Devon Archaeological Society

HENRIETTA QUINNELL PREHISTORIC LITHIC STUDIES GROUP

DRAFT REPORT ON CORE FINDS

By John Newberry

<u>Editor's note.</u> This is a composite of the individual reports John Newberry prepared, on the cores from the Tiverton Archaeological Group finds along the route of the North Devon link road.

I'm sure John would have made changes to these reports had he been able.

Where John refers to farms and fields, I have added the site reference identifiers, which were only agreed after his death.

Trevor Dymond

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(This is a first draft which is designed to provide a provisional format which covers both the TAG finds and Henrietta Quinnell's other objective of providing a lithic framework for future Devon studies. If it is considered that this draft broadly meets these two objectives, it will obviously need considerable editing when producing the final report. For example, in the final report the core raw material data will probably be incorporated in a section covering the material of all the finds. Table numbers are shown as C1, C2 etc. pro tem. The North Devon Link Road cores are discussed separately in an Appendix.)

Introduction

A core is the block of raw material from which flakes, blades and bladelets have been detached (Barton 1992, 264). In some cases these detachments were used as tools without further modification, especially if the only requirement was for a sharp edge. In other cases the detachments formed tool-blanks, which were then modified by retouch to produce the required tools or tool components.

Some cores have a number of detachments made in a recognizable sequence from one or more prepared or natural striking platforms, meeting the criteria of Reynier (2005, 129) for *sensu stricto* cores. However other cores, described here as "roughly flaked lumps", do not display evidence of such a systematic reduction process. Instead these appear to have been knapped anywhere possible and in any direction to maximise detachments. It is stressed that some of these "lumps" may originally have been well-structured cores, which towards the end of their life were knapped anywhere to try and get off the last possible detachments. However since the earlier core evidence has been removed by the later detachments, it is impossible to decipher the earlier history of such cores.

Such roughly flaked lumps illustrate Andrefsky`s (1998, 137) comment that cores only represent the last phase of use and may therefore not necessarily reflect the complete history of the artefact. This also applies to what he (ibid. 12) describes as "exhausted" cores. These are cores where the reductive process has resulted in the core reaching the end of its productive life , so that it is then discarded by the knapper as being of no further use. The majority of such exhausted cores usually have insufficient evidence remaining to do a detailed classification. However a minority (surprisingly) often retain enough evidence to be classified.

The TAG cores and sites

There are 279 core finds, of which 133 (47.7%) are classifiable and 146 (52.3%) are not (Table C1). In addition there are 75 core fragments. Of the classifiable cores, 11 radial cores are considered separately for technological and chronological reasons. The other 122 classifiable cores include both sensu stricto cores with basically parallel detachments from one or more striking platforms, as well as more irregularly worked cores provided these have sufficient evidence to provide the required core analysis data. Of 125 exhausted cores, 37 (29.6%) are classifiable, while 88 (70.4%) do not have enough evidence for this.

Besides these 88, the non-classifiable cores also include 37 roughly flaked lumps, as well as 12 where burning or heavy patination prevents detailed classification and 9 tested or failed cores.

Table C1: Core finds

CLASSIFIED CORES:		
Radial	11	3.9%
Other (including 37 exhausted)	122	43.7%
UNCLASSIFIED CORES:		
Exhausted	88	31.5%
Roughly flaked lumps	37	13.3%
Burnt/heavily patinated	12	4.3%
Tested/failed	9	3.2%
TOTAL CORES	279	
Core fragments	75	

These tested/failed cores comprises cases where either the block of raw material has been tested for it's suitability as a core but for some reason has not been further worked, or alternatively has been tested and rejected as unsuitable core material. The criteria suggested by Waddington (2007, 81) is that a "test piece" is where the block of material has been struck no more than twice before being discarded.

An analysis of the core totals from 32 sites fieldwalked by TAG is shown in Table C2. The ten sites from five farms individually mentioned in this table produced 75% of the total core finds, with the largest number found in OS 1795, a c. six acre field at Crazelowman farm (site 36). These ten sites have an average of 21 cores and five core fragments each, while the other 22 sites not listed individually have an average of three cores and one core fragment each.

The remainder of this core report provides a more detailed discussion of the 133 classified cores.

Table C2: core finds by farm & field

Farm - field	Radial	Other classified	Unclassified	TOTAL	Core fragments
Crazelowman – OS 1795 (site 36)	2	45	9	56	14
Pool Anthony - OS 1790 (site 34)	2	19	9	30	11
Pool Anthony - OS 1716 (site 27)	-	3	19	22	1
Pool Anthony - OS 1796 (Round Barrow field) (site 37)	1	5	12	18	7
Pool Anthony – OS 1757 (Horsepiece) (site 31)	-	1	3	4	-
Little Gornhay - OS 1815/1816 (Wall Down) (site 58)	1	4	16	21	6
Little Gornhay OS 1777 (Ten Acres) (site 33)	1	9	10	20	5
Little Gornhay – OS 1805 (Home Seven Acres) (site 38)	-	1	3	4	-
Knighthayes Home farm – OS 4132 (Hayne Lawn) (site 53)	-	11	8	19	4
Pool Anthony - OS 1193 (West Manley) (site 10)	1	2	13	16	6
Sub-total 10 sites	8	100	102	210	54
22 other sites	3	22	44	69	21
TOTAL	11	122	146	279	75

Radial cores

Introduction

There are 11 radial (8%) among the 133 classified cores. Six are of chert described in Devon as "dark chocolate chert", three are of a lighter coloured Greensand chert and two are of flint. The chert examples are of considerable chronological interest as discussed later.

