Understanding the inhabitation of the Stonehenge Environs: the interpretative potential of ploughsoil assemblages.

Volume II: Chapters 6-8,
Appendices and Bibliography

Benjamin Tun-Yee Chan

Thesis submitted for the degree
of Doctor of Philosophy

The Department of Archaeology,
The University of Sheffield

July 2003

Volume II: Table of Contents

Chapter 6: Lithic Analysis: Searching for Spatial Variation Using a Geographic Information System

6.1 Introduction

In the last chapter, a comprehensive account of the statistical analysis of the sample of the ploughsoil assemblages collected by the SEP was presented. The approaches towards the description of these data were varied, however, all were predicated upon the detection of variation between assemblages from individual sample areas. This approach was unavoidable as the majority of statistical techniques do not account for the spatial location of data. Therefore, it was necessary to divide the data into subsets (sample areas) in order to compare them with each other.

Although the statistical analysis was successful, it will be shown in the succeeding chapter that a more spatially sensitive approach is essential to add further substance to our understandings of the lithic scatters in the Stonehenge Environs. This approach involves the interrogation of the dataset using a Geographic Information System[1] (GIS), which can relate the recorded data to points in geographic space. The application of this approach compliments rather than supercedes the statistical analysis. The former gives spatial coherency and visual representation, whilst the latter provides a more detailed descriptive and analytical understanding of the composition of assemblages.

6.1.1 The need for spatial integrity of data

As suggested, the statistical analysis presented in Chapters 4 and 5 revolved mainly around the comparison of data from assemblages from individual sample areas. The reasons for and validity of this approach have been discussed (Section 4.2.1) and it is not necessary to repeat it here. However, necessary as this approach is for the detailed description of the character of assemblages, it does have some weaknesses. These revolve mainly around the lack of sensitivity of most statistical techniques

[1] The GIS utilised in the analysis in this chapter was ArcView GIS v. 3.2. In addition, the Spatial Analyst extension was also used.

towards the spatial relationships of data. In spatial terms, the results of statistical analyses can also be difficult to represent graphically.

In addition, there are problems created by the location and extent of the individual sample areas from which the statistical analysis was drawn. Firstly, although the majority of sample areas are spatially contiguous, this is not so in all cases. Four sample areas, North of Cursus (52), King Barrow Ridge Addit. (81), New King (87) and Stonehenge Triangle (54) are comprised of two discontinuous blocks of land (Plate 1). This has obvious implications for the extent to which these areas can be treated as analytical units directly comparable to the others in the project. Indeed, the effect of this can perhaps be witnessed at New King (87) where unusual data may have related to two distinct technological processes (Sections 4.3.6.2 and 5.5.8). It is possible that these different technological approaches are spatially distinct with each occurring in one of the two separate halves of the sample area.

Similarly, all of the sample areas differ in terms of size, meaning that they all represent samples of the Stonehenge Environs ploughsoil of different proportions. In addition, current land-use issues, such as the locations and sizes of ploughed fields, also determined their position and extent[2]. In later prehistoric landscapes, major differences occurred in the character of inhabitation across distances much smaller than the sizes of the SEP sample areas. This means that statistical summaries of individual sample area assemblages may incorporate material from several spatially discrete activities. Such a process is parallel to the issue of time depth implied by the unstratified character of ploughsoil assemblages. The difference is that unlike the lack of chronological resolution, poor spatial resolution is an avoidable hazard. All that is needed is a means to conduct an analysis that incorporates the spatial locations of the data. Essentially, we must not only look for differences *between* sample areas but also *within* them.

6.1.2 The benefit of GIS based approaches to data analysis

Using a GIS based approach for the analysis of fieldwalking data overcomes all of the issues discussed in the previous section. ArcView is a GIS application and a

[2] Most sample areas also represent the agglomeration of material from more than one field.

relational database, which also records the spatial features of data. ArcView allows the management of both the graphic and textual aspects of a dataset (Hutchinson and Daniel 2000). This management involves operations that allow the analysis as well as the presentation of data (Wheatley and Gillings 2002, 9).

As a GIS maintains the spatial location of all data, the previously discussed issues of the variation in the size and locations of sample areas are overcome. This is because the data are not recorded as coming from particular sample areas but from fixed points in geographic space. The ease of displaying the patterning of such data means that the visual representation of assemblage variability, which was lacking in the statistical analysis, can also be assessed. In this respect, one of the main advantages of ArcView is the simplicity with which data can be manipulated and represented.

One other advantage is that whilst the statistical analysis relied quite heavily upon assessing the relative *proportions* of different components of assemblages, the analysis presented here tends to revolve more around the *densities* and *distributions* of different aspects of the data. This means that types of artefacts, such as levallois-style cores, which comprised such small proportions of the assemblages that it was fruitless to compare the relative frequencies between sample areas, can now be assessed using a different method.

It is important to realise that the application of a GIS based analysis does not only allow different types of manipulation of data, but accordingly such different forms of engagement facilitate novel types of understanding. In this respect, I would argue that the types of interpretations that are drawn from data are bound up in the methods used to represent them. This is particularly the case with analyses that rely upon the density and locations of material such as lithic artefacts. For landscape surveys, the results of such analyses are most often presented in the form of distribution maps of one sort or another presented at the level of the survey area (i.e. landscape). From such graphic representations, conclusions about differences within lithic assemblages are normally drawn at the same level, the level of the landscape. This reveals itself in the tendency for landscape surveys to try to contrast different swathes of the landscape with each other. An obvious example in the present case is the SEP, which identified broad landscape zones (Richards 1990). Some of these zones were contrasted as representing either 'industrial' (extraction and initial reduction) or 'domestic' (consumption) activities (*ibid.*, 22-4). Accordingly, the physical separation of these activities was hypothesised to occur over considerable distances (in the order of kilometres). I suggest that this conclusion was influenced by their level of analysis, which was based heavily upon the production of distribution maps plotting all material at the level of the Stonehenge landscape. What is missing from the SEP report is a discussion of *why* distinct activities should have taken place in such large blocks of the landscape, or be separated over such large distances. Considering that flint is ubiquitous across the landscape, it is equally possible that the separation of such activities (if they were separated at all) occurred over much shorter distances. For example, the extraction and trimming of nodules may have occurred twenty or fifty metres (rather than two kilometres) from contexts of focused consumption. Indeed, as will be shown, this may well be the case (Section 6.4.6). This possibility needs special consideration due to the expedient character of much of the material in the Stonehenge ploughsoil. The advantage of using a GIS based application is that it is easy to switch between analytical scales. Doing so allows an assessment of the possibilities mentioned above, whilst subtly shifting our pre-expectations of the data.

If the argument above is accepted, then it can be suggested that the ease with which one can alter the scale of an ArcView map, facilitates the alteration of the analytical scale. In this manner, different ways of conceptualising data can be quickly tested. This process allows a tacking back and forth between micro- and macro-scales that is stressed in many approaches towards the social dimensions of technological practice, especially those utilising the concept of the *chaîne opératoire* (e.g. Dobres 2000; Dobres and Hoffman 1994). This process is equally important to approaches that attempt to mediate the relationship between day-to-day and more long-term processes. The mediation of this relationship is essential in order to maintain a duality of rather than dualism between agent and structure (Barrett 2001).

6.1.3 The English Heritage Stonehenge World Heritage Site GIS Database

The data used in the analysis presented in this chapter come from two sources. The first is the database created by my own analysis of the material, to which x and y coordinates have been added to provide the spatial location of the data. This means that the spatial resolution of these data is the same as the original collection grid (i.e. 50m x 25m) (Plate 49)[3]. It is indicative of the differences between this and the previous statistical analysis of the data that it is only at this point that the resolution of the collection grid becomes an issue. As previously data were grouped together per sample area, the size of the collection grid was irrelevant.

The second source of data for the GIS analysis was the English Heritage Stonehenge World Heritage Site GIS database. This database has been developed mainly as a tool to aid with various management issues concerning the World Heritage Site. Accordingly, it contains a variety of 'themes' relating to different aspects of the archaeology in the Stonehenge landscape. These themes have been derived from data from several sources such as the Ordnance Survey, the Wiltshire County Council Sites and Monuments Record (SMR) and English Heritage. For the most part these themes have been used to provide details of the topographical and archaeological background. This database also included the information from the original analysis of ploughsoil assemblages conducted by the SEP. However, these data have been replaced by my subsequent analysis and therefore do not feature in the present discussion.

6.1.4 Summary of findings of statistical analysis

The main findings of the statistical analysis of the flake and core data revolved around the two central issues of the overriding homogeneity of assemblages and of the elements of variation within a restricted number of sample areas relating to a more systematic approach to core reduction. One of the most important aspects of this chapter is to see whether these findings persist at a finer spatial resolution.

In terms of the homogeneity of data between sample areas, the suggestion is that there was little or no spatial distinction between practices. In other words, similarities in the compositions of assemblages suggest that all stages of the reduction sequence took place in all areas. This is in contrast to the suggestions of the SEP who drew distinctions between areas at the level of the landscape (Section

[3] For unknown reasons, the material from the Normanton Down (56) sample area was bagged per hectare rather than per collection run. Therefore, the spatial location of this material can only be recorded per hectare on the subsequent GIS plots of these data.

6.1.2). Currently, the suggestion of homogeneity has been made by comparing assemblages between sample areas. However, it cannot be assumed *a priori* that distinctions between phases of the reduction sequence would have occurred at this level. Therefore, it is now necessary to also look for assemblage variation *within* sample areas. Given the level of detail used to record the material for this project, relating the data to its original collection runs also tests the interpretative limits of ploughsoil assemblages.

It is also necessary to view in more detail the spatial distribution of the material relating to the systematic technology that was identified within some sample areas. There appeared to be higher proportions of this type of technology at King Barrow Ridge (57), The Diamond (59), Nile Clump (70), The Ditches (77), Aerodrome (79), Rox Hill (82), Well House (83) and New King (87). As a different type of technological practice has been tentatively identified in these sample areas, it is important to assess whether the spatial distribution of the *chaîne opératoire* of such practices also differed from other practices. In particular, it is crucial to see whether these practices were heavily nucleated or dispersed and whether there location is correlated with either the distribution of monuments or the topography of the landscape.

6.2 The spatial distributions of artefact types

Before proceeding with the spatial analysis of the findings from Chapters 4 and 5, it is first necessary to present the spatial distributions of a restricted set of artefact types. These types of artefacts were represented by such small numbers within the assemblage that they could not be dealt with previously due to problems of statistical representation. Apart from their low occurrences there is little else that unifies these categories of material. Accordingly, the following discussion is not aimed towards a specific point rather than the presentation of the spatial distribution of certain artefact types. Where relevant the data presented here will be returned to in later discussions.

6.2.3 Levallois cores in the Neolithic

Levallois-style, levalloisoid, discoidal or tortoise cores are cores made using the same method of reduction as classic Palaeolithic Levallois cores (e.g. compare Plates 54 and 70). Indeed, the similarities between Neolithic and Palaeolithic examples led, in the early part of the 20th Century, to extended arguments over the date of mining at Grimes Graves (Mercer 1981c, vi). The levallois method involves the careful preparation and shaping of the bottom and top of a core in order to remove levallois flakes or points of specific shapes (Inizan *et al.* 1992, 48-56). This process is often referred to as 'predetermination' and in Lower and Middle Palaeolithic studies the link between these cores and this cognitive faculty is heavily implicated in arguments concerning the intellectual evolution of pre-anatomically and anatomically modern humans (Schlanger 1996). Cores produced with exactly the same technique of reduction also occur in the Neolithic in Britain where the form of the cores is of importance for quite different reasons. In this period, the level of cognitive evolution is not a matter of academic debate. However, the degree of difficulty and skill required to produce these cores and their products are still of significance.

The use of the levallois method of core reduction in the Neolithic is most commonly associated with Late Neolithic contexts (Edmonds 1998, 254). One of the reasons why this form of technology is so remarkable in this period is that the level of core control that it necessitates is in direct contrast to the multi-platform technology that characterises most core reduction in this period (Edmonds 1995, Ch. 4). It may well have been the juxtaposition between a relatively *ad hoc* approach towards multi-platform core reduction and a highly structured method of levallois production, which emphasised the level of know-how involved in the practice of the latter. This understanding may well have accentuated the value of the artefacts produced using this method, which are suggested to have been highly formalised tools such as discoidal knives (Plate 55), transverse and ripple flaked oblique arrowheads (Durden 1995, 411, Holgate 1988, 42). Predictably shaped levallois flakes would be well suited to the production of such tools. Edmonds (1995, 96) suggests that these types of tools are amongst a new group of elaborate artefact types that occur in Late Neolithic lithic technology, which alongside the otherwise impoverished character of stoneworking indicates the complexity of attitudes towards stone in this period.

An area in which the practice of levallois technology is relatively common is East Yorkshire (Manby 1974). Mainly from looking at the evidence in Yorkshire, Manby (*ibid.*, 83) suggests an explicit link between Grooved Ware sites and the practice of levallois technology. On the Yorkshire Wolds, Durden (1995), through analysis of ploughsoil assemblages, identified significant concentrations of artefacts produced from levallois cores. She suggested that the phases of the *chaîne opératoire* of these artefacts were spatially separated, with the roughing out of cores at source and the production and completion of specialised artefacts occurring some distance away at an inland settlement site. On the settlement site it is suggested that the practice of this form of technology was spatially restricted with the more ubiquitous form of Late Neolithic technology occurring across the broader site. Durden also suggests that the production of tortoise cores can be deemed to be a specialised technological activity (*ibid.*).

During the Late Neolithic, practice of the levallois technique is also attested across southern and eastern Britain, particularly in areas rich in flint (Edmonds 1998, 255; Bradley *et al.* 1984, 96). Small numbers of levallois-style cores were collected by field survey in Cranborne Chase (Gardiner 1991). Levallois-style cores are also present within the material collected by the SEP (Plates 70 and 88). As with the material collected from Cranborne Chase, in the SEP material these cores are present in very small numbers with only seven being recorded from an assemblage of 1,675 cores. It is worth remembering that these cores represent a sample of the material originally collected by the SEP and quite a few more examples were recognised which did not fall within the sample frame. Considering the small numbers present in the assemblage, it is unlikely that the area witnessed the same type of focused production of artefacts from these cores as suggested for some areas in Yorkshire and to a lesser extent in Eastern Britain at Grimes Graves (Mercer 1981a; Saville 1981). At least, in the Stonehenge landscape, such activities were not concentrated or persistent enough to be detected statistically amongst the mass of debris of other types of working occurring in the same locations.

Despite the small scale of the practice, the cores of this type within the Stonehenge Environs are well-worked examples. These cores are all semi-systematically or more often systematically worked with clear evidence for the preparation and maintenance of platforms. In addition, in the few examples that were recorded, there was a clear understanding of the method of reduction and the importance of shaping both the top and bottom of the core to prepare the removal of the levallois flake (Plates 69, 70, 88, and 89). In this respect, most of the cores in this assemblage appear to be more carefully formed than the few illustrated examples presented by Durden (1995; Plate 55) from what she termed specialised workshops. This may in part relate to the differences in the raw material from the two areas. In particular, the material from Yorkshire was derived from tertiary deposits around Flamborough Head. This material is often thin and tabular in form. In contrast, at least some of the material from the Stonehenge Environs is larger and more nodular, thus presenting the knapper with more volume to work with. This would present some benefit to the working of the levallois method as greater volume in a nodule provides a greater potential for the shaping of the core distinctive of the levallois technique.

Although the larger nodules found in some locations within the Stonehenge Environs may have been well suited to the production of levallois cores, the average weight of these cores in the SEP material is significantly lighter than the average weight of cores as a whole. This may suggest that these cores were more heavily worked than other examples. Yet, as continued production of levallois flakes often involves a complete reworking of the core in order to maintain the correct shape, a process that eradicates all signs of previous working, this is very difficult to assess. In addition, Durden (*ibid.*, 411; c.f. Gardiner 1987, 27) suggests that these cores were only worked to allow a single levallois flake removal after which the core was discarded. This is a possibility but one that seems a little extreme although it may have been the case locally in the material studied by Durden. Regardless, there *are* recurrent methods of levallois reduction, which have been identified in Palaeolithic contexts (Inizan *et al.* 1992, 53) and in the Late Neolithic at Grimes Graves the usual practice on levallois cores was the removal of multiple levallois flakes (Saville 1981, 6-7). In addition, at least one of the examples from the Stonehenge Environs shows evidence of more than one removal of a levallois flake (Plates 69 and 89). The reason why this is important is that no distinctive levallois flakes were recorded during the analysis. In addition, all of the artefact types that are suggested to be made from these cores are often heavily retouched or polished meaning that recognition of the original form of the blank is difficult. Therefore, in a ploughsoil context, the size of these cores provides our only means of assessing what tools the blanks produced from them were used to make.

If the levallois cores in the assemblage are not heavily reworked and are representative of their productive stage, then they were generally too small to produce blanks for discoidal knives (Plates 70 and 88). They would however have been ideally suited to the production of blanks for various types of arrowheads. If on the other hand, the cores were reworked through several stages of production, then they may have initially been large enough to produce blanks for discoidal knives. In this respect, there is one example from Well House (83) that is very finely worked and is significantly larger than all of the other recorded examples (Plates 69 and 89). The presence of this core at Well House (83) is unsurprising considering the overall character of technology in this area. The size of this core, which is larger than other examples, is also in keeping with the large size of many cores from this location and this presumably relates to the specific qualities of the raw material in this area.

6.2.3.1 The spatial distribution of levallois cores

There are obvious limitations to any assessment of the distribution of levallois cores as only seven were recorded from the assemblage. This low number suggests that the practice of producing these cores was severely restricted in comparison to all other forms of contemporary stoneworking activities. It is more difficult to suggest what the character of those restrictions actually was. However, the complexity of the technique in comparison to other contemporary stoneworking techniques raises the possibility that not only the practice, but also the knowledge of that practice, was restricted. This is almost inevitable as in tasks such as flintknapping the two are indivisible; knowledge is knowledge of practice and practice is practice of knowledge. Such concepts are central to understandings of embodiment, practice theory, *habitus* and phenomenology (Bourdieu 1977; Heidegger 1962). It is less clear whether any such restrictions were actively and politically imposed or were an inevitable consequence of the division and scheduling of tasks. However, it is highly likely that such levels of craftsmanship were appreciated amongst communities that still worked with flint on a daily basis. It is also unavoidable that there were differences within society between those who could and could not practice such techniques (regardless of the reasons for this), which would have reinforced pre-existing lines of affiliation within and between communities. Often membership of such groups is discussed as revolving around distinctions of age, gender and kin and although this seems likely, the suggestion probably simplifies what must have been complex conceptions of identity.

In this respect, it is quite possible that the groups of people that periodically gathered around Stonehenge were at other times working at flint mines such as Grimes Graves, where they did produce more levallois cores. Hence, the lack of such products in the Stonehenge Environs indicates that meetings there were not the appropriate time or place to conduct such specific technological activities. This would point to the possibility that people had different reasons for coming to the Stonehenge landscape, which presumably revolve around communal gatherings and activities at monuments (Section 8.2.3).

Although, due to their small number suggestions are extremely tentative, some assessment of the spatial distribution of levallois cores is necessary. From Plate 14 it can be seen that although the distribution of this type of core is widespread it does not appear to be random. In particular, there are no examples of levallois cores in the extensive areas east of King Barrow Ridge and north of the Stonehenge Cursus. Four of the seven examples of these cores are also found within The Ditches (77), The Diamond (59) and Well House (83). It is noticeable that these areas are all part of the group that was highlighted in the last chapter as having a distinctive element of systematic technology (Section 5.3.2.2). Therefore, the presence of highly systematic levallois cores seems in keeping with the previous analysis of the character of working in these areas and may be a clue to the chronology of the activity in this area (Section 8.3).

However, the wider distribution of levallois cores shows that its association with the areas identified as having a component of systematic technology is not exclusive as the remaining examples are from sample areas that share little in common with the aforementioned examples. Two of these cores, at Cursus West End (62) and South of Stonehenge (55), come from areas that are most notable for their low densities of material and the undistinguished, unsystematic character of their assemblages (Plate

14). The last of these cores was found at Spring Bottom (78), which again is an area whose assemblage was unremarkable in all other respects.

Accordingly, practices, which produced levallois cores and products, were extremely limited within the Stonehenge Environs. Although the location of these cores tends towards the areas identified in the last chapter as having other elements of a systematic technology, their wider distribution has no conclusive associations. The limited yet widespread character of the practice is not reminiscent of the degree of specialised and spatially restricted production of levallois products that has been identified in other parts of Britain, notably Yorkshire and Norfolk.

6.2.4 The spatial distribution of Kombewa-style cores

The Kombewa method is a distinctive type of flake production that has mainly been identified in African Palaeolithic contexts (Inizan *et al.* 1992, 57). The method first involves the removal of a large flake often with a heavily pronounced bulb; this flake is then used as a core for the production of the Kombewa or Janus flake (Debénath and Dibble 1994, 29). The Kombewa flake is removed from the ventral side of the flake-core using the flake-core's dorsal surface as a platform. The flake is most often designed to remove part or all of the bulb of the flake-core thus giving the resultant flake a regular morphology and smooth convex surfaces (Plate 62). Such flakes are primarily identifiable by their apparent lack of a *dorsal* surface as this surface is actually the *ventral* surface of the flake-core from which it has been removed. Although, it would seem remarkable to have products of an African Palaeolithic technology in the Wiltshire ploughsoil, Inizan *et al.* (1992, 57) note that this technique was used in Britain for the production of gunflints and it is to this practice that these cores probably relate. This possibility is backed up by the extremely 'fresh' character of all of these cores, which appeared to differ from the majority of the assemblage.

Although in total only five Kombewa-style cores were selected within the sampling system, twenty of these cores were found within a single 50m x 25m collection run at Rox Hill (unsown) (86), only one other example was recorded located 100m away from the main cluster. Three more were also noted, though not recorded, in the same location as the latter example. The collection of twenty of these cores from a single collection run is quite remarkable. They also bear so many similarities in the character of their raw material (a large chalk-flint nodule with a reddish hue and a thick yellowish cortex) and the techniques of their production, that it is most likely that these cores were the product of a single episode of knapping.

All the cores were made on large, thick flakes most of which were heavily cortical. The flake-cores also all had very heavily pronounced bulbs, several of which formed almost complete herzian cones standing out from the ventral surface of the flake (Plates 71, 72 and 90). These bulbs were so pronounced that it is possible that a metal hammer was used as a percussor. In most cases, only one Kombewa flake was removed before rejection of the core although sometimes two flakes were removed. These observations indicate the importance of a pronounced bulb on the flake-core, which was used to promote the thickness and convexity of the Kombewa flakes that was eventually removed. The flakes were removed with no preparation of the platform (the dorsal surface of the flake-core). Over 75% of these cores also had their products removed from the left hand side of the flake-core when viewing the ventral side of the flake-core with the butt at the top (Plates 71, 72 and 90).

Analysis of the spatial distribution of these cores is limited because all apart from one were found in the same collection run (Plate 15). It has been suggested that these cores, represent the results of a single knapping episode. If this is the case, it at least shows that after deposition the material was not moved significantly by the plough meaning that the integrity of its spatial distribution was maintained. As the other example of these cores was found in such proximity to the only other group of this type of material it is possible that all of these cores were made in more or less the same instance, perhaps by the same person. Lastly, none of the distinctive products of these cores were noted in the assemblage indicating, perhaps unsurprisingly, that these blanks (presumably for trimming into gun flints) were removed for use elsewhere.

The conclusions made here suggest that the occurrence of these artefacts in the Stonehenge landscape may well represent the *ad hoc* production of blanks for gunflints from the opportunistic knapping of a suitable large and unweathered chalk-flint nodule.

6.2.5 The reuse of lithic artefacts

Another practice, which is represented by only a small proportion of material, is the reuse of artefacts sometime after their initial discard. This reuse is identifiable by distinctive variations in the levels of patina on some artefacts sometimes called 'two-phase cortication' (Saville 1981, 14). In general, patina takes a considerable time to form on the exposed outer surfaces of flint. This means that in cases where there is a distinct variation in the degree of patination between different surfaces created by reworking of a piece or re-chipping through an old (patinated) surface, it can be suggested that there is a significant time gap in between those activities.

Yet, as has already been noted, the patination of flint is a complex process affected by highly localised differences in the context of deposition (Section 5.2.3). It is, for example, possible for a flake to have different levels of patination on its ventral compared to dorsal surface (Saville 1981, 2). Similarly, the length of time it takes for patination to occur also varies widely according depositional context. This is shown by the huge variation in patination in many assemblages from pieces that are hardly patinated to those that are totally patinated. These factors mean that some caution needs to be taken before suggesting that different levels of patination on an artefact represent discard followed by a significant time gap and then reworking of the artefact. Equally, it is not possible to state exactly what period of time would have passed for two distinct levels of patination to occur. Despite this, it seems likely that the amount of time needed is beyond decades and in the order of hundreds of years.

Due to awareness of the issues outlined above, a conservative approach was taken to the recognition of reused artefacts. The material thus recognised falls into two main categories; retouched flakes and reused cores.

In the majority of cases, flakes were identified where retouch was clearly seen to cut through a previously patinated surface (Plate 85). In these cases, the subsequent patination of the retouched surface is of a distinctly different degree to the rest of the flake. It is reasonable to suggest that the different levels of patination do not occur from micro-variations in depositional environment as the retouch can most often be seen to clearly *cut* through previous surfaces. Such sharp contrasts in patination are not of the same character as the localised differences in patination that can occur naturally. Another issue is that the retouch cutting patina may be the result of more recent plough damage rather than prehistoric reworking of material. Again to counteract this possibility a conservative approach was adopted, which ignored edge damage that appeared too 'fresh' and looked for more regular removals characteristic of retouch.

Cores showing signs of reuse were much less common than reworked flakes. They were probably more difficult to recognise but were categorised through similar principles. In particular, cores were selected where removals could clearly be seen to have been taken from surfaces that were already heavily patinated. Such removals seem to cut through previous patination exposing the darker flint remaining in the centre of the core. Although reused cores were few in number, quite often it seems that only a few further flakes were removed before the core was abandoned once again (Plates 73, 86 and 87). This is perhaps symptomatic of the casual character of this practice. It is clearly not motivated by any shortage of raw material. Instead, it seems that it was deemed unnecessary to start a new core afresh when it was possible to remove another flake from a platform prepared long ago. This attitude is basically the same as that implied by the reuse of flakes. In these cases, it was not even considered worthwhile to produce a flake when an old one could be picked up and a workable edge could be regained with a little simple retouch. Therefore, like much of the ploughsoil assemblage, the character of this part of it can be described as *ad hoc* or expedient in character.

Although it is clear that some time elapsed between initial discard and reuse of the pieces under discussion here, it is not possible to state definitively to what period they should be attributed. However, this approach to flintworking shows even less regard for formal reduction of nodules into workable products than the multi-platform techniques that occur increasingly from the Late Neolithic onwards. In general, there is some disagreement about the chronology of the practice of the reuse of stone discarded from earlier periods. For example, Edmonds (1995, 175) suggests it occurs in the Early Bronze Age. Saville (1980, 9) postulates a broader Bronze Age date for the practice although his work has also indicated direct associations with the Middle Bronze Age deposits at Grimes Graves (Saville 1981, 2). Further to this, Young and Humphrey (1999, 232) suggest that the 'recycling' of flint can be demonstrated in Late Bronze Age and even Iron Age contexts. Hence, there is a potentially wide chronological range within which this practice may have been taken place. However, despite the range of possibilities there is a consensus that it relates to Early Bronze Age and later activity. One of the aspects of lithic technology that unite this broad period is the gradual decline in the networks of procurement of stone raw materials (Edmonds 1995, 188). Across the period, people applied increasingly less effort to the procurement of flint to the point that eventually they were willing to use any workable piece that was at hand. Whether these were patinated flakes and cores discarded by previous generations did not matter.

It should be pointed out that although the practice of the reuse of discarded debitage is significant, and probably under rather than over-represented, it is still infrequent in comparison to the rest of the assemblage (i.e. 0.4% of flakes and 0.3% of cores). Hence, if this is a Bronze Age practice, it certainly occurred alongside the more usual reduction of nodules into cores.

6.2.5.1 The spatial distribution of reused artefacts

The small numbers that were recorded limits the analysis of the spatial distribution of reused cores. However, it is noticeable that four of the six examples occur in the western half of just one sample area, North of Cursus (52) (Plate 16). It should be noted that this area also had a particularly high density of cores in general.

The analysis of the spatial distribution of reused flakes is slightly more revealing due to the larger numbers involved. The general distribution is quite widespread and as with the cores there is a tendency for the pattern to mirror areas with overall high densities of flakes (Plate 16). This correlation could relate to the proposition that both the practice of the reuse of flakes and the profligate use of flint in the Stonehenge landscape are relatively late practices (i.e. Late Neolithic onwards), although any such suggestion is necessarily tentative. Equally, the correlation is a little unsurprising as the reuse of earlier material might be expected to occur in areas where such material was at its densest and is therefore easiest to find.

Within the wider pattern of reused flakes there are some notable concentrations along the edges of the dry valley running through Winterbourne Stoke Crossroads (50), The Ditches (77) and Normanton Bottom (67), an area with particularly high densities of material in general (Plate 16). There also seems to be a relatively high occurrence of these flakes spread across Coneybury Hill (51), which is also an area with a high density of flakes. Perhaps the most notable concentrations of this material occur at Woodhenge (60), Railway (71), Home Fields (72) and the western half of New King (87). These are all areas located to the east of King Barrow Ridge stretching south of Woodhenge and Durrington Walls.

6.2.6 The distribution of flake types

Because of the small numbers of certain artefacts representing certain flake type categories statistical analysis of their relative proportions in individual sample areas was not possible (Section 4.3.9). Instead, the distribution of this material is presented here. The categories concerned are thinning flakes and miscellaneous bifacial retouched flakes (Plate 17). In addition, the distributions of other categories of infrequent material, namely core rejuvenation flakes and cores reused as hammerstones, will also be discussed in this section. Lastly, the distributions of blades and crested blade flakes need to be discussed. These latter categories of material will be dealt with in Section 6.4.3, which also presents the location of blade cores in the survey area.

The categories under discussion here share little in common as they all represent different aspects of lithic technology. However, from Plate 17 the low frequency of thinning flakes and miscellaneous bifacial retouched flakes can be appreciated. In addition, it can also be seen that their distribution is widespread with little apparent clustering. In respect to miscellaneous bifacial retouched flakes, this patterning is of limited significance as this type of flake has a wide definition and is by character an expedient technology. However, their low frequency indicates that bifacial retouching was not a common approach towards modifying flakes into useable tools.

In contrast, a greater importance can be associated with the low frequency of thinning flakes in the Stonehenge Environs. These flakes are the by-products of biface or axe manufacture and hence the lack of them in this area indicates that the production of these types of tools was extremely limited. This is of significance because axes clearly held an important place within the consumption of lithic technology throughout the Neolithic and, whilst they were not produced in numbers in the Stonehenge Environs, they were manufactured in quantity at other sites and in other landscape during this period. The importance of this aspect of the assemblage is discussed in more detail in Section 8.2.3.

6.2.6.1 Core rejuvenation flakes

As was suggested in Section 4.3.9.1, 55 core rejuvenation flakes were recorded in the sample of the SEP assemblage. As also suggested, the majority of these flakes represent core rejuvenation tablets. This method of core rejuvenation was most commonly employed as part of a single platform (often blade core) reduction technique.

Like many types of artefacts that make up a minor portion of the assemblage, the distribution of rejuvenation flakes is widespread (Plate 18). The wider distribution of rejuvenation flakes also has some features that are difficult to explain. There are a number of these flakes from North of Cursus (52) (Plate 18), which is surprising as the area was not distinguished by high proportions of systematic or single platform cores. Generally, there is no clear correlation between the distributions of rejuvenation flakes and blade cores or systematically worked cores (Plates 18, 28 and 31), which are the types of cores most likely to be rejuvenated by the removal of this type of flake.

A more positive association can be found with the cluster of rejuvenation flakes at The Ditches (77). Their presence there is in keeping with the higher proportions of systematically worked single platform cores in the area, which were used to produce relatively elongate flakes. In contrast, there are very few rejuvenation flakes from Well House (83) and Rox Hill (82) (Plate 18). This is surprising as, similar to The Ditches (77), these areas also had high proportions of systematically worked single platform cores and elongate flakes. It might be expected that this would suggest that in comparison, the cores at Well House (83) and Rox Hill (82) were not worked as heavily and therefore did not require rejuvenation. Certainly, the average weight of cores at Well House (83) was particularly high. However, the average core weight at The Ditches (77) is higher than at Rox Hill (82) (Table 5.1) so this would not seem to be the case. There are some problems involved with this line of reasoning as the mean weights of cores rely upon data summarised from entire sample area assemblages, whereas rejuvenation flakes represent only a tiny proportion of this material. As lithic scatters are palimpsests of material it is not clear whether the two components of technological practice that are being compared are connected or even broadly contemporaneous. This highlights some of the problems of interpreting material that represents such small proportions of the assemblage. The material has also been sampled from the assemblage collected by the SEP and this process is not well suited for identifying the distribution of categories of material that are present in small numbers as it relies upon significant quantities of them falling within the sampling frame.

6.2.6.2 Cores reused as hammerstones

As with rejuvenation flakes, the distribution of cores reused as hammerstones is widespread (Plate 19). In general, there is also a tendency for the distribution to vary in relation to overall core density. As it is the distribution of *cores* reused as hammerstones that is under discussion, this is to be expected. It is also unsurprising that areas with larger quantities of cores are associated with hammerstones as it is these that are used to work cores. Within this pattern, there are notable concentrations of cores reused as hammerstones around Wilsford Down especially at The Ditches (77), which is the area with the densest surface scatters in the survey area. Similarly, at North of Cursus (52), which is another area with particular dense scatters, there is also an extensive concentration of cores reused as hammerstones. In contrast, despite the relatively low densities of cores around King Barrow Ridge, there are relatively large numbers of them reused in this manner. This perhaps indicates that, whilst the general density of flint near King Barrow Ridge is lower than in the northern and southeastern parts of the survey area, the working of cores was still important there.

The greater occurrence of cores reused as hammerstones at both King Barrow Ridge (57) and North of Cursus (52) is backed up by the distribution of hammerstones (i.e. examples that show no signs of having been used as cores) (Plate 19).

A surprising feature of the distribution is the relative lack of hammerstones at both Rox Hill (82) and Well House (82). Both areas were important locations for the production of stone tools and at Well House (83) these activities were particularly intense and nucleated. Accordingly, it would be expected that this area would be associated with reasonable quantities of hammerstones. Therefore, it is difficult to explain this pattern, although it should be noted that organic percussors were also used and these would not have survived in the ploughsoil.

6.3 Testing the homogeneity of data

In the last chapter, a reoccurring feature when viewing many flake and core attributes was the similarity between the data from individual sample areas. For example, the proportions of types of cores, types of flake butts as well as the lengths and the weights of flakes were very similar in most sample areas. The assemblages from which these data were collected came from sample areas of different sizes. Yet, they were treated as coherent and equally representative subsets of data. Analysis using GIS allows a different perspective to be taken as it presents the material from individual collection runs, rather than from much larger sample areas. In this manner, the spatial integrity of the data is maintained at as fine a resolution as possible given the original collection grid. The major benefit of this approach is that it allows an assessment of the extent to which patterns recognised in the data *between* sample areas also occur *within* them. Given that the major feature of this pattern was the homogeneity of data, with the suggestion being that there was little spatial distinction between different phases of the reduction sequence, it is now possible to assess whether such patterns persist at a more local level.

6.3.1 Looking for similarity

For flakes, the attributes that most clearly indicated the homogeneity between sample areas were the metrical measurements such as length, breadth and weight. The differences in the level of variation between the data for these attributes and for flake density can be clearly seen by comparing the density of material and the average length of flakes per collection run (Plates 2 and 20). The comparison clearly shows that whilst the density of flakes varies significantly across the landscape, this variation is not reflected in the average length of flakes from individual collection runs. It can be seen that the flakes from the vast majority of collection runs have an average length of between 39mm-58mm. In all, 66% of runs have an average length of flakes that falls within this category. Comparison of Plates 2 and 20 also shows that areas such as Normanton Down, which have a higher percentage of collection runs with higher or lower than average values, tend to also have lower densities of material. This is because many of these values come from runs from which only a few flakes or commonly only one flake were recorded. As they are not the averages of larger numbers of flakes, these values have a tendency to record slightly higher or lower values. This in itself indicates that the flakes from individual collection runs tend to be of varying lengths with collections of them therefore averaging out to middling values. This process is reminiscent of the data that were discussed for the individual sample areas (Chapters 4 and 5) in that those that consistently produced unusual distributions were those that yielded comparatively small assemblages of material.

Similar patterns to the above can also be seen with other metrical measurements such as the average weights or length:breadth ratios of flakes from individual runs (Plates 21 and 22). In general, for both of these attributes it can be seen that the vast majority of individual collection runs have the same values. As with the previous case it can also be seen that the areas with the highest incidences of values outside of the most frequent categories are those from which relatively few flakes were recorded. In respect to the average length:breadth ratios of flakes per run, the pattern also shows the heavy predominance of broad flakes across the entire study area (Plate 22).

The same patterns also occur with the average amount of cortex on flakes from collection runs (Plate 23). The majority of sample areas have an average of about 25% of cortex covering the dorsal surface of flakes. Cross-tabulation of the average value of cortex and the number of flakes per run confirms that an average value of 25% cortex increases exponentially in relation to the overall frequency of flakes. Rather than indicating that such runs have many flakes with 25% cortex, this suggests that these runs have many flakes with varying amounts of cortex (some higher some lower than 25%), which average out to a value of around 25%. This suggestion is strengthened when it is considered that whilst runs with an average of 25% cortex covering flakes are by far the most common, in the assemblage as a whole it is flakes with 0% cortex that make up the largest proportion (Table 6.1). Whilst 50% of all runs have flakes with an average of 25% cortex, only about 25% of flakes in the assemblage are covered by 25% cortex, whilst 46% are uncortical (i.e. 0% cortex).

These findings tend to confirm the general conclusions from the last chapter that there is very little spatial differentiation between practices such as the extraction, primary and continued reduction of nodules. Certainly, the results indicate that even when viewed at the spatial resolution of the collection run, there are no large areas that were concerned solely with the practice of individual phases of the reduction sequence.

Flake Cortex Coverage Category	Runs with Category as Average Value		No. and Proportion of all Flakes	
0%	1363	25.2%	9603	46.4%
25%	2552	47.2%	5389	26.0%
50%	1102	20.4%	2448	11.8%
75%	260	4.8%	1902	9.2%
100%	129	2.4%	1355	6.5%
Total	5406	100%	20697	100%

Table 6.1: The proportion of collection runs and the proportion of flakes in the assemblage with different categories of cortex coverage.

As suggested above, a consistent feature of the plots for the average values of these flake attributes is that the areas with consistently high average values for runs tend to be those that yielded relatively small quantities of material. The reason for this is that only one or two flakes were measured in many of the runs in these areas. Therefore, in one sense, the average values for these runs can be regarded as unrepresentative. One solution to this problem is to omit the data for runs from which only a few flakes were recorded. In the present case a decision was made to include only runs from which more than three flakes were recorded (Plates 24 and 25). The effect of this method can be assessed by the increase in the occurrence of the most common categories of average flake lengths from 66% to 78% of all collection runs, and for flake cortex coverage from 47% to 66%.

As with various aspects of the statistical analysis conducted on assemblages from sample areas, these results indicate a degree of homogeneity with many runs and many sample areas, yielding similar values. This is particularly so, once the runs from which only a restricted amount of flakes were recovered, have been excluded from the analysis. In addition, this process gives more significance to those collection runs that still give values outside of the most common categories and makes them easier to recognise.

In this respect, it is interesting to note that comparisons can be made between the results of the current analysis (Plate 24) and the Z-score distributions for flake length (Section 4.4.2.1.1; Plate 3). The sample areas with below mean Z-scores are also those that have the most individual runs with below average values for the mean lengths of flakes. This is especially notable for those areas to the east of King Barrow Ridge, Luxenborough (84) and to a lesser extent The Ditches (77). In the former area, the nature of the distribution also indicates the lower density of material in the area.

Although collection runs with above average mean lengths of flakes seem less common, compatibility between areas with high incidences of these runs and those with high Z-scores can also be seen (Plates3 and 24). This is most obviously the case at Well House (83) where it can be seen that the tightest concentration of runs with the longest flakes occurs, this sample area also had the highest Z-scores for length. To a lesser extent, the same patterns can be followed at The Diamond (59) and also in several of the areas north of the Stonehenge Cursus.

Agreement in values of attributes between statistical summaries of sample areas and visual representations of data from collection runs corroborates the validity of both approaches. In this respect, it confirms that, despite the arbitrary nature of sample area boundaries, summaries of data from these areas does reflect differences in the data when it is viewed as a continuous distribution (i.e. mapped visual representations in two dimensions rather than numerical summaries of sample area assemblages). In the opposite regard, the compatibility between the two also suggests that visual representation of the data, as presented here, is a viable alternative to statistical summary.

6.3.2 Looking within sample areas

6.3.2.1 Collection runs with larger flakes

As suggested, the additional benefit of utilising a GIS to plot values for material per collection run is that it maintains the spatial relationships of the data (Section 6.1.2). Therefore, it is possible to assess not only whether sample areas generally have runs with high or low values, but also whether there are any more spatially discrete clusters of such values that point towards the persistent use of locations for specific technological practices.

In terms of average lengths of flakes per run, it can be seen that there are few discrete areas with consistently high or low values (Plate 24). In general, the distribution tends to show that runs with unusual values are interspersed amongst runs with more common average lengths of flakes. Despite this pattern, there are some areas that show signs of more discrete clustering. As highlighted many times before, Well House (83) proves to be an unusual area again in that not only does it have a large amount of runs with the highest average lengths of flakes, but also the distribution of these runs is spatially restricted to a part of the sample area roughly 200m across (Plate 26). The extent of this pattern also reflects the general density of material in the area, which reaches its peak in the same set of collection runs (Plate 2). In relation to previous aspects of the analysis, this indicates that in this specific area there was a comparatively focused and spatially restricted practice of systematic core reduction that produced heavy and long flakes. The degree of focus that is evidenced in this restricted area is not witnessed anywhere else in the Stonehenge landscape.

Beyond Well House (83), there are no areas with comparable groups of spatially contiguous runs producing above average lengths of flakes. However, a few areas produce some clustering of such runs. This pattern occurs within sample areas at Winterbourne Stoke Crossroads (50), The Diamond (59) and in some of the areas to the north of the Stonehenge Cursus (Plate 27). Unlike Well House (83), in these areas activities that produced runs with longer flakes are dispersed and are typically distributed over areas of 600m or more. Accordingly, it is reasonable to assume that there were differences in the character of the activities that produced these residues.

The activities at Well House (83) are focused and have a distinct boundary and spatially, the extent of the activities is also quite small. In contrast, at Winterbourne Stoke Crossroads (50) and The Diamond (59), whatever activities produced areas of consistently larger flakes, they were not as concentrated but interspersed amongst a greater range of lithic activities. Equally, they are spread over a larger area. Well House (83) appears to have been the focal point of a coherent technological attitude towards the reduction of nodules, whereas this emphasis appears to be less for the other two sample areas. However, the two groups of areas may still represent locations that were used in broadly the same manner. The only difference may be that, compared to Well House (83), at Winterbourne Stoke Crossroads (50) and The Diamond (59) the location of these activities became more displaced over time.

