G.S. 1986. The selection of non-marine mollusc shells for radio-carbon dating. Unpub. PhD thesis, University College, University of London.

Young, R. 1986. Destruction, preservation and recovery: Weardale, a case study. In T.G. Manby and P. Turnbull (eds), *Archaeology of the Pennines.* Oxford: British Archaeological Reports, British Series 158, 213-227.