A radial core is worked using a very different technology to that of the pyramidal, prismatic and other classified cores discussed later. These other cores have roughly parallel detachments from one or more striking platforms and can have up to three or more flaking faces. In contrast a radial (or "discoidal") core uses technology introduced by the Neanderthals. In this the direction of percussion is from the circumference of the core towards the centre, giving rise to the name "centripetal" technology (Kuhn 1995, 83-8). Radial cores are either unifacially or (more commonly) bifacially worked, with detachments removed by using the intersecting edge between the two convex faces (the "plane of intersection": Inizan *et al.* 1992, 49) as the striking platform There are therefore never more than two flaking faces on a radial core. They are usually of circular or oval shape. Often the core peaks in the centre of the flaking face(s). This peak occurs where the detachments do not continue all the way across the face of the core.

Centripetal technology was also used for Levallois cores, causing some definition problems. This followed pioneering work by Eric Boëda (1986 and subsequent). He studied French Palaeolithic assemblages and found that Levallois technology was not solely confined to shaping a core so that a *single* large flake of predetermined shape could be produced from the prepared core surface. He found that in addition Levallois technology was also used to produce a *series* of detachments. The term "preferential" or "lineal" is used to describe single flake Levallois and "recurrent" refers to the multiple flake version (Kuhn 1995, 83; Inizan *et al.* 1992, 53).

Whether or not there is a fundamental difference between radial and recurrent Levallois technologies is a hotly debated subject. The arguments for and against are discussed by a number of authors in Peresani (ed. 2003). An excellent study of the British Levallois concept is provided by Scott (2011), who adds further views on the debate (*ibid.* 11-15). The definition problem arises because, of the six criteria laid down by Boëda for defining Levallois (Scott 2011, Table 2.1), at least four apply equally to the criteria for defining radial cores (Terradas 2003, 21). This common criteria has led to suggestions that radial and Levallois techniques may both best be considered as elements within a centripetal technology system (Kuhn 1995, 83; Mourre 2003, 17).

[*The rest of the comments on radial/discoidal cores is in the "Chronology" section. We have a decision to make as regards the terminology of the TAG examples. Elsewhere these centripetally worked Late Neolithic cores producing inter alia blanks for transverse arrowheads have been described as "discoidal or Levallois-type" by Gardiner (1987, 27) and "Levallois-like" by Ballin (2011, 55). However Gardiner (1987, 27) stresses that they "should not be confused with true Levallois cores which belong to a much earlier period". In order to avoid such confusion, should we call them "centripetally worked radial" cores or just "radial" cores – or, if* *preferred call them "discoidal" cores? There is unfortunately no uniformity in terminology as regards radial versus discoidal among lithic workers]. John. 17.2.2013.*

The TAG radial core finds

Some are typical radial cores, eg. core (a3) from field OS 4048 - Low Bewhayes, Chettiscombe Barton (site 52). They are usually bifacially worked with mainly centripetal detachments. The remaining evidence suggests that the objective (not always successfully achieved) was in most cases the detachment of short but relatively wide flakes. These detachments do not carry all the way across the face of the core and as a result produce a characteristic peaked shape in or near the centre of the face (Kuhn 1995, 84). These "short broad" detachments are typical of centripetal flakes (Cook and Jacobi 1998, 129). They are thought to have been blanks for transverse arrowheads (Gardiner 1987, 27). The measurements of some of these blanks compare, for example, with those for transverse arrowheads found at Hedgemoor Farm, Bridford, Devon (Berridge 1984).

One radial core (R483) from Crazelowman, OS 1795 (site 36) is only unifacially worked. This is a split cobble of dark chocolate chert weighing 111 gms *[the second heaviest of the radial cores – the heaviest being a dark chocolate chert radial (F437) from field OS 1777 - 10 Acres, Little Gornhay (site 33)].* It is not possible to tell whether this is a natural split cobble (eg. due to frost fracture) or the result of knapping, but the former is more likely in view of the lack of features such as a bulb of percussion. There is obviously no plane of intersect between two convex surfaces. Instead the split surface was used as a striking platform to detach short broad flakes from the sole knapping face. This looks a very unpromising rough-looking split pebble which could easily have been dismissed as of no value for tools. However a knapper clearly saw the potential of this cobble and made good use of it.

Two of the radial cores have atypical features and are of particular interest. One is a fairly large, 76 gms, bifacially worked core (O9/15) of dark chocolate chert from field OS 1790, Pool Anthony farm (site 34). This incorporates two core reduction technologies. One face is that of a typical peaked radial core with centripetal detachments. However the other face shows that this side was parallel flaked from just one part of the circumference, with the detachments carrying right across – or nearly right across – the face. As a result, there is no peaked area on this face. The detachments on this "non-peak face" are not the short broad flakes typical of most of the TAG radial cores, but instead are blades and bladelets. Step fractures suggest that several of these may have broken during the knapping process. [This core may have been abandoned, since on neither flaking face do the detachments look to have been particularly successful].