This suggestion is most heavily influenced by the topography of these locations. In this light, it is possible that the earlier stages of the reduction sequence were practiced along the sides of dry valleys utilising the natural erosion of seams of flint nodules that occur there (Harding 1990a, 215; 1990c, 165). In this respect, a link can be proposed between the earlier stages of the reduction sequence and larger flakes. Larger flakes are more likely to be produced early on in the reduction sequence due to the roughing out of cores and the reductive character of the process. Bearing this in mind it is of interest that in the two locations mentioned above, clusters of longer flakes tend to hug the contour lines on the sides of dry valleys. This is the case at Well House (83) where it can be seen that rather than the runs producing longer flakes being clustered in a circular pattern, the distribution is more elliptical or even linear in shape (Plate 26). It can also be seen that the axis of the distribution reflects the direction of the contour lines suggesting that the distribution is spread at right angles to the direction of the slope along the lower reaches of Rox Hill as it descends into Lake Bottom.

Although, like the distribution, the variation in topography is less marked, a similar pattern occurs in the area to the southeast of the Winterbourne Stoke Crossroads. Here the extent of activities producing longer flakes are more dispersed, however it can still be seen that the distribution of these runs is spread linearly and at right angles to the direction of a slope which descends into a dry valley (Plate 27). Although these activities are more spread and therefore less coherent in terms of space and possibly time, the continuity in terms of the use of specific topographical locations may suggest that they still represent the same types of activities practiced in the same types of locations. There is a looser focus to the spatial restriction of such activities to the southeast of the Winterbourne Stoke Crossroads, but as at Well House (83), a specific part of the landscape was returned to over time probably to utilise the raw material that outcropped in a specific location. These locations represent only a few areas amongst the broader swathes of homogenous lithic debris that cover the Stonehenge landscape.

However, the possibility that these areas were returned to for specific reasons does imply a certain level of knowledge of the landscape and the affordances that it presented. The paths of access to these locations may have been trekked by many as part of the routine movements of people through the Stonehenge landscape. Although it does not necessarily imply a sedentary population, the possibility that groups returned to specific locations carrying expectations of the type of stone that they expected to find there represents an intimacy of knowledge of the Stonehenge landscape. This is particularly important to realise because in the Stonehenge landscape this type of close knowledge and the deliberate nature of the actions that it allows has previously only been discussed in relation to the use of monuments.

6.3.2.2 Collection runs with smaller flakes

So far, this discussion has concentrated only on those collection runs that produced above average mean lengths of flakes; it is now necessary to consider those that produced lighter and smaller flakes. As with the previous case, the majority of runs with a low average length of flakes are spread across the survey area interspersed amongst runs with flakes of a more average length (Plate 24). It has also been noted that as with the mean lengths of flakes from sample areas, there is a bias towards shorter and lighter flakes in the eastern part of the Stonehenge Environs. There seems to be some clustering of runs producing such flakes in the southeastern part of Destructor (76), on Coneybury Hill (51) and in those areas east of King Barrow Ridge and south of Durrington Walls. Runs with generally smaller flakes are much more common than those producing longer flakes. This is particularly so in those areas east of King Barrow Ridge. Whereas for the survey as a whole 78% of runs produced an average length of flakes of 39-58mm, in the aforementioned areas, runs with an average length of flakes between 18-38mm are relatively more common (Table 6.2). The latter represent 58% of all runs with more than three flakes at New King (87) and 42% of such runs at Home Fields (72). This is compared to an average of 20% from all collection runs from all sample areas.

Sample Area	Average Length of Flakes per Collection Run								Total	
	18mm-38mm		39mm-58mm		59mm-71mm		72mm-113mm			
New King (87)	19	58%	13	39%	1	3%	0	0%	32	100%
Railway (71)	19	28%	47	69%	2	3%	0	0%	68	100%
Home Fields (72)	36	41%	51	59%	0	0%	0	0%	87	100%
All Material	410	20%	1623	78%	50	2%	2	0%	2085	100%

Table 6.2: The number and proportions of runs with classed average flake lengths (including only runs with more than three flakes).

Considering that in the sample areas mentioned in Table 6.2 there are such high proportions of runs with shorter flakes, it is inevitable that in these areas some clusters of such runs can be noted. However, it is clear that these runs are also mostly interspersed amongst runs with longer and more average mean lengths of flakes. It is thus difficult to assess whether localised patterns representing spatially restricted practices producing smaller flakes (e.g. the latter stages of production) can be inferred or whether the patterns are a general product of the working of smaller cores to produce smaller flakes. However, given that the average weight of cores in all of these sample areas is particularly low (Section 5.2.1), it is quite likely that the latter is the case.

One other sample area, which had a noticeably low average length of flakes, was The Ditches (77). In Chapter 4 it was noted that the flakes from this area were small in comparison to the surrounding sample areas (Sections 4.3.1 and 4.4.2.1.1). In addition, the average length:breadth ratio was relatively high indicating a tendency for more elongate flakes. From Plate 24 it can be seen that within The Ditches (77) runs with shorter than average flakes occur mainly in the central part of the sample area where they form an elliptical cluster. Therefore, this part of the analysis concurs with the previous findings. When combined with the fact that the average weight of cores at The Ditches (77) is relatively high and that there is a high proportion of systematically worked cores, the suggestion is that there was a quite deliberate approach towards reduction in the area, which was directed towards the production of relatively short flakes.

6.3.3 Summary

Assessments of GIS plots have been used to assess whether the homogeneity apparent *between* statistical summaries of sample area assemblages also occur *within* them. In order to test this, the distributions of the attributes that best indicated this feature have been presented in a number of ways. At a general level, this analysis has shown that this level of similarity does occur within as well as between sample areas. This suggests that, in the Stonehenge landscape, there was a lack of spatial distinction between different phases of the reduction sequence. In other words, there do not appear to be areas that were utilised solely for the extraction and primary reduction of nodules. Equally, the same can be said for the later phases of the reduction sequence.

In part it could be suggested that these similarities in patterns are a result of the time depth present within the unstratified ploughsoil assemblages. Indeed, it must be realised that given the character of ploughsoil assemblages, the types of patterns that can be recognised in landscape with dense scatters such as the Stonehenge Environs, will either be reasonably long-term or intense in nature. However, this does not deny the significance of the current findings, as was suggested in the last two chapters and as will be showing in the following sections, there are elements of differences within the assemblage, some of which are subtle. This goes to show that if similar differences had occurred in those elements of the assemblage under discussion here, they would have been recognised during the analysis.

Indeed, despite concentrating on the homogeneity between assemblages, there were a few incidences in which this was not the case. In particular, there were a few restricted locations in which practices did produce consistently larger or smaller than average flakes. Especially with larger flakes, the activities that created them also appear to have been nucleated in a few specific locations. Topographically it was seen that these locations were similar and the suggestion was that this might relate to the early phases of reduction occurring on the sides of dry valleys where eroding seams of flint were exploited. Such observations could not have been from the previous statistical analysis due to its lack of spatial sensitivity. This therefore indicates the importance of the current approach and the ability it provides to assess the spatial organisation of technological practices.

The results from the spatial analysis also show general agreement with those from the statistical analysis. This validates both approaches and concurs that they are successful at revealing the basic patterning of the data.

6.4 The variation of data

In Chapters 4 and 5, despite the overriding homogeneity in the data between sample areas, elements of variation were also highlighted. It was shown that this variation, exhibited in a restricted set of sample areas, related to an element of systematic technology often occurring alongside the more typical unsystematic reduction of multi-platform cores. In addition, this more systematic technology was related mainly to the practice of single platform reduction, which exhibited a higher degree of control over the shape of cores through methods of platform maintenance and rejuvenation. Whilst these forms of technology were not practiced exclusively in these locations, the assemblages from these areas did have significantly higher proportions of material with attributes indicative of these processes.

As with those features of the assemblage that typified the homogeneity of data, it is now necessary to see whether more systematic forms of reduction were spread over the sample areas where they occurred or were spatially restricted at a more localised scale.

The features that most typified sample areas exhibiting systematic forms of technology (Section 5.3.2.2) were relatively higher proportions of:

1) Systematically worked cores.
2) Single platform cores worked all of the way around the platform (Clark Type A1).
3) Cores with prepared platforms.
4) Cores producing mainly elongate flakes.
5) Cores with maintained platforms.
6) Retouched flakes.
7) Flakes with prepared butt types.

As these attributes most clearly distinguished areas with an emphasis on systematic core reduction, analysis of their distribution is the most logical step towards elucidating this aspect of the assemblage. This can be done by comparing the distribution of the cores or flakes with the relevant attributes, to that of cores or flakes as a whole. In this manner, it is possible to assess whether concentrations of specific types of material co-vary with overall concentrations, or whether they represent the agglomeration of activities outside of the ubiquitous practices that produced the majority of debitage left today.

In order to be able to compare the two, a surface density map can be calculated to show the density of all flakes or cores; this can then be overlaid with the distribution of specific types of material (e.g. Plate 28)[4].

6.4.1 The distribution of systematically worked cores

The distribution of systematically worked cores can be compared to the overall density of cores in Plate 28. From the graphical representation of the distribution of systematically worked cores, their low frequency can be appreciated. It can also be seen that their distribution is widespread, with examples occurring in most parts of the landscape. However, closer inspection reveals the tendency for them to be concentrated in certain areas and these are not necessarily those with the highest overall densities.

[4] The background surface density was created using the Arc View Spatial Analyst 'calculate density' function

Concentrations of systematic cores are found in the west and south of the Stonehenge Environs in an area comprising of parts of Winterbourne Stoke Crossroads (50), The Diamond (59) and the whole of The Ditches (77). Similar concentrations in this area can also be found in the eastern half of Normanton Bottom (67), in part of Well House (83) and to a lesser extent in part of Rox Hill (82). The majority of these locations were also considered to be those in which an element of a more systematic technology could be recognised through statistical summaries of sample area data (Section 5.3.2.2).

In all of the areas mentioned above there is covariation between the location of systematically worked cores and the density of all cores, a pattern also found in many other sample areas. In particular those areas in the central part of the study area, mainly located around Normanton Down, which are characterised by a relatively low density of both flakes and cores (Plate 42), also have only a few examples of systematically worked cores. However, it is in the sample areas to the north of this location that the covariation between the density of all cores and the frequency of systematic cores breaks down. At Stonehenge Triangle (54), despite a particularly dense and large concentration of worked flint, there are only a couple of examples of systematically worked cores (Plate 28). More significantly, at North of Cursus (52), where the most extensive and dense spread of worked flint in the survey area occurs, there are only a few examples of systematically worked cores and these are peripheral to the main surface concentration of flint. Although the contrast is less exaggerated a similar pattern can be discerned at Coneybury Hill (51).

Compared to these latter examples, the opposite pattern can be found in several of the sample areas found east of King Barrow Ridge. The densities of material in these sample areas are generally low and yet there is still a significant number of systematically worked cores. The distribution is dispersed but they are mostly found at King Barrow Ridge (57), Nile Clump (70) and New King (87). These areas were highlighted through statistical summary as having an element of a more systematic technology (Section 5.3.2.2).

As can be seen from the discussion above, the location of systematic cores is significant. There are concentrations found in all of the areas described in Chapters 4 and 5 as being distinguished by the presence of a systematic technology (Section 5.6.2.2). As one of the methods used to identify this component was the presence of systematic cores themselves this relationship may seem unsurprising. However, the discussion here moves understanding forward as it is also clear that the presence of these cores is not just a function of the overall density of material. In this respect, it has been shown that in several areas with the densest concentrations of flint there is a comparative lack of systematically worked cores.

Beyond corroborating the results of the analysis based upon the summaries of sample area assemblages, the current analysis also provides an understanding of more localised distributions. In the south and west of the Stonehenge Environs there is covariation between the location of systematic cores and the overall density of material. As suggested, these areas are all situated on the sides of a dry valley system that runs along a circuitous route that actually links them all. However, whilst there may be many similarities between these areas, the distribution of material can be grouped into three or four concentrations of varying sizes and densities (Plate 29). From this perspective, rather than the area representing the 'Normanton Bottom industrial zone', as suggested by the SEP (Richards 1990, 22), there appears to be several more localised foci of activity positioned to utilise the raw material that was exposed in specific locations.

In contrast, the quantity of systematic cores to the east of King Barrow Ridge does not have a nucleated distribution and although they tend to appear within the areas of higher densities of cores the distribution is dispersed. In addition, unlike in the west and south of the Stonehenge Environs the cores are not concentrated along the sides of dry valleys but are spread over a flatter part of the landscape with less distinguishing topographical features. Accordingly, this aspect of the working in this area would not seem to be coordinated around the use of raw material from specific locales. One possibility is that, unlike in the southwest of the Stonehenge Environs, the working of systematic cores to the east of King Barrow Ridge occurred upon surface nodules. This would at least explain the dispersed distribution of the systematic cores in this area.

6.4.2 The distribution of A1 type cores

As described in Section 5.2.5 and Appendix 1 Clark's type A1 cores (my core type 1) are classified as single platform cores worked all of the way around the platform. As also suggested, there is a tendency for them to be worked systematically. Accordingly, there are similarities between the distribution of this type of cores and the distribution of systematic cores discussed in the last section as many may actually be the same cores (i.e. worked systematically and type A1). As with systematic cores these cores have a widespread distribution in the Stonehenge landscape but with some notable concentrations in the west and south of the survey area as well as to the east of King Barrow Ridge (Plate 30). However, the distribution seems less nucleated in all areas despite an apparent focus in the middle of Well House (83). There is still a noticeable paucity of these cores in the central areas around Normanton Down but, unlike the distribution of systematic cores, at North of Cursus (52) there are a quite a few examples. This may be a product of the lack of clarity of the classificatory definition of this type of core (Section 5.2.5.1) and the extensive and dense amount of cores in this area. This issue will be investigated in the succeeding section.

6.4.3 Conical blade cores

Conically shaped blade cores are a type of systematic blade core most typical of the late Mesolithic and early Neolithic periods. Such cores are often but not exclusively single platform, often with maintenance (including rejuvenation) of the platform. This type of blade core also uses the parallel crests formed by previous removals to produce predictably shaped parallel-sided blades or bladelets. The level of care taken over all aspects of core reduction that is typical of this type of working indicates the importance that was placed upon the shape of the blades and the manner in which they should be produced. As a result of their style of working, as these cores approach exhaustion they often become conical in shape (Plates 64, 68, 83 and 84). This makes these types of cores particularly distinctive.

In attempting an analysis of this type of core, there are several issues that originate from the method of recording that was applied. It could be assumed that isolating this type of core within the database could be achieved using their category of core type. This attribute was based upon Clark's (Clark *et* al 1960) core typology and given the type of core under study it would seem that his type A1 would refer purely to just such cores. However as discussed, there is a problem with Clark's method of core classification due to the variety of typologically and technologically different types of cores that can be recorded within the same categories (Section 5.2.5.1). Although for cores of type A1 this problem is lessened, it is still an issue. Thus, although the distribution of cores of type A1 can be expected to be comparable to the distribution of blade cores (the category of cores that they are most likely to represent), there are still some differences. The reason for this is that whilst single platform cores with removals all around the platform (i.e. type A1) are often blade producing cores, the relationship is not exclusive. Actually about half of A1 type cores produced predominantly broad rather than elongate flakes. Equally, though many A1 cores are systematically worked blade cores, there are also likely to be blade cores that have more than one platform or single platform types that do not have removals all of the way around the platform (Table 6.3).

Core Type	Systematically Worked Blade Cores	
	Number	Proportion
A1: One platform, flakes removed all the way around	12	43%
A2: One platform, flakes removed part of the way around	12	43%
B1: Two platforms, parallel	2	7%
B2: Two platforms, one at an oblique angle	1	4%
B3: Two platforms at right angles	1	4%
Total	28	100%

Table 6.3: The number and proportion of systematically worked blade cores of different Clark core types.

As Table 6.3 shows, there is an equal number of well-worked blade cores that have removals all the way around the platform (Plates 64, 68, 83 and 84) to those that have only been worked partially around the platform (Plate 93). In addition, several cases have two platforms of various orientations (Plate 91). This analysis shows that a typology based purely on the number and orientation of platforms cannot be used to securely distinguish between types of cores such as blade cores. In this respect, it would be more informative to classify cores according to the character of the *approach* towards core reduction or even their stylistic quality.

As the full distribution of the most distinctive type of blade cores could not be guaranteed by assessing only cores of type A1, an alternative method had to be applied. No single or combination of attributes could be relied upon to clearly differentiate between cores in the necessary manner. However, all of the blade cores of this classic style were noted independently during the analysis and a list could be compiled on this basis. Accordingly, the discussion presented here is based upon this information.

6.4.3.1 The distribution of conical blade cores

With only 28 examples of conical blade cores in the sample of the SEP assemblage analysis of their distribution is only tentative. However, interesting issues are still raised. Most notable are some of the differences between the distribution of conical blade cores and the distributions of the other attributes indicative of more systematic forms of technology.

Like the distribution of systematic cores, type A1 cores and cores with platform maintenance, many of the same areas that were highlighted as having a higher proportion of systematically worked material also have examples of conical blade cores (Plate 31; Section 5.3.2.2). However, the key concentrations of worked flint at Stonehenge Triangle (54) and North of Cursus (52) had a relative lack of systematic cores compared to density (Plate 28). Yet they appear to have similar numbers of conical blade cores compared to the previously highlighted areas in the southwest and east of the survey area (Plate 31). This feature is surprising as these areas do not appear to have high proportions of any of the other features associated with the areas with systematic material. However, it should be noted that intensive survey at Fargo Wood I (W32) within the North of Cursus (52) sample area did produce an assemblage with a definite component of deliberately produced blades (Richards 1990, 69).

The distribution of conical blade cores in the sample areas east of King Barrow Ridge is also unexpected. It is the block of areas nearest to the King Barrow Ridge that have previously been revealed to contain an element of systematic technology. In this area both the distribution of systematically worked and type A1 cores have tended towards King Barrow Ridge (57), Nile Clump (70) and New King (87), the areas closest to King Barrow Ridge (Plates 28 and 30). In comparison, those areas furthest to the east of King Barrow Ridge and south of Durrington Walls have had a sparser distribution of cores with these attributes. The unexpected feature of the distribution of conical blade cores is that it reverses this pattern. Although there are several examples in New King (87), none are recorded in King Barrow Ridge (57), only one is present at Nile Clump (70) and overall the emphasis is shifted towards the eastern half of this block of areas (Plate 31).

Perhaps the most surprising feature of the distribution of this type of core is that although they are present in most of the same areas that dominate all of the other distributions of attributes characteristic of systematic technology (e.g. The Diamond (59), Well House (83) and Rox Hill (82)), there are none at The Ditches (77). This is unexpected because the dense concentration of cores in this sample area has featured prominently in all previous discussion of systematic forms of technology. In addition, Z-scores indicated the area to have relatively small and elongate flakes (Section 4.4.2). It would have seemed reasonable to suggest that such flakes were most likely to have been produced from blade cores.

Whilst, as few examples were recorded, interpretation of the distribution of conical blade cores must remain tentative, the archaeological significance of the pattern is backed up by the distribution of blades and crested blade flakes (Plate 32). In general, the distribution is extremely widespread and there are significant numbers of these types of flakes. The main problem with assessing their distribution occurs because, although blades were produced deliberately during the Early Neolithic, they were also commonly produced unintentionally as parts of other less specific reduction sequences. In order to counteract this problem a strict definition was applied to the recognition of blades that did not rely solely on their length:breadth ratio (Appendix 1). However, these issues must be taken into account and may partly explain the extent of the distribution of blades in the survey area. Having said this, significance can be given to their distribution and this is strengthened by its similarities to the distribution of blade cores.

This is especially the case for the material from the Stonehenge Triangle (54). The presence of a few blade cores seemed surprising in an area, in which there were few other signs of systematic technologies. However, there is also a particular dense distribution of blades there (Plate 32), which concentrates in the same parts of the sample area as the blade cores (Plate 31). Equally, the presence of blade cores within North of Cursus (52) is also accompanied by a reasonable quantity of blades.

In contrast to these patterns of positive correlations, areas with a notable lack of blade cores also share a lack of blades. This pattern is marked at The Ditches (77) and this must be regarded as significant as the area produced the densest scatters in the survey area. A similar situation occurs in the group of survey areas that span Normanton Down. Although the area is particularly sparse in surface scatter material, the almost complete lack of both blades and blade cores there is noteworthy as it represents such a large part of the landscape in the immediate environs of Stonehenge.

As the types of artefacts (blades and blade cores) under discussion here are most often connected with Late Mesolithic or Early Neolithic technologies, their distribution potentially has chronological value. For example, it is possible that some of the distribution patterns, which it has been suggested do not fit within the patterning of the other aspects of the assemblage, indicate differences in inhabitation patterns between the Early Neolithic and later periods. Using this form of reasoning it could be suggested that the lack of these types of products at The Ditches (77) indicates that the major episodes of flintworking that took place there were Late Neolithic or later. However, with unstratified assemblages aspects of chronology must be treated cautiously when only small proportions of material is being relied upon. Accordingly, chronology must be assessed using as many different aspects of the assemblage as possible. This discussion will take place in Chapter 8 when all of the different strands of the analysis are drawn together (Section 8.3).

6.4.4 The distribution of cores with platform maintenance

During the analysis of cores, four types of platform maintenance (trimmed, faceted, trimmed and faceted and rejuvenated) were recorded. Due to the small numbers of cores involved, for the current spatial analysis all of these types (excluding rejuvenated cores) were combined. Therefore, Plate 33 indicates the distribution of all cores showing any signs of trimming or faceting of platforms.

The distribution of cores showing signs of platform maintenance overlaps to some extent with that of both systematic and type A1 cores. The reason for this is that some are the same cores exhibiting several of the attributes under discussion. However, this is not so in all cases and the distributions provide several different perspectives to assess a particular aspect of technology (the systematic reduction of cores). The various distributions therefore compliment each other improving our understanding of the spatial distribution of practices, which would only be represented by a few cases if only single attributes were discussed. An example of this can be seen in the areas in the south and west of the Stonehenge Environs such as The Diamond (59), The Ditches (77), Normanton Bottom (67), Well House (83) and Rox Hill (82). In these locations, the concentrations of cores with platform maintenance are in exactly the same locations as the other attributes indicative of systematically worked cores (Plates 28, 30 and 33). Some may represent the same cores, yet others represent additional cases. The fact that these appear in the same locations as cores with other types of systematic attributes strengthens the argument that the area is a focus for a considered approach towards core reduction. A better illustration of the importance of looking for corroborative attributes occurs at Coneybury Hill (52) where the distribution of systematic cores and cores with platform maintenance are also very similar (Plates 28 and 33). In this location, the mutual distribution does not represent different features recorded in the same cores rather than different features present on different cores. The importance of this is that the frequency of cores bearing the individual attributes was low and seemingly insignificant, but the combined pattern of different cores with different attributes is much greater. In this case, although still of low frequency in relation to the overall density of cores, there seems to be a spread of systematic cores and cores with maintained platforms, in a linear east-west distribution across Coneybury Hill.

6.4.5 The distribution of flakes with prepared butt types

The main types of platform maintenance, such as platform trimming and faceting, leave distinctive traces not only on the cores themselves but also on the butts of the flakes that are produced from their platforms. Accordingly, the distribution of flakes with prepared butts can also be used to assess areas where platform maintenance has been practiced.

As was shown in Section 4.3.8, flakes with prepared butts are relatively uncommon within the assemblage occurring on under 6% of all flakes (Table 4.6). In addition, the different types of prepared butts are present in uneven proportions with some much less common than others. Due to the low numbers involved, the best overall impression of the distribution of flakes with prepared butts can be gained by assessing the combination of all of them together (i.e. trimmed, faceted, punctiform and trimmed and faceted) (Plate 34). The comparison of this distribution with the density of all flakes indicates similarity between the two. In other words, the frequency of flakes with prepared butts varies in relation to the overall density of worked flint, with all of the major concentrations of flakes also showing increases of flakes with prepared butts. However, the differences in the relative proportions of different butt types presented in Section 4.3.8 also indicated that within this general pattern there *are* differences in the proportions of flakes with prepared butt types between sample areas. Bearing this in mind, it can be seen that there are particularly dense concentrations of flakes with prepared butts at The Ditches (77), Well House (83), Stonehenge Triangle (54) parts of North of Cursus (52), and the northeastern part of King Barrow Ridge (57) (Plate 34).

The distributions of flakes with individual types of prepared butts are also mostly comparable to that of all types of prepared butts combined (e.g. Plates 34 and 35). Flakes with punctiform butts are the only individual type that varies significantly from this pattern. This type of butt preparation involves particularly careful preparation on the platform preceding removal. It is normally associated with blade production where the careful preparation on the platform serves to provide the desired control over the shape of the resultant flake. Accordingly, the flakes that are produced in this manner have small and well-trimmed butts (Inizan *et al.* 1992, 81). Although the techniques used to produce this type of butt preparation are the same as for other types, the degree to which they are applied is much greater. The qualitative differences between punctiform and other types of butt preparation may also be inferred from their relevant distributions. As suggested, flakes with other types of butt preparation tend to vary in relation to the overall density of flakes whereas flakes with punctiform butts are much less common and have a much more nucleated distribution. There is a very dense and discrete cluster of this type of flakes at The Ditches (77) as well as a slight cluster at Well House (83) and a significant concentration lying in the eastern half of New King (87) (Plate 36). The extent of the nucleation of this type of flake butt is noticeable because it contrasts so heavily with the dispersed distributions of most other attributes. Given this, the areas in which the concentrations occur are less surprising as they feature consistently amongst other attributes related to the systematic reduction of cores. This is the case at Well House (83) where the presence of flakes with punctiform butts accords well with the single platform and blade cores also found in the area. The two remaining concentrations of this type of flakes are a little more difficult to account for. In particular, there are no examples of conical blade cores in either of these areas and yet it is this type of core that is most likely to produce such flakes. This perhaps suggests that butt preparation using this method was practiced in the reduction of a variety of types of cores. The factor that may link them is the desire to exercise as much control as possible over the placement of blows on the platform and accordingly over the shape of the resultant flakes.

6.4.6 The distribution of retouched/utilised flakes

Looking at the distribution of retouched/utilised flakes represents a move away from the study of production to the study of consumption. The attributes studied so far have mostly been concerned with cores or the preparation of butts prior to the removal of flakes. In contrast, flakes that have been retouched have been altered after their removal from the core and the assumption is that the purpose of this is the maintenance of flakes as tools. As the current section is primarily concerned with studying the distribution of systematic forms of technology (i.e. production) it may seem surprising to include retouched/utilised flakes here. However as suggested, several areas with high proportions of systematic cores also have relatively high proportions of retouched flakes (Section 5.3.2.2; Table 5.12). In this respect, these areas resist simple classifications such as 'industrial' or 'domestic' in that they seem to represent both the production and consumption of lithic artefacts in the same locations.

As with many of the attributes discussed so far, there is broad comparability between the distribution and density of retouched/utilised flakes and of worked flint in general (Plate 37). Particular concentrations of these types of flakes occur in:

1) The east at The Ditches (77), Winterbourne Stoke Crossroads (50) and Normanton Bottom (67).
2) The south at Well House (83), Rox Hill (82) and Rox Hill (unsown) (86).
3) The north at North of Cursus (52).
4) Near Stonehenge at Stonehenge Triangle (54).
5) The west at Spring Bottom (78), Coneybury Hill (51) and the areas furthest to the east of King Barrow Ridge.

Given the wide-scale distribution of retouched/utilised flakes there is a noticeable lack of them at The Diamond (59) as well as the block of areas immediately east of King Barrow Ridge such as King Barrow Ridge (57) and Nile Clump (70). The lack of this type of flake in these locations is particularly notable as they appear to have high densities of material with all of the other attributes discussed so far. In addition, the difference is also marked because these areas lie in proximity to others with high densities of retouched/utilised flakes. This situation is of particular note for those areas immediately east of King Barrow Ridge as this area is consistently suggested by the SEP to have been a focus for 'domestic' activity (Richards 1990, 22-4; c.f. Richards 1984).

Within the broader distribution, some observations can also be made about the densities and distributions of retouched/utilised flakes. In particular, the highest densities of this material occurs in spatially restricted concentrations within the sample areas at The Ditches (77), Well House (83) and the eastern half of New King (87). The distribution in the latter area occurs in exactly the same part of the survey area as the concentration of flakes with punctiform butts (Plate 36 and 37). The distribution also spreads north into the Home Fields (72) sample area.

The other feature of the distribution of retouched/utilised flakes, is that in specific locations in the south of the survey area, at The Ditches (77), Winterbourne Stoke Crossroads (50) and Normanton Bottom (67), concentrations appear adjacent to rather than on top of the highest overall densities of flakes (Plate 38). Equally and perhaps more significantly, as the densities of flakes and cores are generally the same, they also occur spatially separated from the highest concentrations of cores. This shows that whilst statistical summary of sample area assemblages indicate the presence of high frequencies of both classically 'industrial' and 'domestic' activities, it is still necessary to view the spatial distribution of the material at a high resolution to see whether the two types of activities truly occur in the same locations. In the present case, the separation of activities connected with aspects of production and consumption does occur at a micro-scale. It is noticeable that this separation of activities occurs over the space of tens or hundreds of metres. This is in contrast to the broad divisioning of the landscape in terms of 'industrial' and 'domestic' activities that the SEP suggested (c.f. Section 2.3.1).

Local differences in this type of patterning can also be witnessed in other locations such as Well House (83) and Rox Hill (82), which in all other respects are most similar to the aforementioned areas. In these two areas, despite comparable concentrations of retouched/utilised flakes, they do not appear adjacent to areas of high densities of flakes and cores but in exactly the same locations (Plate 39). This shows that whilst in the previous cases there was spatial distinction between activities concerning the production and consumption of lithic artefacts, in these areas there is no such division with both activities occurring in the same places. In the case of Well House (83), this again shows the extent to which activities appear to have been spatially restricted to an extent not witnessed elsewhere in the survey area.

6.4.7 The distribution of tools

Given that the discussion has now moved towards the analysis of the consumption of lithic artefacts in the form of retouched/utilised flakes, it is necessary to also view the distribution of tools as a complimentary part of this pattern. These represent the more formal products of lithic technology, which like retouched/utilised flakes, were used to carry out basic tasks from the processing of foodstuffs to woodworking and the preparation of hides.

So far, there has been little discussion of the tools in the SEP assemblage. This is mainly because the analysis was concentrated upon debitage and the spatial structure of lithic producing activities (Section 3.2). In addition, no original analysis was conducted upon the assemblage of tools. Instead, a computer database was created from the SEP tool catalogue. The only exception to this was the few examples of tools that had been missed during the SEP's original cataloguing of the material and were identified during the analysis of debitage for the current project. These data have been added to the SEP's tool catalogue and the combination of the two sources of data form the basis of the current analysis.

A wide variety of tools was collected by the SEP and these range from *ad hoc* types such as miscellaneous bifacial core tools and rough Y-shaped tools to more formal examples such as ground flint axes and leaf shaped arrowheads. Equally, it is clear from those types that are chronologically sensitive, that the tools in the assemblage are derived from a long time period stretching from the Mesolithic through to the Early Bronze Age. Despite this, it is necessary in the current circumstances to deal with the assemblage as a whole. This is mainly because there is a need to compare the *whole* of the assemblage of debitage with the *whole* of the assemblage of tools (Plate 40). In this respect, it is important to note that there is a reasonable basis to suggest that the majority of tools are derived from a restricted period representing the Late Neolithic and the Early Bronze Age (Section 8.3). This at least lessens the time depth involved in the analysis and makes the results more meaningful in archaeological terms. Furthermore, the chronological aspects of the assemblage of tools will be discussed in more detail in Section 8.3.3.1.

As with many aspects of the assemblage, there is a general correlation between the distribution of tools and the distribution of worked flint as a whole (Plate 40). In this respect, areas with large quantities of tools also generally have large quantities of flakes and cores. This shows the extent to which all of the activities that produced these different categories of lithic material took place in all areas. This feature of the assemblage does much to indicate that there were many locales with the Stonehenge Environs in which a variety of activities took place and that in terms of lithics these local areas were essentially self-sufficient. This idea was central to the interpretation of the level of homogeneity between sample area assemblages discussed in Chapters 4 and 5.

Within this pattern of covariation between different parts of the assemblage particularly dense concentrations of tools can be identified in the Wilsford and Winterbourne Stoke area, just to the west of Stonehenge at Stonehenge Triangle (54) and in the extensive area North of the Stonehenge Cursus. Especially in these latter two areas there is a close relationship at a micro-scale between locations within sample areas with dense scatters of debitage and those with dense scatters of tools (Plate 40).

In contrast to these aspects of covariation, there are some interesting differences between the distribution of tools (Plate 40) and the distribution of retouched/utilised flakes (Plate 37). In key parts of The Diamond (59), The Ditches (77), Well House (83), New King (87) and King Barrow Ridge (57); areas with low quantities of retouched utilised flakes have dense concentrations of tools and *vice versa*. Interestingly, at The Diamond (59) and The Ditches (77), whereas it was previously argued that there was a displacement of different activities, with the locations of retouched/utilised flakes occurring adjacent to areas of dense scatters of debitage (Section 6.4.6), the concentrations of tools occur in the *same* locations as those of debitage (compare Plates 38 and 40). The differences between the locations of the practices connected to these two types of artefacts perhaps indicates differences in understandings of the appropriate contexts in which retouched/utilised flakes were to be used compared to other types of tools. However, the understanding of this pattern is complicated by the range of different types of tools contained in the database. Given this, it should be noted that just over 74% of all tools were scrapers. Knowing this does little to help with the interpretation of the pattern because scrapers were used in an expedient fashion and were applied in a huge variety of daily tasks. However, in contrast to the distribution of retouched/utilised flakes, the presence of concentrations of tools in the same locations as dense scatters of debitage does much to suggest that the extraction and working of nodules was only one of a number of activities that took place in these locations.

Another method of analysing the distribution of tools across the survey area is to look at the differences in the ratios of cores, tools and flakes from individual sample area assemblages (Plate 41). Although, this approach does not indicate the differences in quantities of the different components of the assemblage, it does show differences in their *composition*. This provides information about the relative emphasis within assemblages from different sample areas on, for example, the production of flakes or the use of tools.

In general, it can be seen that there is a high degree of similarity in the ratios of cores, flakes and tools between all of the sample areas assemblages (Plate 41). For example, as is to be expected, it is clear that in terms of quantity, flakes predominate in all areas to a similar extent. Within this pattern, there are several areas that have relatively high or low proportions of tools. The most clear example of an area with a high proportion of tools, and one noted by the SEP (Richards 1990, 24), is King Barrow Ridge (57) and to a lesser extent its neighbour King Barrow Ridge Addit. (81). Indeed, this was one of the main reasons why the project suggested this to be an area of 'domestic' emphasis. Although it has been suggested that the use of such labels are of limited use in the present context (Section 2.3.1.4.2), it is still clear that in comparison to other areas, the activities that took place near King Barrow Ridge relied more heavily upon the use of formal types of tools. However, the extent of this reliance should not be overstated. Although the tools from King Barrow Ridge (57) represent 7.6%, the average from proportion from all sample areas is just under 3%.

The most notable areas with low proportions of tools are The Ditches (77) and Well House (83) (Plate 41). This is despite the fact that these areas had relatively high densities of retouched/utilised flakes (Section 6.4.6). Given, this pattern it is tempting to suggest that these are areas where flintworking was more focused upon the extraction and reduction of nodules rather than the use of their products. However, given that it is the relative proportions of different parts of the assemblage that are indicated in Plate 41, it is equally possible that the low proportion of tools in these areas is actually a feature of the particularly profligate use of flint (therefore producing larger numbers of flakes). In this respect these two areas have some of the densest scatters in the survey area. Hence, if rather than looking at the proportions of cores, flakes and tools, the amount of tools per ha. is analysed a slightly different pattern is produced. In this case, the figure of 8.0 tools per ha. at The Ditches (77) is actually quite similar to the 9.7 tools per ha. from King Barrow Ridge (57). This tends to suggest that in terms of the density or intensity of activities requiring the use of tools, there was little to separate these two areas. In contrast, at Well House (83) there are 3.3 tools per ha., which again shows that there was a different emphasis in this particular location and that probably more importance was placed upon the working down of nodules in this area that in most others in the Stonehenge landscape.

Another feature of the proportions of different components of the assemblage from different sample areas is that many of the areas with the lowest densities of worked flint also have relatively low proportions of tools (Plates 2 and 41). This is the case for the sample areas at either end of the Stonehenge Cursus and especially for those that are situated upon Normanton Down such as Aerodrome (79), South of Stonehenge (55) and Normanton Down (56). These differences perhaps give a clue as to the types of (lithic producing) activities that took place in these locations in that, as well as being relatively infrequent; they also were not the type that required the use of prepared types of tools. There are low frequencies of even simple tool types such as scrapers in these sample areas. This perhaps shows that whatever were the activities that took place on Normanton Down; they required little more that than the expedient use of flint and perhaps simple flakes were all that was needed to suit most tasks.

6.4.8 Summary

The last part of this chapter has been primarily concerned with mapping the distributions of a restricted set of attributes, which in the statistical analysis highlighted the systematic character of technology in certain sample areas. In general, it has been found that the results of the statistical analysis have been confirmed through this subsequent spatial analysis. The areas that have once again been highlighted are primarily those along the sides of the dry valleys in the south and west of the study area as well as those to the east of King Barrow Ridge. The plotting of material at the resolution of the original collection grid also indicates that in some of these locations the systematic reduction of cores occurred in spatially restricted areas with varying levels of nucleation. The fact that several corroborating types of attributes on both flakes and cores have been used to indicate the presence of the same approach towards core reduction strengthens suggestions that there is something different about a proportion of the material in these areas compared to the assemblage of debitage.

In addition, a discussion of the distribution of tools and their proportions within sample areas has further enriched our understanding of the similarities and differences between areas and the types of practices that took place within them.

6.5 Conclusion

This chapter has presented an analysis of the spatial distributions and densities of the sample of the SEP material recorded for this project. Some of this material could not be dealt with in the previous statistical analysis mainly due to the small numbers involved. Other aspects of the analysis built upon observations already made. This approach was necessitated by the level of detail of the recording strategy and the complexity of the dataset, which was broken down more readily by descriptive statistical analysis. However, the statistical analysis was predicated upon the differences *between* sample areas and the primary concern of the spatial analysis was to see if the same patterns also occurred *within* them. Accordingly, the analysis has revolved around the concepts of the homogeneity and variation that were previously identified in the assemblage. In many cases, the subsequent analysis confirmed patterns identified using descriptive statistics. Yet, even in these instances understanding was moved forward as the spatial distributions of different materials could be assessed. These indicated the extent to which activities were concentrated in locations within sample areas. This approach also allowed an assessment of the topographical locations of the material under study and it was possible to show how this affected the locations of some activities.

Having completed the current analysis it is now apparent that the majority of the material in the survey area represents an unsystematic approach towards core reduction, the products of which are generally broad flakes. Although in differing densities, this type of working occurs throughout the study area and in some cases in very extensive and dense spreads. However, it is clear that whilst the vast majority of lithic working in the Stonehenge landscape was undifferentiated, unsystematic and ubiquitous, there were times and places in which a different approach was adopted. To understand the full significance of this pattern it is necessary to present a discussion that brings together the many types of analysis that have been presented so far. Once this has been done, the ultimate goal is to generate an understanding of the character of inhabitation of the Stonehenge landscape. This will involve the reintegration of the material studied here with our knowledge of the rest of the archaeology that exists in the area. The extent and character of lithic producing activities can now be understood more fully than at any time before and it is important to see how these activities were articulated in a landscape so heavily populated with ritual monuments.

However, before this final discussion takes place it is necessary to place the ploughsoil assemblages from the Stonehenge Environs within their regional context. The next chapter seeks to do this by comparing the results of a variety of landscape survey projects carried out in southern Britain.

Chapter 7: Placing the Stonehenge Environs in a Regional Context: A Comparative Analysis of Landscape Surveys in Southern Britain

7.1 Introduction

Chapters 4, 5 and 6 have involved the analysis of the ploughsoil assemblages from the Stonehenge Environs from a number of different perspectives. Interpretation of the data has gone far in elucidating the character of inhabitation of the Stonehenge landscape in terms of the practice of lithic technology. However, before understanding the full significance of these results it is necessary to place these findings within their regional context. In this respect, there is no basis for viewing the Stonehenge landscape as an isolated entity. This is particularly so given the potential mobility of Neolithic communities. Equally, the scale of activity, the presence of certain artefact types such as stone axes, the stones from Stonehenge and the form of the monuments all hint towards the place of the Stonehenge Environs within wide-scale, regional and inter-regional networks.

In order to place the ploughsoil assemblages from the Stonehenge Environs within a regional context it is necessary to compare the material from this area with those from other landscapes. The first half of this chapter is concerned with the methodological issues concerned with making such comparisons. The second half discusses the results of the comparative analysis and moves on to discuss the significance of the findings to our understandings of the Stonehenge landscape. It will be shown that important results can be generated that should impact the way in which we view inhabitation within the Stonehenge Environs. Before proceeding, it is first necessary to discuss in a little more detail the rationale behind the current analysis.

7.2 Comparing landscapes

At the most general level archaeological assemblages are often interpreted through analysis of the presence or absence of variation over time and/or space. For the material under study for this project this variation can be understood at two main levels. That is variation *within* the Stonehenge landscape and variation *between* different landscapes/regions.

Both levels are essential but for quite different reasons and concurrently they facilitate the investigation of different types of questions. The study of variation (or the lack of it) within a single landscape is of course necessary for the understanding of the organisation of practice at a micro-scale. This is an important level of analysis in later prehistory as it is the one at which the composition and scale of ploughsoil assemblages can be best understood in relation to landscape, topography and most archaeological contexts (principally monuments).

Alternatively, analysis of variation in ploughsoil assemblages between different landscapes frames questions at a regional and inter-regional scale. Unlike those questions posed at a micro-scale they allow the understanding of a specific landscape context *in relation* to other landscapes. Such questions are equally important and allow a different type of assessment of how typical or unusual the overall picture of activity within a landscape may be. The ability to tack back and forth between analytical scales is important in any study of landscape and this is especially the case in the study of the Neolithic and Early Bronze Age when societies may have retained a significant degree of mobility. For example, visits to flint mines, stone axe sources, the gathering of seasonal foodstuffs and the movements of herds, all of which were of importance during this period, would have required certain members of communities to visit a variety of different landscapes on a periodic basis. Hence, it is wrong to talk of groups as inhabiting any single landscape or location. If the Stonehenge landscape is also understood to be just one amongst a number of places that Neolithic and Bronze Age people would have visited then the full character of its inhabitation can only be understood through reference to other landscapes.

In practice what the interpretation of differences in ploughsoil assemblages between landscapes or regions requires is the analysis of material collected by different projects. Whilst in an ideal case this analysis might involve the direct comparison of the actual material from different projects, this is of course impossible due to the immense amount of time it would involve. Therefore, what is required is the comparison of assemblages based upon project publications.

It seems obvious that such comparisons should be made given that in Southern Britain and Wessex in particular the 1980s witnessed a sudden burst of large ploughsoil-based survey projects aimed at providing details of a poorly understood settlement context (e.g. Gardiner 1984; Holgate 1988; Woodward 1991; Sharples 1991a; Richards 1990; Barrett *et al.* 1991; Gaffney and Tingle 1989). Yet all of these projects remain relatively poorly understood and more importantly, stand in isolation from each other.