This Pool Anthony core shows that recent research by Ballin (2011) in Scotland has implications for Devon. He found that what he described as Scottish "Late Neolithic Levallois-like cores" had a dual purpose. This was the production of broad flakes as blanks for chisel-shaped transverse arrowheads and also slender blades such as those used for serrated tools. The Pool Anthony core shows both types of tool-blank present on the same core, as well as bladelets which may have been attempts to make slender blades. It is stressed that the Scottish cores described by Ballin used a somewhat different technology to that of the Pool Anthony core. In view of this, as well as avoiding confusion with classic Levallois technology, it is suggested that Devon cores similar to this Pool Anthony example should be called radial (or discoidal) rather than "Levallois-like".

The other atypical radial find is a tiny, 19 gms, bifacially worked flint core (A5) from OS 1796 - Round barrow field, Pool Anthony (site 37). This has evidence on both faces of bladelet detachments rather than transverse arrowhead blanks. While there are some centripetal detachments, others are chordal (parallel to the centre). The problem with interpreting this tiny core is that it is at the end of its productive life, so therefore these bladelet scars may or may not be representative of the core at an earlier stage in the reduction process.

Comment [Unknown A1]: Tiverton Round Barrow replaced by OS 1796 - Round barrow field

With both these Pool Anthony cores, it is difficult to understand why radial cores were used to produce blades and/or bladelets. These require more care than that required to produce flakes. They were usually produced using a parallel core technology. This involved a series of detachments in parallel from a single or two opposed striking platforms on a well prepared core. There is no obvious advantage and several possible disadvantages (e.g. as regards striking platforms and peaking) in producing them from radial cores. One possibility is that if there was an immediate need for blades and/or bladelets and a knapper only had a radial core available, this could have been used as an ad hoc response to that need.

Other classified cores

Introduction

As Ballin (2000, 9) explains, there is no modern standard core classification system and that of Clark (1960) is still used in many core reports. The Clark scheme could have been used as the foundations for a comprehensive core classification system that took into account the advances made in lithic studies since his pioneering work. However this unfortunately never happened. The 122 cores discussed in this section comprise those other than radial that can be described using Clark's scheme, as supplemented by additional data designed to help classify, describe and interpret these artefacts. The classification sheet, definitions and abbreviations used in recording this data is shown in Appendix C1.

Raw material

The raw material for these 122 cores is given in Table C3. Flint was used for slightly over half the cores. Of the Greensand chert cores, 39 (85%) are of the visually distinct material known locally as "dark chocolate chert" and 7 (15%), from Pool Anthony, are of lighter colour. A well-structured tiny core (J297) (site 36) and a flake rejuvenating the face of a core (flanc de nucléus) (J322) (site 36), both of Portland chert and found at Crazelowman farm, provide most interesting evidence of on-site knapping of this material.

[Presumably the report will mention the Greensand chert find Q2 from field OS 1193 - West Manley, Pool Anthony (site 10), which has areas of BOTH colours on the same piece. This is due to the chert absorbing moisture stained by minerals from surrounding deposits. This particular piece must have been positioned in the ground in such a way that it absorbed dark mineral-stained water in just part of the flake].

In considering sources of raw material the condition of any remaining cortex is helpful (Table C4). Of the 73 cores with cortex, the majority (77%) have an abraded cortex suggesting they are from secondary sources such as fluvial and/or marine gravels. Only 17 (23%) have an unabraded cortex suggesting they are from primary and/or residual sources. This minority includes both flint and Greensand chert, such as a dark chocolate chert core from Pool Anthony [1790, number illegible but 43gms – JN core sheet PA2] (site 34) with an unabraded cortex up to 14mm thick in places.

Abundant primary flint occurs in chalk deposits in east Devon, as shown on Geological Survey map 326/340. These deposits extend intermittently from Dunscombe Cliff near Sidmouth (De La Beche 1839, 255), which is the most westerly chalk in Southern England (Jarvis & Tocher 1987, 51), to Pinhay Bay near Lyme Regis (Jukes-Browne & Hill 1904, 126-7).). In addition, primary flint is found in two inland chalk deposits at Widworthy/Wilmington/Offwell and Furley/Membury (Hart 1982, Fig. 8.6). Claims in some archaeology reports that primary flint in Devon is "scarce" and is "only" found at Beer which is an "isolated" source are merely factoids which ignore the extensive geological literature and site evidence to the contrary. Collcutt`s (1986, 74) important "plea to archaeologists to stop treating the South West as if flint sources ceased at Beer" should have provided the catalyst for a change in views, but unfortunately in general this did not happen.

Erosion has removed a great deal of other Devon flint-bearing chalk, but in some cases the flint remained in situ in residual deposits. This occured either where clay overlying the chalk covered the flint as the chalk dissolved, or where the clay was washed in steadily during such dissolution (Edwards and Freshney 1982, 206). In other cases erosion of the chalk released the flint, which ended up in secondary sources such as rivers, beaches and gravel deposits.

Table C3. Raw material of other classified cores

Material	n	%
Flint	69	56.6
Greensand chert	46	37.7
Portland chert	1	0.8
Chert of uncertain origin	1	0.8
Material uncertain as patinated	5	4.1
TOTAL	122	

Table C4. Cortex of other classified cores

Cortex type	n
Unabraded, relatively thick	8
Unabraded, relatively thin	7

Unabraded, very thin	2
Abraded but well defined	20
Abraded and very thin	36
No cortex	49
TOTAL	122

It is stressed that residual flint is only different from primary flint in that its original chalk cover was later replaced by clay. The knapping quality of residual flint is almost always as good as that of primary flint.

In contrast, flint from deposits described on the Geological Survey maps Sheets 311 and 326/340 as "Clay with Flints and Chert (in part Eocene)" is of very variable knapping quality and condition. Deposits containing this flint and chert are widespread in east Devon (Woodward & Ussher 1911, 67-71). In connection with a raw material project (Newberry 2002), some Widworthy flint nodules and pieces from such deposits were examined. These had clearly been rolled and battered considerably since the erosion of their chalk protection, resulting in a loss of horns and other angular projections and of cortex. Some had a very dry appearance, suggesting the depletion of most of their natural moisture content. Many were badly frost fractured. The tool-making potential of the material from such deposits was in general poor, although in an emergency some could be adapted to provide a limited range of expedient tools as a response to an *ad hoc* situation. It is suggested that use of the term "clay with flints and chert" is best avoided wherever possible in stone tool reports. This is because it is a blanket term which has been used to describe a wide variety of complex deposits (Barber *et al* 1999, 25) which are poorly understood and about which there are difficulties with both classification and origin (Edwards & Freshney 1982, 211; Scott-Jackson 2000, 19-26).

Based on comments by Sir Henry De la Beche, then Director of the British Geological Survey, the nearest source of primary flint to Tiverton may have been the Blackdown Hills. Reporting in 1839 Geological Memoirs on the erosion of chalk in the South West he stated:-

"Judging from the accumulations of flints in several places, the quantity of chalk once existing over parts of this district, where green sand [sic] and frequently a reduced portion of that deposit only, now remain, must have been considerable. From the unrolled condition of a large portion of the flints in the neighbourhood of Lyme Regis, Sidmouth, Chard and many parts of the Black Downs, we are led to suppose that the chalk in which they were once embedded may have been quietly removed from among them, and that these flints have been let down nearly in places above which they occurred in the chalk". (De la Beche 1839, 255).

Unfortunately he did not provide any details of the location of the relevant flint sites in the Blackdown Hills. Elsewhere the nearest primary flint source to Tiverton is the flint-bearing chalk in the Widworthy/Wilmington/Offwell area to the east (M Hart, pers. comm.; Hart 1982, Fig. 8.6). The nearest coastal source of primary flint is Dunscombe Cliffs ((Woodward & Ussher 1911, 59), while the Haldon Hills near Exeter (Hamblin 1973, 461) and Peak Hill near Sidmouth

(Isaac 1979, 341-2) contain residual flint. These sources away from the Blackdown Hills are all a minimum of c. 28km from Tiverton.

Greensand chert primary sources are much closer to Tiverton. This chert is found in nodules and bands in Upper Greensand, which crops out over a wide area of east Devon, south Somerset and parts of Dorset (Edmonds, McKeown & Williams 1969, Fig. 18). In addition there are outliers of chert-bearing Upper Greensand in and near the Haldon Hills, which comprise the most westerly outcrops of Cretaceous strata in England (Selwood *et al*. 1984, 108). The nearest primary sources to Tiverton are in the Blackdown Hills, while secondary sources are probably closer in river valley deposits. [T*he River Culm flows down from the Blackdown Hills to within c. 10km of Tiverton. It would be interesting to know whether this is as productive a secondary source of Greensand chert as is, for example, the River Yarty further east. Also – is there any flint in the River Culm?*].

A copy of a TAG "white sheet" for the Sites and Monuments Register (kindly supplied by Barbara Keene) shows that dark chocolate chert is "present in a field just north of Awliscombe village" and "seemed a general constituent of the soil of this area"and is also "in the Blackdowns around Sweetlands at approx. ST 210 100". It was thought that "a stratum bearing this material runs South West and parallel to the River Otter".

[*I have no information on the nearest sources of lighter coloured Greensand chert to Tiverton. In the chert knapping quality comparisons for my inland flint project, all the Greensand chert found was of the lighter coloured variety – but the sites I collected samples from were all a long way from Tiverton – namely Furley/Membury, the bed of the River Yarty and Uplyme Quarry in Devon, as well as Snowdon Hill Quarry near Chard in Somerset. I am sure that there will be much closer sources than these of this lighter material. Obviously the PAWM Q2 chert find mentioned on page 5 suggests that there may be sources with both dark and lighter coloured G. chert present].*

Portland in Dorset contains vast amounts of Portland chert in the "Cherty Series" of the Jurassic marine limestone "Portland Beds" (House 1989, 74, Table 3 and Fig. 16). In addition the beaches around Portland contain "unlimited quantities" of pebbles and cobbles of this material (Palmer 1999, 54). Portland chert has the same conchoidal fracture properties as flint and Greensand chert. Both primary and secondary sources at Portland contain some good to excellent quality knapping material in considerable quantities (Newberry 2000).