Yet, several of these (the South Dorset Ridgeway Survey, the Maiden Castle Survey and the SEP) were specifically designed as sister projects whose methodologies and therefore results were supposed to be comparable[1]. In addition, as the number of such projects grew during the 1980s so did the basic awareness of ploughsoil assemblages and there was some attempt to standardise collection methodologies. This is witnessed in the acceptance by several projects of a standardised collection grid spaced at 25m intervals aligned on the National Grid based upon the then Trust for Wessex Archaeology field collection system (e.g. Ford 1987a, 11; Gaffney and Tingle 1989, 15; c.f. Woodward 1978)

Given the above it is indeed strange and somewhat reprehensible that a comparative analysis of different landscape surveys has not previously been attempted in any detail. Even the South Dorset Ridgeway Survey and the SEP ultimately failed to directly compare their results. Indeed in general Woodward felt that analysis of such a:

> "...mass of data...would require considerable processing and assessment to allow detailed cross correlation and comparison." (Woodward 1991, 122).

Yet the voracity of Woodward's statement must be questioned. As will be seen there are of course problematic issues involved in the comparison of material from different projects. However the extent to which they are considered insurmountable depends largely on how directly comparable in 'statistical' terms one wants the results to be. It will be shown that a relatively rapid comparison can be made between projects and although there may be some issues involved with the final results they are not serious enough to negate the overall significance of the findings.

[1] Furthermore, all of these projects were conducted by the Trust for Wessex Archaeology.

7.2.1 Project selection

The selection of landscapes that can be used in a comparative analysis is restricted to those in which survey projects have been carried out that have been published in enough detail to provide the required data. It also seems logical to select material from projects conducted in reasonable proximity to each other; in this case southern Britain or preferably Wessex.

Within the limitations of projects available for analysis a variety have been chosen. Some have been selected because of their similarity in terms of geology, topography and archaeology. Given the uncommon character of the upstanding archaeology in the Stonehenge Environs, these projects are from some of the other 'core areas' of Wessex (Bradley 1984), namely the South Dorset Ridgeway and the Avebury region (Woodward 1991; Whittle *et al.* 2000). It is highly desirable to add a new dimension to the comparison of these areas because previous interpretations have been orientated around the discussion of monuments (c.f. Chapter 2). In this respect, some of the surveys used here *have* explicitly set out to determine the settlement pattern in their respective areas (Woodward 1991, 2-5; Richards 1990, 9). However, it is a different approach to compare the character of ploughsoil assemblages *between* areas in order to assess whether the character of inhabitation is constant in relation to the presence of monuments. It will be shown in this chapter that characterising the inhabitation of a landscape should not be contemplated without some understanding of whether the *scale* and *composition* of ploughsoil assemblages in an area are typical or extraordinary.

In contrast to the previously mentioned projects, others have been chosen for their incomparability, at least in terms of their archaeology. These projects include the Middle Avon Survey and the Upper Meon Valley Survey, both conducted by Schofield (1987; 1988; 1991c). Part of the original emphasis of this work was to survey previously neglected landscapes away from monumental complexes. This decision is welcomed as these projects provide a contrast to the core areas of Wessex and the opportunity to see how the intensity of inhabitation varies in relation to these differences.

Lastly, some projects have been selected because they have covered large areas of landscape and a much wider range of geology and topography. It is important to assess this level of variation in relation to the character of stoneworking practices in order to provide a context for understanding the nature of practice in the particular landscapes viewed in the other projects, many of which are dominated by the chalk (Table 7.1).

Survey Name	General Topography	Neolithic and Bronze Age Archaeology
South Dorset Ridgeway and Maiden Castle Survey	Varied topography. Dominated by upland and lowland landscapes. Some River valleys.	Rich and dense monumental sequence including all major classes. Comparable to Stonehenge and Avebury.
Middle Avon Valley Survey	Varied topography dominated by the Avon Valley	Few monuments. Little known archaeology.
Upper Meon Valley Survey	Small chalkland river valley	A few long barrows and a reasonable quantity of round barrows.
East Berkshire Survey	Varied Topography. Chalk overlain by drift deposits.	Relatively sparse monumental sequence including a causewayed enclosure and some round barrows and ring ditches
North Stoke Survey	Chalkland landscape dominated by the Thames and other river valleys	Very sparse monumental sequence including one possible bank barrow and one round barrow
Windmill Hill Survey and Avebury Region	Chalkland landscape. Moderately varied topographically, some dry and river valleys.	Rich and dense monumental sequence comparable to the South Dorset Ridgeway and Stonehenge
Maddle Farm Project	Varied topography. Some Chalk down land, dry valleys, and hills.	Some monuments including two long barrows, a few round barrow cemeteries and ring ditches

Table 7.1: Summary of landscape survey projects used in the analysis.

In summary, in terms of geology chalk dominates the landscapes of all of the projects selected. Within this the South Dorset Ridgeway Survey (Woodward 1991), the Maiden Castle Survey (Sharples 1991a), the Middle Avon Valley Survey (Schofield 1987; 1988), the Upper Meon Valley Survey (*ibid.*; 1991c), the Windmill Hill Survey (Whittle *et al.* 2000) and the Maddle Farm Project (Gaffney and Tingle 1989) are all entirely chalkland landscapes. The East Berkshire (Ford 1987a) and North Stoke Surveys (Ford 1987b) contain extensive areas of varied drift deposits representing a range of different geologies.

In terms of prehistoric archaeology the projects can be split into two rough groups (Table 7.1). The South Dorset Ridgeway Survey (Woodward 1991), the Maiden Castle Survey (Sharples 1991a) and the Windmill Hill Survey (Whittle *et al.* 2000) come from areas with very dense distributions of monuments and with monumental complexes that incorporate the entire range of Neolithic and Bronze Age ritual monuments.

In contrast, The Maddle Farm Project (Gaffney and Tingle 1989), the Middle Avon Valley Survey (Schofield 1987; 1988), the Upper Meon Valley Survey (*ibid.*; 1991c), the East Berkshire Survey (Ford 1987a) and the North Stoke Survey (Ford 1987b) all contain some elements of the range of Neolithic and Early Bronze Age monuments. For the most part these monuments are long barrows, round barrows and ring ditches. However, they are relatively sparsely distributed and in much smaller numbers than in areas such as Stonehenge, Avebury and the South Dorset Ridgeway.

As can be seen there is great variety in the character of the landscapes in which the projects that are included in this analysis were conducted. This level of variation is critical for framing several important questions regarding the nature of landscape inhabitation and the relationship of routine life to the places, times and practices represented by monuments.

7.2.2 Issues of comparability

Although it was suggested above that there was an attempt by some projects to standardise collection grids, it will be shown that there is a potential for variation in just about every aspect of the collection, analysis and presentation of ploughsoil assemblages. Therefore, in order to understand the significance of the comparison between different survey projects it is first necessary to understand how the data were derived.

The variation encountered between projects results from differences in:

1) Project objectives
2) Collection methodologies
3) Analysis methodologies
4) Data presentation
5) Post-depositional processes

7.2.2.1 Project objectives

Project objectives are perhaps the most influential of all factors affecting variation between different projects. It is an essential part of problem-orientated methodologies that early choices concerning project objectives rightly underlie all subsequent decisions made during a project. Therefore, all of the other issues listed above (excluding 5) are directly influenced by project objectives, as they are the tools with which they are supposed to be met.

One particular example of the effect of differing project objectives is the choice over the sizes and locations of survey areas. Choices over the area of the landscape to be investigated and the proportion of this landscape that will be sampled obviously vary from project to project according to their original objectives. For example the SEP set out:

> "...to show that the area [was] also unique in terms of its prehistoric settlement record, demonstrating a range and density of human activities hitherto unstudied and essentially unknown." (Richards 1990, 9).

Therefore, the choice of the study area centred around a coherent landscape determined partially by the extent of the concentration of monuments and partially by previous work through the acceptance for the most part of the RCHME's definition of the 'Stonehenge Environs' (an area of roughly 8x6km) (*ibid.*, 1; RCHME 1979). Hence, the coverage of the project is comparatively intense with survey area boundaries predicated to a certain extent by the character of the archaeology in the area as opposed to any topographical or geological variation[2].

In contrast, other projects set out with quite different objectives. Both the East Hampshire Survey (Shennan 1985) and the East Berkshire Survey (Ford 1987a) were carried out in areas where, compared to the Stonehenge Environs, little was known of the archaeology. Both also lacked the range and density of monuments of the latter landscape. In addition, both explicitly set out to examine the relationship between human exploitation and ecological variables understood through surface geology (Shennan 1985, 5; Ford 1987a, 5). It was this decision that determined the extent and location of the survey areas in that both were designed to take in as large

---

[2] In actuality the geology of the Stonehenge Environs is composed entirely of Middle Chalk.

a variation in surface geology as possible. Due to this, and also probably because the general density of material in the areas was relatively low, the survey areas for these projects are much larger than that chosen for the SEP. The East Hampshire Survey covers an area of 15x10km whilst the East Berkshire Survey covered a single transect of roughly 25x6km. In addition, the intensity of surface sampling within the study area was lower than that of the SEP. Ultimately the East Berkshire Survey walked three times as many hectares as the SEP but collected only a fraction of the material (Tables 7.2 and 7.3).

At the opposite range of the spectrum, some fieldwalking projects have not been conducted as part of such large-scale surveys. They have instead been targeted towards answering more specific questions or have taken place within ongoing projects whose approaches are not so heavily orientated towards surface collection. The work that has taken place around Avebury by, amongst others, Alasdair Whittle and Joshua Pollard is an example of just such a project (e.g. Whittle 1993; Whittle 1994; Whittle 1997b; Whittle *et al.* 1993; Whittle and Pollard 1998; Whittle *et al.* 1999). Although the work has concentrated largely on excavated contexts and field monuments, some detailed systematic field collection has occurred on a relatively small scale. The main example of this is the collection from a single field on the south slope of Windmill Hill called North Field, which covers an area of roughly 1x1km (Whittle *et al.* 2000).

As can be seen, the geographical scale of different episodes of surface collection varies immensely according to individual project objectives. For larger projects there is an inevitable variation in the intensity of prehistoric activity over the large areas of the landscape covered by projects like the East Berkshire Survey (Ford 1987a). This can make comparisons with episodes of much more focused collection such as that carried out adjacent to Windmill Hill (Whittle *et al.* 2000) difficult. However, most of the projects included in the current analysis are large scale, which should make the results broadly comparable in these terms. Despite the small scale of the collection the results of Whittle *et al.* (2000) are included because of the importance of the area and the lack of other published surface collections from the Avebury region.

Area Name	Area No.	Geology	Total Flint	Hectares Walked (ha.)	Line Spacing (m)	Flint/ha.	Prop. of Cores (%)	Prop. of scrapers (%)	Prop. of retouched flakes to measured flint (%)	Prop. of waste flakes to measured flint (%)	Prop of tools in assemblage (%)
Winterbourne Stoke Crossroads	50	Middle Chalk	4493	17.6	25	254.92	9.93	3.49	3.58	87.40	4.16
Coneybury Hill	51	Middle Chalk	7588	42.6	25	178.02	7.04	2.56	3.49	88.28	3.15
N. of Cursus	52	Middle Chalk	11655	27.3	25	427.71	10.48	2.22	3.57	85.63	2.77
S.H. Triangle	54	Middle Chalk	8748	33.5	25	261.13	5.48	2.74	2.71	92.04	3.98
South of S.H.	55	Middle Chalk	1639	31.1	25	52.66	7.32	0.61	1.17	91.82	0.73
Normanton Down	56	Middle Chalk	466	26.8	25	17.42	13.95	1.72	0.00	87.04	1.93
King Barrow Ridge	57	Middle Chalk	4373	34.1	25	128.15	5.65	6.08	0.33	92.23	7.59
The Diamond	59	Middle Chalk	4068	20.8	25	196.05	10.28	3.86	1.54	87.54	4.94
Woodhenge	60	Middle Chalk	2934	16.6	25	176.48	7.50	2.42	2.22	89.70	2.83
Normanton Gorse	61	Middle Chalk	300	10.5	25	28.57	3.67	3.33	2.13	93.62	4.33
Cursus West End	62	Middle Chalk	2366	64.3	25	36.82	10.23	1.23	2.08	88.26	1.65
Fargo Road	63	Middle Chalk	3591	34.1	25	105.23	7.44	3.06	1.22	92.46	3.98
Horse Hospital	64	Middle Chalk	2977	21	25	141.76	7.73	5.07	2.99	90.41	6.32
Durrington Down	65	Middle Chalk	3031	26.4	25	114.92	7.16	4.32	1.79	92.11	5.18
Sewage Works	66	Middle Chalk	482	8.6	25	55.88	8.09	1.45	0.80	92.00	1.87
Normanton Bottom	67	Middle Chalk	2529	12.1	25	208.58	9.96	0.87	7.13	83.11	1.66
West Field	68	Middle Chalk	3856	24.6	25	156.59	3.86	2.80	1.84	92.65	3.48
King Barrow Ridge East	69	Middle Chalk	2330	19.9	25	117.23	4.16	1.80	3.03	94.13	2.10
Nile Clump	70	Middle Chalk	1265	15	25	84.33	8.06	1.90	1.69	86.78	2.29
Railway	71	Middle Chalk	3335	19.5	25	171.03	5.28	1.86	3.63	90.66	2.40
Home Fields	72	Middle Chalk	3409	20.8	25	164.29	4.25	1.29	5.37	90.74	1.61

Table 7.2: Flint density and assemblage composition of material from the Stonehenge Environs Project (part 1 of 2).

Area Name	Area No.	Geology	Total Flint	Hectares Walked (ha.)	Line Spacing (m)	Flint/ha.	Prop. of Cores (%)	Prop. of scrapers (%)	Prop. of retouched flakes to measured flint (%)	Prop. of waste flakes to measured flint (%)	Prop of tools in assemblage (%)
Whittles	73	Middle Chalk	806	6.8	25	119.41	3.85	1.49	1.63	95.11	1.86
Pig Field	74	Middle Chalk	475	6.5	25	73.08	6.74	2.32	1.68	90.76	2.74
Bunnies Playground	75	Middle Chalk	1466	8	25	183.25	6.21	2.18	1.92	94.57	2.66
Destructor	76	Middle Chalk	473	9	25	52.56	9.30	1.06	0.81	92.74	2.11
The Ditches	77	Middle Chalk	2752	6.1	25	449.31	4.69	1.34	5.48	86.93	1.78
Spring Bottom	78	Middle Chalk	5594	23.6	25	236.78	3.90	1.61	5.38	91.08	1.97
Aerodrome	79	Middle Chalk	753	16.4	25	45.98	11.69	0.53	0.99	84.16	0.93
Ammo Dump	80	Middle Chalk	540	13.9	25	38.92	11.48	1.11	1.88	85.00	1.67
King Barrow Ridge Addit.	81	Middle Chalk	484	4	25	121.00	7.64	1.86	2.80	89.72	3.72
Rox Hill	82	Middle Chalk	4279	27.3	25	157.03	6.12	2.55	4.76	86.69	3.44
Well House	83	Middle Chalk	1313	4.9	25	269.33	6.70	0.69	9.64	79.64	1.22
Luxenborough	84	Middle Chalk	1661	13.9	25	119.71	8.31	0.48	1.79	90.05	1.14
South of Cursus	85	Middle Chalk	380	12.8	25	29.80	15.79	2.11	0.00	87.60	2.11
Rox Hill (unsown)	86	Middle Chalk	2254	11.4	25	198.15	5.77	0.71	8.22	85.37	1.24
New King	87	Middle Chalk	1655	20.8	25	79.76	4.95	2.18	8.56	85.57	2.66
Normanton East	88	Middle Chalk	1274	29.5	25	43.19	7.14	2.35	1.99	91.74	3.06
Lake Bottom	89	Middle Chalk	199	2	25	99.50	2.51	0.50	0.00	97.78	2.01
Wood End	90	Middle Chalk	382	10.8	25	35.53	8.38	4.19	1.98	90.10	4.19
Total	-	-	102175	754.5	-	135.42	7.14	2.49	3.28	89.24	3.18
Mean	-	-	2620	19.3	-	139.23	7.40	2.15	2.88	89.56	2.81

Table 7.2 (continued): Flint density and assemblage composition of material from the Stonehenge Environs Project (part 2 of 2).

7.2.2.2 Collection methodologies

Decisions about how material will be collected from the surface of ploughed fields also affect the comparative potential of projects. Collection methodologies determine the proportion of the surface that will be walked and from which material will be picked up. The most basic requirement is for a consistent and systematic collection throughout the course of a project. This may seem obvious but it should be remembered that the history of fieldwalking early last century by people such as the Rev. H.G.O. Kendall and A.D. Passmore around Avebury were more or less *ad hoc* collections (Whittle *et al.* 2000; Holgate 1984; 1987). In addition, as they were also often heavily biased towards tools their incorporation in current studies is problematic (Gardiner 1984). Indeed it was not until the late 1970s with the gradual acceptance of the importance of sampling strategies in all areas of archaeology (e.g. Cherry *et al.* 1978) that systematic sampling of surface populations by the use of predetermined collection grids was widely adopted (e.g. Woodward 1978).

Fortunately since that time nearly all survey projects, including all those used here, have adopted this approach. What this means is that the collection and recording of material conducted for these projects took place on a regularly spaced grid (e.g. Plate 49), most usually aligned on the national grid.

One project that unfortunately has not conformed to this pattern is the East Hampshire Survey (Shennan 1985). It seems odd for a project whose emphasis was orientated towards the importance of sampling and statistical analysis but the spacing of the collection lines were not uniform. They were not measured but paced and an unknown quantity were at 30 pace intervals whilst others were at 15 (*ibid.*, 10). Although some data for the density of material/ha. are presented (*ibid.*, 50), as it is not known what proportion of the surface material the data represent they cannot be included in the current analysis[3].

Whilst different decisions have often been made about the appropriate dimensions of collection grids (i.e. the spacing *and* length of collection lines), it is not the grid that affects the amount of material collected and concurrently the comparative compatibility of projects. The size of the collection grid determines the spatial

[3] It should be mentioned that some data for the East Hampshire Survey (Shennan 1985) are presented per 100m of walked line rather than per hectare but no other project has presented its data in this way.

resolution with which collected material can later be *analysed*, whereas the spacing of the collection lines determines what *proportion* of the surface material is *collected*. As one of the basic comparisons of this analysis is the density of material it is essential to know what proportion of the surface material has been collected. Similarly, as the spatial resolution and distribution of the material from different projects is not included in this analysis, the length of collection lines is not relevant.

Despite the fact that all of the projects included in this analysis used systematically spaced collection lines, the spacing of these lines is not the same between projects. As a consequence of project objectives and as a reaction to varying densities of material in different landscapes, the collection lines in the projects presented here vary from 10m-50m apart.[4]

Given the differences in the proportions of the surfaces of fields that different projects have collected from it is necessary to compensate for the differences in the spacing of collection lines before the results from these projects can be considered comparable. Fortunately as the spacing of collection lines is constant within individual projects a simple calculation is all that is required to reconfigure the densities of material as they had all been collected on the same basis (Table 7.3). For the sake of convenience all of the figures have been recalculated as if they were collected from lines spaced 25m apart (the spacing used by the SEP).

There is one other issue concerning collection methodologies that also affects the comparative potential of different landscape surveys. This concerns the imposition by certain projects of collection corridors. As discussed, the proportion of surface material collected depends upon the spacing of collection lines. However, it also relies upon the distance either side of those lines from which material is collected. In this respect, there are some inconsistencies in suggestions of the size of a fieldwalkers 'natural' collection corridor. Whilst some estimate it to be a corridor roughly 2.5m-2m wide (Tingle 1987, 89; Richards 1985), others suggest only a 1m corridor (Ford 1987a, 11).

[4] For example, even though the Maiden Castle Survey (Sharples 1991a), the South Dorset Ridgeway Survey (Woodward 1991) and the SEP (Richards 1990) were designed as sister projects, all have collection lines that are spaced differently.

Project	Area Sub-division	Geology	Topography	Total Flint	Ha. Walked	Line Spacing (m)	Flint/ ha.	Adjusted flint/ ha.	Prop of Cores %	Prop of Scrapers (%)	Prop. of Retouched Flakes (%)	Prop. of Waste Flakes (%)	Prop. of Tools (%)	Data taken or calculated from:
SDR Survey	All	Varied: Mostly Upper Chalk some River Gravels	Varied: Upland, Lowland and River Valleys	38659	231.15	10	167.25	66.90	-	-	-	-	-	Woodward 1991
SDR Survey	1	Varied: River Gravels and Alluvium	River Valley	3634	51.75	10	70.22	28.09	6.96	5.26	28.45	57.65	6.93	Woodward 1991
SDR Survey	1b	Mainly Chalk	Lowland	1390	10.65	10	130.52	52.21	4.53	0.72	19.78	74.68	4.53	Woodward 1991
SDR Survey	2	Upper Chalk	Upland	3498	44.50	10	78.61	31.44	6.83	3.63	8.40	80.82	3.95	Woodward 1991
SDR Survey	3	Upper Chalk	Upland	2147	13.50	10	159.04	63.61	2.28	1.40	1.44	94.78	1.49	Woodward 1991
SDR Survey	4a	Upper Chalk	Upland	4106	27.75	10	147.96	59.19	6.02	2.51	5.53	84.90	3.56	Woodward 1991
SDR Survey	4b	Upper Chalk	Upland	15570	42.75	10	364.21	145.68	4.69	2.23	2.36	90.32	2.63	Woodward 1991
SDR Survey	4c	Upper Chalk	Upland	8314	40.25	10	206.56	82.62	3.40	2.35	1.94	91.91	3.40	Woodward 1991
Maiden Castle Survey	All	Mostly Upper Chalk	Upland, Lowland and River Valley	46789	322.60	25	145.04	145.04	4.69	1.08	1.70	91.11	1.10	Sharples 1991a
Maiden Castle Survey	W107	Unclear	Unclear	30350	184.70	25	164.32	164.32	3.60	0.71	2.06	91.81	1.04	Sharples 1991a
Maiden Castle Survey	W156A	Unclear	Unclear	9756	69.40	25	140.58	140.58	5.96	0.81	1.16	90.26	1.24	Sharples 1991a
Maiden Castle Survey	W156B	Unclear	Unclear	6683	68.50	25	97.65	97.65	7.74	0.81	0.84	89.21	1.14	Sharples 1991a
Middle Avon Valley Survey	All	Mainly Chalk	Varied	6450	402.40	15	16.74	10.04	-	-	-	-	-	Schofield 1987; 1988
Middle Avon Valley Survey	1	Gravel & Alluvium	-	566	28.00	15	20.21	12.13	5.00	7.70	28.60	-	-	Schofield 1987; 1988
Middle Avon Valley Survey	2	Valley Gravels	-	1833	70.60	15	25.96	15.60	3.50	2.70	19.20	-	-	Schofield 1987; 1988
Middle Avon Valley Survey	3	Lower Chalk	-	652	39.90	15	16.34	9.78	1.90	1.80	20.80	-	-	Schofield 1987; 1988
Middle Avon Valley Survey	5	Gravels & Sands	-	1992	141.80	15	14.05	8.43	3.60	4.10	22.80	-	-	Schofield 1987; 1988

Table 7.3: Flint density and assemblage composition of material from landscape surveys in southern Britain (part 1 of 3).

Project	Area Sub-division	Geology	Topography	Total Flint	Ha. Walked	Line Spacing (m)	Flint/ ha.	Adjusted flint/ ha.	Prop of Cores %	Prop of Scrapers (%)	Prop. of Retouched Flakes (%)	Prop. of Waste Flakes (%)	Prop. of Tools (%)	Data taken or calculated from:
Upper Meon Valley Survey	All	Upper & Lower Chalk	Chalk Downland some nr. River valley	5217	260.71	15	20.01	12.01	5.95	-	6.57	-	-	Schofield 1988; 1991c
Upper Meon Valley Survey	1	Upper Chalk	Relatively flat downland	3026	80.89	15	49.60	29.76	1.20	1.20	3.20	-	-	Schofield 1988; 1991c
Upper Meon Valley Survey	2&3	Lower Chalk	River side downland with some steep slopes	2191	179.81	15	14.50	8.70	8.50	2.00	8.80	-	-	Schofield 1988; 1991c
East Berkshire Survey	All	Very Varied	Varied	6533	2119.00	25	3.08	3.08	-	-	-	-	-	Ford 1987a
E. Berkshire Survey	-	Thames Gravel	-	783	202.00	25	3.88	3.88	-	-	-	-	-	Ford 1987a
E. Berkshire Survey	-	Upper Chalk	-	3378	452.00	25	7.47	7.47	-	-	-	-	-	Ford 1987a
E. Berkshire Survey	-	London Clay	-	387	964.00	25	0.40	0.40	-	-	-	-	-	Ford 1987a
E. Berkshire Survey	-	Reading Beds	-	1912	358.00	25	5.34	5.34	-	-	-	-	-	Ford 1987a
North Stoke Survey	All	Very Varied	Varied	9097	968.00	Prob. 25	9.39	9.39	-	-	-	-	-	Ford 1987b
North Stoke Survey	-	Gravel	-	1355	145.00	Prob. 25	9.35	9.35	10.20	-	-	-	-	Ford 1987b
North Stoke Survey	-	Lower Chalk	-	4604	436.00	Prob. 25	10.56	10.56	6.67	-	-	-	-	Ford 1987b
North Stoke Survey	-	Middle Chalk	-	2079	228.00	Prob. 25	9.12	9.12	7.73	-	-	-	-	Ford 1987b
North Stoke Survey	-	Upper Chalk	-	103	11.00	Prob. 25	9.39	9.39	10.00	-	-	-	-	Ford 1987b
North Stoke Survey	-	Older Coombe	-	796	88.00	Prob. 25	9.05	9.05	10.60	-	-	-	-	Ford 1987b
Windmill Hill Survey	-	Middle and Lower Chalk	Hillside	1091	71.00	50	15.37	30.73	2.57	3.85	1.83	81.67	-	Whittle *et al.* 2000

Table 7.3 (continued): Flint density and assemblage composition of material from landscape surveys in southern Britain (part 2 of 3).

Project	Area Sub-division	Geology	Topography	Total Flint	Ha. Walked	Line Spacing (m)	Flint/ ha.	Adjusted flint/ ha.	Prop of Cores %	Prop of Scrapers (%)	Prop. of Retouched Flakes (%)	Prop. of Waste Flakes (%)	Prop. of Tools (%)	Data taken or calculated from:
Maddle Farm Project	All	Chalk	Varied	39955	1792.00	25	22.30	22.30	4.68	-	-	92.60	2.71	Gaffney and Tingle 1989
Maddle Farm Project	Area 1	Lower Chalk	Edge of chalk scarp	199	43.00	25	4.63	4.63	1.00	6.03	0.50	92.46	6.03	Gaffney and Tingle 1989
Maddle Farm Project	Area 2	Middle Chalk	Edge of chalk scarp	219	24.00	25	9.13	9.13	0.91	3.65	0.46	94.98	3.65	Gaffney and Tingle 1989
Maddle Farm Project	Area 3	Middle and Some Upper Chalk	Hillside slope	2053	62.00	25	33.11	33.11	4.43	1.56	0.39	93.38	1.80	Gaffney and Tingle 1989
Maddle Farm Project	Area 4	Upper Chalk & prob. Clay-with-flints	Slope	563	11.63	25	48.26	48.26	0.18	0.18	0.00	99.64	0.18	Gaffney and Tingle 1989
Maddle Farm Project	Area 5	Upper Chalk & some Clay-with-Flints	Gentle slope	1674	40.50	25	41.33	41.33	0.96	1.08	0.30	97.55	1.19	Gaffney and Tingle 1989
Maddle Farm Project	Area 6	Middle & Upper Chalk and Clay-with-Flints	Slope of a dry valley	503	27.00	25	18.63	18.63	2.98	0.20	0.00	96.82	0.20	Gaffney and Tingle 1989
Maddle Farm Project	Area 7	Upper Chalk & Clay-with-Flint	Spur between two dry valleys	1392	17.25	25	80.70	80.70	2.01	0.65	0.29	96.26	1.44	Gaffney and Tingle 1989
Maddle Farm Project	Area 8	Middle Chalk	Slope	1369	14.50	25	94.41	94.41	2.70	0.66	0.29	95.84	1.17	Gaffney and Tingle 1989

Table 7.3 (continued): Flint density and assemblage composition of material from landscape surveys in southern Britain (part 3 of 3).

In general, differences in estimations of the size of collection corridors do not affect the comparability of data from different survey projects as we may assume that disregarding unpredictable variation (e.g. lighting, individual ability etc.) people will collect material from a roughly equal area. However, some projects such as the survey conducted in the south side of Windmill Hill have purposefully imposed a collection corridor (Whittle *et al.* 2000). For this project collection took place along 1m wide strips spaced 50m apart (*ibid.*, 137). Accordingly, in this case estimates of a walkers 'natural' collection corridor are important. If, as some suggest, a walker would normally collect from a 2m wide area then the survey at Windmill Hill would only have collected half as much material as other surveys. There is no immediate resolution to this issue. It is enough for now to be aware of this problem and to take it into account when viewing the data presented in this analysis. It should also be noted that the issue of varying collection corridors (also affected by surface conditions) has not received a prominent place in the sampling literature and for the sake of comparison, within as well as between projects, artificially imposed collection corridors warrant further consideration.

7.2.2.3 Analysis methodologies

Unlike the previous issue analysis methodologies do not concern comparisons of the *density* of surface assemblages, but of their *composition*.

Inconsistencies in the classification of material and variation in analytical methodologies are a significant problem in all areas of lithic analysis. It is of concern in the comparison of stratified assemblages as much as with unstratified ones. There are inconsistencies in the terminology used to describe the same attributes, particularly between America and Britain, just as there are in the way in which attributes are measured (Andrefsky 1998). Even the measurement of relatively simple metrical attributes such as length can be taken in several different ways (Plate 59). Definitions of simple categories such as primary, secondary and tertiary flakes also vary widely (e.g. Gaffney and Tingle 1989, 31; Ford 1987a, 20; Richards 1990, 22).

As the analysis has been conducted at a broad scale these discrepancies are lessened in the present case. No metrical measurements have been included and therefore it is only the categorisation of material that affects the comparability of data. The problem is lessened again because it is only the most basic categories that have been used (waste flakes, cores, scrapers, tools and retouched flakes).

Yet, as discussed in Sections 4.1.2.2, 4.1.2.3 and 5.2.5.1 classifying material to even basic categories can be problematic. For example, the definition between whether a large thick flake with heavy removals taken from one side should be recorded as a flake, retouched flake, rough tool or core can be a subtle one. Such factors are very hard to quantify and impossible without direct analysis of material. In this respect, the most positive aspect is that the categories of material used in analytical terms are the easiest to identify, which should minimise inconsistencies. It is though, a salient reminder that all of the data presented here and elsewhere, are not to be taken as absolute values. They are but the record of a plethora of individual incidences of quick decisions made whilst looking at a piece of knapped flint. Informed though they may be, they are sometimes informed from differing perspectives. Given this, the most basic requirement of lithic analysis is to be explicit about the nature of the analysis that has been conducted and to be consistent in the application of this approach.

Underlying these issues is the reality that sometimes the most important decisions do not concern how things are measured but what is measured. It is an obvious point but different projects have made different decisions about what attributes are to be recorded. Most often the problem with ploughsoil assemblages is the lack of analysis (c.f. Section 2.3.1). Accordingly some projects have not recorded some of the basic categories used here, which can be seen from some of the gaps in Table 7.3. However, enough data has been presented by the projects under consideration here to render the comparison between the assemblage compositions of different projects fruitful.

7.2.2.4 Data presentation

It is not only the extent of lithic analysis that limits analytical compatibility but also the amount of the data that is actually published. Every project presents its data in different ways. A major difference is between major surveys producing extended and often more detailed reports compared with smaller projects whose results are often presented as papers in journals or edited volumes. The latter sometimes never reach a fuller publication.

In terms of the presentation of data, the East Hampshire Survey displays many of the problems that can occur. For this project a detailed analysis was conducted on material from 55 fields. This included the recording of flakes, cores, extent of cortex, retouch, length and breadth. Yet, despite the report's emphasis on statistical analysis, a tabulated summary of the data is not presented and without this basic information comparisons with other projects remain tantalisingly limited. Accordingly the data from the project cannot be used here.

Furthermore, in nearly all cases it is rare for the full data to be presented anywhere other than in the project archive[5]. Therefore, what is presented for use by others is always in the form of summarised data. It can be difficult to assess exactly what categories of summarized data represent, as the original data from which these summaries have been deduced are not known. In addition, as the data cannot always be expected to be presented in the same way, it is sometimes necessary to make new calculations. For example the data presented in Table 7.4 have been adjusted so that the figures represent the total material collected as if all geologies had covered an equal amount of the collection area. The calculations are described in detail in the publication (Ford 1987b) and the adjusting factors are given so it is easy, though time consuming, to unadjust the figures. The problem is that the proportions of the different components of the assemblage and the densities of material are not presented. Calculating these data is not difficult but it is not stated whether the listed lithic categories are mutually exclusive or not. For example due to their definition, the categories of blades and flakes are mutually exclusive but it is not known whether the categories of waste flakes, cutting flakes and flakes with blade scars are contained within or separate to the totals for blades and flakes. In this case it has been decided that the categories were mutually incompatible and they have all been added together to gain required total of all worked flint. These data have also been checked against the East Berkshire Survey publication (Ford 1987a, Table 4) and there are gross

[5] Whilst it is realised that the complete data are not presented in project publications for practical reasons recent developments have presented new opportunities for the publication of data either on a CD ROM or on the World Wide Web. The full data from the lithic analysis for this project are presented on CD ROM.

differences in the figures presented that are not related to the issues outlined here. It is unclear why this is the case and for the present analysis the results from the survey publication have been favoured.

Geology	Area km^2	Percent. survey area	Percent walked	Adjusting factor	Blades	Flakes	Waste	Cutting	Flakes with blade scars	Blade cores	Cores
1. Gravel	2.88	15.05	50.35	13.19	2,282	13,089	-	-	686	763	1,055
2. Third terrace	0.24	1.25	83.30	96.03	96	4,902	-	-	96	96	384
3. Lower chalk	6.58	34.40	66.26	4.39	1,274	17,274	-	-	315	195	1,154
4. Middle chalk	5.70	29.79	40.00	8.39	830	15,136	-	-	125	165	1,183
5. Upper chalk	1.08	5.65	10.19	173.69	525	15,613	-	-	-	43	1,754
6. Older coombe	1.95	10.19	45.13	21.75	761	14,617	-	-	108	195	1,633
7. Young coombe	0.37	1.93	40.54	127.81	128	3,460	-	-	-	-	512
8. Clay-with-flints	0.27	1.41	66.67	106.38	318	5,744	-	-	-	-	744
9. Alluvium	0.07	0.37	100.00	270.27	540	1,080	-	-	-	-	

Geology	Area km^2	Percent. survey area	Percent walked	Adjusting factor	Blades	Flakes	Waste	Cutting	Flakes with blade scars	Blade cores	Cores
1. Gravel	6.11	6.30	33.10	165.86	4,312	103,828	44,782	9,620	1,990	663	4,147
2. Upper chalk	10.58	10.90	42.10	42.94	4,638	124,054	61,018	8,502	1,460	515	3,220
3. Clay-with-flints	0.49	0.50	-	-	-	-	-	-	-	-	-
4. London clay	31.11	32.20	31.00	6.85	192	1,884	781	397	110	55	116
5. Reading Beds	13.26	13.70	27.00	43.19	2,246	67,240	34,898	6,047	1,425	648	2,203
6. Plateau gravel	5.83	6.00	11.80	510.98	1,533	7,664	2,044	3,577	511	-	-
7. Bracklesham Beds	6.58	6.80	-	-	-	-	-	-	-	-	-
8. Bagshot Beds	7.68	8.90	3.10	868.96	869	8,690	43,449	-	-	-	1,738
9. Alluvium	6.33	6.60	7.50	684.98	1,370	17,124	7,535	2,055	685	2,740	2,740

Table 7.4: An example of tabulated data from the North Stoke Survey (top) and the East Berkshire Survey (bottom) (from Ford 1987b).

Similar problems exist with other categories of data. For example, the results of the survey at Windmill Hill are presented reasonably extensively (Whittle *et al.* 2000). However, in order to calculate the density and composition of the assemblage it is first necessary to work out the figure for the total flint. This raises questions as it is not known whether the 'total flint' that is elsewhere presented ready calculated, should include burnt flint (which often represents unworked or indistinguishable lumps). If they are excluded from the total, the proportion of waste flakes in the assemblage changes from 65% to 78%. A similar situation occurs with the Maiden Castle Survey data (Sharples 1991a). For this project core totals are given next to totals for worked lumps. However, in comparison it is not known whether other projects have made the same distinction and have excluded worked lumps from their totals for cores. It is not even clear whether they have recognised miscellaneous worked lumps as cores at all. For the data Maiden Castle survey cores and worked lumps have been grouped together to gain the total number of cores, as this classification is closest to my own method of analysis.

As can be seen, although many categories and calculations may seem straightforward when there is a need to work in detail with the data many unanswered questions begin to emerge. If the differences that can arise from inconsistencies in classification are small then the problems that occur may not be significant. However, particularly when dealing with assemblage composition the variation between assemblages can be minor, which exaggerates any inconsistencies. As with some of the other issues outlined in this chapter these unquantifiable factors need to be taken into account when viewing these or any other similar data. However, as the variation between projects is relatively large, it is suggested that these issues are less of a problem when dealing with gross comparisons of the densities of assemblages and it is these results that provide the most significant results for the current analysis.

7.2.2.5 Post-depositional processes

The post-depositional processes that affect ploughsoil assemblages have been a major concern of the literature on the subject for the last 20 years (e.g. Schofield 1988; Clark and Schofield 1991; Allen 1991; c.f. Section 3.5). This literature concerns the range of factors that affect materials in the period between their original deposition and their eventual collection from the surface of the ploughsoil. The major factors in this respect are land use history, topography, geology and soil type (c.f. Boismier 1991, 15). These factors may vary locally and quantification of their relative effects between different projects is almost impossible to assess. However, as far as possible there is some coherency within regional areas defined by broad similarities in "environment, climate and the nature and intensity of agricultural use" (Clark and Schofield 1991, 94). This is part of the reason that within the current analysis areas have been selected that are reasonably close together and there has been a preference for projects conducted upon the chalk.

One last factor warranting consideration is a post-depositional process of quite another kind. The actions in the past of avid collectors working on an unsystematic basis, who sometimes left little or no record of their activities, obviously affect the material remaining to be collected today. Such collections can be very localised and often took place over a considerable number of years. One such collector was the aforementioned Rev. Kendall who collected from all over the Avebury region around the beginning of the century (Whittle *et al.* 2000; Holgate 1987). It must be said that he was a conscientious man and we are lucky as he apparently collected all struck flint and recorded the locations from which they were found. However, it is still not possible to quantify the impact of such persistent action on the quantities and composition of material collected from the surface today. Equally, as the precise locations and collection methodologies he used are not known we cannot use the information from his collections to compare with current surveys (*ibid.*; c.f. Gardiner 1984)

In the Avebury region in general and around Windmill Hill in particular the problem is compounded because Alexander Keiller was openly willing to pay Kendall and others for surface collected material (Whittle *et al.* 2000, 134). Over the years thousands and thousands of artefacts entered his collection in this way. As payment was on the basis of the perceived quality of pieces it seems inevitable that collection in this area was biased towards certain artefact types.

As these types of activities were quite localised and probably concentrated around areas already of interest due to the presence of upstanding monuments this is another unquantifiable factor affecting the comparability of projects from different areas. However, many of these types of large-scale amateur collections took place before the Second World War (Holgate 1988, 91-2) and it was not until after this time that mechanised ploughing seriously increased the extent and depth of ploughing. As this process would have dramatically altered the amount of material that was incorporated into the ploughsoil, it could be argued that the problems connected with the early collectors are limited.

7.2.3 Summary

As discussed, there are many issues that mitigate against the direct comparison of the data from different survey projects. They are wide ranging and many are difficult to quantify. This is probably why Woodward (1991, 122) amongst others felt that to conduct such a project would be immensely time consuming, and hence why this has not been done before. However, the current contention is that these issues will be resolved by keeping the comparative analysis relatively more simple rather than by making it more complicated. That is why the elements of survey data that have been used in this analysis are directed towards the understanding of two simple factors. Those are the *scale* of activity, assessed through differences in the density of material and *character* of activity, assessed through the composition of assemblages. It should also be realised that the objective is not to generate an exact index of the intensity of occupation of these landscapes. The object is not to suggest that one landscape witnessed exactly ten times more occupation than another; rather it is enough to talk of gross differences in scale. The clearest assessment of the validity of this approach is the character of the results themselves and the degree of differences between different landscapes that they suggest.

7.3 The comparative analysis

Having discussed the issues affecting the comparison of material from different projects it is now time to look at the results of the analysis. The data from the SEP are presented in Table 7.2 and the data from the other projects are presented in Table 7.3.

7.3.1 Scale

The first and most notable variation in the data from the survey projects relates to the scale of lithic producing activities measured by the density of flint per hectare (Table 7.2; Table 7.3; Fig. 7.1). There is a considerable difference ranging from 0.4 flints per ha. to 449.3 flints per ha. Unsurprisingly, a major factor that affects the density of material is the type of surface geology. This can be seen clearly in the results from the East Berkshire Survey (Ford 1987a) where within one region there is considerable difference between material collected from London Clay, Thames Gravel and Upper Chalk with densities ascending in that order (Table 7.3).

Considering all of the data there is a general rule of thumb that the densities of worked flint are higher in areas with a chalk surface geology. Yet, it is also noticeable that within areas of chalk there is still a great deal of variation. In this respect it is perhaps not so much the type of surface geology as the character and abundance of raw materials that is important. Flint nodules occur in primary geological deposits mainly in Middle and especially Upper Chalk and in tertiary deposits such as clay-with-flints and some gravels (Luedtke 1992). Within chalk landscapes areas of higher density of material tend to correlate locally with those areas that produce abundant flint nodules of a good size. This is the case with the Upper Meon Valley Survey (Schofield 1991c). In this valley flint occurred naturally only in the areas of Upper Chalk, whereas the surveyed areas of Lower Chalk contained no flint sources but stood only 4-5km away. Despite their reasonable proximity the differences in the density of material is marked (Table 7.3). Schofield (1988; 1991c) suggests that this difference is associated with local land-use practices, with the Upper Chalk representing an area of industrial exploitation whilst domestic activities are represented on the Lower Chalk. It should be noted that the correlation between areas with dense scatters of worked flint and chalk geology is reproduced at a broader scale throughout most of the data in Table 7.3.

The relative abundance of surface scatters of worked flint in areas where the raw material is present could be explained by several factors. One is that inhabitation was preferentially located in these areas. Overtime this would obviously lead to a higher density of material in these locations. From another perspective the concentration of activities in chalkland landscapes in the Neolithic and Early Bronze Age is indicated by the locations of monuments such as long barrows and round barrows, which are generally located upon the chalk. However, there is considerable variation in both the density of surface scatters and monuments even within areas with chalk geology. Therefore, it seems unlikely that decisions concerning inhabitation were made *only* in relation to the location of flint sources.