Portland Beds also outcrop in small areas elsewhere (Palmer 1970, 83), but all these areas are to the east of Portland and so are unlikely sources of the Tiverton material. Obviously Portland itself is a potential source but, in view of the distance involved, secondary source pebbles and/or cobbles from contemporary Devon beaches would seem a more likely source of the TAG Portland chert finds. [*This assumes TAG Pc finds are all of secondary source material. Unfortunately neither the core nor flanc de nucléus had any cortex. However the Pool Anthony West Manley (site 10) scraper E4 with a pebble cortex is obviously helpful*].

Core classification

Introduction

As mentioned earlier [*Page 1],* the limitation of core analysis is that what remains of the original core only represents the last phase of use. It may therefore not be a reliable guide to earlier stages of core preparation, reduction and rejuvenation. Further, it may not be indicative of the material quality of earlier detachments. This is particularly relevant to those flint nodules from Devon (and elsewhere) which have good quality flint adjacent to the cortex but poorer quality flint in the centre (Newberry 2002). In such cases a core may have been abandoned once the detachments reached this central poor flint. The remaining core evidence would suggest a poor quality material, whereas actually it may have produced good quality blanks from the outer flint.

The above remarks do not apply to the Devon and Somerset lighter coloured Greensand chert used in comparative knapping tests for two projects, a Devon inland flint survey (Newberry 2002) and the "Red Lady of Paviland" South Wales lithic study by Stephanie Swainston (2000, 105). In these tests this chert proved to be a more homogeneous material than some of the Devon flint tested and was warmly praised by knappers Martin Green and John Lord. However none of the Greensand chert tested was dark chocolate chert and the present writer has no practical experience of the knapping quality of this material.

Subject to these qualifications, the 122 non-radial classified cores are discussed below and the classifications are summarised in Table C5.

Typology

This is based on Clark (1960). There is no dominant type among the 122 cores. The majority have either three or more platforms (34), two opposed platforms (32) or one platform with removals part way round (30). If all one platform and two platform cores are compared, they comprise exactly the same number at 44 each. The 34 with three or more platforms are all irregularly worked cores where detachments have been made from all possible angles to maximise material use.

There are no keeled cores. This is in contrast to, for example, the John Uglow major core etc. site at Nether Exe (Silvester *et al*. 1987), where Berridge (1987, Table 1) reports 43 (10.3%) of the 418 classified cores are keeled. However, there is unfortunately no general agreement as to the criteria for defining keeled cores. As Ballin (2011, 55) explains, the Clark keeled core type is poorly defined and in some reports includes discoidal/radial, Levallois-like and other types of core. As used in this TAG report, the term is restricted to (usually rare) cores which have two short flaking faces and a single striking platform, with the detachments from the two faces producing a somewhat keeled appearance at the distal end. The shape is somewhat similar to that of the hull of a ship. Peter Berridge does not define his criteria for a keeled core and it is therefore possible that the nil TAG keeled compared to 43 at Nether Exe is more to do with definition than technology. In this respect it is perhaps significant that Berridge makes no mention of radial/discoidal cores at Nether Exe.

Morphology

The 43 pyramidal and semi-pyramidal cores form the main morphological category. The latter are cores with removals only part way round, where the conical shape is partly due to the natural shape (often cortical) of the unworked side of the core (Reynier 2005, 133). There are also 34 irregular and 26 prismatic cores, It is stressed that some TAG prismatic are what best be described as “short” or “stubby” prismatic. They are not all classic long prismatic cores. For example, the largest number of prismatic cores are 11 from Crazelowman Farm (sites 36 & 42). Their maximum remaining length ranges from 21 mm to 58 mm, with an average of 36.5 mm. In contrast, at the Powell Early Mesolithic site at Hengistbury Head, Dorset, the length of the 54 prismatic cores range from 36 to 65 mm, with an average of 49.8 mm (Barton 1992, 209).

The eight V-shaped (alternate flaking) cores represent a more complex reduction strategy. These are cores where detachments are made in one direction, then the core is turned so that the proximal end of the first set of detachments forms the striking platform for a second set of detachments. There are several variations of this alternate flaking technology, as discussed in Ashton & McNabb 1996 (201 & Appendix 1, Fig. 3) and Ashton 1998 (205 & Appendix 6, Fig. 4). Hutcheson & Callow (1986, 243) describe such cores as “double platform, at right angles”, while Reynier (2005, 132) calls them “orthagonal” cores. However the TAG cores of this type invariably have an angle between the two flaking faces of somewhat less than 90°, giving them a more V-shaped than right-angled appearance. *[See “Morphology of classifiable cores” in Appendix 2 of this core report – these cores do not fit comfortably into the Clark classification system]*.

In most core collections there are usually examples that in some respects differ from the criteria used in the chosen morphological classification system. There are 11 of these among the TAG finds. An example of the complexities of some such cores is one from Tiverton Round Barrow (site 37). This [*D1*] has a main striking platform and (based on bladelet scars) once had a second opposed platform. In addition, the proximal end of the of the main striking platform formed a third striking platform for alternate flaking (trying for more bladelets but with only limited success). Finally, the distal end of the main striking platform formed a fourth platform which produced tiny bladelet detachments across that distal end.

Detachments

While only 10 (8%) of the 122 are bladelet cores, a further 96 (79%) have bladelet as well as other detachments. Only 16 cores (13%) do not have any bladelet detachments. This suggests that the production of bladelets was the principal objective of most knapping episodes.