Given the above it must also be realised that it is as much the character of stoneworking as the density of inhabitation that is affected by the presence of raw material. This may seem an obvious point but it is one that needs to be stated. When we talk of the density of material in an area we tend to think of it as referring to the intensity of occupation, yet what it really refers to is the intensity of practices that produced lithic debris. To a certain extent the two may correlate, as long-term occupation would lead to more working of stone. Yet of equal effect are the choices about how stone should be worked. In general, areas where abundant raw material is present are characterised by a more profligate use of flint (Schofield 1986; c.f. Healey 1986). There can be a massive difference in the ratio between waste and products according to how carefully a nodule is worked. In the late Neolithic the character of stoneworking, from which much surface material is derived, is itself generally *ad hoc* and wasteful in its use of flint (Edmonds 1998, 255). This practice was undoubtedly exaggerated in areas where flint was present in abundance. In this respect, it is important to remember that the combination of the expansion of settlement and the more profligate use of flint during the Late Neolithic may often mean that surface scatters are swamped with material from this period. This potentially makes it very difficult to distinguish material from other periods such as the Early Neolithic when lithic producing activities were relatively small-scale.

Despite the above, the data from this analysis also indicate that whilst the presence of usable flint has an effect upon the density of surface lithic material it is not the only factor (Tables 7.2 and 7.3). This is clear as there is major variation even within areas where flint occurs naturally. These differences appear to relate to the character of the archaeology of the areas and their associated variations in density are of an order of magnitude above those just discussed. In this respect, two main groups can be disguised upon the basis of the density of flint per ha. One group consists of the Stonehenge Environs, the South Dorset Ridgeway and Maiden Castle and the other contains just about all other areas surveyed (Fig. 7.1). Whilst the average density for the former projects is roughly 130 flints per ha. the average for all the other projects presented here is only about 20 flints per ha. The difference in these figures is clear. In terms of upstanding archaeology the differences between these groups of areas is also marked (Table 7.1).

The first group consisting of the landscapes with lower densities of surface scatters all have broadly comparable distributions of field monuments. These areas such as the Berkshire Downs, the Middle Avon Valley and the Upper Meon Valley all contain ritual monuments such as long barrow, round barrows and ring ditches. However, the distributions of these monuments are sparse. In contrast, the landscapes with higher densities of material, such as the Maiden Castle environs, the Stonehenge Environs and the South Dorset Ridgeway are clearly different to the previous group as they are areas densely populated with monuments such as enclosures, henges and barrow cemeteries, which form monumental complexes. Within this group the Maiden Castle Survey (Sharples 1991a) recorded the highest average density of surface material but it should be noted that collection was carried out in a more or less continuous area centred on the monument. It is perhaps the tight spatial focus of the collection for this project that explains the consistently high densities of the material.

Therefore, considering the data from the projects used in this analysis there seems to be two main features that affect the density of surface worked flint. The first is the presence of an underlying chalk geology, especially flint bearing chalk, and the second is the presence of monuments. In respect to the latter observation, the pattern is that areas with dense populations of monuments also witnessed intensive episodes of lithic producing activities.

Given this pattern, one of the most striking features of this analysis is that despite the similarities between the Stonehenge Environs, the South Dorset Ridgeway and Avebury in terms of their upstanding archaeology, there are clear differences in their ploughsoil assemblages. The density of flint collected to the south of Windmill Hill was just 30 flints per ha. compared to an average of 130 flints per ha. in the Stonehenge Environs (Tables 7.2 and 7.3). Indeed, the density of flint from the area near Windmill Hill is lower than all but three of the 39 sample areas from the SEP.

As already discussed there are some problems with comparing these data due to the small area of collection at Windmill Hill (Section 7.2.2.1) and its previous history (Section 7.2.2.5). Yet, the differences in these data are so stark that they cannot be explained purely in these terms. Furthermore, there has been some large-scale systematic collection around Avebury (Plate 44) conducted by Holgate and Thomas (Holgate 1987; 1988, 91-2). Unfortunately no data has been published from this work so it has not been possible to include it in the present analysis[6].

However, despite the lack of publication of the data, Holgate (1987) did publish a distribution map of the material that they collected (Plate 44). Of course it is far from

[6] Holgate (1987, 260) suggested that a full report of their fieldwalking project was being prepared for publication but unfortunately this work was never published (R. Cleal pers. com.).

ideal to compare survey projects on this basis but some observations can be made. First, the distribution map places the material collected by Whittle *et al.* (2000) within a wider context. From the material collected by Holgate and Thomas it seems that within the Avebury landscape the environs of Windmill Hill feature as a spot with relatively dense distributions (Plate 44). In addition, at least anecdotally, locals knew the southern side of Windmill Hill as a particularly rich area within the Avebury region (Whittle *et al.* 2000, 132-4). This suggests that the density of material collected by Whittle *et al.* is not unrepresentatively low compared to the area as a whole.

In addition, a rough comparison can be made between the distribution maps produced by the SEP (Plate 42) and those produced from Holgate and Thomas's work (Plate 44). The maps are broadly comparable in that both represent dot densities of the amount of flint collected per (50m long) collection line. Although, it is only a gross comparison it is clear from the distribution maps that whilst in the area around Avebury the highest densities of flint are in the region of 11-15 pieces of worked flint per collection unit, in the Stonehenge Environs there are extensive areas with values of above 40 pieces of flint per collection unit. Accordingly, the relatively low densities of surface scatters in the around Avebury compared to the Stonehenge Environs does seem to be a reliable pattern.

Therefore, it is reasonably clear that the landscape around Stonehenge witnessed a much higher level of lithic debitage producing activity than the area around Avebury. These findings show the importance of the current analysis and indicate an unexpected difference in the character of inhabitation of these two regions. This also demonstrates the necessity of providing a regional context in which to place the lithic scatters from the Stonehenge Environs and indicates the variation in regional traditions of landscape inhabitation that existed in the Neolithic and Bronze Age.

7.3.2 Composition

Whether the variations outlined in the last section refer purely to the scale of activities or also to their character is more difficult to assess. Some progress can be made by comparing assemblage compositions but this is hampered by several factors. The differences in composition are relatively small and sometimes localised, the assemblages are palimpsests of possibly very different activities and the proportions of all elements of the assemblages are not present in all of the publications. This means that the data concerning assemblage composition cannot necessarily be taken at face value. In this respect, it is apparent that the more detailed the comparison between assemblages the more difficult it becomes.

At a broad scale the assemblage compositions, especially the proportion of cores and waste flakes are comparable (Tables 7.2 and 7.3). However within individual areas some differences occur. This is the case for example with the Meon Valley and the Avon Valley and in both cases Schofield (1987; 1988; 1991c) has suggested that different areas within these regions were used for quite different purposes mainly reflecting an industrial vs. domestic dichotomy (c.f. Section 8.6). Between projects there is more similarity, although the Maddle Farm Project (Gaffney and Tingle 1989) in particular recorded a consistently low proportion of cores and a high proportion of waste flakes. Equally the material from the Stonehenge Environs seems to have a slightly higher proportion of cores than most projects (Table 7.2).

These patterns may suggest that the area of the Berkshire Downs studied by the Maddle Farm Project (Gaffney and Tingle 1989) was used mainly for the extraction, primary reduction and trimming of cores that were transported for use elsewhere. Such a situation would explain the low numbers of cores in comparison to flakes. However, the project covered a considerable area of the Berkshire Downs and a low proportion of cores was a reasonably consistent factor. Considering this, it seems unlikely that such a large part of the landscape was used solely for the purposes of flint procurement and as with other landscapes used in this analysis there is no evidence for quarrying or any systematic strategy to gain access to un-weathered seams of flint (*ibid*., 33). An alternative explanation is that these differences in the proportions of cores in the assemblages represent the more *ad hoc* and wasteful use of flint around Stonehenge compared to the Berkshire Downs. A consistent lack of careful core preparation and the abandonment of cores early on in the reduction sequence would also explain the differences in assemblage composition. This certainly seems possible considering the overall character of material in the Stonehenge Environs.

However, these suggestions cannot be taken further without a more detailed comparison of other aspects of the assemblages such as the extent of cortex on flakes or the potential remaining in cores at discard. Therefore, these questions may indicate the limits of the current analysis. Whilst differences in composition may be apparent, explaining these differences is often dependent on access to a more detailed level of information. This type of information can only be gained through technological analysis of debitage. Not only is analysis of such detail uncommon for ploughsoil assemblages the increased complexity of the datasets that are created by such analysis would make comparisons between projects particularly difficult.

7.4 Implications for the Stonehenge Environs

Hopefully the importance of the current analysis is now beginning to become clear. For the first time the material from the Stonehenge Environs can be set in its wider context. The character of inhabitation can now be understood in relation to the scale of occupation of other areas. The importance of this perspective is realised when it is considered that the density of material in areas such as Normanton Down (which in the context of the SEP assemblage is characterised as an almost total lack of activity) in other landscapes such as that of Middle Avon Valley would be considered to be densely occupied.

From this analysis it is now clear that there are major differences in the scale of stoneworking activities in the landscapes around Stonehenge and the South Dorset Ridgeway compared to all other more 'mundane' landscapes. This immediately places the Stonehenge landscape within a more informed context of regional inhabitation patterns. In this respect, the landscape appears to be unusual not only in relation to the range and density of monuments in the area, but also because of the intensity of other activities. In this respect, the Stonehenge Environs must have been a relatively 'busy' place.

It is now necessary to examine the relationship between dense populations of monuments and dense concentrations of lithics in more detail. In trying to suggest what types of activities might have created these large amounts of lithic debitage the most significant problem is that lithic scatters are palimpsests of material. Therefore, it is not possible to tell whether dense surface scatters are derived from a relatively intense concentration of activity within a short timescale or a persistent amount of activity over a long period.

In order to understand which of these possibilities best fit the character of material in the Stonehenge Environs it may be helpful to hypothesise two idealised types of inhabitation:

1) Permanent and long term occupation
2) Intermittent short or long term occupation

In other terms, the first is the possibility that there was a local Stonehenge population whose residential pattern was centred on the Stonehenge landscape and who lived there more or less permanently. The second is that the monuments and lithic scatters in the Stonehenge Environs are the remains of people who gathered periodically in the area from a much wider region. Whereas the first would tend to suggest that a single large community occupied the Stonehenge landscape, the second would suggest that it was the domain of supra-community groups.

It is clear that the Stonehenge Environs was very heavily utilised during the Neolithic and Bronze Age. Any increase in the scale of inhabitation (compared to other landscapes) must have involved increases in any combination of the duration of occupation, the number of episodes of occupation or the amount of people present at any one time. In this respect it can be suggested that the more intermittent and short term you imagine periods of occupation to be the larger the numbers that must have gathered.

7.4.1 Permanent occupation

When considering the possibility for large-scale permanent occupation the first thing that needs to be considered is the lack of evidence for any place in which such a population could have lived. For example, there are no substantial settlement structures within the Stonehenge landscape, or for that matter in southern Britain in general. The only possible exception is Durrington Walls and the two circular wooden structures that were found within it (Wainwright and Longworth 1971). Central to the debate over the interpretation of the timber circles as occupation structures is whether or not they were roofed buildings. In this respect, the excavators clearly favour their interpretation as roofed buildings in all of the significant structural phases of both the Southern and Northern Circles (*ibid.*, 204-34). However, on the basis of their structural integrity Musson (1971, 363) suggest that his:

> "...study produces no conclusive evidence that the Durrington structures...were originally roofed buildings." (*ibid.*).

In addition, Pitts (2000, 244-5) notes that, although the excavators looked for such a feature, there was no sign of an eaves drip gully or any other evidence of water running of a roof. Yet, these types of features are inevitably found in connection to buildings especially those with roofs of the sizes required to cover the timber circles at Durrington Walls. Hence, the status of the structures as roofed buildings seems far from certain. Even if these buildings were roofed the hypothesised plan of the larger Southern Circle leaves a large unroofed 'central court', which seems to preclude a domestic function (Wainwright and Longworth 1971, 231).

More positive evidence of the use of Durrington Walls as a settlement location is provided by the massive quantities of refuse from the site, much of which was centred on the Southern Circle. However, there are clear elements of ritual deposition within this material and there is no clear means to distinguish between domestic refuse and the ceremonial deposition of the remains of large feasting episodes (*ibid.*, 232). However, it is equally unclear whether ritual and secular activities were mutually or conceptually exclusive practices during this period so such distinctions may be unhelpful. One last factor concerning the use of Durrington Walls as a centre for occupation is that only a small part of the site was excavated and the excavators felt it possible that even if the two timber circles were not inhabitation structures, then they may have been public buildings that served a larger settlement within Durrington Walls (*ibid.*, 234).

Therefore, it is far from clear whether Durrington Walls can be interpreted as the centre for permanent occupation. However, given the balance of the evidence it is suggested here that this was not the case. Furthermore, within the context of the Stonehenge Environs, explanation is sought for the massive quantity of lithic debitage from the ploughsoil. This material is densely scattered across the landscape and its greatest concentrations generally occur large distances away from Durrington Walls (Plate 42). Hence, in these terms the henge enclosure was clearly not the central focus for inhabitation in this landscape.

If Durrington Walls is discounted as the remains of permanent occupation, then other forms of evidence of settlement related structures are even less convincing. The main type of deposits that could potentially be linked with settlements are the Neolithic pits that are scattered across the Stonehenge landscape. These are mainly concentrated in the King Barrow Ridge/Durrington area although examples also occur in other locations such as near Robin Hood's Ball (Richards 1990, 61, 65; Stone and Young 1948; Vatcher 1969; Harding 1988). By far the largest example is the Coneybury Anomaly, which also produced the earliest dates (3980-3708 BC (OxA 1402)) for Neolithic deposits in the Stonehenge area (Richards 1990, 40-61). In the absence of other forms of evidence Neolithic pits have often been taken as the only surviving remains of settlements (Thomas 1999, 176). However, more recently it has been noted that most pits are too shallow to serve as either refuse dumps or storage pits and many show signs of both the structured selection and deposition of material (*ibid.*, 64-74; Edmonds 1999, 29). In this respect, it has been suggested that, rather than just representing the functional discard of refuse, deposition in these pits was a deliberate means of "fixing a connection between people and a place" (Thomas 1999, 86). This idea of people renewing a sense of tenure with certain locations is seen as particularly important by those that suggest that Neolithic populations retained a high degree of residential mobility (Edmonds 1999, 29).

The type of considered deposition described above certainly occurs in the pits from the Stonehenge Environs in for example the Coneybury Anomaly (Richards 1990, 40-61) and the Chalk Plaque Pit (Vatcher 1969; Harding 1988). In addition, the pits that have been found tend to occur widely scattered or in small clusters. Neither of these patterns suggests that they were connected with substantial settlement sites. Hence, the presence of such features within the Stonehenge Environs is not considered to be evidence of either large-scale or permanent occupation structures.

7.4.2 Intermittent occupation

If the possibility of permanent occupation within the Stonehenge landscape is rejected then the ploughsoil assemblages must presumably have been derived from some form of intermittent occupation. As the regularity and duration of episodes of occupation and activity are still not defined this is as yet ambiguous. There are two possible types of intermittent occupation. The first is regular and a good example would be seasonable occupation where visits took place annually and for relatively short periods (i.e. a few months). The other type is irregular or erratic intermittent occupation. This form of inhabitation has been included because it is less restrictive in terms of the timing and duration of events. In particular it leaves open the possibility that occupation may have been temporary but does not imply that this period was only for a few months annually, it could equally have been for a year or more and on an irregular basis.

In terms of seasonal occupation, this would mean that groups spent only relatively short periods of time were actually spent in the Environs and it would also be quite possible that the timings of these events would be coordinated to allow disparate groups to gather together from diverse regions. Such gatherings have been proposed for several types of individual monuments especially causewayed enclosures, although here we are talking of a much larger aggregation of people. Ideas of seasonality are inviting for a number of reasons. Firstly, they are in keeping with the idea that the construction of Stonehenge involved key lunar alignments during phases 1 and 2 and solar alignments during phase 3 (Ruggles 1997). The suggestion that specific ceremonies may have been observed at Stonehenge during the midsummer sunrise and the midwinter sunset obviously implicates people in the wider landscape on a seasonal basis. Secondly, ideas of seasonal visits also fit with the wider scale routine movements of people implicated by suggestions that Neolithic communities practiced a kind of 'tethered mobility' (Thomas 1999, 222; Whittle 1997c; Edmonds 1999).

Central to arguments of mobility amongst Neolithic communities are that the economic base of the period was not, as has traditionally been suggested, a stable mixed farming regime (e.g. Allen 1997). Instead the growing of crops has been suggested to have taken place as part of fixed plot horticulture or long fallow systems in which cultivation was small scale and episodic (Thomas 1999, 223; Barrett 1994, 143-4). Once the reliance upon large-scale agriculture has been rejected then it is much easier to imagine the seasonal movements of all or part of Neolithic communities for a variety of reasons from the movements of herds, to the gathering of seasonal foods to the aggregations at causewayed enclosures or later at henges. Within the rhythms created by these movements "the roll-call of specific times and places would have varied" (Edmonds 1999, 17) and there may have been only certain times of the year when the whole community was gathered in one place.

The benefit of these ideas of mobility is that it provides a context for the intermittent occupation of the Stonehenge landscape that is suggested here. It also draws attention to the fact that during other times these people would have occupied other landscapes and that they may have come to Stonehenge from some of the other locations included in this comparative analysis. Reconstructing these patterns of movement and the temporality of prehistoric life is one of the central concerns of this research (Section 2.2.3.1.1). Within such a temporality the nature of practice and the timing of events created the contexts through which social relations were reproduced.

Despite the above, it is impossible to make a definitive statement over whether the occupation of the Stonehenge landscape occurred on a seasonal basis. This is because the resolution of the material with which we have to work simply cannot give us such detailed information. This is why a form of intermittent and more irregular occupation has also been put forward. Occupation of the Stonehenge landscape may have been erratic with groups potentially staying for longer than just a few months. At least in one sense this suggestion may accord with what we understand of the constructional history of monuments like Stonehenge. Recent work by Cleal *et al.* (1995) has indicated the complexity of the structural history of Stonehenge supporting the idea that its construction was a messy project which was never fully planned and never finished. At certain points the site was abandoned for long periods and stone settings were put up taken down and rearranged a number of times. In this sense work at the site took place over hundreds of years and appears to have been conducted on an intermittent basis. Perhaps this feature of Stonehenge provides us with a clue that the wider occupation of the landscape took place on a similar basis.

7.4.3 The character of inhabitation of the Stonehenge landscape

Several types of potential inhabitation within the Stonehenge landscape have been put forward. Ideas of a 'Stonehenge population' who resided in the area on a permanent basis have been rejected in favour of more intermittent modes of occupation. Beyond this it is difficult to assess what the timings of these events may have been and whether they were seasonal or more infrequent. In this respect it is necessary to realise that there is no means of telling exactly what the type of occupation was. As a corollary it is important to stress that there is no suggestion that there was only *one* type of inhabitation. This is necessarily so considering the millennia under discussion. Equally there is no reason to assume that only one type of occupation was occurring at any one point in time, undoubtedly the trajectories of many different lives and projects met at Stonehenge. Accordingly the potential modes of inhabitation that have been put forward are not to be seen as mutually exclusive. They are not hypotheses to be tested by creating a universal scale for measuring types of settlement. They are suggestions of idealised cases presented in order to help consider this problem.

However, perhaps the most important statement that arises from the suggestion of intermittent occupation is that this means that groups must have visited Stonehenge from elsewhere. By placing Stonehenge within a regional settlement context it is also clear that the landscapes that they came from were much less densely occupied than the one they came to. In this sense it is appropriate to imagine that gatherings in the Stonehenge landscape were aggregations of supra-community groups from a widespread region. In this respect, at certain times the landscape around Stonehenge must have seemed a busy place. More people may have aggregated around Stonehenge than in any other contemporary landscape. Disparate groups must have come together; old faces would be recognised and relationships would need to be renewed (c.f. Bender and Edmonds 1998). Where normally one might not see any but immediate kin for long periods of time, around Stonehenge the smoke from many different camps must have risen into the sky.

That after all this we can now say that people must have aggregated in the landscape around Stonehenge may seem a minor addition to our knowledge. Although the SEP never discussed it in such terms they must have been aware of the unusually large concentrations of material they were picking up during fieldwalking. More importantly, many of the arguments concerning monuments over the last few decades have emphasised the necessity for coordinating large labour forces, and there are few landscapes with more monuments than Stonehenge. Building the earthworks of Durrington Walls alone required the input of something like 900,000 man-hours (though this is not to suggest that only men took part). Therefore the huge population of monuments must have implicitly demanded an equally large population of people. Yet accounts of this landscape have tended to concentrate on the ritual and the ordered and not on the daily activities these people carried out. Accordingly, until now the barrows, enclosures and henges remain a silent testament to these folk, it is almost as if the monuments arrived by themselves, shuffling into an empty space.

Yet, the lithic scatters in the Stonehenge Environs change all of this. They provide complimentary evidence to the monuments for large numbers of people in the Environs. They also suggest something of the types of activities that these people were engaged in. For example, it could be suggested that the dense scatters of debitage were just the by-products of the huge labour force that must have been aggregated at certain times to construct the larger monuments like Stonehenge and Durrington Walls. However, if this was the case then equally large amounts of material would be expected in the landscape around Avebury and this does not appear to be the case. The construction of the monuments in the Avebury region must have required the same large amounts of people as the monuments in the Stonehenge landscape and Avebury itself dwarves all other henges by a considerable margin. Therefore, some regional differences begin to emerge indicating that these two landscapes were not inhabited in the same way. It also suggests that having many people building large monuments does not necessarily involve the creation of quantities of lithic debitage of the scale that occurs in the Stonehenge Environs.

Therefore, we can begin to understand that outside of moments of building more people may have gathered in the Stonehenge landscape than they did around Avebury. Here we may begin to comprehend that there was more to be done in these places than just the construction of monuments. There were other activities that were practiced as well. Some may have involved ritual observance and archaeologically these may be hard to trace. Yet others involved the working of stone and in these activities at least there seems to be a major difference between the uses of Stonehenge as opposed to Avebury.

If the construction of monuments was not the most important part of activity in the Stonehenge Environs then, given the character of the data, it can perhaps be suggested that it was the act of gathering itself that was of central importance. Amongst relatively small and dispersed communities drawing upon ideas of being part of a much larger group may have served to provide a strong sense of belonging. In metaphorical terms the strength and ability of the wider community was set in stone through the communal labour involved in constructing monuments such as Stonehenge. However, these associations were also embodied in acts of aggregation themselves and rather than seeing such gatherings as serving other causes perhaps they should be understood as end points in themselves.

7.5 Conclusion

The first half of this chapter mainly concerned issues of comparability between different survey projects. They were many and varied; some could be accounted for others could not. Overall, the issues are hard to quantify, meaning that direct statistical analysis of the results is not possible. However, these problems have been overcome by the nature of the results. Although comparison of assemblage composition is still difficult the huge differences found in the densities of material validate the current approach.

By comparing the density of surface material around Stonehenge with other regions the inhabitation of the area can be placed in a regional context. Important differences begin to emerge, which indicate that activity around Avebury may have been different to that around Stonehenge. It is also evident that the Stonehenge landscape may have witnessed gatherings of unparalleled amounts of people. When people were there they did not just erect monuments, they were also involved in other types of activity. They took part in the quotidian activities that they practiced everywhere else. Indeed the broad similarities in assemblage composition suggest that it was not the character of these activities but their sheer scale that varied so hugely. These practices necessitated the working of stone and over time the debitage left by them covered much of the landscape and must have been recognisable to later generations as they conducted any activities that cut through the turf. It was through practice that the history of this place was understood and encountered anew and lithic scatters are the most persistent remains of that practice that we have left to us.

Chapter 8: Discussion: Understanding the Inhabitation of the Stonehenge Landscape

8.1 Introduction

The main goals of the current project are to test the interpretative potential of lithic scatters, to extend our understandings of the character of inhabitation of the Stonehenge landscape and to assess these findings in relation to existing interpretations of the area.

The problems involved in recent interpretations of the Stonehenge landscape have been outlined and it has been suggested that in order to comprehend the character of inhabitation of the area a detailed analysis of the ploughsoil assemblages from the region is required. This analysis has proceeded by a thorough consideration of the material collected by the SEP (Richards 1990). In comparison to previous treatments of these data the analysis presented here has been in depth both in terms of its recording and its subsequent analysis. This means that we are now in a better position than any time previously to investigate what this source of material has to tell us about the forms of occupation evidenced at a landscape level that can be understood through the remains of lithic working practice.

In addition, a comparison has been made between the surface scatters around Stonehenge and those from other landscapes. For the first time this allows us to place the Stonehenge landscape within a regional context of inhabitation practices. Having conducted all of these analyses, we are now well situated to understand the character of inhabitation of the Stonehenge landscape. It now remains to draw all of these sources of evidence together so that the full ramifications of the analysis can be made clear.

8.2 The character of lithic practice in the Stonehenge Environs

8.2.1 Unsystematic technology

Having assessed in detail the recorded assemblages of both flakes (Chapter 4) and cores (Chapter 5) it is clear that in technological terms the vast majority of material represents the same basic approach to nodule reduction. In this respect, this material is grouped together here as an analytical and archaeological coherent group even though it is comprised of a series of morphologically different core-reduction technologies (Section 5.2.5.1). The rationale behind such grouping is different to traditional typological approaches towards lithic analysis. Although the material may differ in terms of its morpho-typological form, it represents considerable unity in terms of the basic *attitude* towards nodule reduction. This attitude is described as *expedient* and concurrently its products resist typological classification. This is especially the case as the material in the assemblage is derived from knapping episodes conducted within a huge variety of contexts. Accordingly, it is important in understanding this material that elements that suggest the similarity in the basic approach to reduction are prioritised over traditional typological analyses. Indeed, the current analysis has called into question the analytical value of standard core typologies such as that defined by Clark (Clark *et al* 1960; Section 5.2.5.1).

In light of the above, it has been suggested that the differences between the majority of single and multi-platform cores relate more to the point in the reduction sequence at which cores have been discarded than technological differences in the manner of their reduction. For example, many single platform cores may represent cores rejected earlier on in the reduction sequence, often after only a few usable flakes have been removed. Despite the character of these cores there is no reason to suggest that they represent 'failed' (i.e. tested and rejected) cores, as the flakes that were removed from them are as workable as those removed from the majority of cores that have been more heavily worked.

In the majority of the assemblage little care was displayed over the shaping of cores, the preparation of platforms and the subsequent maintenance of them. This type of technology fits well with the idea of expedient working in a flint-rich area where material was often close at hand and nodules could be picked up to serve immediate needs, worked and then discarded just as quickly. Under such conditions, there was no need to conserve raw material through the careful working of cores. Equally, there is no evidence that tools were produced in an effort to 'gear up' ahead of scheduled tasks (c.f.

Myers 1989; Torrence 1989). One group of cores, which indicate this attitude towards the working of flint are those made on small irregularly shaped nodules. These were often worked using alternate flaking to create keeled platforms. This technique exemplifies an approach that seeks the simplest method of producing a few workable flakes from a nodule. The affordances presented by the shape of nodule are utilised to minimise the need for platform preparation and control over flaking angles by alternate flaking along an existing edge of a tabular nodule (Plates 65 and 80). This method was used without any prior platform preparation and instead the negative facets of previous removals on one side of the nodule are used as platforms for the removal of flakes from the other.

The other major group of cores that fit within this complex of *ad hoc* working strategies is multi-platform cores (Plates 67 and 82). Together these represent roughly 40% of the assemblage of cores. They vary in terms of the number and orientation of their platforms but just under 14% have two platforms at right angles and about 19% have three or more platforms (Section 5.2.5; Table 5.3). As the most common types amongst multi-platform cores, these two categories represent the usual approach towards the rejuvenation of platforms in cases where a core was to be worked after its initial platform had ceased to be productive. Rather than the removal of a rejuvenation tablet to rework the same platform as is common with blade cores, rejuvenation was implemented by simple rotation of the core to start a new platform. As the proportions of multi-platform cores indicates, this was most commonly attempted by rotating the core roughly 90°, the main reason for this was that it allowed the negative facets of the previous flaking surface to be used as the new platform (Plates 66 and 81). This technique was further employed in the most heavily worked examples by continued rotation of the core until no further platforms could be created (Plates 67 and 82). Such cores were most often exhausted due to the total loss of potential flaking angles on all surfaces of the core.

Given its character, it is inevitable that the products of this expedient technology, influenced by the general lack of core control and care in the placement of blows on platforms, were predominantly broad or squat flakes[1]. Although, no measurements of flake or butt thickness were taken, many thick flakes were present within the assemblage. In keeping with the paucity of cores witnessing platform maintenance, the flakes in the assemblage have mostly unprepared or plain butts. The orientation of flake scars on flakes also broadly reflects the proportions of different types of cores with a relative abundance of flakes with scars running in the same direction as the axis of the flake, as well as those with scars running at right angles to the axis of the flake (Section 4.3.5).

It is impossible to definitively quantify the proportion of the assemblage represented by the type of expedient technology outlined above. This is particularly the case for the assemblage of flakes as (especially during the early stages of reduction) many different techniques of reduction are likely to produce quantities of morphologically similar flakes. The situation with cores is slightly different as they are potentially more definitive of particular technological processes. However, it must be remembered that, as the subjects of a reductive process, the character of cores at the point of discard does not necessarily reflect the techniques used in the earlier stages of reduction. Bearing this in mind, it can still be noted that over 70% of cores were recorded as being worked unsystematically and 94% showed no signs of platform maintenance. Similarly, 63% of cores produced broad flakes and almost 50% of cores produced predominantly either broad or squat flakes[2]. Accordingly, it may be surmised that whilst it is not possible to suggest exactly what proportion of the assemblage represents the products of an expedient or *ad hoc* technology, an estimate of at least 70% can be tentatively put forward.

[1] In this respect, the average length:breadth ratio for complete flakes was 1.3, 31% of flakes had a length:breadth ratio equal to or less than 1 (i.e. 1:1) and 72% of flakes had a length:breadth ratio equal to or less than 1.5 (i.e. 3:2).

[2] There are some problematic issues concerning the figure for the predominant types of flakes produced from cores (Sections 5.1.1 and 5.2.8). It should be noted that for this attribute over 40% of cores were indeterminate as they did not produce a predominance of flakes of any one type (i.e. elongate, broad or squat). Hence, it is likely that well over 50% of cores produced mainly broad or squat flakes or a combination of the two.

8.2.2 Systematic technology

Given that the *ad hoc* and unsystematically worked cores (and resultant flakes) represent such a large part of the assemblage, those elements that differed from this approach stood out quite clearly. These parts of the assemblage consist of more systematically worked (mainly single platform) cores, blades, other flakes indicating butt preparation and 'fancy' core types such as levallois-style cores. Within the single platform cores, it is possible to make a slight distinction between those of varying shapes and sizes that have nevertheless been worked with a degree of care and a more coherent (though small) group of classically Late Mesolithic/Early Neolithic conically shaped blade cores (Section 6.4.3). The main reason for this distinction is that just because a single platform core has been worked systematically does not mean that it was intended to produce blades or that it was Early Neolithic. However, the factor that unites this group of material is the general attitude towards the systematic reduction of cores. This means that platforms were more carefully prepared and effort was expended in setting up flaking surfaces through the shaping of cores. Subsequently, platforms and flaking angles were maintained mainly through techniques such as trimming and faceting of platform edges.

In addition, in cases where rejuvenation of cores was necessary, rather than using rotation to create new platforms, the same platforms were reworked either through removal of a core rejuvenation tablet or through the removal of part of the flaking surface (Section 4.3.9.1). The level of effort indicated in the working of cores necessarily relates to the desire to control the shapes of the flakes that they produced. Consequently, the areas in which these cores occur in the greatest quantities also often have a tendency to produce more elongate flakes and flakes with signs of butt preparation, although the relationship is by no means exclusive.

Whilst we must be cautious of creating hard classificatory boundaries between what are fluid flintworking techniques, the characteristic features outlined above define an alternative tradition of approaches to working flint within the Stonehenge Environs. Given this it remains to assess whether the presence of two forms of technology within the ploughsoil assemblages is a feature of the chronological mixing of material or the results of parallel and contemporaneous practices. These points are discussed below through the assessment of the spatial organisation of practice and the chronology of the ploughsoil assemblages (Sections 8.3 and 8.4).

8.2.3 Uncommon techniques of reduction

Another noticeable feature within the assemblages was the lack of specific types of products such as levallois cores (Plates 69, 70, 88 and 89), their products as well as products of biface (specifically flint axe) manufacture. Although, levallois cores were present within the assemblage and some significance can be attributed to their distribution (Section 6.2.3.1), only small numbers of them were found[3]. Certainly, it can be stated with confidence that no extensive or specialised production of levallois products took place within the areas studied by the SEP. However, whilst it is easy to recognise the distinctive cores produced by the levallois technique, it is more difficult to assess the distribution of its products. These are usually thought to be either discoidal knives, arrowheads such as ripple flaked oblique or transverse types and even sometimes axes (Durden 1995, 411; Saville 1981, 52). Whilst, these types of tools are present within the ploughsoil assemblages as well as from some of the monuments in the area, it is unlikely that all of them were produced exclusively using the levallois technique and many of them could also have been made from flakes produced by the more ubiquitous multi-platform technology. Therefore, when combined with the fact that locations of production and consumption need not be the same, the presence of products that could have been made on levallois flakes does not necessarily indicate the practice of the technique within the Stonehenge Environs.

A similar situation occurs when assessing the by-products and tools created by the bifacial working of core tools. The definition of 'bifacial' working is broad and can refer to any working that involves alternate removals taken from either side of the edge of a core. The range of core tools produced using this method is broad and can refer to elaborate and finely worked axes as well as to crudely worked picks and other rough

[3] Levallois cores are only represented by 7 examples or 0.4% of the assemblage of analysed cores.

tools. It is to the production of the more formal tools such as flint axes and adzes that the current discussion refers as their by-products (thinning and finishing flakes) are potentially more distinctive than those produced by the *ad hoc* working of miscellaneous biface forms (Newcomer 1971).

Detecting the presence of production is slightly different for bifacial core tools than for the levallois technique because the cores are not the by-products but the objects of production. Their presence within the survey area cannot be taken as *a priori* evidence of local production, as it is known that both stone and flint axes were traded or otherwise transported over considerable distances throughout the Neolithic (Elliot *et al.* 1978; Craddock *et al.* 1983; Edmonds 1993; Bradley and Edmonds 1993). Accordingly, locating biface production in the Stonehenge Environs is reliant upon the identification of specific flake by-products such as thinning and finishing flakes (Newcomer 1971). These types of flakes often have several distinguishing features, which makes their identification possible although not unproblematic (c.f. Harding 1990c, 168). Despite this, as with levallois by-products, very few were recorded during the analysis. Only 12 thinning flakes were identified representing less than 0.06% of the assemblage of flakes. The distribution of these flakes is also spread across the survey area (Section 6.2.6; Plate 17). The combination of these factors makes it extremely unlikely that any large-scale manufacture of axes occurred within the areas fieldwalked by the SEP. It should be noted that biface production was identified in one excavated context by the SEP on Wilsford Down (Richards 1990, 22). However, the evidence relates to the refitting of a single crudely worked biface roughout abandoned in the early stages of production and which may only potentially have been worked into an axe form (Plate 56). Therefore, this evidence does not seem to relate to any intensive production of axes or other core tools.

The lack of evidence for flint axe production within the Stonehenge Environs is paralleled by a similar lack of evidence for their consumption. In this respect, just over twenty objects within the SEP tool archive from the extensive survey were recorded as either flaked or flaked and ground flint axes representing only 0.7% of the assemblage of tools.

8.2.3.1 The wider associations of axes and levallois products

Accordingly, it seems that despite the huge quantity of debitage present within the ploughsoils of the Stonehenge Environs, there is no evidence for the extensive or focused production of either axes or tools produced from levallois products. This largely negative evidence is of importance in assessing the range and types of lithic producing practices performed by the populations that dwelt in the area. In particular, whilst the consumption of axes and tools produced from levallois products seems negligible in the ploughsoil assemblages from between the monuments, several of the classes of monument in the area have been positively correlated with just these types of tools. For example, for a long time a link has been suggested between causewayed enclosures and both stone and flint axes (Edmonds 1999, 83; c.f. Bradley 1998). Within these monuments, axes are often found within formal deposits amongst other materials such as bone and pottery. Such associations occur at sites such as Hambledon Hill, Etton, Maiden Castle and Windmill Hill (Edmonds 1995, 71; Mercer 1980; Pryor 1988; Sharples 1991a; 1991b, 47-51; Smith 1965; Whittle *et al.* 1999). In many cases, particularly in relation to stone axes, it is thought that axes arrived at enclosures as finished products (e.g. Smith 1965, 110). However, at Etton and Maiden Castle there is also a possibility that enclosures were special locations in which axes were produced and especially finished[4] (Pryor 1988; Sharples 1991a, 254; 1991b, 51). Woodward (1991, 33) also suggests from fieldwalked material from the South Dorset Ridgeway, that the distribution of polished axes is restricted to the area immediately around Maiden Castle, whilst flaked axes are found in the upland areas stretching along the Ridgeway.

It is not clear how well defined the patterns that Woodward refers to are, but the hypothesis is closely linked to the idea that causewayed enclosures were appropriate locations for not only the finishing and polishing of axes but also for their exchange. These ideas of exchange were originally prompted by the common occurrence of imported stone axes found within enclosures at sites such as Windmill Hill. Indeed after

[4] However, at Maiden Castle, Edmonds and Bellamy (1991, 227-9) note that despite a mixed assemblage of complete, partially finished and broken axes the distinctive by-products of axe manufacture are less common. Therefore, they suggest that the status of the site as a focus for axe production remains unclear.

fifteen years of the petrological study of stone axes, researchers proclaimed that the Avebury region,

> "...may be described as the capital emporium of the whole axe trade of the country." (Stone and Wallis 1951, 132-3).

This statement clearly shows the belief of the time that the production and exchange of axes could be understood in terms of an organised industry with established distribution networks and with production occurring at factory centres. More recently, modern modes of thinking are not so openly transplanted into the prehistoric past and the idea of a highly organised axe trade has lost currency (Bradley and Edmonds 1993). Furthermore, the exclusive connection between causewayed enclosures and axe exchange has also been brought into question. It has been argued that these suggestions may be misplaced as the actual presence of quantities of axes within enclosures does not seem in accord with the possibility that they were brought to them to be moved on through exchange (Pollard and Whittle 1999, 340; Bradley and Edmonds 1993). In addition, many axes found within enclosures have been reworked or smashed. This raises the possibility that rather than being involved in systems of exchange, axes may have been involved in acts of conspicuous consumption and deposited as part of the complex treatment of the dead that also occurred within many causewayed enclosures (Edmonds 1995, 71).

In the later Neolithic, though to a lesser extent, henges such as those at Llandegai and Mayburgh have also been linked with the deposition of axes (*ibid.*, 127). A similar link has also been drawn between henges and the consumption of arrowheads and other tools that could have been produced from levallois flakes. The clearest example within the Stonehenge Environs is the assemblage of extremely well worked oblique and oblique ripple flaked arrowheads from Durrington Walls (Wainwright and Longworth 1971, 171-3, 257-9; Plate 57)[5]. Within the assemblage from the excavation at Durrington Walls 58 transverse arrowheads were recorded representing 16% of the assemblage of tools. Of these arrowheads, 81% were found in the Southern Circle

[5] In addition, two plano-convex knives were also found near the southern circle, which were also potentially produced from levallois flakes (Wainwright and Longworth 1971, 174).

suggesting that this material was involved as part of the structured deposition that occurred at the site (*ibid.*). Although not in a henge, later Neolithic and Early Bronze Age levels excavated at Windmill Hill contained finds such as a polished knife and petit tranchet derivative arrowheads that were produced from levallois cores (Pollard 1999, 332).

Given that the consumption of these specific artefact types occurred in specific contexts within certain monuments in the Stonehenge Environs it is significant that no focused, intensive or otherwise specialised production of them occurs in the area covered by the SEP's extensive collection. This raises two possibilities; either production occurred in areas not covered by the SEP, or it took place outside of the Stonehenge landscape altogether. The first suggestion has some potential as despite its wide coverage it is possible that production occurred outside of the area of the SEP's survey because it took place within the confines of the monuments. As suggested above, this may have occurred elsewhere such as at the Maiden Castle causewayed enclosure where the nature of stoneworking practices seemed to differ markedly between the monument and those areas in the landscape around it (Edmonds and Bellamy 1991, 227). However, as none of the monuments excavated in the area seem to have assemblages comparable to Maiden Castle, there seems little evidence to support this argument in the context of the Stonehenge Environs. In this respect, it should be noted that compared to Maiden Castle, relatively little is known of Robin Hood's Ball causewayed enclosure, which is the only causewayed enclosure within the survey area. Excavation at the site has been limited to two trenches across its ditches and there has been no investigation of its interior (Thomas 1964)[6]. However, the interim report of survey work carried out by the SEP just outside of the enclosure indicated that despite the presence of ground tool fragments in four out of five excavated pits (providing dates of 3640-3370 BC (OxA 1400) and 3361-3039 BC (OxA 1401)), there was no evidence of core tool production (Richards 1990, 61; Harding 1990d, 63).

[6] Furthermore, the publication of the fieldwork carried out by the SEP between 1984-6 in the immediate environs of Robin Hood's Ball remains forthcoming

Therefore, it seems probable that, despite sporadic and small-scale episodes, the production of these artefacts in both the early and later Neolithic (i.e. during the use of both causewayed enclosures and henges) occurred, outside of the area of the Stonehenge Environs. The potential of this suggestion is strengthened as the movement of artefacts over considerable distances across Britain has already been indicated by petrological analysis of the sources and distributions of stone axes (Stone and Wallis 1951; Cummins 1979; Bush and Sieveking 1979; Edmonds 1993; 1995, 50-9). Hence, the possibility that the other types of artefacts (i.e. flint axes, certain arrowhead types and discoidal knives) that were consumed within causewayed enclosures and henges were also produced some distance away is a realistic one.

8.2.3.2 The role of flint mines in the Neolithic

Bearing this in mind it is worth considering that the focused production of both axes and levallois products in the Neolithic does occur in quite specific contexts, namely in quarries and flint mines. Given this, there is a possibility that the artefacts of these types that were deposited within the causewayed enclosures and henges in the Stonehenge landscape came from these types of places. Flint axes were definitely produced in southern and eastern Britain in the Early Neolithic at flint mines such as Cisbury and Black Patch and in the Late Neolithic at Grimes Graves (Mercer 1981a; 1981b; Longworth *et al.* 1991). In addition, the levallois reduction method was practiced at Grimes Graves where Saville (1981) suggests it was used to produce discoidal knives, points, cutting flakes and even possibly axes[7].

It must also be noted that flint mines also occur much closer to the south of Stonehenge at Easton Down and Martin's Clump (Booth and Stone 1952, 381; Stone 1933). Indeed, there is also a flint mine right on the boundaries of the survey area situated just a short distance from Durrington Walls (Booth and Stone 1952). In this area, several pits and three pit-shafts were sunk into the chalk. However, although a petit tranchet derivative

[7] Notably, at Grimes Graves no arrowheads indicated evidence of being produced from levallois flakes though it should be pointed out that, despite the massive assemblage from the site; only five arrowheads were recorded (four petit tranchet derivative types and one barbed and tanged).

arrowhead in a primary context suggests this 'mine' to be Late Neolithic, it is quite different to Grimes Graves. The pits and shafts were sunk to remove material from only about 1m-2m underground and the material that was retrieved was a poor quality tabular flint. The excavators suggest that this may be the reason why the pits and galleries were more or less abandoned after only minimal exploitation (*ibid.*, 385). In addition, there is no evidence of intensive knapping episodes or of the huge quantities of debitage that we have come to expect from flint mines. Instead, Booth and Stone (*ibid.*) note that 'no normal flint flakes occurred in the shaft or gallery fillings'. It seems that without the distinctive shape formed by the pit/shafts and radial galleries[8] it would be hard to characterise the site as a flint mine at all. It is also difficult to gain a detailed understanding of the site from the rather limited report of its excavation. Either way, it is tough to imagine that the pit/shafts created much of a serious impact on the landscape. Equally, it seems unlikely that their limited products would have had much impact on the ploughsoil assemblages in the region or that material from them was used to produce any quantity of the types of specialised artefacts under discussion above. It is quite probable that these were short-lived features and the remnants of a failed, and considering the lack of depth of the excavations, poorly conceived plan.

Excavations at flint mines suggest that in both the earlier and later Neolithic working was episodic with quarrying occurring shaft by shaft rather than on a massive industrial scale. Edmonds (1995, 117; 1999, 42) suggests that the 'event-like' working of these sources may have been embedded within the seasonal movements of groups, perhaps instep with the movements of herds or lulls in the agricultural cycle. Another common feature of these sites is that they appear to be distant or marginal to areas of 'settlement'. Similarly, there is no evidence that they were in the ownership of groups of specialised resident populations. These factors suggest that these were places at which people may have arrived from disparate locations to work material from specific sources whose quality had long been appreciated[9]. The contexts of practice at flint

[8] The radial galleries were excavated even though material was being removed from quite close to the surface. Material could have just as easily been removed by excavation of an open pit.
[9] As Taçon (1991) reminds us in the context of Western Arnhem Land, the appreciation of raw material sources does not have to be for purely functional grounds. In the Australian aboriginal context,

mines such as the group excavation of shafts, the individual working of radial galleries and the collective knapping of large quantities of raw material into axes and other products provides us with a series of clues as to the significance of the practice. In a similar manner to ritual practice within monumental contexts such as Stonehenge (e.g. Barrett 1994, 40-7), the choreography of flint mining may have involved distinctions between those who could or could not take part (Edmonds 1995, 65; 1999, 44-7). As such, these practices represented one aspect of a resource that could be drawn upon to redefine identity within and between groups. These were also places in which skills could be learned and appreciated, providing contexts in which young heads could come of age and old ones could reaffirm a status born of experience (*ibid.*, 66; Edmonds n.d.). The character of practices would also have served to begin the ongoing biographies of the objects made at flint mines as they carried forward their associations of specific peoples, times and places. These histories would have given objects a meaning that could only serve to add significance to the contexts of their exchange (Edmonds 1995, 66).

One of the significant differences between Early Neolithic and Late Neolithic flint mines is that production at earlier examples seems more focused towards axes. In contrast, the assemblage from Grimes Graves is extremely mixed (Saville 1981). Obviously, given the huge mass of material, working with material from any quarry or mine presents many methodological problems to archaeologists (Torrence 1986). In the context of Grimes Graves, the situation was further complicated as, whilst the prehistoric shaft excavation occurred during the Late Neolithic, much of the material was chronologically mixed as it was derived from the slipping-in of surface material surrounding shafts (Saville 1981, 12). In addition, the majority of the dateable assemblage actual comes from later episodes of Middle Bronze Age occupation and/or midden dumping (Mercer 1981a). Some securely Late Neolithic working areas were excavated, but given the massive size of the site it is difficult to assess whether this material is typical of working during the period, or indeed whether there even was a 'typical' approach. Despite this, in the material that was attributable to the Late

---

understandings of the qualities of different stone sources are heavily bound up in oral traditions concerning Dreamtime mythology.

Neolithic, the production of both axes and tools made from levallois products (mainly discoidal knives) was important (Saville 1981, 70). However, this was not a specialised industry and the production of 'domestic equipment' (e.g. scrapers, points and other simple tools) outweighed the production of more specialised tools in all contexts (*ibid.*).

Accordingly, the lack of intensive production of axes in the Early Neolithic and of levallois products in the Late Neolithic within the Stonehenge Environs combined with the focused production of them at flint mines and quarries indicates the range of variation in flintworking practice in the Neolithic of southern Britain. In addition, it has been suggested that some of the monumental sites around Stonehenge (for example Robin Hood's Ball and Durrington Walls) may have been arenas appropriate for either the exchange or deposition of such artefacts. Therefore, it has been postulated that they may have arrived from elsewhere, possibly from the large flint mines such as those found in eastern Britain or the smaller examples located closer to Stonehenge.

The character of activities at flint mines and the associated movements of the artefacts made at them to other prehistoric landscapes present clues about the potential mobility and shifting composition of Neolithic and to a lesser extent Early Bronze Age communities. If this mobility is accepted then it also informs us that the seasonal round would have involved expectations about the different types of practices that were to be carried out in different regional locales. The movements of populations most probably would have been undertaken to conduct a variety of tasks such as the herding of cattle or even the construction monuments. For many of these activities the only durable remnants that we have left to study are stone tools and the debitage from their production. The character of this material tells us that, whilst some places such as mines were visited to conduct the focused production of elaborate tools, this was not the case for the groups that visited the Stonehenge landscape. In this area, there is no evidence of the extensive production of these types of artefacts. Instead, assemblages are dominated by the production of much cruder tools (especially scrapers and miscellaneous retouched forms) and it is possible that many tasks were undertaken using unmodified or simply retouched flakes. Accordingly, this suggests that the ploughsoil assemblages in the area relate to quite mundane tasks.

This does not mean that the only activities that took place in the Environs were purely quotidian and it is clear that massive episodes of construction occurred throughout the 3rd and 2nd Millennium. There were also many moments of ritual performance that must have taken place within and around the monuments. However, if accepted to be contemporaneous, the lithic scatters remind us that even during these times there was a need to conduct many other daily tasks such as the preparation of food, the working of wood or the processing of hides. It is this sense of the hustle and bustle of daily practice that has been missing from many accounts of the Stonehenge landscape.

Now that the overall character of the ploughsoil assemblages has been outlined, it is necessary to undertake a more detailed assessment of the likely chronology and organisation of the activities that produced them.

8.3 The chronology of the ploughsoil assemblages in the Stonehenge Environs

Owing to their unstratified character and because lithic artefacts are normally the only component to survive, assessing the chronology of ploughsoil assemblages has always been problematic (Ford 1987c). Traditionally there have been two main responses to this issue.

The first is to date ploughsoil assemblages from chronological type-fossils. The second is to date scatters through the excavation of comparative assemblages from well-stratified and dated deposits. As shall be discussed, both methods concentrate on different aspects of an assemblage. Each also has its own problems, which will be discussed in detail before moving on to discuss the chronology of the Stonehenge Environs material.

8.3.1 Dating ploughsoil assemblages using chronologically distinctive tool types

The most common approach towards dating ploughsoil assemblages is to prioritise the analysis of chronologically distinctive tools at the expense of the analysis of debitage (c.f. Section 2.3.1). Such analysis is normally predicated upon assigning both date and function to surface scatter 'sites' using the proportion of the assemblage represented by tools. For example, Holgate (1988, 51) not only dated areas of occupation by the presence of certain tool types but also suggested that an area that contained five or more types of tools could be characterised as a multi-purpose site. These areas were then interpreted as settlement sites based on the assumption that such areas could be defined by the practice of a variety of tasks in a single location (c.f. Woodward 1991, 37-8; Woodward and Bellamy 1991, 30; Thomas 1991, 17). However, Holgate's (1988) method involves major assumptions about the organisation of practice in past societies. The supposed relationship between multi-task areas and 'domestic' sites is based upon ethnographic studies of sedentary farming communities (*ibid.*, 35). Therefore, the character of the subsistence base has been assumed and many authors have recently questioned the connection between the Neolithic and sedentary mixed farming practices (Thomas 1991; 1999; Barrett 1994, 141-6).

There are also major problems with providing a mono-functional, mono-chronological interpretation of lithic scatters, as to varying extents they are palimpsests of different activities potentially separated by long periods. Further problems arise from using tools to do this when they represent only a tiny proportion of the material in any scatter. Given that notions over the appropriate use of different tools would have altered markedly over time and according to context, it is incorrect to give the presence of all tools the same weight in assigning function or chronology to ploughsoil assemblages. Accordingly, the use of tools to date scatters is fraught with difficulties and whilst it may provide some broad indications, it cannot replace the detailed study of assemblages of debitage.

8.3.2 Dating ploughsoil assemblages through technological analyses of debitage

An alternative approach towards dating than the use of chronological type-fossils is the use of comparative assemblages from excavated contexts. This method does not rely purely on the analysis of tools, but are aimed at distinguishing chronologically distinctive technological features within assemblages of debitage. This approach was attempted by both the South Dorset Ridgeway Survey and the SEP (Woodward 1991, 14-16; Richards 1990, 18). Unfortunately in both cases the attempt was unsuccessful. For the South Dorset Ridgeway Survey the main problem was the lack of securely stratified and dateable assemblages from all of the periods likely to be represented in the lithic scatters in the area. Good comparative assemblages were obtained for the Early Neolithic and the Middle-Late Bronze Age but none were located for the Later Neolithic and Early Bronze Age (Woodward 1991, 92). The problems encountered by the SEP were slightly different. In this case, although a suite of chronologically distinctive technical attributes from excavated and stratified assemblages was sought, the:

> "...degree of technical variation observed within groups of both Early and later Neolithic date appeared insufficient to warrant this approach." (Richards 1990, 18).

Even if these difficulties are disregarded, it can be suggested that there are other problems involved in the use of excavated comparative assemblages. For example, the approach assumes that within any period there was only a single definable approach towards the working of stone. This proposition denies the possibility for different task and context specific approaches towards core reduction within the same period. Similarly, as the majority of Neolithic stratified deposits occur within monumental sites the approach assumes that assemblages from these are directly comparable to those generated under different conditions from the areas between monuments (which are later incorporated into the ploughsoil). Accordingly, whilst the future analysis of stratified assemblages is desirable in increasing our limited understanding of later prehistoric flint working, their use as comparanda for ploughsoil assemblages is of limited potential.

Although rarely relied upon for dating lithic scatters the other major technique of dating assemblages of lithic debitage is the analysis of the length:breadth ratios of waste flakes (Pitts 1978a; Pitts and Jacobi 1979; c.f. Bohmers 1956; Smith 1965; Wainwright and Longworth 1971). The use of these ratios depends on a general shift from the production of narrow flakes in the Late Mesolithic/Early Neolithic to the production of broad flakes in the Late Neolithic/Early Bronze Age (Pitts 1978b). The trend in the shape of flakes also reflects the wider technological practices of the periods in that from the early fourth millennium onwards there is perceived to be a gradual shift from a reliance upon single platform blade cores to the adoption of more unsystematic technologies of multi-platform reduction. Whilst these general trends have been realised for sometime[10], it was not until the late 1970s that the shift in flake shape was quantified systematically by comparing length:breadth ratios from a large number of sites of known dates (Pitts 1978a; Pitts and Jacobi 1979). The results gained from this analysis clearly showed the trend outlined above and the authors suggested that, for the first time assemblages could be broadly dated through analysis of their waste flakes alone (*ibid.*, 172-3). Since this study measuring length:breadth ratios has become one of the most standard analytical techniques applied to later prehistoric flake assemblages.

Given that the analysis conducted here has focused upon debitage it might be considered that length:breadth ratios would give an excellent means for providing a broad chronology of assemblages. Unfortunately, this is not the case due to problems arising from the mixed character of the assemblages. In this regard it should be noted that Pitts and Jacobi (1979, 173) themselves quite clearly stated the limitations of the technique proposing that further investigation of its validity could best occur using well stratified *in situ* working floors. Similarly, the examples that they used to test the technique represented some of the largest, most carefully excavated and well-stratified lithic assemblages in the country. The selection of such sites was quite deliberate and they also stated the importance of selecting material from sites where complete retrieval of material had occurred (*ibid.*, 165). Obviously within surface collected assemblages

[10] Humphrey Case (1952/3) first noted the shift from narrow to broad flakes, whereas Smith (1965, 89-91) quantified the differences by comparing flake length:breadth ratios from two sites of different dates. It is probably through her work that the presentation of length:breadth ratios became more standardised and the significance of the analysis of waste flakes came to be recognised (c.f. Pitts 1978a, 25).

these conditions cannot be fulfilled leaving the possibility that they are derived from different episodes of working separated by long periods of time. It is also possible that field collection is biased towards larger flakes more easily recognised in the field. Although a distinction should be made between the size and shape of flakes[11], collection biases obviously affect the comparability of surface collected and excavated assemblages. Considering that dating of a scatter using length:breadth ratios would rely entirely upon comparison with stratified assemblages of known date this would seriously affect the validity of any results.

At a more general level, the usefulness of the technique has been brought into question with some researchers suggesting that the diachronic changes in the shapes of flakes that it relies upon have been overestimated (Farley 1979). Particular problems arise from inconsistencies in the way in which length:breadth ratio data are calculated. Furthermore, the technique has no inherent means of dealing with the comparison of different task-specific sites (Pitts and Jacobi 1979, 173). For example, even amongst radically different techniques, the early stages of reduction involving the removal of cortex and the rough shaping of cores, often produces similar products. Accordingly, it would be expected that two sites of different dates that were both involved in the initial extraction and reduction of nodules would be hard to differentiate on the basis of length:breadth ratios alone. Given that this contextual information is non existent for ploughsoil assemblages and that the material is mixed and potentially derived from different periods and techniques of reduction, length:breadth ratios could only be used to broadly date assemblages in exceptional cases.

In the case of the SEP material the use of ratios of length and breadth to date assemblages is further limited because, as noted above, there do not appear to be massive differences between Early and Late Neolithic technologies. The extent of this problem can be better understood from the more detailed analysis that was carried out upon a restricted set of stratified lithic assemblages recovered from various excavations conducted for the project. For example, the date of 3980-3708BC (OxA 1402) makes the material from the Coneybury Anomaly the earliest Neolithic assemblage in the

[11] It is the shape and not the size of flakes that length:breadth ratios record.

Stonehenge landscape. The lithic assemblage contains the highest proportion of blades of all of the assemblages analysed in detail (Richards 1990, 43). This seems in keeping with the early date of the material in that Late Mesolithic/Early Neolithic assemblages are described as predominantly single platform blade producing technologies (Edmonds 1995, 35-6). However, whilst these associations may conjure up images of an assemblage full of pristine blade cores, the reality is quite different. Actually, the high proportion of blades from the Coneybury Anomaly represents only 24% of the assemblage (Richards 1990, 43). In addition, most of the cores found from primary contexts were regarded as failed examples, core fragments were reused to produce further blanks and flakes were often struck from unmodified thermally fractured surfaces (Harding 1990e, 44). The production of crested blades may have occurred, but so did flake production from multi-platform cores. This level of variation indicates that it is dangerous to generalise about the character of lithic practices in individual periods or even within individual sites. Although there may have been predominant methods of reduction in certain periods, there were still many ways of working flint.

This is further suggested from material excavated near Robin Hood's Ball. Two dates, 3640-3370BC (OxA 1400) and 3361-3039BC (OxA 1401), indicate that this material is slightly later than that from the Coneybury Anomaly but it is described as broadly contemporary (Richards 1990, 61). In this location, the proportion of blades in the assemblage is only half of that found in the Coneybury Anomaly (Harding 1990d, 63). In addition, only one of 26 cores showed evidence of blade production and unmodified platforms were common as were multi-platform types.

A knapping sequence can be understood in more detail from the refitted *in situ* knapping deposit retrieved from the Phase 1 ditch of Amesbury 42 long barrow (Richards 1990, 96). Although no radiocarbon dates are given to date this activity, the position of the material within the ditch of a long barrow suggests an Early Neolithic date (though presumably sometime later than the material from the Coneybury Anomaly). The material from the ditch represents the working of three cores, the technique of reduction is suggested to be most similar to the material analysed from near Robin Hood's Ball (Harding 1990b, 103). Although limited blade production does occur:

> "The overall technology is very basic. There are none of the features, for example core shaping/preparation and cresting, which might be expected of a specialised blade industry." (*ibid.*, 104).

Furthermore, all three cores exhibit rejuvenation through rotation of the core by about 90° and in these cases previous flaking surfaces were used unprepared as new platforms. Both of these techniques are common amongst the ploughsoil assemblages collected by the SEP. One of these cores not only has three platforms, two of which use negative facets, but one of these platforms was also used to produce blades (*ibid.*, 103). Therefore, in this single core can be found contradictory elements that are normally thought of as characteristic of different periods (i.e. blades and the Early Neolithic and multi-platform reduction and the later Neolithic). Similarly, several cores from the SEP ploughsoil assemblages also show this intermixing between techniques of broad and narrow flake production with blades being removed from cores that were previously multi-platform and broad flake producing (Plate 92).

The situation with these cores is analogous to the wider picture presented by the detailed analysis of material from a range of periods and contexts from within the Stonehenge Environs. This level of ambiguity and intermixing between what archaeologists categorise as techno-typologically and chronologically distinctive processes indicates the fluidity of approaches to the working of stone in the past. This possibility should warn us of the dangers of seeking to date assemblages on the basis of technological features. In this respect, it could perhaps be stated that the link between the Early Neolithic and the systematic reduction of carefully prepared single platform blade cores has often been overstated. This is not to suggest that such modes of working were not important in the period, but that the associations between the two are not exclusive and there were also many other ways in which stone was worked.

The above arguments seem to make it even less possible to provide a chronology for the lithic scatters in the Stonehenge Environs. It has been suggested that approaches that rely upon either tools or debitage have major flaws particularly when applied to unstratified ploughsoil assemblages. However, whilst it is necessary to be aware of the limitations of suggestions, this does not mean that assessment of chronology cannot be fruitful. In particular, whilst there may have been a great deal of variation in the character of lithic reduction according to contingent circumstances, at a broader scale there were still significant differences between technologies of the Early Neolithic compared to later periods. Hence, Early Neolithic assemblages may have examples of broad flake production or multi-platform cores. Yet, overall when taking large assemblages of material into account it can still be expected that earlier assemblages will evidence a higher degree of single platform working, 'bladedness', platform maintenance and other features of a more systematic technology. Similarly, the production of elaborate artefact types and the working of levallois cores indicate that in certain contexts late Neolithic working practices were highly structured. Yet, large assemblages of Late Neolithic material, even from sites such as Grimes Graves where excellent quality flint was available, will contain a predominance of unsystematically worked multi-platform cores with little platform maintenance used to produce broad flakes (Saville 1981).

8.3.3 Dating the Stonehenge Environs ploughsoil assemblages

If these statements are taken into consideration then significant suggestions can still be made. A major improvement of the current analysis is that, for the first time, chronological assessment does not need to rely on the study of tools or debitage in isolation. As will be seen the emphasis of both elements of the assemblage seem to be in general agreement.

8.3.3.1 Tools

Firstly, quantification of the chronologically distinctive tools from the extensive survey of the SEP suggests a predominance of Late Neolithic types (Table 8.1). Consideration of these findings must take into account the issues previously highlighted (Sections 2.3.1.3 and 8.3.1). In particular, Table 8.1 indicates the variation in the range of morphologically distinct tool types from different periods. This means that certain

periods, especially the Bronze Age, will be underrepresented in this analysis as during this period most tasks were undertaken using miscellaneous retouched tools or unretouched flakes (c.f. Section 2.3.1.3). The absence of the Middle and Late Bronze Age in Table 8.1 indicates the lack of morphologically distinct tool types that can be assigned to those periods. This has a major impact on the current analysis as it essentially makes it impossible to detect a later Bronze Age component of the assemblage on this basis. Therefore, any such analysis is necessarily going to be biased towards the recognition of earlier periods. The significance of this factor cannot be overstated and it is essential to consider that despite the results of the analysis of tools there is a serious possibility that much of the material in the assemblage may in fact be derived from later Bronze Age activity.

In the context of the Stonehenge landscape the possibility for the ploughsoil assemblages dating from the later Bronze Age needs to be taken seriously because, whilst the landscape witnessed unparalleled Late Neolithic and Early Bronze Age activity, its later Bronze Age component is equally remarkable. In particular, there is an unusually dense system of 'celtic' field boundaries that cover much of the Stonehenge Environs, many of which may date to this period. Due to the importance of the possibility of a later date for the SEP material a full discussion will be held in Section 8.3.4.

Further to these issues, there are several more things that need to be considered in the current analysis of tools. The figures in Table 8.1 are only tentative as they are derived from the SEP archive tools register compiled during the original analysis. As no systematic form of classification appears to have been used to describe this material, some assumptions had to be made over what the descriptions in the archive represented. Scrapers have been excluded from this analysis as, although the SEP tried to construct a chronological typology, the results were considered inconclusive (Riley 1990; Richards 1990, 265). Lastly, the definition of what tools represent which periods is based upon the identification by the SEP (Richards 1990, 18) and some categories are more chronologically 'defined' than others are. Hence, whilst distinctive flaked flint axes and plano-convex knives start to be produced in certain periods, they were still being used in later periods (Edmonds 1995).

Despite the issues outlined above several clear patterns emerge (Table 8.1). The data indicate the low percentage of the total tool assemblage that is indicative of individual periods. Within these tools, it is clear that evidence of a Mesolithic presence in the Stonehenge Environs is extremely limited. In contrast, Early Neolithic and Early Bronze Age material is well represented but the vast majority (almost 70%) can be broadly attributed to the Late Neolithic.

Period	Tool Type	Number	Proportion of Diagnostic Tools	Proportion of all Tools
Mesolithic	Tranchet Axe	2	0.85%	0.06%
	Microlith	1	0.43%	0.03%
	Total	3	1.28%	0.09%
Early Neolithic	Ground Flint Axe/Frag.	11	4.68%	0.33%
	Flint Axe/Frag.	13	5.53%	0.38%
	Leaf Shaped Arrowhead	8	3.40%	0.24%
	Stone Axe	2	0.85%	0.06%
	Microdenticulate	15	6.38%	0.44%
	Total	49	20.85%	1.12%
Late Neolithic	PTD Arrowhead	56	23.83%	1.65%
	Rod/Fabricator	57	24.26%	1.68%
	Discoid/Discoidal Knife	30	12.77%	0.89%
	Plano Convex Knife	2	0.85%	0.06%
	Y-shaped tool	14	5.96%	0.41%
	Total	159	67.66%	4.28%
Early Bronze Age	Barbed and Tanged Arrowhead	6	2.55%	0.18%
	Borer	18	7.66	0.53%
	Total	24	10.21%	0.18%
Total		235	100.00%	6.94%

Table 8.1: The number and proportion of chronologically diagnostic tools collected by the SEP extensive survey (information taken from the SEP archive special finds register).

Given the findings, there must be some discussion of their meaning and in this regard there are two significant points. The first is that due to the issues outlined above the predominance of Late Neolithic tools cannot be taken to preclude the possibility for a major later Bronze Age component within the assemblage. The second point is that regardless of any further discussion on the possible later date of the material, the dominant Late Neolithic portion of the assemblage of tools cannot be ignored. In other words, even if it is suggested that there is a significant later Bronze Age component within the assemblage of debitage, there is already a proven component of later Neolithic activity and this indicates that much of the lithic producing activities were carried out during this period.

8.3.3.2 Debitage

As mentioned above it would be fruitless to rely upon analysis of the morphology (length:breadth ratios) of flakes as is common with stratified assemblages. Instead, a broader and admittedly less quantifiable assessment can be made of the overall character of material and some of the chronologically distinctive aspects of it. These latter elements largely relate to the presence of distinctive core types that have some value in this instance. Unfortunately, the numbers of such cases is extremely limited as only well-formed (Early Neolithic) conical blade cores and (Late Neolithic) levallois cores were considered distinctive enough to be attributed to individual periods. There were very few of these types of cores in the assemblage with 28 blade cores and 7 levallois cores recorded in the sampled assemblage. These represent 1.7% and 0.4% of recorded cores respectively. Obviously, these figures cannot be used to quantify the relative frequency of activity in the two periods represented. However, previous chronological analysis of the ploughsoil assemblages was based upon only the identification of tools. Hence, whilst it was known that tools were being used or consumed in the wider landscape during the Early and Late Neolithic, it can now also be shown that they were being produced there as well.

More significant than these insights based upon such a small proportion of the material is the assessment of the assemblage in general. In this respect, it should be noted that the vast majority of the assemblage represents a similar technological approach to the reduction of nodules (Section 8.2). This approach is characterised by the quick and easy reduction of cores (by either single or multi-platform reduction) with little or no regard towards the initial shaping of cores or the preparation, maintenance or rejuvenation of platforms. Equally, there is no apparent attempt to determine the shapes of flakes meaning that the majority of flakes produced are broad or squat. This aspect of the assemblage has been alluded to consistently throughout the analysis and its prevalence in all areas (and the associated lack of spatial distinction in the same technological practice) has led to the assemblage being described as homogenous. Given these characteristic features of the majority of the assemblage it is clear that their description fits the general picture that is painted of the gradual decline in flintworking techniques from the Late Neolithic onwards (Pitts 1978b; Ford 1987c; Edmonds 1987, 169-75; 1995). As suggested, this decline involves a shift from an emphasis on single platform cores and narrow flakes to multi-platform cores and broad flakes. Other distinctive features of post-Early Neolithic technology, such as the lack of core rejuvenation tablets, the reuse of previous flaking surfaces as new platforms and the relatively high occurrence of hinge fractures also occur within the SEP assemblage.

However, given that a strong suggestion can be made that the technology is post-Early Neolithic, the issue then becomes whether it can be dated more accurately within the Late Neolithic and Bronze Age. This is a major issue as during the course of this period the Stonehenge landscape changed drastically in use. An assessment of the assemblage on this basis is made in Section 8.3.4

8.3.3.3 The chronology of the systematic components within the assemblage

Given that some assessment has been made of the homogenous elements of the assemblage the same must now be attempted for those elements that differed from this predominant part of the assemblage. These represent the restricted set of sample areas, such as Well House (83), The Ditches (77) and King Barrow Ridge (57) from which an above average proportion of more systematically worked material was recorded (Section 5.3.2.2; Plate 13). It must be stressed that even in these locations the systematic technology was only an additional element alongside material similar to those found in all other areas. Analysis indicated that this material was defined by above average proportions of systematically worked cores, single platforms cores, cores with platform maintenance and in some cases retouched flakes or flakes with butt preparation (Section 5.3.2.2).

The association with systematically worked single platform cores may immediately suggest an Early Neolithic component within these assemblages. However, this does not necessarily need to be the case. Firstly, the single platform cores from these areas are not necessarily blade cores. Indeed, at Well House (83) massive single platform cores were found that produced large roughly elongate flakes but these were clearly not of the type that would normally be associated with the Early Neolithic production of blades and bladelets (Plate 78). Furthermore, the distribution of conical blade cores that are more typical of Early Neolithic working is widespread and does not concentrate in the same sample areas as does the other elements of the systematic assemblage (Section 6.4.3.1; Plate 31).

In contrast, although few in number, the distribution of (presumably) Late Neolithic levallois cores does seem to gravitate towards the areas between Wilsford Down and Rox Hill where the sample areas that produced the largest proportions of systematically worked debitage are located (Section 6.2.3.1). This is perhaps a hint that, although the systematic working in these areas is associated with single platform reduction, this may still date to the later Neolithic.

In this respect, single platform working is common in a variety of Late Neolithic contexts with between 30%-40% of cores at Grimes Graves (Saville 1981, 48) and Durrington Walls (Wainwright and Longworth 1971) being single platform types, whilst at Arreton Down this figure is as high as 47% (Alexander and Ozanne 1960). These figures accord well with the SEP assemblage as a whole with just under 35% of cores being single platform types. Within the sample areas where there is a higher proportion of systematic working this figure is generally higher but still within the same range with 38% of cores at King Barrow Ridge (57), 45 % of cores at The Diamond (59) and 48% of cores at Rox Hill (82) having single platforms. The only area that far exceeds this is Well House (83) where 62% of cores have single platforms indicating yet again the unusual character of working in the location.

8.3.4 Chronological Concerns: Distinguishing Late Neolithic and Bronze Age Assemblages

Given the preceding discussion it is important to consider from when within the Late Neolithic and Bronze Age the bulk of the SEP material is derived. As will be seen, there are two main problematic issues when trying to differentiate chronologically between Late Neolithic and Bronze Age material.

1) Chronological comparisons using tool types is not possible due to the differences in the range and forms of tools used in the different periods.

2) Chronological comparisons of debitage are hampered by the similarity of the broad flake technology between the different periods.

In regard to the first issue, as has already been discussed, there was a much more restricted range of formal tools produced in the Bronze Age compared to the Late Neolithic making the comparison of the two periods on the basis of tools alone misleading (Section 8.3.1). Any such analysis would be biased towards the recognition of the Late Neolithic and Early Bronze Age in contrast to later periods as no distinctive tool types were created during the Mid to Late Bronze Age.

This means that consideration of debitage is the only available avenue for understanding the relative chronology of the assemblage under question. However this approach has its own problems. In this respect, there is a general continuity from the Late Neolithic through to the later Bronze Age in terms of traditions of working flint. This pattern has been noted by Drewett (1982) from the analysis the Late Bronze Age lithic assemblage from Black Patch who suggested that the technology of the assemblage clearly continued that practiced during the Late Neolithic (*ibid.*, 374).

Similar observations were made for the multi-period assemblage retrieved from the excavation of a barrow, whose mound was later reused as a flint source, at Micheldever Wood, Hampshire (Fasham and Ross 1978). The excavated phases ranged from pre-barrow activity dated to 4950 ± 170 bc (HAR 1043) to post-barrow knapping activities dated to 1420 ± 90 bc (HAR 1044) and 1050 ± 90 bc (HAR 1041) (*ibid.*, 49-51). The majority of the material was derived from the Early Bronze Age barrow construction and the mid-late Bronze Age post-barrow flint industry (*ibid.*, 54). However, despite the wide chronological range of this assemblage the authors find that the metrical analysis of flakes indicates:

> "...a remarkable stability in size of flake production throughout the history of the site, due to unchanged knapping techniques and similar sources of flint." (*ibid.*, 65).

Fasham and Ross (1978, 66) clearly see a strong degree of continuity in Late Neolithic and Bronze Age lithic technologies to the extent that they discuss it as a unified stoneworking tradition. Furthermore, this represents a continuation of the broad flake technology that begins during the Late Neolithic as shown by assemblages from West Kennet (Smith 1965) and Durrington Walls (Wainwright and Longworth 1971). That such technologies continue well into the Middle to Late Bronze Age is shown not only from the sites already mentioned but also from assemblages recorded in Wiltshire by Saville (1980), at Itford Hill, Sussex (Bradley 1972) and at Mildenhall Fen, West Suffolk (Clark 1936).

However, despite the emphasis on continuity presented by many researchers, Ford *et al.* (1984) take a slightly different line in suggesting that although the broad shapes of flakes remain the same there were changes in the basic technology which produced them. They suggest that the emphasis on continuity by other authors is partially a result of the use of length:breadth ratios to analyse flake assemblages. Applying a more comprehensive statistical analysis they suggest that the Late Neolithic is characterised by a wide range in the variation of the shape and sizes of flakes in comparison to the Bronze Age (*ibid.*, 161). They suggest that the main reason behind this is the wider range of formal tools that was used during the Late Neolithic, which would have necessitated a wider range of blanks to produce them. However, they suggest that this is not the only difference between the two periods with the lack of variation in the sizes and shapes of blanks produced during the Bronze Age also being accompanied by a "progressive loss of control over the raw material" (*ibid.*, 167).

Therefore it can be suggested that, whilst there are clear contrasts between Early Neolithic and Late Neolithic/Bronze Age methods of flintworking, there are much more subtle differences between Late Neolithic and Bronze Age technologies. Different authors disagree on the extent of the latter differences and it is perhaps best to suggest that there is a slight quantitative rather than qualitative difference in the lithic technology of the two periods. Specifically, whilst Late Neolithic and Bronze Age technologies are broadly comparable there is a continued gradual decline in the standards of flintworking diachronically. Both the Late Neolithic and the Bronze Age are characterised by the use of *ad hoc*, often multi-platform, broad flake producing reduction strategies. The only consistent difference is the gradual decline in the care taken over core reduction strategies over time.

Now that the form of flintworking strategies between the Late Neolithic and Late Bronze Age has been discussed it is necessary to move forward to consider the chronology of the SEP material. As suggested, in the present case this can only be done through analysis of waste flakes and cores.

Whilst chronological analysis of debitage usually focuses on length:breadth ratios this technique is not applicable in the present case because of the unstratified nature of the assemblages (Section 8.3.2). In addition, this technique has most often been used to separate or contrast Early Neolithic with Late Neolithic/Early Bronze Age assemblages. It is well suited to this task due to the relatively marked differences between the narrow flake and broad flake technologies that define the two periods. However, in the present case we wish to distinguish between Late Neolithic/Early Bronze Age assemblages and

Mid-Late Bronze Age ones. As both of these periods are defined by broad flake technologies, differentiation on the basis of length:breadth ratios is unlikely to occur (Ford *et al.* 1984, 159).

Alternative to the use of length:breadth ratios, the current analysis has shown that the easiest means of characterising the assemblage of debitage is through analysis of its cores. This is aided by the fact that the presentation of standardised core types is one of the few types of data presented commonly enough to allow comparison on the basis of published sources. Table 8.3 indicates the assemblage composition of core types from a range of excavated Bronze Age sites classified using Clarke's core types (Clark *et al.* 1960). Whilst these sites are not limited to Wessex they represent some of the best excavated and published data for mid-late Bronze Age lithic assemblages from chalk regions with broadly comparable (i.e. abundant) lithic resources to the Stonehenge Environs.

The assemblage composition in these excavated examples of lithic assemblages can be compared with the composition of the SEP material (Table 5.3). As suggested in Section 8.3.2, there are many issues concerned with comparing stratified with unstratified material. However, discussion of these data is still fruitful in the present circumstances in highlighting several aspects of Bronze Age technology.

In the comparison of Tables 5.3 and 8.3 the key aspects of variation occur within core types A2, B2, B3 and C. Within the context of *ad hoc* Late Neolithic and Bronze Age working strategies these core types most likely represent the following:

A2) Cores abandoned after only a small number of removals, which did not necessitate platform development or rejuvenation through core rotation.

B2 & B3) Cores with slightly more developed reduction sequences necessitating platform rejuvenation through a single core rotation.

C) Broad flake cores with developed and lengthy reduction sequences necessitating multiple core rotations. Often these cores are nearing exhaustion.

Site	Phase/ Sub-division	Period	Core Type										Reference
			Ai	Aii	Bi	Bii	Biii	C	D	E	Misc.	Total No.	
Rowden, Dorset	-	EN	-	28.6%	-	7.1%	-	35.7%	21.4%	-	7.1%	14	Woodward (1991, 78)
	-	M/LBA	-	27.3%	-	-	-	57.6%	6.1%	-	9.1%	33	
Black Patch, East Sussex	Barrow 1	EBA	2.0%	65.3%	-	20.4%	10.2%	2.0%	-	-	-	49	Drewett (1982, 374)
	Barrow 3	EBA	-	40.0%	-	40.0%	10.0%	10.0%	-	-	-	10	
	Barrow 11	EBA	-	68.4%	-	5.3%	26.3%	-	-	-	-	19	
	Hut Platform 4	LBA	4.9%	63.4%	2.4%	9.8%	12.2%	7.3%	-	-	-	41	
	Hut Platform 1	LBA	-	41.6%	-	16.7%	41.6%	-	-	-	-	12	
Micheldever Wood, Hamps.	Phase 1	EN	-	32.1%	-	-	21.4%	25.1%	7.1%	7.1%	7.1%	28	Fasham & Ross (1978, 54)
	Phase 2	EBA	1.9%	39.6%	4.7%	4.7%	6.6%	20.8%	6.6%	0.9%	17.2%	106	
	Phase 4	M/LBA	0.4%	38.4%	2.7%	0.8%	12.2%	18.4%	5.9%	1.6%	19.6%	255	
Winterbourne Stoke G45, Wilts.	-		2.5%	35.0%	-	22.5%	7.5%	30.0%	2.5%	-	-	40	(Saville 1980, 13)
Grimes Graves, Norfolk	1971 Shaft	MBA	-	37.4	-	27.5	1.8	30.4	1.8	1.2	-	171	(Saville 1981, 14)
	1972 Shaft	MBA	0.3	40.4	1.4	25.1	4.5	15.0	8.8	4.5	-	354	(Saville 1981, 19)

Table 8.2: The proportions of core types from selected Bronze Age sites.

The first impression given from the data in Table 8.3 is of the wide variety of proportions of different core types even within only the parts of the assemblages relating to the Mid-Late Bronze Age. For example, between assemblages, A2 type cores vary from 27.3% of the assemblage at Rowden to 63.4% of the material from Black Patch. Similarly, C type cores vary from 0% of the assemblage at Black Patch to 57.6% of the assemblage at Rowden. Clearly the recurrence of these two sites at either end of the spectrum indicates the inter-relationship between the two types of cores.

Variation in the proportions of core types from such different later Bronze Age sites is perhaps to be expected. However, it is still a reminder that there is no single definitive type of Mid-Late Bronze Age assemblage. Indeed variation is to be expected as the norm due to the task specific nature of different sites, local raw material conditions and localised historically specific attitudes towards the working of stone. In this respect, the sites under analysis range from contexts associated with huts such as at Rowden (Woodward 1991) and Black Patch (Drewett 1982) to those associated with quarries such as at Grimes Graves (Mercer 1981a; 1981b; Saville 1981).

In addition, significant variation also occurs within individual sites. The clearest example of this is at Grimes Graves (*ibid.*) where there are major differences in the assemblages excavated from two different mine shafts (Table 8.3).

Despite this degree of variation a few observations can be made by comparing the data for the Mid-Late Bronze Age contexts from these sites to the SEP material. In general many of the stratified Mid-Late Bronze Age contexts have higher proportions of A2 type cores than the SEP material. The proportions vary but most have about 10% more of this type of core with extremely high proportions occurring at Blackpatch Hut Platform 4. Many of the same sites also have higher proportions of B2 type cores. The proportions of C type cores are more varied. Some sites such as Rowden, Grimes Graves and Winterbourne Stoke G45 have notably higher proportions of these multi-platform cores. However, an equal number of sites have lower proportions of these cores especially at Black Patch where some parts of the site have no C type cores at all.

Whilst the evidence is clearly equivocal a few points can be derived from these observations. It seems that, in comparison to assemblages of known Middle-Late Bronze Age date, the material from the Stonehenge Environs has a lower proportion of cores abandoned after the use of only one or sometimes two platforms. To a certain degree the SEP also has a higher proportion of cores worked into the later stages of reduction when three or more platforms had been utilised.

These findings tend to suggest that, in comparison, Middle and later Bronze Age flintworking was even more expedient in character than the admittedly *ad hoc* assemblage from the SEP. This would be in keeping with the idea of a decline in core control during the Bronze Age, which would eventually have led to situations where even simple rejuvenation strategies such as core rotation were not practiced and cores had to be abandoned at a relatively early stage in their reduction. Hence it would be expected that high proportions of single platform (A2) and double platform (B2) cores would be over-represented in later Bronze Age assemblages. In contrast, the data indicate that a higher proportion of cores had longer reduction sequences in the SEP material, often involving the use of three or more platforms. Following the current logic this would possibly suggest that the material has closer associations with Late Neolithic and Early Bronze Age technologies than later Bronze Age ones. This is because, *ad hoc* though they may be, extended reduction sequences involving multiple core rotations still indicate a significant degree of core control, which has been suggested to be a general feature of Late Neolithic compared to later Bronze Age flintworking traditions.

However, these patterns are extremely tentative and the most significant observation is the range of variation in assemblages. This should indicate the difficulty of assigning chronology to unstratified assemblages on the basis of this type of analysis. In addition it should be noted that, out of all of the assemblages in the analysis, the one that most closely fits the SEP material is the Mid-Late Bronze Age assemblage from Micheldever Wood Phase 4 (Fasham and Ross 1978). Furthermore, this is also the largest assemblage in the analysis, meaning that it does not suffer from the small sample size of some of the other assemblages. On this basis a similar later Bronze Age date could be argued for the SEP assemblage.

8.3.4.1 Summary

Hence it can be suggested that after the current analysis there is still definite potential for the assemblage to be either Late Neolithic/Early Bronze Age, Mid-Late Bronze Age or potentially both. From the analysis of tools (Section 8.3.3.1) it can be shown that there is *definitely* a significant proportion of Late Neolithic activity represented in the assemblage and this cannot be discounted. The same cannot be said for the later Bronze Age. However, as duly noted, the lack of later Bronze Age tool types means that a lack of later Bronze Age tools in the SEP assemblage does not mean that the material was not derived from activity during this period.

We are then left in a position where the date of the assemblage remains unsecured and arguments could be put forward for it either having a heavy emphasis in the later Neolithic or the later Bronze Age. Given the nature of ploughsoil assemblages it is unlikely that this situation will ever be satisfactorily resolved. In this respect perhaps the most secure label that can be applied to the assemblage is Late Neolithic *and* Bronze Age, a term that makes no distinction as to when within this period the majority of the material may be derived.

The major problem that this leaves is whether to frame the discussion of the results of the analysis towards the discussion of the inhabitation of a later Neolithic/Early Bronze Age landscape or a later Bronze Age one. Such differences obviously have major consequences to our understanding of this material and to the Stonehenge landscape in general. I believe personally that the weight of the evidence can be brought down to suggest a later Neolithic/Early Bronze Age date for the majority of the material and much of the subsequent discussion will proceed on this basis. However, as suggested the evidence is entirely equivocal and the possibility of a later date for the material is admitted and the ramifications of this possibility will also be discussed.

8.3.5 Conclusion

Hence, it is suggested from assessment of both the tools and debitage from the SEP assemblage that whilst Early Neolithic material is probably attested in some quantity the vast majority of it is most possibly derived from the later Neolithic and Bronze Age. It is difficult to make more specific suggestions about the quantity of Late Neolithic compared to Bronze Age material as the differences in tool use between the two periods means that the Bronze Age will always be underrepresented in this type of analysis. Equally, as both periods are characterised by similar approaches towards core reduction, it is difficult to define the periods according to debitage typologies. However, an assessment has been made in as far as possible to assess this situation by analysing the composition of the assemblage of cores from the SEP with those from excavated examples of known later Bronze Age date. The results of this analysis are equivocal and this means that two significant possibilities remain when considering when the bulk of the material is derived from.

This first possibility, in line with the analysis of tools and certain aspects of the technology of the assemblage is that the material is dated from between roughly the early to mid 3rd to mid 2nd Millennium BC. This collapses the chronology of the scatters considerably and most importantly brings the activity witnessed in the scatters broadly parallel to that witnessed in the monuments in the Environs. As with the monuments, this would indicate the definite and persistent use of the area in the Early Neolithic but with a large growth in the scale of activity in the Late Neolithic persisting into the Early Bronze Age. This also means that the history of the most intense (in terms of lithic use) periods of (not necessarily sedentary) occupation in the wider landscape broadly spans the period of active use of Stonehenge itself. Being able to align the lithic scatters with the other forms of archaeological material in the area is essential for understanding the contexts under which the activities that produced them took place. Equally, it allows us to understand something of the context in which people came to places like Stonehenge and Durrington Walls.