This is also evident from the 70 flake/bladelet cores, where often the flake scars look no more than by-products from the production of bladelets. Such flakes are what Zetterlund (1990, 76) describes as the “debris” from making bladelets or blades. With some of the cores it looks as if a number of intended bladelet detachments became flakes due to step or hinge fractures or other raw material problems. In other cases the small size of the core suggests that it would have been difficult for the knappers to control the reduction process as they would wish, resulting in the production of flakes rather than the more skill-demanding bladelets, Further, the scars show that many of the flakes from flake/bladelet cores are very small and would therefore have been unlikely tool blanks. Their size adds weight to the view that they are often no more than debitage arising from bladelet production.

Condition

A small majority (56.6%) of the cores were either worked until they reached the end of their effective life (“exhausted”cores) or were abandoned due to developing problems, in particular step fractures. Another 35.2% have just a little potential life left, while only 8.2% (ten cores) have a lot of life left. These ten cores with considerable remaining potential comprise four from Crazelowman Farm (sites 36 & 42), two from Knighthayes Home Farm (site 53) and one each from four other sites. Five are of dark chocolate chert, four of flint and one of lighter coloured Greensand chert.

Table C5. Core classification

TYPOLOGY (Clark)	n	%age
One platform – removals all round	14	11.48
One platform – removals part way round	30	24.59
Two platforms – opposed	32	26.23
Two platforms – one at oblique angle	1	0.82
Two platforms – at right angles	11	9.02
Three or more platforms	34	27.87
Keeled	0	0
Total	122	100

MORPHOLOGY	n
Pyramidal	31
Semi-pyramidal	12
Prismatic	26
V-shaped (alternate platform)	8
Keeled	-
Irregular	34
Other	11
Total	122

DETACHMENTS	n
Flake	12

Blade	-
Bladelet	10
Flake/blade	4
Flake/bladelet	70
Blade/bladelet	10
Flake/blade/bladelet	16
Total	122

CONDITION	n
Lot of life left	10
Little life left	43
Exhausted	37
Abandoned (step fractures etc.)	32
Total	122

The heaviest of the four flint cores is N6 from Higher Moor Farm (site 32) weighing 145 gms, while the heaviest of the five of dark chocolate chert is G180 from Crazelowman Farm (site 36) weighing 112 gms. The only lighter coloured Greensand chert core with a lot of life left is B34 from Pool Anthony Farm (OS 1716) (site 27) which weighs 95 gms.

There is no obvious reason why these ten cores were not further worked. For example, N6 is a large flint core which has a coarse area in the centre of the flaking face, giving rise to step fracture problems. However it knapped well either side of this coarse area. There is plenty of potential for further detachments on both sides of this coarse area but this did not happen. Also the core is plenty big enough to have struck off a *flanc de nucléus* to try and get rid of this coarse area, but again this did not happen. One possibility is that N6 was put on one side with the intention of either knapping it further later or asking a more experienced knapper to strike off a *flanc de nucléus* - but the core was then forgotten or mislaid. [*Since we know nothing of the circumstances of the knapping episode(s) obviously this is just pure speculation. There are a number of other possible reasons why N6 was not knapped further – eg. a hurried exit from the knapping site due to the arrival of a brown bear in the vicinity!!*].

Within the above general picture of the condition of the 122 cores, there are significant differences between the sizes of flint and Greensand chert examples. Flint cores weigh between 9 gms (*Crazelowman X628 (site 36)*) and 145 gms (*Higher Moor N6 (site 32)*), with an average of 32.26 gms. Greensand chert cores weigh between 12 gms (*Crazelowman X618 (site*

36)) and 112 gms (*Crazelowman G180 (site 36)*), with an average of 41.17 gms. The average weight of the 46 classified Greensand chert cores is 27.62% more than the average weight of the 69 classified flint cores.

Comment [Unknown A2]: From (*Crazelowman illegible, but possibly 612*) to Crazelowman X618.

Interpreting the core evidence

Introduction

There are problems in interpreting the cores (and other) finds from fieldwalking a lithic scatter site. What is collected will depend on such factors as the experience of the fieldwalkers (in this case experienced TAG members), collection methodology, time available, weather conditions, visibility, soil conditions and vegetation cover. Other factors such as slope processes (Waddington 2007, 18-21) and field history (ploughing etc.) will have affected the final position of the recovered artefacts within the area.

A further fundamental problem is that excavations of lithic scatter areas show that often only a small proportion of what is in the soil will be on the surface at any given time. This proportion may be as little as 1-5% of the total lithic artefacts in the soil (Schofield 2000, 3). At the Mesolithic site at Hengistbury Head, Dorset, for example, only 1,399 (3.72%) of the total finds were surface finds by a highly experienced fieldwalker, Mr Ronald Powell. The other 36,195 (96.28%) finds came from excavations (Barton 1992, 203 and Tables 5.1 and 5.10). Pollard (1998, 67) illustrates what he describes as the "complex and contingent nature of lithic scatter evidence" through two case histories. One surface lithic scatter gave little indication of the underlying prehistoric archaeology. In contrast, the other provided a reasonably clear-cut interpretation of what was later found below the surface.

The interpretation of the radial and non-radial classified cores is therefore subject to the above factors. Further work at these TAG sites might uphold or drastically alter the views expressed below.

Site activities

Obviously the cores only provide limited evidence of the no doubt varied prehistoric activities at these TAG sites. However one activity is certain. The exhausted and abandoned cores provide primary evidence of on-site knapping of flint and both dark chocolate and lighter coloured Greensand chert, as well as Portland chert [*see below*]. Such cores at the end of their productive life are [*along with chips and some other debitage*] of great importance because there would have been no point in knappers bringing them to the site. They would been discarded at the place of knapping when of no further use, which in this case is the TAG sites. In contrast, the cores with life left do not provide primary evidence of on-site knapping since they might have been brought to the sites.

Based on the number of exhausted and abandoned cores, the 27 at Crazelowman (sites 36 & 42) provide the best evidence of on-site knapping, followed by 10 at Pool Anthony OS 1790 (site 34) and 6 at Knightshayes Home Farm (site 53).

The evidence of a few cores suggests that some of the knapping was done by trainees. A 42gm "horn" of a flint nodule from West Manley Farm (site 10) (*K3*) is an interesting example of this. The horn was flaked off during core preparation. It was then knapped across it's face to produce bladelets which, because of the shape of the horn, are too small to be of any practical use. It therefore seems likely that the horn was passed to a trainee knapper to practise on. A few other cores suggest the involvement of trainees because they have been intensively worked to produce similar very small blanks of no practical use.

Jacobi (2004,20 and 22) reports similar cores at Gough's Cave, Cheddar, describing them as being "intensively worked to a point where the last removals were both very small and often irregular". He suggested they may represent the work of "apprentice knappers". Similarly at Launde, East Leicestershire, Cooper (2006, 68) found cores that appeared to represent "practice pieces of unaccomplished knappers". However it is not always possible to interpret such evidence as being the work of trainees. A core from Middle Wall Down at Little Gornhay (site 42) (*D 92*) has both intensive working and knapping accidents. This might well suggest the work of a trainee. However the raw material is a chert of unusually poor quality. This core may therefore equally represent the work of an expert knapper using this as the only material to hand in an *ad hoc* emergency situation.

Portland chert

The 13gm Portland chert core [*J* 297] found at Crazelowman Farm (site 36) falls into the exhausted category, having been worked until the end of its life. This and the Portland chert *flanc de nucléus* [*J 322*] (also from Crazelowman (site 36)) mentioned earlier [*page 5*] are atypical finds on South West sites in that they provide rare primary evidence of on-site knapping of this material.

While not common, occasional tools and tool-components of Portland chert are found in both Devon and Cornwall. These include microliths at Poldowrian (Smith 1982, 33) and leaf-shaped arrowheads and a single scraper at Carn Brea (Saville 1981, Table 9), both in Cornwall. Devon Portland chert finds include leaf-shaped arrowheads at Hembury (Liddell 1935, 162 and Plate XXX1X [no. 1666]) and both leaf-shaped arrowheads and small scrapers at Hazard Hill (Masson-Phillips 1963). These are usually superbly made artefacts, as the illustration of Hembury 1666 arrowhead demonstrates.

However such artefacts are obviously not evidence of on-site knapping. The present writer's previous interpretation of these Portland chert artefact finds in Devon and Cornwall was that they are light-weight artefacts of visually distinctive and uncommon (being non-local) material, which were ideal for hunter-gatherers or early farmers to carry ready when needed for gift/exchange. [*In modern terms they would, for example, have provided an excellent gift for prospective future "in-laws"*]. There was no evidence to help establish whether these were made locally or at Portland or elsewhere. However the Crazelowman Farm (site 36) Portland chert core and *flanc de nucléus* now suggest that there was at least one Portland chert tool-making (or tool-blank production) site in the South West. Whether this chert came from Portland or a local contemporary beach or elsewhere is unknown. Also obviously unanswerable is the intriguing question of why Portland chert was taken to Crazelowman Farm to be knapped. Whatever the source and whatever the reason, one thing is clear. The Crazelowman Portland chert core and *flanc de nucléus* are of great significance in considering the role of Portland chert in the South West. [*The Crazelowman Farm core report has more on this on page nine. While of obvious importance, clearly there will not be room in the final report for all this discussion of Portland chert*].

Chronology

Dating the Late Glacial and Mesolithic is complicated by periods with a "plateau" in radiocarbon curves. This results in radiocarbon ages at the end of such a period being indistinguishable from those at the beginning (Ashmore 2004, 83 and Fig. 6.1). In view of this it is common in Late Glacial and Mesolithic studies to quote dates in the form of uncalibrated radiocarbon years BP (Barton and Roberts 2004, 339; Reynier 2005, 65-68; Saville 2004, xiii) and this convention is followed here.

Chronology of the radial cores

While radial cores owe their origin to the centripetal core technology introduced by the Neanderthals in connection with the Levallois concept, they are in general of little chronological value. This is because, as Roe (1981, 81) explains, " the Levalloisian is a technique, not a culture". This core technique became widespread across Africa, Europe and Asia over a period of several hundred thousand years, temporarily ending in Britain with the disappearance of the Neanderthals about thirty thousand years ago (Barton 2005, 12). In the South West the reasons for an apparent low representation of Palaeolithic Levallois technology are discussed by Basell and Brown (2011, 16-17). *[The reasons include a collection bias at the terminal Lower Palaeolithic site at Broom on the Devon/Dorset border, caused by the high price antiquarians were willing to pay the quarrymen for the several thousand Acheulian handaxes recovered from the gravels. NB. The Oxbow "Quaternary History and Palaeolithic Archaeology in the Axe Valley at Broom, South West England" edited by Hosfield and Green was still "forthcoming" in January 2013 when this draft report was completed].*

The Levallois technique sporadically reappeared after the Palaeolithic, as in Britain , for example, at Hengistbury Head, Dorset. Here " discoidal or Levallois-type" cores were thought to have provided blanks for Neolithic transverse arrowheads (Gardiner 1987, 27).