The second possibility is that the bulk of the material is derived from between the mid 2nd millennium to the beginning of the 1st millennium BC. This possibility relies partly on the technology of the assemblage, but mainly on the fact that this period cannot be discounted because it is not properly represented by any chronological analysis of tools. If the majority of the material belongs to this date then it makes it contemporary with the dense patchwork of field systems in the area. Rather than envisioning a sacral landscape in which quotidian activities were also essential as in the previous case above, this possibility suggests that the lithic producing activities were associated with mid-late Bronze Age settlements and the working of the fields in the area. The significance and potential of this possibility will be further considered in Section 9.4.

8.4 The spatial organisation of lithic practice in the Stonehenge Environs

The data collected from the recording of assemblages from the SEP was analysed in detail through statistical analysis. This analysis was based upon comparison of individual sample area assemblages. A more detailed spatial analysis was also conducted using a GIS. Hence, in spatial terms the material was understood at two levels. As the analysis showed, these two methods complimented each other strengthening the patterning that had been identified and highlighting new areas of interest. This means that we are now well placed to understand, in as much detail as is possible, the spatial organisation of lithic working practices in the Stonehenge Environs.

8.4.1 The spatial distribution of aspects of homogeneity in the assemblage

The first and most overriding impression gained from the comparison of different sample area assemblages was the level of similarity or homogeneity present in the data for a variety of different attributes. This level of homogeneity was particularly striking because it was quite unexpected. Before the analysis, perhaps influenced by previous accounts of the Stonehenge landscape that envisaged activity in the area to be organised around a rigorous ritual structure (Chapter 2), it had been hoped that detailed analysis of the ploughsoil assemblages would reveal a hitherto unappreciated patchwork of spatially differentiated lithic practices. Instead, the homogeneity revealed by the predominant proportion of the assemblage indicated quite the opposite. It is from this pattern that the most significant conclusions of the current project can be drawn and hence a summary of the findings is warranted here.

The similarity between sample area assemblages was most clear from the data recorded from flakes. This was particularly so for the metrical attributes such as flake weight, length, and breadth. This can best be appreciated by comparing the mean values for these attributes from individual sample areas (Table 4.1; Appendix 2). The similarity in the sizes of flakes between sample areas suggests the tendency for similar types of reduction techniques and similar types of products to be produced in all areas. For example, at a broad scale the early stages of the reduction sequence can be associated with larger flakes and the later stages with smaller ones. Hence, the similarity in not only the ranges of flake size (i.e. the smallest vs. the largest) but also in the relative frequency of flakes of different sizes between almost all sample areas indicates the potential that all stages of the reduction sequence took place in all areas. This suggestion is also made from a different angle by comparing the extent of cortex covering flakes. This method is one of the most usual ones used to assess areas of initial extraction and reduction (high amounts of cortical flakes) compared to areas of production and consumption (high amounts of non-cortical flakes) of flint artefacts. As with the data for the sizes of flakes, sample areas indicated a high level of similarity in the proportions of flakes with different amounts of cortex coverage. Again, the homogeneity in the data indicates that there were no sample areas where practice was markedly concentrated on any single phase of the reduction sequence. What this means is that all stages of the reduction sequence took place in all areas of the landscape. Therefore, at a broad scale, there was no spatial differentiation or other type of organisation in lithic practice. In other words, there was no movement of prepared cores between different parts of the landscape and practices were conducted at a much more local scale.

As the SEP has shown in a variety of locations (Harding 1990c, 165), surface flint was often used, even in contexts where better quality flint was eroding out of nearby seams. Outside of flint mines like Grimes Graves (Mercer 1981a), the gradual decline in the quality of flint that is used and the amount of effort that is expended in getting it is a general feature of Late Neolithic and Early Bronze Age flint working practice (Woodward 1991, Ch. 10). This fits well with the patterning of the data just discussed and also accords with the suggestion made above that the majority of the material may have been derived from later Neolithic activity. It is also in keeping with the character of the technology under discussion. This has been described as *ad hoc* and expedient in character and so it should be of little surprise that the spatial organisation of such practices would indicate the same lack of considered form. Instead, both the character of the technology and the shape of the data from individual sample areas suggest that the working of flint was probably undertaken locally to meet immediate desires. Material was probably retrieved from the nearest or most accessible source, worked swiftly to produce usable blanks and discarded just as quickly. In an area where flint was readily available, there was no concern with conserving or curating the flint that was used. Hence, there was no desire to extend the productivity of individual platforms or cores. This is reflected in the low proportion of cores with platform maintenance, the preponderance of broad flakes with plain butts and the infrequency of core rejuvenation by any method other than core rotation.

Not only does the data suggest that all parts of the reduction sequence took place in all parts of the landscape but other aspects of it also indicate the similarity between the character of that reduction sequence. In this respect attributes such as the orientation of flake scars on flakes, the types of flake terminations or the numbers of flake scars recorded on cores all give information about the basic approach towards reduction. As with the metrical attributes discussed above, the data for these attributes suggest a gross similarity between different sample areas. Several of these also hint at the common occurrence of multi-platform reduction and the occurrence of hinge fractures also points towards the lack of control over flaking angles. These features occur consistently between sample areas and relate to the *ad hoc* character of production referred to above. In no other aspect of the assemblage is this clearer than the recording of the character of working of the cores in the assemblage. This showed that in the assemblage as a whole over 70% of cores had been worked unsystematically and this figure was typical of the proportion in all but a few sample areas. Hence it can be shown that not only were all stages of the reduction sequence taking place in all areas but also that the actual character of reduction and the techniques used to produce flakes were also the same.

Having assessed this level of similarity from the data from individual attributes, more complex multivariate statistical techniques were also applied. The results of the Principal Components Analysis were in general agreement with the findings discussed here (Section 4.4.3). A plot of the first two principal components showed that the majority of sample areas were located in one large undifferentiated group (Fig. 4.16). Further to this a GIS was used to plot the data at the level of the original collection grid to test whether the patterns that had been perceived between sample areas also occurred within them. This analysis concurred that this was indeed the case especially for the metrical data for flakes that had indicated the most similarity between sample areas. This analysis was important because it showed that the similarity between sample areas was not due to the unwitting aggregation of spatially distinct practices caused by the large size of some of the sample areas.

8.4.2The spatial distribution of aspects of variation in the assemblage

8.4.2.1 The density of worked flint

So far, the discussion has concentrated upon the areas of homogeneity in the data. However, there were also some areas of difference and understanding these is equally important. The most obvious aspect is the overall variation in the density of worked flint (Plate 42). This variation is particularly significant given the preceding discussion of the similarity in other aspects of the assemblage. The average amount of flint per collection run (50m long spaced 25m apart) varies from just 2.2 flints per run at Normanton Down (56) to 56.2 flints per run at The Ditches (77) (c.f. Table 7.2). The distribution of areas with differing densities of surface material represented the basis of the interpretation of the ploughsoil assemblages conducted by the SEP (Richards 1990, 15-24). The broad zones of the landscape that they identified through this analysis have already been discussed (Section 2.3.1). Generally, it can be noted that the density of material in the lithic scatters is consistently high across the Stonehenge landscape.

There are some major areas with particularly high densities such as those in the southwest between Wilsford Down and Rox Hill, the areas north of the Stonehenge Cursus stretching also to its south immediately west of Stonehenge and the area around Coneybury Hill and to the south at Spring Bottom (Plate 42).

Perhaps more significant are those areas with consistently low densities of material. When viewed at the level of the landscape, some of these areas, such as those at the western and eastern end of the Stonehenge Cursus, may represent the periphery of the area of major activity. However, the same cannot be said for the other large area with a low density of surface material represented by all of the sample areas south of Stonehenge and north of Normanton Bottom. Located mainly on Normanton Down this area lies in the heart of the survey area and the low density of surface flint there is particularly marked as it is surrounded on all sides by major concentrations of dense surface scatters (Plate 42).

One of the features of the distribution of tools in relation to the distribution of debitage was that these areas with low densities of flint, such as at Normanton Down, also had relatively low proportions of tools (Section 6.4.7). This perhaps indicates that the relatively infrequent lithic producing activities that took place in this area were not of a type that required the use of retouched tools. This suggests that even in comparison to other areas in the landscape these activities were expedient, perhaps involving little more than the use of simple flakes. The relatively high proportion of cores in relation to both flakes and tools in the area also suggests that cores were rejected after only limited production. Probably cores were picked up, worked and then immediately discarded.

Despite this, given the extent of variation in the density of material across the Stonehenge Environs, it is surprising that there is little evidence that this relates to a similar level of variation in the types of lithic producing activities. Comparisons between sample areas with high and low densities of material is made difficult by the small sample sizes representing the areas from the latter groups, which can lead to skewed results. However, the general homogeneity between the data indicates that it is the intensity or duration of activities rather than the character of the reduction sequence that varies between different sample areas. Hence, for the most part both areas dense and sparse in material are dominated by the products of the unsystematic reduction of cores by the quickest and easiest means.

8.4.2.2 The average weight of cores

The other major element of variation in the assemblage of debitage is the average weight of cores from sample areas. Out of all of the metrical measurements taken from both flakes and cores, it was this attribute that varied the most (Tables 4.1 and 5.1). The heavier weight of cores at Well House (83) led the SEP (Richards 1990, 22) to suggest that the assemblage was 'industrial' in nature and concerned with the early roughing out of cores. In contrast, the lighter cores from King Barrow Ridge (57) were taken to indicate more of an emphasis upon 'domestic' activities also involving the greater curation of raw material away from its source (*ibid.*). However, there is no real evidence to support this. Spatial distinctions between practices of extraction and later consumption of flint would be expected to produce variations in the proportion of cortical flakes or the amount of exhausted verses abandoned cores but these do not seem to occur.

An alternative explanation is that the variation in the sizes of cores across the Stonehenge landscape reflects differences in the size of the nodules from which they were originally made. The flint in the area occurs in the Middle Chalk deposits in which it formed and also in eroded clay-with-flint deposits. It is also clear that a wide range of sizes of nodules were worked into cores. These range from small weathered surface flint nodules from which only a few flakes have been removed to massive nodules in areas like Well House (83). Therefore, it is much more likely that the variation in the weight of cores is due to the original size of the raw material than the transportation of prepared cores from one area of the landscape to another. This is particularly the case considering the character of the technology in the assemblage, as the majority of cores indicate few signs of having been roughed-out or shaped before use. Equally, there is little evidence for the selection of raw material of consistent size or quality and it is clear in several cases that surface flint was selected for use even where seams of higher quality flint were available close by (Harding 1990c, 165). As the technology in the assemblage is generally characterised as expedient, this would also seem to be at odds with the possibility of the organised movement of prepared cores between different parts of the landscape.

8.4.2.3 The spatial distribution of the elements of a systematic technology

The other significant source of variation within the material related to the presence of an element of a more systematic technology within the assemblage from a restricted set of sample areas. It should be stressed that even in these locations this material most often did not represent the majority of the sample area assemblages. However, whilst the details varied between cases, the practice of a more systematic technology could be identified in certain sample areas by relatively high proportions of certain types of single platform cores, cores with prepared platforms, cores with platform maintenance and systematically worked cores (Section 5.3.2.2). Although the pattern is less clearly defined, some of these areas also had unusual flake assemblages with relatively high proportions of flakes with prepared butts and retouched flakes. The Principal Components Analysis conducted using data from all of the flake attributes also identified many of the areas with an element of systematic technology as the few sample areas which were outliers to the main group (Section 4.4.3; Fig. 4.16). In the landscape, the distribution of areas with higher proportions of systematically worked material is split. In the southwest, the group is represented by The Diamond (59), The Ditches (77), Well House (83) and Rox Hill (82). These areas define either end of the dry valley, which though slight in places, runs from the Winterbourne Stoke/Wilsford Down area to Rox Hill (Plate 13). The second group of areas is located immediately east of King Barrow Ridge and consists of New King (87), King Barrow Ridge (52), and Nile Clump (70). The remaining area is Aerodrome (79), which lies just south of Stonehenge; of these areas, it has the lowest density of surface flint.

Although these sample areas have similarities in the character of the assemblages collected from them, there are major differences in their overall densities of worked flint (Table 8.2). In particular, the areas in the southwest represent some of the areas with the highest densities in the survey area, whilst those to the east of King Barrow Ridge are all below average. The topography between the two locations is also quite different with the areas in the southwest mostly situated on the edge of a dry valley, which becomes particularly pronounced on the slopes of Rox Hill. In contrast, the areas located to the east of King Barrow Ridge lie on the reasonably undifferentiated terrain between the dry valley of Stonehenge Bottom to the west and the larger Avon Valley to the east.

Area Name	Average Core Weight (g)	Average Flint per Collection Run
King Barrow Ridge (57)	92.9	16.0
Nile Clump (70)	97.2	10.5
New King (87)	98.0	10.0
Aerodrome (79)	112.1	5.8
The Diamond (59)	144.4	24.5
The Ditches (77)	138.8	56.2
Rox Hill (82)	128.4	19.6
Well House (83)	407.0	33.7
Average for whole assemblage	123.9	17.2

Table 8.3: The average weight of cores from sample areas with higher proportions of systematically worked material.

In parallel to the differences in the density of working and the topography of the locations, the average core weight also varies between the two groups of areas (Table 8.2). All of the areas east of King Barrow Ridge have a below average mean weight of cores whereas those in the southwest are all above average. This pattern is most exaggerated at Well House (83) where the average weight of cores is twice that of any other sample area. It was suggested above that, variation in core weight probably mostly reflected variations in the original sizes of raw material and this might well be the case here. This fits with observations of the differences in the topography of the two areas. In particular, nodules erode out of the chalk along the sides of the dry valley, which runs from Wilsford Down towards Rox Hill, upon which the areas in the southwest are centred. In contrast, it is more likely that the areas around King Barrow Ridge utilised flint from surface clay-with-flint deposits.

Although excavation of a scatter on Wilsford Down within The Diamond (59) led Harding (1990c, 165) to the conclusion that surface flint nodules rather than those eroding from the chalk were being utilised, the massive size of nodules in areas like Well House (83) indicates that this was not always the case. It is quite possible that the majority of material from these areas utilised surface nodules to practice a technology typical of the Stonehenge Environs as a whole. However, it is also suggested that the element of systematic technology that is contained within these assemblages in the southwest relates to a slightly different process. This practice may well have taken advantage of the quality of the nodules in the area, particularly those that were eroding out of the sides of the dry valley.

This possibility is backed up localised analysis of the topography of these locations using GIS that indicated that at Wilsford and Well House (83) the distribution of larger flakes is spread laterally along the sides of the dry valley (Section 6.3.2.1). It could be suggested that this pattern represents the early stages of reduction occurring at the level at which seams of flint were outcropping. In addition, the activity at Well House (83) is unusually focused and its assemblage has the largest proportion of systematic cores from anywhere in the survey area. Therefore, this specific area seems to have witnessed the intensive production of lithic artefacts in a manner unparalleled in the Stonehenge landscape.

Hence, for the most part it is probable that little care was taken over the selection of raw materials and this is in keeping with the general character of the technology in the assemblage. However, this was not always the case and at certain times, effort was expended to try to gain access to better quality flint nodules (either in terms of size or consistency). From another perspective, this is indicated by the trial flint mine near Durrington Walls (Booth and Stone 1952). This attempt failed and it might have been realised that it was also unnecessary as the seams that elsewhere required excavation to gain access to, were eroding naturally out of the sides of the dry valleys to the southwest.

The fact that the assemblages from these areas represent some of the densest concentrations of surface material in the survey area indicates the persistence with which the flint in these areas was worked. This is not to suggest that these areas represent the centres of an industrial-scale production, for their assemblages also have a tool component that is most often contrasted as representing 'domestic' activity (Section 6.4.7).

Accordingly, it is likely that the working of flint was only one amongst a number of activities that took place in these locations. These were also places to which people returned on a periodic basis and the presence of a consistent element of systematic working indicates that perhaps the qualities of the raw material in the area were appreciated. This indicates an intimacy of knowledge of the landscape around Stonehenge and the affordances that it offered. It also gives some idea of the histories that were created by the occupation of the area and gives rise to the possibility that certain groups may have favoured certain locations within the Stonehenge Environs. Familiarity or access to such knowledge would have provided one of the means through which the wisdom or experience of individuals could be expressed providing a series of cues that separated young from old.

In contrast to the areas in the southwest of the survey area, those areas to the east of King Barrow Ridge have below average densities of material and weights of cores. This makes it a little more difficult to explain why the assemblages in this area share the same character in terms of an element of systematic working. There would not seem to be the same potential for working a better quality material and production is not as focused as it is in the other area. It is more probable that in this area surface flint nodules were being used. Although smaller, this material would have been perfectly suitable for producing blanks used for making the majority of tools used throughout the Neolithic. One exception to this would be the nodules necessary to make the larger core tools such as axes but it should be noted that there is only very slight evidence for the manufacture of bifacial tools anywhere in the Stonehenge Environs. Previously, the area around King Barrow Ridge has been described as a centre for domestic activity and an area in which raw material was actively curated (Laidler and Young 1938; Richards 1990, 22-4; Bender 1998, 55). However, neither suggestion is accepted here (c.f. Section 5.3.3). In general, it is not considered appropriate to contrast areas of the landscape in terms of industrial vs. domestic activity as the greatest tendency of the distributions of the densities of cores, flakes and tools is for covariation (Section 2.3.1.4.2). Furthermore, any such suggestions would necessarily involve the transportation of prepared cores between different areas of the landscape and this is considered extremely unlikely (5.3.3).

Therefore, it remains difficult to explain the presence of an element of systematic technology in the area around King Barrow Ridge. However, if, as suggested (Section 7.4), groups from the wider region gathered periodically in the Stonehenge landscape, then these localised differences may relate to differences in regional flintworking traditions. Any such suggestions are necessarily tentative but if accepted then this would indicate that certain locations within the area were preferred by certain groups who returned to them time and again. This possibility should certainly be considered as in the Early Bronze Age it is argued that the associations of specific groups with certain areas of the landscape is evidenced by the clustered distribution of round barrow cemeteries. Furthermore, the homogeneity of the majority of the assemblage has indicated that similar ranges of technological practices and all stages of the reduction sequence took place in all areas. In this respect, stoneworking practices appear to represent localised and piecemeal practices. This could be taken to suggest that, in terms of lithic production, the different locales within the Stonehenge landscape were essentially self-sufficient. In keeping with the material relating to the practice of a systematic technology this localised coherency of practice may also fit tentatively with the idea of groups gathered from a wider region encamped across the Stonehenge landscape, each serving their own immediate needs in terms of the production of stone tools. As discussed (Chapter 7), the comparative analysis of material from different survey projects also supports this idea of large aggregations of dispersed peoples.

Now that the spatial organisation of practice within the area has been discussed, it is necessary to assess the significance of these suggestions to existing interpretations of the Stonehenge landscape in the Neolithic and Bronze Age.

Chapter 9: Final Discussion and Conclusions

As was discussed in detail (Section 8.3) the chronology of the ploughsoil assemblages around Stonehenge is far from certain. This means that there are two possible periods from which the material might be derived. The first is the Late Neolithic and the Early Bronze Age, whilst the second is the Middle and later Bronze Age.

The first possibility would make the mass of stoneworking represented by the lithic scatters contemporaneous with the majority of monuments in the area, including Stonehenge. Alternatively, if the material was dated to the Middle and later Bronze Age, it would be divorced from the context of the active use of the monuments and instead brought into a period in which the landscape around Stonehenge was being actively worked through the creation of extensive field systems.

Obviously, the differences between the two broad periods are quite stark. This makes discussion of the lithic scatters and their significance difficult. For reasons I have stated elsewhere (Section 8.3.4.1), I strongly favour the possibility that the ploughsoil assemblages are derived from Late Neolithic and Early Bronze Age material. For this reason, it is around this chronology that much of the discussion in the preceding and following chapter revolves. However, the potential of a later chronology cannot be discounted and the implications of this will be raised once again in the following final discussion.

9.1 Inhabiting the Stonehenge Environs

As discussed in Chapter 2 recent interpretations of the Stonehenge landscape in the early to mid 3rd to mid 2nd Millennium BC have presented a picture of life that is heavily weighted towards the use of monuments. Although the foci of interpretations differ, they still share a common theme. In nearly all cases there is some notion of a series of proscriptions governing actions both within monuments and between them. It has been shown that consistently accounts emphasise movement in the landscape as being restricted (e.g. Thomas 1991; Parker Pearson and Ramilisonina 1998; Exon *et al.*

2000). In some accounts, it is as if the landscape was ordered according to some cosmological 'mind-map' (Darvill 1997). These accounts indicate a desire to believe that a prehistoric peoples cosmological understanding of the world can be neatly boxed, labelled and packaged. At least this is suggested by the nature of the maps, such as those used by Darvill (1997; Plate 47) and Parker Pearson and Ramilisonina (1998; Plate 45) to illustrate the manner in which the landscape was ordered according to cosmology.

Yet the lines that neatly intersect their maps have been imposed by pen and ink on a two dimensional surface. What such diagrams can never show is that, if any boundaries existed in this landscape, they were written in the body and inscribed on the land through the movement of people. If proscriptions did govern what actions were correct in any given location, they would have been created through a history of occupation and would have been understood through the phenomenological experience of the landscape. It is precisely the sense of the personal understanding of place that is lacking in accounts that emphasise grand divisions in the Stonehenge landscape.

Furthermore, many accounts seem to be predicated upon the absence of people in the Stonehenge Environs. This is quite literally the case for Parker Pearson and Ramilisonina (1998) who suggest that during the later Neolithic and Early Bronze Age the area around Stonehenge was the 'Domain of the Ancestors'. To differing extents, it is also true in many other accounts that suggest that areas of the landscape were absent of 'non-ritual' activity (e.g. Whittle 1997a, 145). However, it is also more generally true because it is rare to find narratives that give any sense of the full range and character of human activity in the Environs. In particular, despite the efforts of the SEP (Richards 1990) to reveal the extent of settlement, mundane or daily practices are very rarely discussed. Yet, the lithic scatters still represent the best potential to address these issues. In this respect, the interpretations put forward by this project allow an alternative reading of life in the Stonehenge Environs.

In some cases, specific suggestions about the division of the landscape can be questioned on the grounds of the distribution of surface scatters. For example, Mike

Parker Pearson and Ramilisonina (1998) suggested that the area immediately around Stonehenge was the domain of the ancestors and that for the most part actions by living people did not take place there (Section 2.2.2). Yet this interpretation does not seem to fit with the large quantities of lithic debitage that litters the landscape, including the part of it in which only the ancestors are suggested to reside.

In this respect one possibility is that this lithic debitage was generated by the large numbers of people involved in the process of monument construction and that at other times, as the authors suggest, the area immediately around Stonehenge was an empty 'ancestral' landscape. However, whilst the construction of monuments must certainly have involved many people and the working of considerable quantities of flint, the suggestion that this alone could explain the majority of material in the ploughsoil assemblages is discounted for the following reasons:

1) The comparison with the Avebury landscape (Section 7.3.1 and 7.4.3), which has much lower densities of surface scatters, indicates that the large-scale construction of monuments does not *necessarily* generate the amounts of debitage found in the Stonehenge Environs.
2) If the majority of the debitage was generated during the construction of monuments it would be expected that the densest distributions of flint would coincide with the densest distributions of monuments and this does not seem to be the case.

Darvill (1997) also suggested that the landscape was divided by a complex series of partitions that determined the activities that could take place within them (Section 2.2.2). As with the previous case the distribution of the lithic scatters in the Stonehenge Environs does not seem to respect the kind landscape divisions that he puts forward. In particular, he suggests that 'flint mining and extensive flint-knapping are known only in the eastern and southern sectors' of a quadruple partition radiating from the centre of Stonehenge (*ibid.*, 186; Plate 47). However, the material collected by the SEP indicates that these types of activities also occurred to the north and west of Stonehenge (Plate 42).

Yet, the real implications of the analysis carried out for this project have a much wider currency than these specific instances. Whilst, many accounts do not make such direct interpretations of the nature of inhabitation of specific locales, it has been shown that there is a more general description of activity in the landscape as ordered, restricted and orientated towards ritual practice. The consistency of such interpretations indicates the tendency towards a *monumental myopia*. In this respect, arguments are generally developed through analysis of monuments and monumental contexts and these interpretations are expanded across the landscape as a whole as if they have equal relevance to all forms of activity in all places. What nearly all of these accounts fail to do is to consider the material that lies in the ploughsoil between the monuments, which as it has been shown here, can tell us something quite different about the inhabitation of this landscape.

In this light, as the analysis provided a detailed characterisation of the assemblages from different areas it is now possible to assess whether lithic producing practices reflect the structure and organisation in inhabitation that is suggested by monument-dominated accounts. The immediate answer to this question is that no they do not. There was no *zoning* of the landscape according to different phases of the reduction sequence. There were no areas dedicated purely to the procurement or consumption of flint and flint artefacts. No identification of 'industrial' or 'domestic' complexes is possible because the character of activities in different locales was not specialised in this way.

Instead, the working of stone in the Stonehenge landscape appears to have been undertaken on a more piecemeal basis. The homogeneity between assemblages from different sample areas suggests that all stages of the reduction sequence took place in all areas. In other words, flint was procured locally to suit the wide range of everyday tasks that involved its use. The reduction and discard of cores was also most often expedient and perhaps nodules were retrieved nearby, quickly worked and then rejected once tasks had been finished.

The whole character of the majority of the ploughsoil assemblage seems to stand in opposition to ideas of the landscape being a place reserved solely for the careful observation of ritual. Instead, they suggest that it was a busy place alive with people carrying out everyday tasks. Although areas of overlap between the distribution of lithic scatters and monuments are generally absent due to the extent of permanent pasture, where they exist they seem to concur with Bender's suggestion that in the Early Neolithic:

> "Clearance, flint working, planting and grazing washed up to the very edges of the monument." (Bender 1998, 55).

Indeed, to this it can be added that these activities occasionally washed right through them as well. The waste flakes and cores that are ubiquitous in the primary fills of the ditches of nearly every monument in the region show this. As suggested above, the majority of the material in the ploughsoil is probably derived from Late Neolithic-Early Bronze Age activity, which indicates that this was not a purely Early Neolithic phenomenon as Bender suggests.

Accordingly, it does not seem at all likely that heavy ritual proscriptions created a zoned landscape in which it was inappropriate in large parts of it to conduct anything other than ritual activities. The one exception to this rule may be Normanton Down. Within the survey area, this is the only centrally located part of the landscape, surrounded by intense lithic producing activity that consistently has very low densities of surface scatters (Plate 42). The other comparable areas are situated at either end of the Stonehenge Cursus and it seems possible that these represent the periphery of activity in the landscape as a whole. The same cannot be said for Normanton Down and for some reason lithic producing activities did not generally take place there. It would be wrong to immediately assume that this pattern represents some form of ritual exclusion. In this respect, it should be noted that in this case and also more generally, there is no correlation between the distribution of different monument types and the density of surface scatters.

The Normanton Down round barrow cemetery lies in the heart of the area but such cemeteries occur elsewhere in the landscape where they do not appear to affect the density of scatters. Perhaps the one unusual monument in the area is the Normanton Down long mortuary enclosure (Vatcher 1961). Interestingly, in parallel to the surrounding ploughsoil, excavation at the site revealed no flint artefacts of any kind (*ibid.*, 166). Probably associated with the laying out of the dead it would be tempting to see the presence of the mortuary enclosure as the reason behind the history of avoidance of the area and this remains a possibility.

However, the enclosure lies on the boundaries of the area under discussion here. It also fits within the general tradition of building and using long barrows several of which lie close by. Yet, they also appear in other areas such as the Winterbourne Stoke Crossroads and Wilsford Down where they are associated with high-density scatters. Therefore, the situation remains unclear although the idea of some ritual proscription prohibiting certain types of activity in this *specific* area is a possibility. In this respect, any exclusion was not absolute as there is still a low-density scatter across the area.

Although there is little to differentiate the assemblage from this area with any others, there are a few interesting features. There is a relatively low proportion of tools compared to debitage and it is possible that the technology practiced on Normanton Down was even more expedient than in other areas (Section 6.4.7). This feature may perhaps fit with the idea of a ritual exclusion in that those activities that did take place in the area (and which therefore may have broken any proscription) were not formal or extensive but relatively quick or short events.

Another possible explanation of the low density of the material in the area is that if activity was restricted, then the material that is there may have been derived from later on in the sequence when the histories that created such proscriptions had long been forgotten. In this respect it is interesting to note that there are no Early Neolithic style blade cores and hardly any blades in the assemblages from Normanton Down perhaps suggesting that earlier activity in the area was particularly limited.

9.2 Understanding inhabitation in the Stonehenge Environs in its regional context

Central to the current attempt to understand the character of inhabitation in the Stonehenge Environs is the ability to switch between different scales of analysis. So far, the discussion has revealed the organisation of the taskscape (Ingold 1993) at the level of the landscape by comparing assemblages from different sample areas and at a micro-scale by investigating variation within sample areas in relation to topography. It is now essential to further contrast these levels of analysis by placing the material in its regional context. This has occurred by contrasting the character of inhabitation in the area with other landscapes. This was done in Chapter 7 by comparing the ploughsoil assemblages in the Stonehenge Environs with those collected by other major landscape projects in southern Britain.

The only practical means of comparing material collected from different landscapes was through the analysis of published data. The problem that this raised was that there was a great deal of variation in the methodologies of the collection and analysis of data as well as the manner in which the results were presented. The other major issue that affected the comparability of the data was variation in the effects of post-depositional processes in different landscapes. Accordingly, all of these concerns had to be taken into account before the significance of the analysis could be assessed.

However, despite the range of potential factors, the results largely validated themselves. As the variation in surface scatter density was of such a magnitude it must have related to differences in the character of inhabitation of different landscapes to a significant extent. Therefore, for the first time it is possible to understand the inhabitation of the Stonehenge landscape within a regional context. The key question that can then be asked is whether the character and density of occupation around Stonehenge can be considered typical or unusual in comparison to other contemporary landscapes.

The simple answer to this question is that it most definitely was unusual. Material from a range of landscapes was assessed. Within these, there was variation in the character of their archaeology and geology. Some, such as the Middle Avon Valley and East Berkshire, contained only a sparse distribution and restricted range of monuments and other known archaeological deposits. Others like the South Dorset Ridgeway and the Avebury region represent some of the other 'core areas' of prehistoric Wessex and are therefore broadly comparable in terms of known archaeology. Equally, many were areas with an underlying geology of flint-bearing Middle or Upper Chalk, whilst others represented areas were flint had to be brought into the area before it could be worked.

This last aspect of the presence or absence of natural deposits of workable flint clearly had a major effect on the use of stone in those areas. As is to be expected, surface scatters of flint were generally denser in areas where the material occurred naturally. This pattern was replicated throughout the analysis. It was particularly clear amongst projects, such as the East Berkshire Survey (Ford 1987a; 1987b), where survey areas incorporated a range of surface geologies, some producing flint some not. Within such projects, there was a consistent correlation between areas where flint was available and higher density surface scatters.

Detailed work carried out by Schofield (1986; 1987; 1988) in the Middle Avon Valley indicates that not only the density of material but also the whole character of technologies is affected by the presence or absence of raw material. Although not all patterns were clear-cut, his analysis showed that generally as one moved away from the sources of raw material;

1) Flakes become smaller.
2) The proportion of core rejuvenation flakes increases.
3) The proportion of retouched flakes increases.
4) The proportion of primary flakes decreases.
5) The density of flint decreases.

Schofield (1986) interpreted all of these patterns as the results of 'resource stress' suggesting that they represent methods for curating raw material away from its source. He goes on to suggest that the availability of raw material represents the primary factor behind the character of prehistoric lithic technologies. There is a heavy ecological emphasis behind his work and it is probable that in neglecting the role of material traditions in technological choice he has ignored an essential feature of prehistoric technologies (Healy 1986; Lemmonier 1993). However, it is still of significance that the presence of raw material will greatly affect the character of surface scatters in an area. In particular, areas with flint generally witness its more profligate use. Therefore, variation in the density of surface scatters cannot be directly equated with variation in the density of inhabitation.

More importantly, the comparative analysis indicated that the presence of sources of flint was not the only factor that affected surface densities of worked flint. The analysis showed that even within areas where the raw material occurred naturally there was still major variation in scatter density. Indeed, in this respect, it was shown that the most significant variation between landscapes did not correlate to the presence of flint but to the character of their archaeology. Hence, the adjusted values for the density of flint per ha. from the different survey projects indicated a distribution split between those areas with a dense archaeological record and those without (Section 7.3.1; Fig. 7.1). Moreover, the differences between the two groups was of a high magnitude with the adjusted (and necessarily approximate) figures for the group with lower densities of worked flint being roughly ten times less than in the areas around Stonehenge and Maiden Castle. It was the size of these differences that indicated that significant results could be gained from the analysis despite the methodological problems involved.

The surveys with the densest scatters were carried out in the Stonehenge landscape, the South Dorset Ridgeway and the area around Avebury. Clearly, these represent some of the core areas of Wessex and are the landscapes with the densest concentrations of later prehistoric monuments in southern Britain. Hence, there seems to be a broad correlation between the presence of monuments and the intensity of occupation. Furthermore, within the group of areas with higher densities there was also variation. Again, the results were a little surprising in that the material collected from the Avebury region, on the slopes of Windmill Hill (Whittle *et al.* 2000), was significantly sparser than that collected by both the SEP (Richards 1990) and the Maiden Castle Survey (Sharples 1991a) (Section 7.3.1). The lack of extensive and systematic fieldwalking in the Avebury region compared to both of the latter areas, limits the extent of possible comparisons. However, if the differences that have been identified here are upheld once more detailed survey work has been carried out, this would point to significant differences in the inhabitation of these areas that in other respects have traditionally been considered comparable. This suggests that much larger groups gathered in the

Stonehenge landscape than they did in the Avebury region. Concomitantly, this opens up the possibility that people used the areas quite differently in the past and that activities in these locations might have held very different connotations.

In terms of the Stonehenge landscape, the analysis showed that it was as unusual in terms of its history of occupation evidenced through daily practice, as it was in terms of its range and density of monuments. Accordingly, the character of its inhabitation was of a type that was not witnessed in any other contemporary landscapes other than those such as the South Dorset Ridgeway. Clearly, there was a much heavier human presence around Stonehenge than there was elsewhere.

As lithic scatters represent material derived from palimpsests of activity, interpreting the nature of this human presence is problematic. This is because there is no inherent means of assessing whether relatively dense surface scatters were created by dense and synchronic occupation or persistent and long-term occupation. However, it is considered here that the wider evidence best supports the hypothesis that the exceptional density of the lithic scatters around Stonehenge can be best explained in terms of large gatherings of people on an intermittent basis (Section 7.4). This notion rejects the possibility of a permanent sedentary population in the Stonehenge Environs during the Neolithic and Early Bronze Age.

This is considered to be the case for several reasons. Firstly, as is generally the case in southern Britain for this period, there is no excavated evidence indicative of houses or any other type of substantial occupation structures. In this respect, it is clear from the distribution of the surface scatters, that occupation was not centred in restricted locations but spread across most of the landscape. Where these scatters have been excavated, a mixture of results has been found. In some locations, such as King Barrow Ridge there are clusters of insubstantial pits typical of the Neolithic. In others such as Wilsford Down, there is no evidence of any sub-surface features. In either case, the types of features that are found beneath the lithic scatters can hardly be described as evidence of permanent settlement. Secondly, in general there is still much debate over the character of settlement in the Neolithic and Early Bronze Age. Traditionally the beginning of the Neolithic has been understood as an economic phenomenon representing the widespread adoption of farming (Atkinson 1956, 148; Megaw and Simpson 1979; c.f. Thomas 1988; 1999, Ch. 2). This has often been followed by the assumption that farming equates with sedentary occupation. Hence, the character of inhabitation in the period has largely been a matter of assumption.

However, more recently the basis of these suggestions has been called into question. Amongst others, Thomas (1991; 1999) and Barrett (1994, 141-6) have questioned the extent of the reliance upon agriculture during the Neolithic. They have posited various possible forms of mobility even amongst populations that practice some form of cultivation. Furthermore, recent accounts have emphasised the mobility of populations and the punctuated variation in the 'role call' of groups that were engaged in a wide variety of tasks, such as farming, herding, gathering or quarrying in many potentially disparate locations (Edmonds 1997; 1999; n.d.; Whittle 1997c; Thomas 1991; 1999).

From another perspective, it is difficult to comprehend the huge amount of labour that went into the construction of the numerous monuments within the relatively restricted area of the Stonehenge landscape, as the output of a single local population. Certainly, the form of the monuments themselves, with the exception of Stonehenge, makes reference to regional traditions of architectural elaboration. In this respect, implicit in most accounts of the area is the suggestion that supra-community groups built and used these monuments (e.g. Bender 1998, 62).

Hence, it is suggested here that the remarkable density of flint in the ploughsoils around Stonehenge should be taken as evidence of equally remarkable concentrations of people gathering in the Environs on an intermittent basis. The comparative analysis of different survey projects also makes it clear that the size of these gatherings would have far exceeded those that would have occurred in almost all other contemporary landscapes. The meetings of people within the Stonehenge Environs would have involved the gathering of close and distant kin from a wide region. This would have provided an opportunity for otherwise disparate groups of communities to renew their bonds of affiliation. Like the choreography of ritual activity within Stonehenge and the genealogies suggested by linear round barrow cemeteries, the geography of the network of camps in the landscape around the landscape would have provided a material resource that could be drawn upon to define and renew political allegiances and positions of power. Although, the tasks that created the lithic scatters may be considered mundane, they provided the means to reproduce or radically alter the very thread of society as surely as did moments of ritual observance.

Now that an interpretation of the inhabitation of the Stonehenge landscape has been provided on the basis of the lithic scatters in the area it remains to see how these findings fit with the environmental data from the region.

9.3 Interpreting the ploughsoil assemblages in relation to the environmental data from the Stonehenge Environs

The goal of this project is to develop an understanding of the nature of inhabitation of the Stonehenge landscape. The primary means of achieving this is the examination of the ploughsoil assemblages in the area. The information gained from this material relates largely to long-term and large-scale mundane practices. Accordingly, it is necessary to assess the other forms of data that can inform us about the same aspects of prehistoric life. These principally relate to the various forms of environmental data that have been collected from a wide variety of contexts within the Stonehenge Environs. These data have been summarised a number of times for the SEP (Richards 1990, 250-8), the Stonehenge in its Landscape volume (Cleal *et al.* 1995; Allen 1995a; 995b) and the Science and Stonehenge volume (Allen 1997).

For the most part these different accounts agree with each other meaning that an overall picture of the changes in the environment around Stonehenge has been presented, which can be summarised as following:

1) Early Neolithic: A complex mosaic of woodland, scrub and grassland with localised clearings (Richards 1990, 256; Allen 1997, 126-7). The presence of hazelnuts in Early Neolithic contexts indicates the continued importance of wild resources and the potentially open nature of some woodland cover (Carruthers 1990, 250). In this period the data collected from contexts within monuments such as Stonehenge, Netheravon Bake Amesbury G42 long barrow, the Lesser Cursus and the Coneybury Anomaly all indicate open grassland environments.
2) Late Neolithic: A continued mixture of woodland, scrub and grassland. However, the landscape is generally described as being more open with larger and more permanent clearings and concomitantly more established and permanent areas of grassland (Richards 1990, 256; Allen 1997, 128-32). Despite this there was some localised woodland regeneration[12], which is indicated by molluscan sequence from Coneybury Henge (Bell and Jones 1990; Richards 1990, 256). In this period the data collected from contexts within monuments such as Stonehenge, Woodhenge, Durrington Walls, the Stonehenge Cursus and the Lesser Cursus all indicate open grassland environments.
3) Later Neolithic-Early Bronze Age: Some open secondary woodland intermixed with scrub but amongst a more dominant and well established grassland landscape. During this period the presence of grassland is indicated from secondary ditch fills from Stonehenge, Coneybury and Woodhenge (Richards 1990, 257). The same picture is indicated from barrows from the cemeteries along King Barrow Ridge and at Amesbury (Cleal and Allen 1994; Allen 1997, 132). Allen (*ibid.*) also suggests that this period witnessed the widespread adoption of arable agriculture within the Stonehenge landscape within a stable mixed farming regime associated with a sedentary residential pattern.

Accordingly, it can be seen that there is a general emphasis upon the gradual opening up of the landscape. Moving beyond the periods summarised here the suggestion is that there was a shift from a heavily wooded landscape in the Mesolithic period to an almost completely open one in the Late Bronze Age. In addition, the importance of open grassland is attested in all periods and most often this is suggested to be maintained by grazing (though to differing extents between periods).

One of the major possibilities reached from the analysis of lithic scatters is that the Stonehenge landscape was not the sole residence of a permanent local population, but that it witnessed intermittent gatherings from a widespread region, with increasing numbers during the Late Neolithic and Early Bronze Age. Accordingly, these

[12] Previously the molluscan sequence from Stonehenge was also interpreted as indicating a period of abandonment and woodland regeneration during this period (Evans 1984). However, more recent analysis has called into question the integrity of the deposits from which this sequence was derived and the chronology to which it can be related (Cleal *et al.* 1995, 163).

suggestions are not directly contradicted by the findings of the environmental data that there was an increasingly open and grazed landscape during this period. The idea of a gradually more open landscape also fits well with the suggestion made here that the lithic scatters in the area indicate the much heavier use of the area during the Late Neolithic and Early Bronze Age.

However, whilst there is general agreement between the current interpretation of the lithic scatters and the environmental data discussed above, it is harder to resolve the main interpretation put forward in this thesis with Allen's (1997) proposal that the later Neolithic and Early Bronze Age witnessed the growth of arable farming and a sedentary residential pattern. Accordingly, some discussion of Allen's interpretation of the environmental evidence is warranted here.

The first observation that should be made is that the range and quality of environmental data for the area is generally poor and in relation to the size of the landscape the contexts, which it comes from, are sparsely distributed (Allen *et al.* 1990, 253-4). This is particularly the case when the data are broken down chronologically in attempts to correlate the broadly dated environmental data with the more finely dated monumental sequence (especially that from Stonehenge) (Allen 1997, 116-7). Further problems are derived from the range of different types of evidence used to infer different features of the environment. For example:

1) Molluscan sequences retrieved from stratified deposits such as ditch fills are the most common form of evidence of open grassland.
2) Carbonised plant remains are one of the main forms of evidence used to indicate what plants were being consumed, particularly hazelnuts and cereal remains.
3) Charcoals are the main form of evidence for the presence of and species variation within woodland environments.

Accordingly, recreating an environmental mosaic is dependant upon combining a range of data that have been collected in a variety of ways. When combined with the various methodological issues associated with each type of data the picture of the environment becomes less certain. For example, it is openly admitted that there are problems with the interpretation of molluscan sequences as they provide information from very localised areas and:

> "...all the suites of molluscan samples taken within the Stonehenge area are derived from identified monuments, assumed to be centres of human activity, and may, therefore, by their very nature, be biased towards felled and open country areas within the landscape." (Allen *et al.* 1990, 254).

At least in part this explains the predominance of open grassland in the molluscan sequences from nearly all monuments in the Stonehenge landscape. It is also possible that this bias is created by the active clearance of these areas as part of the preparation for monument construction.

In addition, carbonised plant remains, which are generally few in number and have been retrieved from contexts within monuments, are mostly indications of the consumption of these foodstuffs within certain contexts rather than evidence of their production in the Stonehenge landscape. If the suggestion of a dispersed population of people gathering at Stonehenge intermittently to meet and to worship at monuments is accepted, then it is highly likely that people would have brought much of the food that they intended to consume with them. This is particularly the case if the food was intended to be consumed as part of large feasting events.

Accordingly, it can be seen that there are problems involved with the interpretation of the environmental data from the Stonehenge Environs. This is compounded by the lack of other forms of evidence, particularly pollen data, which would normally be used to provide complimentary information on the broader environment. Therefore, the environmental data allows a high degree of latitude in its interpretation.

This latitude is particularly apparent in Allen's statement concerning his landscape reconstruction for the Science and Stonehenge volume that:

> "...in this paper the reconstructions attempt to be more holistic, and are not just based on specific datasets, but also use evidence of local topography, artefact and monument distributions, as well as educated, informed *postulation*, to complete an *impression* of the Stonehenge landscape." (my emphasis) (Allen 1997, 124).

All of this means that Allen's (1997) suggestion of the reliance on arable cultivation during the late Neolithic and Early Bronze Age and its implication of a resident and sedentary Stonehenge population practising a mixed farming economy is open to question. His interpretation is based upon the following observations:

1) The increased presence of cereal remains.
2) Molluscan evidence from Durrington Walls, the Stonehenge ditch, the Mesolithic post holes near Stonehenge and North Kite.
3) The ard marks underneath Amesbury G71 barrow.
4) Colluvial fills in the ditches of several monuments such as both Cursus monuments and localised colluvium at Durrington Walls and on Coneybury Hill.

Allen's (*ibid.*) proposal and the evidence on which it is based has already been the subject of detailed criticism by Thomas (1999, 165-7). Thomas (*ibid.*) points out that the presence of cereal remains is more indicative of their consumption rather than their production. He also suggests that the presence of ard marks under Amesbury G71 barrow may just as equally represent the preparation of ground for pasture or barrow building as for planting. In reference to the molluscan evidence Thomas (1999, 166) highlights the uncertain nature of the data. Many of the authors of the molluscan reports from sites such as Durrington Walls and North Kite stated that the presence of arable cultivation as opposed to a grassland environment is only a 'possibility' (Wainwright and Longworth 1971, 335; Allen 1990, 192). In regard to the colluvial deposits it is pointed out that they are extremely (and notably) limited in extent and that whilst Allen (1997, 133) links colluvium with tillage, such soil erosion can also occur through intensive grazing and trampling by cattle (Thomas 1999, 167).

For the above reasons Allen's suggestions of a reliance upon agriculture during the later Neolithic and Early Bronze Age are rejected here. Instead, like Thomas (1999, 167), it is suggested that the environmental data may equally be used to suggest that groups visited the area intermittently from a dispersed region. Whilst, for the reasons outlined above, the extent of open grazed grassland may have been exaggerated, grazing was still probably an important part of the formation of the Stonehenge landscape. This fits well with the idea of seasonal migrations of people for whom the timings of social gatherings would have had to have been in agreement with the seasonal cycle and the movements of herds. Within this context meetings of normally dispersed populations would have presented an opportunity for groups to exchange cattle in order to maintain a viable breeding population.

Although slight, the evidence of woodland regeneration occurring on Coneybury Hill between the early and Late Neolithic also accords well with the intermittent character of visits to the Stonehenge landscape. Even though the suggestion is necessarily tentative, this could indicate that the periods between large-scale gatherings in the Stonehenge landscape were not always regular and that they may have sometimes been quite extended.

It may be that the intermittent character of these visits partly explains, or at least compliments, the confused structural sequence of Stonehenge. It is now clear that it took well over 1000 years for the final form of Stonehenge to develop (Cleal *et al.* 1995; Bayliss *et al.* 1997). There is also a staccato feeling to much of the construction with long periods of relatively minor changes followed by massive changes occurring much more quickly (Lawson 1997). It is also obvious that there was no overall plan of what Stonehenge should look like and certain features such as the posts in the Aubrey Holes were put up and taken down again, whilst others like the bluestones were put up, taken down and rearranged (*ibid.*; Cleal *et al.* 1995). Accordingly, the idea of the form of Stonehenge that we see today being the result of a number of small, irregularly spaced construction projects that were not fully planned and never finished is in keeping with the idea that other types of activity in the wider landscape were also intermittent.

There may have been long periods of time, even generations, when visits to the Stonehenge landscape did not involve construction work at the monument itself. If this is true then perhaps this indicates the changing significance of Stonehenge to succeeding generations of prehistoric societies. It was probably only in response to certain historically contingent concerns that people felt it necessary to initiate new episodes of construction at the monument. At other times it was perhaps the very act of gathering rather than the act of construction, which was of importance.

9.4 Moving Towards an End

Much of the discussion within Chapters 8 and 9 has revolved around the tying up of loose ends and the closing down of possibilities. Much of this has been concerned with an attempt to make some sort of strong statement about the character and meaning of the lithic scatters in the Stonehenge Environs. It is not only fitting but also necessary to make such an attempt given the amount of work and effort that has gone into the completion of this project. In doing so it has been necessary to prioritise certain potential interpretations of the material over others. However, now that this thesis is drawing to a close there is still time and it is still necessary to open up some alternative possibilities once more. This is mainly necessary because the unstratified character of lithic scatters resists chronological definition. Accordingly, whilst one possibility may be preferred over another, alternative hypotheses can never be rejected outright. The problematic issue of chronology has been discussed at length in Section 8.3 and it is serious enough that it deserves a final comment.

The major difficulty faced with this issue is whether the material in the SEP assemblage is derived from the Late Neolithic and Early Bronze Age, the later Bronze Age or a mixture of both periods. Put simply, whilst I prefer the former possibility, the other two cannot be discounted. The ramifications of a Late Neolithic and Early Bronze Age date do not need to be discussed further as this possibility has formed the basis of much of the preceding discussion. However, some discussion of the significance of a potential later Bronze Age date is warranted.

9.4.1 Later Bronze Age Activity in the Stonehenge Landscape

The main evidence for later Bronze Age activity in the Stonehenge landscape is associated with either funerary practices or field systems. The former is comprised mainly of Wessex-type barrows as well as some small and less ornate bowl barrows (Richards 1990, 277). In general, as with many other aspects of the barrows of Salisbury Plain, the geographical and numerical extent of later Bronze Age round barrows are poorly understood as is a detailed chronological framework. Primarily this is due to the lack of examples of modern, well-recorded excavations. Despite this, it is known that many Early Bronze Age barrow cemeteries had barrows of Wessex form added to them during their final phase of active use. Our level of understanding of the extent of Later Bronze Age funerary activity in the area is further hampered by the potential for secondary and satellite burials within barrows originating from the Early Bronze Age.

In contrast to the lack of knowledge of the extent of later Bronze Age funerary monuments the extent of later Bronze Age field systems is readily observable and widespread (RCHME 1979, 20-31; Richards 1990, 277-279). In addition there are several factors that suggest that the field systems may have some relation to the ploughsoil assemblages in the Stonehenge landscape. Chief amongst these is the complimentary aspects of their distribution.

As can be seen from Plate 1 the current distribution of field systems in the Stonehenge Environs (as recognised from aerial photography) is concentrated in five main areas. These are as following:

1) Rox Hill
2) Winterbourne Stoke Crossroads
3) Stonehenge Down
4) Fargo Wood
5) Durrington Down

As suggested, it is the similarity between the distribution of the most concentrated field systems and the densest parts of the lithic scatters in the Stonehenge Environs that provides the most convincing part of the argument that the latter are later Bronze Age in date. More specifically, the areas of Rox Hill, Winterbourne Stoke Crossroads, Stonehenge Down and Fargo Wood are all areas that have amongst the highest densities scatters in the Stonehenge landscape. This leaves only Durrington Down as a slight anomaly in that it has a comparable concentration of field systems but only an average density of surface flint.

Clearly an argument could be made that the correlation between the two facets of the Stonehenge landscape, one dated and one not, is suggestive that the two were also derived from the same broad set of activities. Concurrently the hypothesis could therefore be formed that they were in fact created at the same time. Essentially the implication is that the concentration of field systems equates to the focused inhabitation of these areas during the later Bronze Age. Under this rubric, such focused inhabitation was also accompanied with the working and using of flint, which in turn has led to the concentration of the ploughsoil assemblages in the same general locations.

However, keeping in mind the extraordinary density of lithic scatters in the area, it is a hard to picture how so much flint working would have occurred within the boundaries of a formal and enclosed field system. An alternative possibility is that the concentration of surface finds accumulated through the manuring of fields with refuse from settlements, which were located elsewhere.

This current argument has several important potential implications for the current project. Firstly, the dating of the material under analysis is problematic and this correlation provides an alternative basis for providing a date for the assemblage. Secondly, if the material is later Bronze Age in date, rather than Late Neolithic-Early Bronze Age, then our understanding of the Stonehenge landscape as presented in this thesis is radically changed. Essentially it pushes the dense inhabitation of the Stonehenge Environs back almost a millennia. This means that the idea of the Late Neolithic-Early Bronze Age Stonehenge landscape being a largely uninhabited one in which ritual proscriptions governed the majority of behaviour can be put in place once more. Equally it would mean that the inhabitation of the area in the later Bronze Age occurred with a density hitherto undiscussed and possibly on a scale not witnessed in any other contemporary landscape.

As the chronology of the ploughsoil assemblages can never be definitively known the possibility for them to be later Bronze Age must remain. However, it must also be stated that there are several problems with the argument suggested for a later chronology. Firstly, it is based heavily upon the complimentary distribution of the field systems, yet none of these earthworks have been excavated in any extent and no datable material has been retrieved from them. Hence, within the final discussion of this part of the landscape in the SEP report it is clearly stated that the later Bronze Age date of the field systems remains a matter of assumption (Richards 1990, 277). Therefore, even if a correlation with the field systems is used to tie down the chronology of the scatters, their date still remains unknown as the date of the field systems themselves is open to question.

The second issue is that whilst the suggestion on chronology relies upon the distribution of high density scatters and field systems, the correlation is limited. Although many areas with dense field systems also have high density scatters, there are several areas with high density scatters which have only slight evidence of field systems. These are areas such as Coneybury Hill, the eastern half of North of Cursus and the area south of Durrington Walls (Plate 2). According to Richards (1990, 277) differential survival is not an explaining factor in the distribution of the field systems, Hence, within the boundaries of the current suggestion the differences in distribution would mean that either these were areas during the later Bronze Age that were outside of areas of agriculture, or that these areas were inhabited during another period.

The other main source of evidence for activity in the period is the surface finds of Deverel-Rimbury and Late Bronze Age pottery. The distribution of this material is clustered and correlates closely with the areas with dense field systems. This helps support the later Bronze Age date for the field systems but also suggests that those areas without high density scatters but no field systems or surface finds of Later Bronze Age pottery are of an earlier date.

From the preceding discussion it has been shown that an alternative date for the ploughsoil assemblages in the Stonehenge Environs is possible. Given the unstratified nature of the material in question their chronology must always remain another contestable aspect of the Stonehenge landscape. There are certainly enough correlations to consider the possibility of a later date. However, the possibility for a later Bronze Age date is equivocal and on balance this is not the chronology put forward by this thesis. Much of the description and interpretation conducted for this thesis has significance regardless of chronology However, in those aspects where this is important; the contention is that the majority of the material is dated to the later Neolithic and the Early Bronze Age.

9.5 Concluding remarks

From the outset this project has been concerned with not only assessing the potentials of the detailed analysis of ploughsoil assemblage but also with understanding the inhabitation of a very specific landscape. Hopefully it will be considered that it has been successful on both fronts. The ploughsoil assemblages collected by the SEP have been sampled, recorded and analysed in detail and from a number of different perspectives. Of course there will always be problems when dealing with such large and unstratified assemblages but it has been shown that significant interpretations can be drawn. Essential to this approach is the belief that analytical detail is essential if more sophisticated understandings of what lithic scatters represent are to be gained. Equally important is the potential that this approach allows in detecting and interpreting both differences *within* and *between* lithic scatters from different parts of the landscape.

From the analysis of this assemblage the details of the inhabitation of the Stonehenge landscape have begun to emerge. Importantly, these findings tend to differ from most recent accounts of the area. This is perhaps unsurprising, as it has been shown that these interpretations have mostly concentrated upon ritual behaviour and the use of the monuments in the Stonehenge Environs. Accordingly they have tended to describe activity as highly structured and often it is suggested that proscriptions governed what forms of activity could take place in different parts of the landscape.

Yet, the ploughsoil assemblages generally provide an alternative view. It is obvious that their very presence indicates that ritual activities were not the only form of action that took place in the Stonehenge landscape, and yet this is a point missed by many archaeologists. Beyond this, the analysis showed that whilst the density of lithic producing activity varies across the landscape the character of those activities is surprisingly homogenous. It is also apparent that all stages of the reduction sequence took place in all areas and that in this respect local areas were essentially self-sufficient in terms of the production and consumption of flint artefacts. The character of this technology is also generally expedient and when combined with the extent of flint resources in the area this fits with the idea that flint was procured locally to carry out tasks at hand.

Hence, in respect to the majority of the assemblage it would seem that it contradicts previous suggestions of a predominantly ritual and zoned landscape. This simple realisation does much to repopulate a prehistoric landscape in which it has sometimes seemed that the only people were the ones buried underneath barrows. Yet, it is not enough to put the people back in the landscape. It is also necessary to ask what it was that they were doing there. This question has been approached from a number of different perspectives including the comparison of the Stonehenge Environs ploughsoil assemblages with those from other contemporary landscapes. Although the nature of the evidence will always preclude concrete conclusions, it has been suggested here that the debitage in the Stonehenge ploughsoil was most probably the produce of large-scale periodic gatherings of a widely dispersed population. It is clear from the analysis that considerable numbers of people must have gathered in the landscape around Stonehenge; perhaps more people than would have been witnessed in any other place.

However, it should be realised that concentrating upon the debitage produced by daily practice and the suggestion that these remains show that not only ritual activity took place in the area is not to deny the importance of the monuments. Indeed all of these aspects of life must have been intertwined to the extent that these different types of practices were inseparable from each other. The reason why so many people gathered around Stonehenge must have had something to do with the construction and use of the monuments in the area. Equally, both of these activities also involved large gatherings of normally dispersed peoples. Given this, it has to be realised that the act of gathering, of meeting distant kin, of exchanging news, information and even livestock was just as important as those activities that were specifically focused on the monuments. Whilst it has often been suggested that large monuments engendered a sense of community and collective achievement, this was also realised through the act of congregation itself.

The lithic scatters in the Stonehenge Environs show that during these gatherings time was spent conducting a variety of daily maintenance tasks in the wider landscape. There may have been times in which proscriptions had to be observed and movement was restricted and orientated towards the enactment of rituals at monuments such as Stonehenge. However, there were other moments when these specific locales and the behaviour associated with them must have shifted to the background as other more mundane tasks took precedence. Amongst other things cattle needed to be watched over, wood needed to be collected and food needed to be prepared. As would have occurred in any other landscape many of these tasks would have involved working and using flint.

Hence, as Bender (1998) has pointed out, there were many Stonehenge landscapes and the manner in which the area was perceived and the role that it played in society would have shifted according to a plethora of different contexts. If it is accepted that the role of archaeology is the study of people and societies and the manner in which they reproduced themselves then there is no reason why actions in certain contexts should be prioritised above any others. By assessing the lithic scatters in the area in relation to interpretations of both environmental data and monuments it is believed that this has been realised and that a more rounded picture of life in the Stonehenge landscape has been drawn. If nothing else it is hoped that this project has succeeding in finding some meaning amongst the monumental scatters that lie in a landscape so scattered with monuments.

Appendices and Bibliography

Appendix 1: Description of Recording Terminology and Methodology for the Analysis of Flakes and Cores

The following appendix details the terminology and methodology used for the recording of flakes and cores. The recording forms (containing attribute categories) are presented alongside a description of the definition of individual categories. Both of these sources are required to understand the data presented in Appendix 3, which contains the raw data from all of the lithic analysis. The fields contained in Appendix 3, which are not included on the recording forms (e.g. Collection Unit No. and various metrical attributes), are also explained here.

Flake attributes

Flake No.
Unique I.D. number assigned to each recorded flake.

Collection Unit No.
The original collection run reference assigned by the SEP. The reference locates material to its original collection run/collection unit. Each unit is a walked line 50m long and spaced at 25m intervals (Plate 49). The first part of the reference consists of a 6 figure O.S. map reference that locates the S.W. corner of a 100m square. The second part consists of a letter (from A to H) that denotes which run from within the 100m square the material comes from (Plate 49).

Completeness
The completeness of flakes was recorded using this attribute. In order to be considered complete, flakes had to retain their proximal and distal ends. In cases where it was clear that only a minor proportion of a flake was missing (i.e. where it was clear what the original proportions of the flake would have been) the flake was still recorded as complete.

Flake Recording Form

Flake Attribute	Attribute Category	
Completeness:	0 Broken	1 Whole
Bulb Type:	0 Indeterminate 1 Diffused	2 Pronounced
Butt Type:	0 Indeterminate/absent 1 Plain 2 Faceted 3 Thermal 4 Dihedral	5 Cortical 6 Punctiform 7 Crushed 8 Trimmed 9 Trimmed and Faceted
Termination Type:	0 Indeterminate/absent 1 Feather 2 Step	3 Hinge 4 Plunging
Flake Scar Orientation:	0 None (Cortical/indeterminate) 1 Same axis as direction of removal 2 Opposed (2 directions) 3 Right angles to the axis of the flake 4 Multiple directions 5 Opposed (1 direction)	
Flake Class:	0 Combination of other categories/indeterminate 1 Point of percussion immediately behind a ridge 2 Point of percussion to one side of a ridge 3 Point of percussion behind two ridges 4 Unridged/flat/cortical/dished dorsal surface	
Raw Material:	1 Chalk Flint	2 Brown Flint
Cortex Coverage:	0% 25% 50%	75% 100%
Flake Type:	0 Indeterminate 1 Core rejuvenation flake 2 Thinning/finishing flake 3 Preparation Flake 4 Side trimming flake 5 Distal trimming flake 6 Side and distal trimming flake 7 Misc. trimming flake 8 Scraper retouch flake 9 Bipolar flake 10 Notched flake	11 Misc. retouched/utilised flake 12 Chunk or chip 13 Misc. bifacial retouch 14 Blade 15 Point/borer 16 Retouched blade 17 Scraper 18 Knife 19 Denticulate 20 Fabricator/rod 21 Crested blade flake

Length

Flake length was measured to the nearest millimetre. The length was measured perpendicular to the butt of the flake along the axis of the removal (Plate 59a). In cases where flakes were irregularly shaped the longest possible measurement was taken (Plate 59c). Length was recorded only for complete flakes.

Breadth

Flake breadth was measured to the nearest millimetre. The flake breadth was measured at right angles to flake length. In cases where flakes were irregularly shaped the widest possible measurement was taken. Breadth was recorded only for complete flakes.

Length:Breadth Ratios

Length:breadth ratios were calculated simply by dividing the length of a flake by its breadth. Length:breadth ratios were calculated only for complete flakes.

Weight

Weight was recorded on an electronic balance to the nearest tenth of a gramme.

Bulb Type

Flake bulbs were recorded as *pronounced* (well-formed, rounded and exaggerated) or *diffused* (slight, flat or otherwise lacking definition). Bulbs were recorded as *indeterminate* where they were either missing or were unrecognisable for any other reason.

Butt Type

- Flake butts were recorded as *indeterminate/absent* where this portion of a flake was either not present or unrecognisable for any other reason.
- *Plain butts* occur on flakes removed from a previously flaked smooth surface (Debénath and Dibble 1994, 13) showing no other signs of butt (i.e. platform) preparation.
- *Faceted butts* show "several negatives of removal (facets) of preparation" (Inizan *et al.* 1992, 80). Such removals are the negative scars of facets removed from the interior surface of the platforms of cores prior to flake removal (Plates 60 and 64).

- *Thermal butts* occur on flakes that have been removed from unmodified exposed thermal surfaces of nodules that have been utilised as platforms.
- *Dihedral butts* are butts defined by the presence of two facets that intersect at a sharp ridge or arris, which is used as the point of percussion (Debénath and Dibble 1994, 13; Inizan *et al.* 1992, 80) (Plate 60).
- *Cortical butts* occur on flakes removed from unmodified and cortical platforms whose butts are therefore entirely cortical (Plate 60).
- *Punctiform butts* are particularly small or narrow (Debénath and Dibble 1994, 14; Inizan *et al.* 1992, 80). Such butts often indicate the deliberate preparation of the platform prior to the removal of a flake through trimming and/or faceting and an equally careful placement of the removing blow (Plate 60).
- Butts that were unrecognisable owing to smashing or crushing of the platform edge during removal were recorded as *crushed.*
- *Trimmed butts* show platform preparation through small vertical removals from the exterior margin of the platform (i.e. down across the proximal margins of the flaking surface) (Debénath and Dibble 1994, 13) (Plate 64).
- *Trimmed and faceted butts* are butts that show evidence of both the trimming and faceting of platforms as defined for these individual categories above.

Termination Type

- Flake terminations were recorded as *indeterminate/absent* where this portion of a flake was either not present or unrecognisable for any other reason.
- *Feathered terminations* are terminations where the "interior surface of the flake gradually intersects with the exterior surface resulting in a sharp edge" (Debénath and Dibble 1994, 17) (Plate 61).
- *Step terminations* occur when a flake snaps distally as it is removed (*ibid.*) This results in a sharp flat termination that is most similar to a snapped flake (Plate 61).
- *Hinge terminations* occur when not enough force is applied to the removal of a flake. This results in a distinctive rounded and lipped end to a flake (Plate 61).

- *Plunging terminations* occur when too much force is applied to the removal of a flake. In these cases the force travels into the body of a core producing flakes with thick ends and dipping or plunging profiles (Plates 58 and 61).

Flake Scar Orientation

- Flake scar orientation was recorded as '*None*' where the flake scars on the dorsal surfaces of flakes were either not present as the surface was entirely cortical, or were indeterminate as they were too slight to be recognised.
- Flake scar orientation was recorded as being along the '*same axis as the direction of the removal*' where the flake scars on the dorsal surface of the flake ran in the same direction from which the flake itself had been removed.
- Flake scar orientation was recorded as being '*opposed (2 directions)*' where flake scars ran in the direction of the removal the flake (as above) *as well as* in the opposite direction (i.e. running from the distal towards the proximal end of the flake).
- Flake scar orientation was recorded as being at '*right angles to the axis of the flake*' where flake scars ran perpendicular to the direction of the removal of the flake itself.
- Flake scar orientation was recorded as being in '*multiple directions*' where flake scars ran in multiple directions involving any combinations of the above categories. In practice this meant that flake scars ran in more than two separate directions on any individual flake.
- Flake scar orientation was described as '*opposed (1 direction)*' where flake scars ran *only* in the opposite direction to the direction of the removal of the flake.

Flake Class

Flake class was recorded according to Gingell and Harding (1981). Flake class defines the relationship between the point of percussion and any ridges on the dorsal surface of the flake (Plate 63).

- *Category 0* records flakes where the nature of this relationship is indeterminate. This most usually occurs because the relationship does not fit within the description of any (other) single category.
- *Category 1* records flakes where the point of percussion lies immediately behind a ridge or crest on the dorsal surface of a flake.
- *Category 2* records flakes where the point of percussion lies immediately to one side of a ridge or crest on the dorsal surface of a flake.
- *Category 3* records flakes where the point of percussion lies behind (or between) two ridges or crests on the dorsal surface of a flake.
- *Category 4* denotes flakes where the relationship between point of percussion and dorsal ridges cannot be recorded because the dorsal surface is unridged, flat, cortical or dished.

Raw Material

Flakes were found to be overwhelmingly made from the same type of flint typical of nodules occurring within (or derived from) the chalk. Only seven flakes were made from other raw materials and these were all of a brown flint more typical of flint found within gravel contexts.

Cortex Coverage

An estimation was made of the amount of the dorsal surface of a flake that was covered by cortex. The recording was fitted around categories based on an estimation of whether the extent of coverage was closest to 0%, 25%, 50%, 75% or 100% of the dorsal surface of a flake.

Flake Type

- Flake type was recorded as '*Indeterminate*' where none of the other flake types could be assigned. In practice this applied to the vast majority of flakes that could not be assigned to any specialised purpose on the basis of typology or function. It should be noted that this does not necessarily mean that the flakes were not used, as many could have been used in a completely unmodified state.
- A *core rejuvenation flake* is any flake that is removed in order to prolong the life of a platform. The core rejuvenation tablet is the most common form, especially

on single platform cores. These types of rejuvenation flakes are normally thick removals designed to remove all or most of the platform and the upper part of the flaking surface. Right angle core rejuvenation flakes represent a different method. Rather than removing the entire platform, these types of flakes are struck across the face of the core and thus remove irregularities on the upper portion of the flaking surface and the edge of the platform.

- *Thinning and finishing flakes* are flakes associated with the bifacial reduction of core tools. These flakes are most clearly characterised by multiple direction flake scars on their dorsal surface, a dipping profile often with feathered terminations and thin, faceted butts with a pronounced flaking angle (Newcomer 1971).
- *Preparation flakes* are flakes removed during the early stages of the reduction sequence. They are primarily associated with the roughing out and shaping of a core and its platforms and flaking surfaces (Harding 1990a, 218). Accordingly these types of flakes are most often heavily (or entirely) cortical.
- *Side trimming flakes* are flakes removed for the purpose of shaping or broadening the flaking surface (*ibid.*). Accordingly these types of flakes most often have cortical lateral edges.
- *Distal trimming flakes* are similar to side trimming flakes but are removed in order to lengthen or extend the flaking surface (*ibid.*). Accordingly these types of flakes often have cortical distal ends.
- *Side and distal trimming flakes* are flakes that have the characteristics of both of the above categories.
- *Miscellaneous trimming flakes* represent a more general category used to incorporate any form of trimming flakes not described by the other trimming flake categories.
- *Scraper retouch flakes* are flakes removed to resharpen the edge of a scraper. Such removals therefore evidence the scraper's characteristic steep retouched edge, which forms the sharpening flake's dorsal surface.
- *Bipolar flakes* are flakes produced by placing a core on an anvil before striking it with a hammer. The flakes that are produced are distinctive as they can have

ripples running in two directions on their ventral surface as well as sometimes two bulbs of percussion or even two distal ends. However, it should be noted that Crabtree (1972, 42) disputes that the technique produces these characteristics suggesting instead that it causes the Hertzian Cone to be severed or sheared.

- *Notched flakes* are flakes that have had a notch removed from their distal or lateral margins. The notch is formed by abrupt retouch. It can be hard to differentiate between the intentional creation of a notch through the removal of a single blow and unintentional plough damage. Therefore a conservative approach was taken towards the identification of notched flakes. Preference was given to cases in which multiple regularly spaced removals were used to form the notch, as this type of removal was considered less likely to have been caused by the plough.
- *Miscellaneous retouched/utilised flakes*. Differentiating between flakes that have been intentionally retouched and those that have been edge damaged during utilisation can be problematic and accordingly both of these categories were combined for this analysis. Beyond this, differentiating between retouched/utilised flakes and flakes that have been plough damaged is also difficult. Accordingly, a conservative approach was adopted towards the recognition of this type of flake. Preference was given to signs of retouch/utilisation that were even, multiple and regularly spaced and formed.
- *Chunks and chips* are small flakes or core fragments and are waste products of the knapping process. They normally have proportions of less than 20mm. Chips are extremely small flakes not intended to be produced as blanks, whilst chunks are more indistinguishable fragments. Whilst it must be clear that they were produced during the act of knapping, few more technological details can be determined from these aspects of debitage.
- *Miscellaneous bifacial retouched flakes* are flakes that have been retouched on both their ventral and dorsal sides on the same part of a flake.
- Normally the definition of *blades* relies upon their length being 2-2.5 times greater than their breadth. However this can be too wide a definition, as many

flakes of such dimensions do not share the other features of blades and were not intentionally produced as blades. Hence this category was applied to flakes that also had relatively small platforms, roughly parallel sides and were generally 'blade-like' in appearance.

- *Points/borers/piercers* are flakes with convergent sides that have been retouched in order to form a definite point.
- *Retouched blades* are flakes that display all of the features of blades (see above) but also show signs of having been retouched.
- *Scrapers* are ubiquitous and distinctive tools often made on thick flakes. They are distinguished by their retouch, which is abrupt and steep and generally forms a convex flake edge suitable for either scraping or wood working activities.
- *Knife* is a wide term used to describe a variety of forms that are all essentially edge tools with a cutting edge prepared by flaking or grinding.
- *Denticulates* are flakes defined by the removal of a series of contiguous notch removals creating a denticulated edge (Plate 75).
- *Fabricators and rods* are elongated lozenge shaped implements normally with a D-shaped cross section. They are formed by extensive, abrupt and steep retouch and are often abraded at one or both ends.
- *Crested blades* are the first blades to be removed from blade cores that have been prepared by cresting. This method sets up the first parallel-sided removal by creating a ridge consisting of the negative bulbs of a series of previous bifacial removals, which is then removed by a single blow (Inizan *et al.* 1992, 84). The flake produced in this manner is the crested blade. Accordingly crested blades have a triangular cross section with a distinctive dorsal ridge consisting of a series of negative bulbs of percussion.

Flake Shape and Flake Profile

A rough assessment was made of the general shape in plan and in profile of individual flakes. *Flake shape* (especially describing the relationship between the lateral margins of a flake) and *flake profile* were described as being either:

Flake Shape
1. Convergent
2. Divergent
3. Parallel
4. Sub-circular
5. Ovate
6. Amorphous

Flake Profile
1. Straight
2. Dipping
3. Plunging
4. Everted
5. Amorphous

Core Recording

Unlike the recording of flakes the recording of cores took place through a mixture of numerical attributes (weight, flake scar length etc.) and written description. The reason for this was to keep the recording of cores in line with that carried out originally for the SEP (Richards 1990). Most of the aspects of this part of the analysis are self-explanatory. All metrical measurements of flake scars on cores were taken from complete flake scars only. The weight of cores was measured on an electronic balance to the nearest tenth of a gramme. The written description of cores was ordered around categories of raw material, striking platforms, core production and core rejection. This description was orientated around the use of keywords in each category. These keywords are contained in the Core Recording Form and are self-explanatory. The keywords do not represent attribute states and are not mutually exclusive. Hence a wide variety of combinations of them could be used to describe individual cores.

In order for a statistical analysis to be conducted on the data from the recording of cores a method needed to be found to turn the written description into numerical values. In order to do this it was necessary to provide a separate field in the database for each individual keyword/subcategory contained in the Core Recording Form. Within these subcategories, such as nodule type, the presence of thermal fractures or the character of working of cores, different attribute states were assigned numerical values. The Core Recording Key can be used to identify individual sub/categories, their different attribute states and their associated numerical values/codes. The Core Recording Key is needed to interpret the values contained in the core analysis data, which is presented in Appendix 3.

Core Types

The recording of cores also involved the use of a core typology. This was based upon Clark's (Clark *et al.* 1960) core typology (see Core Recording Form) with some additional core types. Clark's core types are defined largely by the number and spatial relationships of the platforms on cores. Accordingly, the categories do not need further description here. However, several of the additional core types do need explanation.

- *Tortoise, levallois or discoidal cores* (Core Type 9) are distinctive by-products of the levallois method. This method is aimed at the removal of a (levallois) flake of predetermined form through the careful preforming of a core (Inizan *et al.* 1992, 90). The preforming involves the centripetal removal of flakes from around the circumference to shape both the top and the bottom of a core and to create a domed surface from which the levallois flake will eventually be removed (Plates 54, 69, 70, 88 and 89).
- *Tabular cores* (core type 10) are cores made on thin tabular or plate-like nodules. Their form is essentially *ad hoc* and the technique seems to mainly be a means of working thin and flat nodules. Accordingly, most cores of this type show few signs of core preparation. Owing to the shape of the nodules on which these cores are made their platforms are most often narrow and there is only limited potential for control over flaking angles. Flakes may be struck invasively from several different directions and edges of the nodule/core (Plate 94). The thin character of the raw material also limits production in most cases.
- *Bifacially worked tabular cores* (core type 11) have all of the same characteristics as tabular cores but have been worked on both sides of a tabular nodule rather than just one (Plates 76 and 95).
- *Kombewa cores* (core type 12) are the by-products of the Kombewa method. Like the levallois method the Kombewa method is also a means of gaining a flake of predetermined shape (*ibid.*). The Kombewa method first involves the production of a large flake with a pronounced bulb. This flake is then used as a core with a second flake then being struck from its ventral surface, which is designed to remove all or part of its bulb of percussion (Debénath and Dibble 1994, 29)(Plates 71, 72 and 90). Owing to the character of the technique the resultant flake, sometimes called a Janus flake, has two convex (essentially ventral) surfaces (Plate 62).

Core Recording Form

Attribute/descriptive category		Keywords/Description
Core Type:		
My core type	Clark core type	
0	-	Miscellaneous
1	A1	One platform, flakes removed all of the way around
2	A2	One platform, flakes removed part of the way around
3	B1	Two platforms, parallel
4	B2	Two platforms, one at an oblique angle
5	B3	Two platforms, at right angles
6	C	Three or more platforms
7	D	Keeled, flakes struck from two directions along a ridge
8	E	Keeled, with one or more platforms
9	-	Tortoise or levallois core
10	-	Tabular core
11	-	Bifacially worked tabular core
12	-	Kombewa-style core
Raw Material:		Thermally/naturally fractured Cortical/thermal/naturally patinated surfaces Nodule/tabular Core made on a fragment/flake/reused core
Striking Platforms:		Prepared/constructed; indicating deliberate preparation Use of negative flake scar/facet; implies opportunistic use of an existing flake surface (e.g. in multi-platform or rotated cores). Unmodified; thermal, naturally patinated or fractured surfaces
Production (extent):		Productive; blanks produced Productive/limited; blanks produced in limited numbers Non-productive; failed core
Production (type):		Description of blank form as either elongate, squat or broad
Core Rejection		Flake angle; edge of striking platform too step to remove flakes effectively Edge recession; percussion has continued after the edge of the striking platform has become too steep resulting in heavy crushing Size: core too small to produce useable blanks Potential; core would be too small following preparation/ rejuvenation to produce usable blanks Abandoned; no other reason for core rejection Exhausted; core is exhausted due to any number of factors Raw material; core rejected due to a flaw in the raw material Hinge fractures; core made unworkable by the presence of hinge fractures

Measurements of the longest complete flake scar, the average complete flake scar length, the number of complete flake scars and the core weight were also recorded.

Category	Sub Category	Attribute State
Raw Material:	Core Completeness	0) Fragment 1) Complete
	Thermal Fractures	0) None 1) Slight 2) Medium 3) Heavy
	Cortical	0) None 1) Slight 2) Medium 3) Heavy
	Cherty Inclusions	0) None 1) Slight 2) Medium 3) Heavy
	Nodule Type	0) Indeterminate 1) Nodular 2) Tabular 3) Nodule/Tabular 4) Made on a Flake
Platforms:	Prepared	0) No platforms of this type 1) 1 platform of this type 2) 2 platforms of this type etc.
	Use of Negative Flake scar/Facet	0) No platforms of this type 1) 1 platform of this type 2) 2 platforms of this type etc.
	Use of Existing Surfaces of a Flake	0) No platforms of this type 1) Use of ventral surface 2) Use of dorsal surface 3) Use of ventral and dorsal surface 4) Use of flake butt
	Unmodified: Thermal/Cortical/Naturally Patinated	0) No platforms of this type 1) 1 platform of this type 2) 2 platforms of this type etc.
	Platform Maintenance	0) None 1) Trimmed 2) Faceted 3) Trimmed and faceted 4) Rejuvenated

Category	Subcategory	Attribute State
Production Type:	Elongate Flakes	1) Non-productive 2) Productive/limited 3) Productive
	Broad Flakes	1) Non-productive 2) Productive/limited 3) Productive
	Squat Flakes	1) Non-productive 2) Productive/limited 3) Productive
	Character of Core Working	0) Unsystematic 1) Semi-systematic 2) Systematic 3) Indeterminate
Core Rejection:	Potential Remaining	0) Exhausted 1) Exhausted/potential limited 2) Potential limited 3) Potential limited/abandoned 4) Abandoned
	Loss of Flake Angle	0) None 1) Slight 2) Medium 3) Heavy
	Edge Recession	0) None 1) Slight 2) Medium 3) Heavy
	Size	0) Unproblematic 1) Problematic
	Hinge Fractures	0) None 1) Slight 2) Medium 3) Heavy
Reworking of Core:	Reuse as hammerstone	0) None 1) Slight 2) Medium 3) Heavy

Appendix 2: Tabulated Z-Score data

The following appendix contains a tabulated summary of all of the data used to calculate the Z-score distributions for various flake and core attributes in Chapters 4 and 5. Z-scores were calculated for flake length, flake breadth, flake length:breadth ratios, flake weight and flake cortex coverage. They were also calculated for core weight, the average number of flake scars on cores, the average length of flake scars on cores and the maximum length of flakes scars on cores. Z-scores were calculated for summarised data from each sample area. The details of the methodology are contained in Section 4.4.2.

Area Name	Area No.	No. of Complete Flakes	Mean Length (mm)	Mean Length Z-score	Mean Breadth (mm)	Mean Breadth Z-score	Mean Length: Breadth Ratio	Mean Length: Breadth Ratio Z-score
Winterbourne Stoke Crossroads	50	788	46.26	0.78	37.36	1.11	1.32	-0.33
Coneybury Hill	51	1303	42.74	-0.31	34.14	-0.35	1.34	-0.11
North of Cursus	52	2048	44.14	0.13	35.70	0.36	1.33	-0.24
Stonehenge Triangle	54	1566	42.79	-0.29	33.25	-0.75	1.38	0.42
South of Stonehenge	55	375	46.01	0.71	36.80	0.85	1.36	0.20
Normanton Down	56	87	46.93	0.99	35.99	0.49	1.38	0.45
King Barrow Ridge	57	788	44.74	0.31	35.02	0.05	1.37	0.32
The Diamond	59	696	47.32	1.11	36.54	0.74	1.39	0.59
Woodhenge	60	545	43.24	-0.15	36.12	0.55	1.27	-0.99
Normanton Gorse	61	82	44.00	0.08	34.26	-0.29	1.40	0.73
Cursus West End	62	579	42.11	-0.50	35.59	0.31	1.27	-1.00
Fargo Road	63	724	43.96	0.07	35.81	0.41	1.34	-0.11
Horse Hospital	64	555	46.72	0.93	36.36	0.66	1.40	0.63
Durrington Down	65	612	45.55	0.57	37.36	1.11	1.31	-0.52
Sewage Works	66	113	42.96	-0.24	35.34	0.19	1.30	-0.58
Normanton Bottom	67	452	45.24	0.47	35.58	0.30	1.37	0.28
West Field	68	733	44.52	0.24	34.89	-0.01	1.35	0.06
King Barrow Ridge East	69	475	41.42	-0.71	34.34	-0.25	1.27	-0.98
Nile Clump	70	248	41.86	-0.58	31.25	-1.65	1.43	1.04
Railway	71	612	42.05	-0.52	33.31	-0.72	1.35	0.09
Home Fields	72	667	40.34	-1.05	33.00	-0.86	1.30	-0.58
Whittles	73	166	39.90	-1.19	32.82	-0.94	1.29	-0.72
Pig Field	74	103	43.39	-0.11	36.13	0.55	1.28	-0.94
Bunnies Playground	75	279	43.82	0.03	35.98	0.48	1.32	-0.30
Destructor	76	108	41.98	-0.54	35.83	0.42	1.28	-0.88
The Ditches	77	492	40.59	-0.97	28.72	-2.79	1.53	2.40
Spring Bottom	78	1047	41.06	-0.83	34.15	-0.34	1.27	-1.02
Aerodrome	79	163	40.43	-1.02	30.93	-1.80	1.44	1.20
Ammo Dump	80	134	42.25	-0.46	34.87	-0.02	1.30	-0.58
King Barrow Ridge Addit.	81	90	41.72	-0.62	36.44	0.69	1.21	-1.74
Rox Hill	82	804	45.22	0.46	35.73	0.37	1.36	0.23
Well House	83	242	58.68	4.63	40.00	2.30	1.63	3.70
Luxenborough	84	336	43.21	-0.16	34.72	-0.09	1.33	-0.20
South of Cursus	85	94	44.93	0.37	36.82	0.86	1.30	-0.63
Rox Hill (unsown)	86	445	41.93	-0.56	34.63	-0.13	1.28	-0.85
New King	87	331	38.08	-1.75	28.58	-2.86	1.44	1.26
Normanton East	88	299	44.86	0.35	35.96	0.47	1.33	-0.19
Lake Bottom	89	38	44.05	0.10	35.50	0.27	1.38	0.48
Wood End	90	85	44.40	0.21	35.61	0.32	1.30	-0.58
Total	-	19304	-	-	-	-	-	-
Mean	-	495	43.73	-	34.90	-	1.32	-

Mean and Z-score data for flake length, breadth and length:breadth ratios (complete flakes only).

Area Name	Area No.	No. of Complete Flakes	Mean Weight (g)	Mean Weight Z-Score	Mean Weight Z-Score Without Well House	Average Amount of Cortex (%)	Average Amount of Cortex Z-Score
Winterbourne Stoke Crossroads	50	788	26.39	0.79	1.92	25.86	-0.13
Coneybury Hill	51	1303	22.24	-0.03	0.24	31.43	1.57
North of Cursus	52	2048	22.18	-0.04	0.22	27.10	0.25
Stonehenge Triangle	54	1566	18.55	-0.75	-1.26	21.66	-1.41
South of Stonehenge	55	375	24.47	0.41	1.15	31.00	1.44
Normanton Down	56	87	23.88	0.30	0.90	27.01	0.23
King Barrow Ridge	57	788	20.57	-0.35	-0.44	27.13	0.26
The Diamond	59	696	23.70	0.26	0.83	24.82	-0.44
Woodhenge	60	545	25.23	0.56	1.45	31.15	1.49
Normanton Gorse	61	82	18.70	-0.72	-1.20	17.99	-2.53
Cursus West End	62	579	19.92	-0.48	-0.70	30.35	1.25
Fargo Road	63	724	20.22	-0.42	-0.58	25.28	-0.30
Horse Hospital	64	555	22.54	0.03	0.36	22.48	-1.16
Durrington Down	65	612	23.66	0.25	0.82	28.92	0.81
Sewage Works	66	113	21.83	-0.11	0.07	28.54	0.69
Normanton Bottom	67	452	24.56	0.43	1.18	23.73	-0.78
West Field	68	733	22.64	0.05	0.40	23.29	-0.91
King Barrow Ridge East	69	475	21.79	-0.11	0.05	24.58	-0.52
Nile Clump	70	248	19.16	-0.63	-1.01	32.66	1.95
Railway	71	612	20.67	-0.33	-0.40	24.55	-0.53
Home Fields	72	667	20.73	-0.32	-0.37	29.61	1.02
Whittles	73	166	20.25	-0.42	-0.57	23.80	-0.76
Pig Field	74	103	21.57	-0.16	-0.03	26.90	0.19
Bunnies Playground	75	279	19.85	-0.49	-0.73	21.24	-1.54
Destructor	76	108	19.50	-0.56	-0.87	22.45	-1.16
The Ditches	77	492	17.97	-0.86	-1.49	25.25	-0.31
Spring Bottom	78	1047	20.96	-0.28	-0.28	27.87	0.49
Aerodrome	79	163	16.93	-1.07	-1.92	28.68	0.73
Ammo Dump	80	134	20.13	-0.44	-0.62	26.30	0.01
King Barrow Ridge Addit.	81	90	21.92	-0.09	0.11	24.17	-0.64
Rox Hill	82	804	26.04	0.72	1.78	28.08	0.55
Well House	83	242	49.70	5.35	-	23.24	-0.92
Luxenborough	84	336	22.35	0.00	0.28	28.79	0.77
South of Cursus	85	94	25.34	0.58	1.50	27.13	0.26
Rox Hill (unsown)	86	445	23.99	0.32	0.95	22.53	-1.14
New King	87	331	16.01	-1.25	-2.29	26.84	0.17
Normanton East	88	299	22.92	0.11	0.52	25.33	-0.29
Lake Bottom	89	38	23.10	0.14	0.59	31.58	1.62
Wood End	90	85	20.25	-0.41	-0.57	25.29	-0.30
Total	-	19304	-	-	-	-	-
Mean		495	22.37			26.27	

Mean and Z-score data for flake weight and cortex coverage (complete flakes only).

Area Name	Area No.	No. of Complete Cores	Mean Weight (g)	Mean Weight Z-Score	Mean No. of Flake Scars	Mean No. of Flake Scars Z-Score	Mean Average Flake Scar Length (mm)	Mean Average Flake Scar Length Z-Score	Mean Maximum Flake Scar Length (mm)	Mean Maximum Flake Scar Length Z-Score
Winterbourne Stoke Crossroads	50	81	144.30	0.71	7.40	0.36	28.10	-0.15	41.40	0.17
Coneybury Hill	51	116	90.00	-1.23	7.40	0.36	26.00	-0.87	37.40	-1.06
North of Cursus	52	245	127.10	0.09	7.30	0.27	27.80	-0.25	41.90	0.33
Stonehenge Triangle	54	88	102.00	-0.80	7.50	0.46	27.20	-0.46	41.60	0.23
South of Stonehenge	55	24	127.80	0.12	6.60	-0.41	29.20	0.24	42.90	0.63
Normanton Down	56	14	116.20	-0.30	6.40	-0.60	27.80	-0.25	39.10	-0.54
King Barrow Ridge	57	63	94.40	-1.07	6.80	-0.21	26.60	-0.67	36.20	-1.43
The Diamond	59	88	145.50	0.75	7.70	0.65	29.90	0.48	43.60	0.85
Woodhenge	60	43	86.20	-1.37	7.60	0.56	24.50	-1.39	37.00	-1.18
Normanton Gorse	61	4	134.30	0.35	6.30	-0.69	36.30	2.70	46.50	1.74
Cursus West End	62	59	111.90	-0.45	7.40	0.36	25.00	-1.22	37.70	-0.97
Fargo Road	63	49	119.50	-0.18	6.70	-0.31	28.90	0.13	40.90	0.02
Horse Hospital	64	40	104.90	-0.70	6.60	-0.41	28.20	-0.11	40.00	-0.26
Durrington Down	65	39	123.10	-0.05	6.30	-0.69	28.70	0.06	43.00	0.66
Sewage Works	66	8	226.90	3.65	10.30	3.16	27.40	-0.39	46.10	1.62
Normanton Bottom	67	50	155.80	1.12	9.40	2.29	30.50	0.69	46.90	1.87
West Field	68	40	134.10	0.34	7.90	0.85	27.50	-0.35	39.70	-0.35
King Barrow Ridge East	69	15	94.70	-1.06	5.30	-1.66	25.40	-1.08	35.60	-1.62
Nile Clump	70	33	101.40	-0.82	8.70	1.62	27.10	-0.49	39.50	-0.41
Railway	71	41	104.40	-0.72	6.10	-0.89	30.10	0.55	42.10	0.39
Home Fields	72	25	100.70	-0.85	7.40	0.36	28.20	-0.11	41.80	0.29
Whittles	73	5	111.60	-0.46	5.00	-1.95	33.40	1.69	40.00	-0.26
Pig Field	74	8	162.30	1.35	6.60	-0.41	33.60	1.76	47.10	1.93
Bunnies Playground	75	11	133.40	0.32	7.40	0.36	29.20	0.24	45.50	1.43
Destructor	76	8	122.20	-0.08	6.80	-0.21	26.70	-0.63	37.60	-1.00
The Ditches	77	39	153.30	1.03	6.90	-0.12	30.10	0.55	40.70	-0.04
Spring Bottom	78	38	131.80	0.26	6.80	-0.21	29.50	0.34	42.00	0.36
Aerodrome	79	27	121.30	-0.11	7.20	0.17	27.70	-0.28	39.60	-0.38
Ammo Dump	80	21	170.70	1.65	8.50	1.42	27.20	-0.46	43.60	0.85
King Barrow Ridge Addit.	81	8	94.60	-1.07	5.60	-1.37	29.60	0.38	39.50	-0.41
Rox Hill	82	72	133.40	0.32	6.60	-0.41	30.80	0.79	43.60	0.85
Well House	83	26	441.10	-	6.70	-0.31	35.00	2.25	64.00	-
Luxenborough	84	32	134.70	0.36	7.40	0.36	30.50	0.69	43.60	0.85
South of Cursus	85	15	93.20	-1.12	6.10	-0.89	29.30	0.27	38.00	-0.88
Rox Hill (unsown)	86	32	145.60	0.75	5.90	-1.08	28.60	0.03	40.00	-0.26
New King	87	21	108.30	-0.58	6.00	-0.98	27.50	-0.35	36.10	-1.46
Normanton East	88	22	140.20	0.56	6.80	-0.21	28.10	-0.15	41.20	0.11
Lake Bottom	89	1	143.10	0.66	11.00	.	24.00	-1.57	39.00	-0.57
Wood End	90	8	86.90	-1.34	7.40	0.36	21.00	-2.61	34.10	-2.08
Total	-	1559	-	-	-	-	-	-	-	-
Mean	-	39.97	132.60	-	7.12	-	28.51	-	41.44	-

Mean and Z-score data for core weight, average number of flake scars, average length of flake scars and average maximum length of flake scars (complete cores only).

Appendix 3: Data from the Analysis of Flakes and Cores

This appendix is presented on an attached CD ROM and contains all of the raw data from the analysis of both flakes and cores. The data are presented in two separate Excel workbooks. The data for flakes is contained in the file "Flake Data.xls" and the data for cores is contained in file "Core Data.xls". The worksheets contain a series of fields with headings stating the attribute presented in that column. The rows are filled with the data for individual flakes and cores, which is presented in numerical form. In order to interpret these numerical values it is necessary to refer to Appendix 1, which details the recording system and provides a key for understanding the numerical values in the flake and core spreadsheets.

Bibliography

Addington, L. R. 1986 *Lithic Illustration. Drawing Flaked Stone Artifacts for Publication.* Chicago and London: The University of Chicago Press.

Alexander, J. and Ozanne, P. C. 1960 Report on the investigation of a round barrow on Arreton Down, Isle of White. Proceedings of the Prehistoric Society 26: 263-302.

Allen M. .J. 1990 Land Mollusca, in Richards, J. (ed.) *The Stonehenge Environs Project.* London: English Heritage Archaeological Report No. 16. pp 191-192.

Allen, M. J. 1991 Analysing the landscape: a geographical approach to archaeological problems, in Schofield, A. J. (ed.) *Interpreting Artefact Scatters: Contributions to Ploughzone Archaeology.* Oxford: Oxbow Monograph no. 4. pp 39-57.

Allen, M. J. 1995a Taming of the wildwood, in Cleal, R. M. J., Walker, K. E. and Montague, R. *Stonehenge in its Landscape: Twentieth Century Excavations.* London: English Heritage Report No. 10. p 473.

Allen, M. J. 1995b An economy to support the stones?, in Cleal, R. M. J., Walker, K. E. and Montague, R. *Stonehenge in its Landscape: Twentieth Century Excavations.* London: English Heritage Report No. 10. p 484.

Allen, M. J. 1997 Environment and Land-use; the economic development of the communities that built Stonehenge (an economy to support the stones), in Cunliffe, B. and Renfrew, C. (eds.) *Science and Stonehenge.* London: Proceedings of the British Academy, 92. pp 115-44.

Allen, M. J., Entwistle, R. and Richards, J. 1990 Molluscan studies, in Richards, J. *The Stonehenge Environs Project.* London: English Archaeological Report No. 16. pp 253-4.

Ammerman, A. J. 1981 Surveys and archaeological research. *Annual Review of Anthropology* 10: 63-88.

Andrefsky, W. 1998 *Lithics: Macroscopic approaches to analysis.* Cambridge: Cambridge University Press.

Atkinson, R. J. C. 1956 *Stonehenge.* London: Penguin.

Barrett, J. C. 1994 *Fragments from Antiquity. An archaeology of social life in Britain, 2900-1200 BC.* Oxford: Blackwell.

Barrett, J.C. 2001 Agency, the duality of structure, and the problem of the archaeological record, in Hodder, I. (ed.) *Archaeological Theory Today.* Cambridge: Polity Press. pp 141-164.

Barrett, J. C., Bradley, R. J. and Green, M. 1991 *Landscape, Monuments and Society. The prehistory of Cranborne Chase.* Cambridge: Cambridge University Press.

Barrett, J. C. and Fewster, K. J. 1998 Stonehenge: *is* the medium the message? *Antiquity* 72: 847-52.

Bayliss, A., Bronk Ramsey, C. and McCormac, F. G. 1997 Dating Stonehenge, in Cunliffe, B. and Renfrew, C. (eds.) *Science and Stonehenge.* London: Proceedings of the British Academy, 92. pp 39-59.

Bell, M. and Jones, J. 1990 Land mollusca, in Richards, J. *The Stonehenge Environs Project.* London: English Archaeological Report No. 16. pp 154-8.

Bender, B. 1992 Theorising landscapes, and the prehistoric landscapes of Stonehenge. *Man* 27: 735-55.

Bender, B. 1993 Stonehenge - Contested Landscapes (Medieval to Present-Day), in Bender, B. (ed.), *Landscape, Politics and Perspectives.* Oxford: Berg. pp 245-279.

Bender, B. 1998 *Stonehenge: making space.* Oxford: Berg.

Bender, B. and Edmonds, M. E. 1998 Dialogue, in Bender, B. *Stonehenge: making space.* Oxford: Berg. pp 69-77.

Bohmers, A. 1956 Statistics and graphs in the study of flint assemblages. *Palaeohistoria* 5: 1-38.

Boismier, W. A. 1991 The role of research design in surface collection: an example from Broom Hill, Braishfield, Hampshire, in Schofield, A. J. (ed.) *Interpreting Artefact Scatters: Contributions to Ploughzone Archaeology.* Oxford: Oxbow Monograph no. 4. pp 11-25.

Booth, A., St. J. and Stone, J. F. S. 1952 A trial flint mine at Durrington, Wiltshire. *Wiltshire Archaeological and Natural History Magazine* 54: 381-8.

Bourdieu, P. 1977 *Outline of a theory of practice* (trans. R. Nice). Cambridge: Cambridge University Press.

Bowden, M. C. B., Ford, S., Gaffney, V. L. and Tingle, M. 1991 Skimming the surface or scraping the barrel: a few observations on the nature of surface and sub-surface archaeology, in Schofield, A. J. (ed.) *Interpreting Artefact Scatters: Contributions to Ploughzone Archaeology*. Oxford: Oxbow Monograph no. 4. pp 107-113.

Bradley, R. 1072 The flint industry, in Holden, E.W. A Bronze Age cemetery-barrow on Itford Hill, Beddingham, Sussex. *Sussex Archaeological Collections* 110: 93-102.

Bradley, R. J. 1984 *The Social Foundations of Prehistoric Britain: Themes and variations in the archaeology of power.* Harlow: Longman.

Bradley, R. J 1987 A Field Method for Investigating the Spatial Structure of Lithic Scatters, in Brown, A. and Edmonds, M. R. (eds.) *Lithic Analysis and Later British Prehistory*. Oxford: British Archaeological Reports 162. pp 39-47.

Bradley, R. J. 1991 Ritual, time and history. *World Archaeology* 23(2): 209-19.

Bradley, R. J. 1993 *Altering the Earth: The origins of monuments in Britain and continental Europe*. Edinburgh: Society of Antiquaries Scotland, Monograph Series No. 8.

Bradley, R. J. 1998 *The Significance of Monuments*. London: Routledge.

Bradley, R. J., Cleal, R., Gardiner, J., Green, M. and Bowden, M. 1984 The Neolithic Sequence in Cranborne Chase, in Bradley, R. J. and Gardiner, J. P. (eds.) *Neolithic Studies. A review of some current research*. Oxford: Reading Studies in Archaeology No.1 British Archaeological Reports No. 133. pp 87-105.

Bradley, R. and Edmonds, M. 1993 *Interpreting the axe trade*. Cambridge: Cambridge University Press.

Brück, J. 1999 What's in a settlement? Domestic practice and residential mobility in Early Bronze Age southern England, in Brück, J. and Goodman, M. (eds.) Making

Places in the Prehistoric World: themes in settlement archaeology. London: UCL Press. pp 52-75.

Bush, P. R. and Sieveking, G. de G. 1979 Geochemistry and the provenance of flint axes, in Clough, T. H. McK. and Cummins, W. A. (eds.) *Stone axe studies: archaeological, petrological, experimental and ethnographic.* London: Council for British Archaeology Research Report No. 23. p 97.

Carruthers, W. 1990 Carbonised plant remains, in Richards, J. *The Stonehenge Environs Project.* London: English Archaeological Report No. 16. pp 250-2.

Case, H. 1952/3 Mesolithic finds in the Oxford area. *Oxoniensia* 17/18: 1-13.

Cherry, J. F., Gamble, C., Shennan, S. (eds.) 1978 *Sampling in Contemporary British Archaeology.* Oxford: British Archaeological Reports British Series 50

Clark, J.G.D. 1936 Report on a Late Bronze Age site in Mildenhall Fen, West Suffolk. *Antiquaries Journal* 16: 29-50.

Clark, J. G. D., Higgs, E. S. and Longworth, I. H. 1960 Excavations at the Neolithic site at Hurst Fen, Mildenhall, Suffolk. *Proceedings of the Prehistoric Society* 26: 202-45.

Clark, R. H. and Schofield, A. J. 1991 By experiment and calibration: an integrated approach to archaeology of the ploughsoil, in Schofield, A. J. (ed.) *Interpreting Artefact Scatters: Contributions to Ploughzone Archaeology.* Oxford: Oxbow Monograph no. 4. pp 93-105.

Cleal, R. M. J. and Allen, M. J. 1994 Investigations of tree-damaged barrows on King Barrow Ridge and Luxenborough Plantation, Amesbury. *Wiltshire Archaeological and Natural History Magazine* 87: 54-88.

Cleal, R. M. J., Walker, K. E. and Montague, R. *1995 Stonehenge in its Landscape: Twentieth Century Excavations.* London: English Heritage Report No. 10.

Conolly, J. 1999 *The Çatalhöyük Flint and Obsidian Industry: Technology and typology in context.* Oxford: British Archaeological Reports International Series no. 787.

Crabtree, D. E. 1968 Mesoamerican Polyhedral Cores and Prismatic Blades. *American Antiquity* 33(4): 446-478.

Crabtree, D. E. 1972 *An introduction to flintworking.* Idaho: Idaho State University Occasional Papers of the Museum No.28.

Craddock, P. T., Cowell, M. R., Leese, M. N. and Hughes, M. J. 1983 The trace element composition of polished flint axes as an indicator of source. *Archaeometry* 25: 135-63.

Cummins, W. A. 1979 Neolithic stone axes: distribution and trade in England and Wales, in Clough, T. H. McK. and Cummins, W. A. (eds.) *Stone axe studies: archaeological, petrological, experimental and ethnographic.* London: Council for British Archaeology Research Report No. 23. pp 5-12.

Cunnington, M. E. 1929 *Woodhenge.* Devizes: Simpson.

Darvill, T. C. 1997 Ever Increasing Circles: the sacred geographies of Stonehenge and its landscape, in Cunliffe, B. and Renfrew, C. (eds.) *Science and Stonehenge.* London: Proceedings of the British Academy, 92. pp 167-202.

Debénath, A. and Dibble, H. 1994 *Handbook of Palaeolithic Typology. Volume One Lower and Middle Palaeolithic of Europe.* Philadelphia: University Museum of University of Pennsylvania.

Dobres, A. M. 2000. *Technology and Social Agency: Outlining a Practice Framework for Archaeology.* Oxford: Blackwell.

Dobres, A. M. & Hoffman, C. 1994. Social agency and the dynamics of Prehistoric Technology. *Journal of Archaeological Method and Theory* 1(3): 211-258.

Drewett, P. 1982 Later Bronze Age downland economy and excavations at Black Patch, East Sussex. *Proceedings of the Prehistoric Society* 48: 321-400.

Durden, T. 1995 The production of specialised flintwork in the later Neolithic: a case study from the Yorkshire Wolds. *Proceedings of the Prehistoric Society* 61: 409-432.

Edmonds, M. R. 1987 Rocks and risks: problems with lithic procurement strategies, in Brown, A. and Edmonds, M. R. (eds.) *Lithic Analysis and Later British Prehistory.* Oxford: British Archaeological Reports 162. pp 155-80.

Edmonds, M. R. 1990 Description, understanding and the *chaîne opératoire. Archaeological Review From Cambridge* 9.1: 55-70.

Edmonds, M. 1993 Towards a context for production and exchange: the polished stone axe in earlier Neolithic Britain, in Scarre, C. and Healy, F. (eds.) *Trade and Exchange in Prehistoric Europe*. Oxford: Oxbow Monograph No. 13. pp 69-86.

Edmonds, M. R. 1995 *Stone Tools and Society: Working stone in Neolithic and Bronze Age Britain*. London: Batsford.

Edmonds, M. R. 1997 Taskscape, Technology and Tradition. *Analectia Praehistoria Leidensia* 29: 99-110.

Edmonds, M. R. 1998 Sermons in Stone: Identity, Value and Stone Tools in Later Neolithic Britain, in Edmonds, M. R. and Richards, C. (eds.) *Understanding the Neolithic of North-Western Europe*. Glasgow: Cruithne Press. pp 248-76.

Edmonds, M. R. 1999 *Ancestral geographies of the Neolithic: landscapes, monuments and memory*. London: Routledge.

Edmonds, M. R. n.d. Written in the body, in Barrett, J. C and Richards, C. (eds.) *Embodiment in cultural perspective*. One World Archaeology. London: Routledge.

Edmonds, M. R. and Bellamy, P. 1991 The flaked stone, in Sharples, N. *Maiden Castle. Excavations and field survey 1985-6*. London: English Heritage Archaeological Report no. 19. pp 214-29.

Ellison, A. B. 1980 A policy for archaeological investigation in Wessex, unpublished report, The Trust for Wessex Archaeology.

Elliot, K., Elman, D. and Hodder, I., 1978. The simulation of Neolithic axe dispersal in Britain, in Hodder, I. (ed.) *Simulation Studies in Archaeology*. Cambridge: Cambridge University Press. pp 79-97.

Entwistle, R. and Richards, J. 1987 The geochemical and geophysical properties of lithic scatters, in Brown, A. and Edmonds, M. R. (eds.) *Lithic Analysis and Later British Prehistory*. Oxford: British Archaeological Reports 162. pp 19-38.

Evans, J. G. 1984 Stonehenge: the environment in the Late Neolithic and Early Bronze Age and a Beaker-age burial. *Wiltshire Archaeological and Natural History Magazine* 78: 7-30.

Exon, S., Gaffney, V., Woodward, A. and Yorston, R. 2000 *Stonehenge Landscapes: journeys through real-and-imagined worlds*. Oxford: Archaeopress.

Farley, M. 1979 Flint flake dimensions in the British Neolithic. *Proceedings of the Prehistoric Society* 45: 232-3.

Fasham P. J. and Ross, J. M. 1978 A Bronze Age flint industry from a barrow site in Micheldever Wood, Hampshire. *Proceedings of the Prehistoric Society.* 44: 47-67.

Foley, R. 1981a Off-site archaeology: an alternative approach for the short-sighted, in Hodder, I., Isaac, G. and Hammond, N. (eds.) *Pattern of the past :studies in honour of David Clarke.* Cambridge: Cambridge University Press. pp 157-83.

Foley, R. 1981b Off-site archaeology and human adaptation in Eastern Africa: an analysis of regional artefact density in the Ambroseli, Southern Kenya. Oxford: Cambridge Monographs in African Archaeology 3, British Archaeological Reports International Series 97.

Ford, S. 1987a *East Berkshire Archaeological Survey.* Berkshire: Department of Highways and Planning, Berkshire County Council Occasional Paper No. 1.

Ford, S. 1987b Flint Scatters and Prehistoric Settlement Patterns in South Oxfordshire and East Berkshire, in Brown, A. and Edmonds, M. R. (eds.) *Lithic Analysis and Later British Prehistory.* Oxford: British Archaeological Reports 162. pp 101-135.

Ford, S. 1987c Chronological and functional aspects of flint assemblages, in Brown, A. and Edmonds, M. R. (eds.) *Lithic Analysis and Later British Prehistory.* Oxford: British Archaeological Reports 162. pp 67-86.

Ford, S., Bradley, R. J., Hawkes, J. and Fisher, P. 1984 Flint-working in the metal age. *Oxford Journal of Archaeology* 3: 157-73.

Gadamer, H.-G. 1979 *Truth and Method* (trans. of *Warheit und Methode*, Tubingen: 1965). London: Sheed and Ward.

Gaffney, V. and Tingle, M. 1989 *The Maddle Farm Project: an integrated survey of Prehistoric and Roman landscapes on the Berkshire Downs.* Oxford: British Archaeological Reports No. 200.

Gardiner, J. P. 1984 Lithic distributions and Neolithic settlement patterns in central and southern England, in Bradley, R. J. and Gardiner, J. P. (eds.) *Neolithic Studies. A review of some current research.* Oxford: Reading Studies in Archaeology No.1 British Archaeological Reports 133. pp 15-40.

Gardiner, J. P. 1987 The Occupation, 3500-1000 BC, in Cunliffe, B. W. *Hengistbury Head, Dorset, The prehistoric and Roman settlement, 3500 BC-AD 500.* Oxford: Oxford University Committee for Rescue Archaeology Monograph No. 13. pp 22-59.

Gardiner, J. P. 1991 The flint industries in the study area, in Barrett, J. C., Bradley, R. J. and Green, M. *Landscape, Monuments and Society. The prehistory of Cranborne Chase.* Cambridge: Cambridge University Press. pp 30-1, 59-69.

Garfitt, J. E. 1979 Moving the stones to Stonehenge. *Antiquity* 53: 190-4.

Garfitt, J. E. 1980 Raising the lintels at Stonehenge. *Antiquity* 54: 142-4.

Gingell, C. 1980 The Marlborough Downs in the Bronze Age, in Barrett, J. C. and Bradley, R. J. (eds.) *Settlement and Society in the British Later Bronze Age.* Oxford: British Archaeological Reports British Series 83. pp 209-22.

Gingell, C. and Harding, P. 1981 A method of analysing the technology of flaking in Neolithic and Bronze Age flint assemblages, in Engelen, F. M. G. (ed.) *Third International Symposium on Flint.* Staringia No. 6, Maastricht: Nederlandse Geologishe Vereniging. pp 73-6.

Green, C. P. 1997 The Provenance of Rocks used in the Construction of Stonehenge, in Cunliffe, B. and Renfrew, C. (eds.) *Science and Stonehenge.* London: Proceedings of the British Academy, 92. pp 257-70.

Harding, P. 1988 The Chalk Plaque Pit, Amesbury. *Proceedings of the Prehistoric Society* 54: 320-6.

Harding, P. 1990a The comparative analysis of four stratified flint assemblages and a knapping cluster, in Richards, J. *The Stonehenge Environs Project.* pp 213-225. London: English Archaeological Report No. 16.

Harding, P. 1990b The analysis of a sealed knapping deposit from the phase 1 ditch, in Richards, J. *The Stonehenge Environs Project.* pp 99-104. London: English Archaeological Report No. 16.

Harding, P. 1990c Sealed flint assemblages, in Richards, J. *The Stonehenge Environs Project.* London: English Archaeological Report No. 16. pp 164-169.

Harding, P. 1990d Lithics, in Richards, J. *The Stonehenge Environs Project.* London: English Archaeological Report No. 16. pp 61-5.

Harding, P. 1990e Lithics, in Richards, J. *The Stonehenge Environs Project.* London: English Archaeological Report No. 16. pp 43-45.

Haselgrove, C. 1985 Inference from Ploughsoil Artefact Samples, in Haselgrove, C., Millett, M. and Smith, I. (eds.) *Archaeology from the Ploughsoil: Studies in the collection and interpretation of field survey data.* Sheffield: The Department of Archaeology and Prehistory University of Sheffield. pp 7-29.

Haselgrove, C., Millett, M. and Smith, I. (eds.) 1985a *Archaeology from the Ploughsoil: Studies in the collection and interpretation of field survey data.* Sheffield: The Department of Archaeology and Prehistory University of Sheffield.

Haselgrove, C., Millett, M. and Smith, I. 1985b Introduction: not a Universal Panacea but..., in Haselgrove, C., Millett, M. and Smith, I. (eds.) *Archaeology from the Ploughsoil: Studies in the collection and interpretation of field survey data.* Sheffield: The Department of Archaeology and Prehistory University of Sheffield. pp 1-3.

Hayden, B. and Cannon, A. 1983 Where the garbage goes: refuse disposal in the Maya Highlands. *Journal of Anthropological Archaeology* 2: 117-63.

Healy, F. 1986 Shopping around for the right model: a rejoinder. *Lithics* 7: 30-3.

Healey, F. 1987 Prediction or prejudice? The relationship between field survey and excavation, in Brown, A. and Edmonds, M. R. (eds.) *Lithic Analysis and Later British Prehistory.* Oxford: British Archaeological Reports 162. pp 9-17.

Heidegger, M. 1962 *Being and Time* (trans. by Macquarrie, J. and Robinson, E.). Oxford: Blackwell.

Hinchcliffe, J. and Schadla-Hall, R. T. 1980 *The past under the plough.* London: Directorate of Ancient Monuments and Historic Buildings Occasional Paper No.3.

Holgate, R. 1984 Settlement and monumentality in Neolithic Wessex. *Oxford Journal of Archaeology* 3: 235-8.

Holgate, R. 1985 Identifying Neolithic Settlement Patterns in Britain: the role of field survey in the interpretation of lithic scatters, in Haselgrove, C., Millett, M. and Smith, I. (eds.) *Archaeology from the Ploughsoil: Studies in the collection and interpretation of field survey data.* Sheffield: The Department of Archaeology and Prehistory University of Sheffield. pp 51-7.

Holgate, R 1987 Neolithic settlement patterns at Avebury, Wiltshire. *Antiquity* 61: 259-63

Holgate, R. 1988 *Neolithic Settlement of the Thames Basin*. Oxford: British Archaeological Reports 194.

Hutchinson, S. and Daniel, L. 2000 *Inside ArcView GIS (3rd Edition)*. Albany: OnWord Press.

Ingold, T. 1993 The temporality of the landscape. *World Archaeology* 25.2: 152-74.

Ingold, T. 1995 Building, dwelling, living: how animals and people make themselves at home in the world, in Strathern, M. (ed.) *Shifting context: transformations in anthropological knowledge*. London: Routledge. pp 57-80.

Ingold, T. 1996a Hunting and gathering as ways of perceiving the environment, in Ellen, R and Fukui, K. (eds.) *Redefining Nature: ecology, culture and domestication*. Oxford: Berg. pp 117-155.

Ingold, T. 1996b Culture, perception and cognition. In *Psychological Research: Innovative Methods and Strategies* (ed Haworth, J.). London: Routledge, pp. 99-119.

Ingold, T. 2000 *The Perception of the Environment*. London: Routledge.

Inizan, M.-L., Roche, H., and Tixier, J. 1992. *Technology of Knapped Stone*. Meudon: CREP, Préhistoire de la Pierre Tailée Tome 3.

Karimali, E. 1994 *The Neolithic Mode of Production and Exchange Reconsidered: Lithic Production and Exchange Patterns in Thessaly, Greece*. Unpublished PhD thesis, Boston University.

Laidler, B. and Young, W. E. V. 1938 A surface flint industry from a site near Stonehenge. Wiltshire Archaeological and Natural History Magazine 48: 151-60.

Lambrick, G. 1977 *Archaeology and agriculture: a survey of modern cultivation equipment and the problems of assessing plough damage to archaeological sites*. The Council for British Archaeology and Oxfordshire Archaeological Unit.

Lambrick, G. 1980 Effects of modern cultivation equipment in archaeological sites, in Hinchcliffe, J. and Schadla-Hall, R. T. 1980 *The past under the plough*. London:

Directorate of Ancient Monuments and Historic Buildings Occasional Paper No.3. pp 18-21.

Lawson, A. J. 1997 The Structural History of Stonehenge, in Cunliffe, B. and Renfrew, C. (eds.) *Science and Stonehenge*. London: Proceedings of the British Academy, 92. pp 15-37.

Lemonnier, P. (ed.) 1993 *Technological Choices: Transformations in material culture*. London: Routledge.

van der Leeuw, S. E. 1993 Giving the potter a choice: conceptual aspects of pottery techniques, in Lemonnier, P. (ed.) *Technological Choices: Transformations in material culture*. London: Routledge. pp 238-288.

Longworth, I., Herne, A., Varndell. and Needham, S. 1991 *Excavations at Grimes Graves Norfolk 1972-1976, Fascicule 3*. London: British Museum Press.

Luedtke, B. E. 1992 An Archaeologist's Guide to Chert and Flint. Los Angeles: University of California, Los Angeles Archaeological Research Tools 7.

Manby, T. G. 1974 *Grooved Ware Sites in the North of England*. Oxford: British Archaeological Reports No. 9.

Marzillier, L. F. 1990 *Elementary Statistics*. Dubuque IA: Wm. C. Brown Publishers.

Megaw, J. V. S. and Simpson, D. D. A. 1979 *An Introduction to British Prehistory*. Leicester: Leicester University Press.

Mercer, R. J. 1980 *Hambledon Hill: A Neolithic Landscape*. Edinburgh: Edinburgh University Press.

Mercer, R. J. 1981a *Grimes Grave, Norfolk: Excavations 1971-71, Volume 1*. London: HMSO, Department of the Environment Archaeological Reports No. 11.

Mercer, R. J. 1981b *Grimes Grave, Norfolk: Excavations 1971-72, Volume 2, The Flint Assemblage*. London: HMSO, Department of the Environment Archaeological Reports No. 11.

Mercer, R. J. 1981c Summary of the excavation, in Mercer, R. J. *Grimes Grave, Norfolk: Excavations 1971-72, Volume 2, The Flint Assemblage*. London: HMSO, Department of the Environment Archaeological Reports No. 11. pp vi- ix.

Musson, C. R. 1971 A study of possible building forms at Durrington Walls, Woodhenge and The Sanctuary, in Wainwright, G. J. and Longworth, H. I. *Durrington Walls: excavations 1966-1968*. London: Society of Antiquaries. pp 363-77.

Myers, A. 1989 Reliable and maintainable technological strategies in the Mesolithic of mainland Britain, in Torrence, R. (ed.) *Time, Energy and Stone Tools*. pp 78-91. Cambridge: Cambridge University Press.

Newcomer, M. H. 1971 Some quantitative experiments in handaxe manufacture. *World Archaeology* 3: 85-94.

Parker Pearson, M. and Ramilisonina 1998 Stonehenge for the Ancestors: the stones pass on the message. *Antiquity* 72: 308-26.

Pavel, P. 1992 Raising the Stonehenge lintels in Czechoslovakia. *Antiquity* 66: 389-91.

Pelegrin, J. 1990 Prehistoric lithic technology: some aspects of research. *Archaeological Review from Cambridge* 9.1: 116-25.

Pigeot, N. 1990 Technical and social actors: flintknapping specialists and apprentices at Magdelenian Etiolles. Archaeological Review from Cambridge 9.1: 126-41.

Pitts, M. W. 1978a On the shape of waste flakes as an index of technological change in lithic industries. *Journal of Archaeological Science* 5: 17-37.

Pitts, M. W. 1978b Towards an understanding of flint industries in post-glacial England. *Bulletin of the Institute of Archaeology* 15: 179-97.

Pitts, M. W. 2000 *Hengeworld*. London: Arrow Books.

Pitts, M. and Jacobi, R. 1979 Some aspects of change in flaked stone industries of the Mesolithic and Neolithic in southern Britain. *Journal of Archaeological Science* 6: 163-77.

Pollard, J. 1999 Flint, in Whittle, A., Pollard, J. and Grigson, C. *The harmony of symbols: the Windmill Hill causewayed enclosure*. Oxford: Oxbow Books. pp 318-37.

Pollard, J. and Whittle, A. 1999 Other finds, in Whittle, A., Pollard, J. and Grigson, C. *The harmony of symbols: the Windmill Hill causewayed enclosure*. Oxford: Oxbow Books. pp 338-43.

Pryor, F. 1988 Etton near Maxey, Cambridgeshire: a causewayed enclosure on the Fen edge, in Burgess, C., Topping, P., Mordant, C. and Maddison, M. (eds.) *Enclosures and defences in the Neolithic of Western Europe*. Oxford: British Archaeological Reports International Series 403. pp 107-27.

Richards, J. 1984 The development of the Neolithic landscape in the environs of Stonehenge, in Bradley, R. and Gardiner, J. (eds.) *Neolithic Studies. A review of some current research*. Oxford: Reading Studies in Archaeology No.1 British Archaeological Reports No. 133. pp 177-88.

Richards, J. 1985 Scouring the surface: approaches to the ploughzone in the Stonehenge Environs. *Archaeological Review from Cambridge* 4: 27-42.

Richards, J. 1990 *The Stonehenge Environs Project*. London: English Heritage Archaeological Report No. 16.

Richards, J. and Whitby, M. 1997 The Engineering of Stonehenge, in Cunliffe, B. and Renfrew, C. (eds.) *Science and Stonehenge*. London: Proceedings of the British Academy, 92. pp 231-56.

Riley, H. 1990 The scraper assemblages and petit tranchet derivative arrowheads, in Richards, J. *The Stonehenge Environs Project*. London: English Heritage Archaeological Report No. 16. pp 225-8.

RCHME 1979 *Stonehenge and its environs*. Edinburgh: Edinburgh University Press.

Ruggles, C. 1997 Astronomy and Stonehenge, in Cunliffe, B. and Renfrew, C. (eds.) *Science and Stonehenge*. London: Proceedings of the British Academy, 92. pp 203-29.

Saville, A. 1980 Five flint assemblages from excavated sites in Wiltshire. *Wiltshire Archaeological Magazine* 72/73: 1-27.

Saville, A. 1981 *Grimes Graves, Norfolk. Excavations 1971-2, II, The flint Assemblage*. London: HMSO, Department of the Environment. Archaeological Reports No.11.

Schlanger, N. 1990 Techniques as human action: two perspectives. *Archaeological Review From Cambridge* 9.1: 18-26.

Schlanger, N. 1996 Understanding Levallois: Lithic Technology and Cognitive Archaeology. *Cambridge Journal of Archaeology* 6(2): 231-54.

Schofield, A. J. 1986 The 'Asda Factor': core reduction, resource stress and the nature of lithic assemblages in Central-Southern Britain. *Lithics* 7: 17-29.

Schofield, A. J. 1987 Putting Lithics to the Test: non-site analysis and the Neolithic Settlement of Southern England. *Oxford Journal of Archaeology* 6(3): 269-286.

Schofield, A. J. 1988 *The interpretation of surface lithic collections: case studies from southern England*. Unpublished PhD thesis, University of Southampton.

Schofield, A. J. (ed.) 1991a *Interpreting Artefact Scatters: Contributions to Ploughzone Archaeology*. Oxford: Oxbow Monograph no. 4.

Schofield, A. J. 1991b Artefact Distributions as Activity Areas: Examples from South-East Hampshire, in Schofield, A. J. (ed.) *Interpreting Artefact Scatters: Contributions to Ploughzone Archaeology*. Oxford: Oxbow Monograph no. 4. pp 117-128.

Schofield, A. J. 1991c Lithic Distributions in the Upper Meon Valley: Behavioural Response and Human Adaptation on the Hampshire Chalklands. *Proceedings of the Prehistoric Society* 57(2): 159-178.

Sharples, N. M. 1991a *Maiden Castle. Excavations and field survey 1985-6*. London: English Heritage Archaeological Report no. 19.

Sharples, N. M. 1991b *Maiden Castle*. London: Batsford/English Heritage.

Shennan, S. 1985 *Experiments in the collection and analysis of archaeological survey data; The East Hampshire Survey*. Sheffield: Department of Archaeology and Prehistory University of Sheffield.

Shennan, S. 1988 *Quantifying Archaeology*. Edinburgh: Edinburgh University Press.

Shennan, S. 1997 *Quantifying Archaeology (2nd Edition)* .Edinburgh: Edinburgh University Press.

Smith, I. 1965 *Windmill Hill and Avebury. Excavations by Alexander Keiller, 1925-39*. Oxford: Clarendon Press.

Stone, J. F. S 1933 Excavations at Easton Down, Winterslow 1931-32. *Wiltshire Archaeological and Natural History Magazine* 46: 225-42.

Stone, J. F. S. and Young, W. E. V. 1948 Two pits of Grooved Ware date near Woodhenge. *Wiltshire Archaeological and Natural History Magazine* 52: 287-306.

Stone, J. F. S and Wallis, F. W. 1951 Third report of the Sub-Committee of the South-Western group of Museums and Art Galleries on the petrological identification of stone implements. *Proceedings of the Prehistoric Society* 17: 99-158.

Taçon, P. 1991. The power of stone: symbolic aspects of stone use and tool development in western Arnhem Land, Australia. *Antiquity* 65: 192-207.

Thomas, J. S. 1988 Neolithic explanations revisited: The Mesolithic-Neolithic transition in Britain and south Scandinavia. *Proceedings of the Prehistoric Society* 54: 59-66.

Thomas, J. S. 1991 *Rethinking the Neolithic*. Cambridge: Cambridge University Press.

Thomas, J. S. 1999 *Understanding the Neolithic* (a revised second edition of Rethinking the Neolithic). London: Routledge.

Thomas, N. 1964 The Neolithic causewayed camp at Robin Hood's Ball, Shrewton. *Wiltshire Archaeological and Natural History Magazine* 59: 1-27.

Tilley, C. 1999 *Metaphor and Material Culture*. Oxford: Blackwell.

Tingle, M. 1987 Inferential limits and surface scatters: the case of the Maddle Farm and Vale of the White Horse fieldwalking survey, in Brown & Edmonds (eds.) Lithic analysis and Later British Prehistory. Oxford: British Archaeological Reports 162. pp 87-99.

Tixier, J., Inizan, M.-L. and Roche, H. 1980 *Préhistoire de la Pierre taillée. I. Terminologie et technologie.* Antibes: Cercle de recherches et d'études préhistoriques.

Torrence, R. 1986 *Production and Exchange of Stone Tools: Prehistoric Obsidian in the Aegean.* Cambridge: Cambridge University Press.

Torrence, R. 1989 Retooling: towards a behavioural theory of stone tools, in Torrence, R. (ed.) *Time, Energy and Stone Tools.* Cambridge: Cambridge University Press. pp 57-66.

Wainwright. G. J. and Longworth, H. I. 1971 *Durrington Walls: excavations 1966-1968.* London: Society of Antiquaries.

Wessex Archaeology 2002 *A303 Stonehenge Improvement Archaeological Surveys: Stage 2 fieldwalking survey.* Unpublished report: Wessex Archaeology ref. 50275.03.

Wheatley, D. and Gillings, M. 2002 *Spatial Technology and Archaeology: The archaeological applications of GIS.* Taylor and Francis: London.

Whittle, A. 1993 The Neolithic of the Avebury area: sequence, environment, settlement and monuments. *Oxford Journal of Archaeology* 12:29-53.

Whittle, A. 1994 Excavations at Millbarrow chambered tomb, Winterbourne Monkton, north Wiltshire. *Wiltshire Archaeological and Natural History Magazine* 87:1-53.

Whittle, A. 1997a Remembered and Imagined Belongings: Stonehenge in its traditions and structures of meaning, in Cunliffe, B. and Renfrew, C. (eds.) *Science and Stonehenge.* London: Proceedings of the British Academy, 92. pp 145-66.

Whittle, A. 1997b *Sacred Mound, Holy Rings. Silbury Hill and the West Kennet palisade enclosures: a Later Neolithic complex in north Wiltshire.* Oxbow Monograph 74. Oxbow: Oxford.

Whittle, A. 1997c Moving on and moving around: Neolithic settlement mobility, in Topping, P. (*ed.*) *Neolithic Landscapes.* Oxford: Oxbow. pp. 14-22.

Whittle, A., Rouse, A. J., Evans, J. G. 1993 A Neolithic downland monument in its environment: excavations at the Easton Down long barrow, Bishops Cannings, north Wiltshire. *Proceedings of the Prehistoric Society* 59: 197-239.

Whittle, A. and Pollard, J. 1998 Windmill Hill causewayed enclosure: the harmony of symbols, in Edmonds, M. and Richards, C. (eds.) *Understanding the Neolithic of North-Western Europe*. Glasgow: Cruithne Press. pp 231-247.

Whittle, A., Pollard, J. and Grigson, C. 1999 *The harmony of symbols: the Windmill Hill causewayed enclosure*. Oxford: Oxbow Books.

Whittle, A., Davies, J. J., Dennis, I., Fairbarn, A. S. and Hamilton, M. A. 2000 Neolithic activity and occupation outside Windmill Hill causewayed enclosure, Wiltshire: survey and excavation 1992-93. *Wiltshire Archaeological & Natural History Magazine* 93: 131-80.

Williams-Thorpe, O., Green, C. P. and Scourse, J. D. 1997 The Stonehenge Bluestones: discussion, in Cunliffe, B. and Renfrew, C. (eds.) *Science and Stonehenge*. London: Proceedings of the British Academy, 92. pp 315-8.

Woodward, P. J. 1978 Flint Distribution, Ring Ditches and Bronze Age Settlement Patterns in the Great Ouse Valley: The Problem, a Field Survey Technique and Some Preliminary Results. *Archaeological Journal* 85: 32-56.

Woodward, P. J. 1991 *The South Dorset Ridgeway: Survey and excavation 1977-84*. Dorchester: Dorset Natural History and Archaeological Society Monograph Series No.8.

Woodward, P. J. and Bellamy, P. 1991 Artefact Distribution, in Sharples, N. M. *Maiden Castle. Excavations and field survey 1985-6*. London: English Heritage Archaeological Report no. 19. pp 21-32.

Woodward, A. B. and Woodward, P. J. 1996 The Topography of some Barrow Cemeteries in Bronze Age Wessex. *Proceedings of the Prehistoric Society* 62: 275-91.

Vatcher, F. de M 1961 The excavation of the long mortuary enclosure on Normanton Down, Wilts. *Proceedings of the Prehistoric Society* 27: 160-73.

Vatcher, F. de M. 1969 Two incised chalk plaques from Stonehenge Bottom. *Antiquity* 43: 310-11.

Young, R. and Humphrey, J. 1999 Flint use in England after the Bronze Age: time for a re-evaluation? *Proceedings of the Prehistoric Society* 65: 231-42.