Despite the chronological uncertainties of this type of core technology, the size and shape of some (but not all) of the TAG radial core detachment scars suggests that such cores were similarly knapped to produce transverse arrowhead blanks. However as mentioned earlier (*page* 4) blades and bladelets were also produced from two of the radial cores. Based on Ballin's (2011) research, all these three types of detachment are from what he describes as "Levallois-like cores"and relate to the Late Neolithic. He stresses (*ibid*. 59) that radiocarbon dating of secure contexts associated with these cores is needed to more precisely date them.

While there are only 11 of these cores among the TAG finds, they are of considerable raw material chronological interest in showing a preference for Greensand chert for these Late Neolithic radial cores. Nine (82%) are of this chert and only two (18%) are of flint. This contrasts with a study by Berridge of finds at Nether Exe. He concluded that the various forms of analysis that he used " *quite clearly show the chronological separation of the Nether Exe material into two broad groups, with the use of Greensand chert dominating the Mesolithic activity and flint dominating the Neolithic activity"* (Berridge 1987, 13).

[*In my view chronological raw material preferences are difficult to ascertain. It is a complex subject because there is a range of factors that affect material usage. Obviously such "preferences" will usually largely depend on what is locally available. Different considerations would have applied to knappers in north Devon (with an excellent residual and secondary flint* *source at Orleigh Court but no comparable Greensand chert source) as compared to those in east Devon (where a number of primary flint and Greensand chert sources provide excellent material in abundance, with considerable further quantities available in secondary sources).*

Other factors include local and regional traditions, personal preferences of individual knappers, what material was immediately to hand at the time of each individual knapping episode and the effect on material usage of gift/exchange with neighbouring groups. In addition the varying approach route to a site with no local lithic source might dictate what is used at that site, depending on whether on the way there the knapper(s) passed through a flint or a chert source.

A further interpretational problem is that usually the vast majority of lithic artefacts are not chronologically diagnostic. The relatively small number that can be dated therefore make the interpretation of material preferences somewhat speculative. For example, at Nether Exe the 7,591 finds included 2,295 tools, of which only 29 microliths and 16 other tools are chronologically diagnostic (Berridge 1987, 13 and Table 1). Similarly with the 11 radial cores at the TAG sites – while these certainly show that Greensand chert was used in the Later Neolithic for this particular artefact type, this is all that they show. They do not give any indication of overall raw material preferences in that period. In addition they are such a small number of cores that statistically they cannot be relied on even to suggest a preference for Greensand chert for Late Neolithic radial cores on these Tiverton lithic scatter sites. [Different considerations would apply if from a secure context].

However despite the problems, chronological raw material preference is obviously an important subject and worthy of a major study. Ideally what is needed is assemblages from secure contexts containing some datable finds in areas containing both good quality flint and chert.

Devon is fortunate in having the next best evidence for such a study. The parishes of Stockland and Membury in east Devon contain both the inland Furley/Membury chalk outlier containing plenty of good quality flint and also abundant Greensand chert of equally good quality. The area was extensively field-walked by Mrs Nan Pearce over many years. Her finds (well over 80,000) represent the largest lithic collection in Devon (John Allan, pers. comm.). By arrangement with John Allan, the finds were catalogued for the Exeter RAM Museum by Mrs Pearce as part of the Blackdown Hills Project 1993. A collection of this size from a relatively concentrated area containing both good quality flint and chert provides an excellent opportunity for studying chronological material preferences. While I have never had the time to do this, it did not take long to do a "non-chronological" analysis from the excellent museum records of a large sample of the Stockland and Membury finds*. This covered 45 sites and 45,212 artefacts. Of these, 23,333 (51.6 %) are of Greensand chert, 21,846 (48.3 %) are of flint and 33 are of other material including Portland chert].*

Chronology of the other classified cores

As stated earlier, the production of bladelets was the principal objective of most knapping episodes relating to these cores. Bladelets were used to make microliths in the Late Glacial and Mesolithic periods. However a Late Glacial date seems highly unlikely. This is due to the absence of core evidence showing detachments of the large blades and large flakes typical of the Long Blade assemblages of this period (Barton and Roberts 2004, 341-2).

Microliths, together with their microburin debitage, are the main chronologically diagnostic lithic evidence of the Mesolithic period. Other Mesolithic tools made from bladelets include some awls, piecers and microdenticulates, as well as *méche de florêt*, which are thought to have had a drill function (Barton 1992, 267; Reynier 2005, 131).

Bladelets were used for microliths etc. throughout the Mesolithic period. This is conventionally considered to start at c. 10,000 BP (Barton and Roberts 2004, 339). The earliest dated evidence of Mesolithic settlement in Britain so far discovered is at Star Carr in Yorkshire, which has radiocarbon dates ranging from 9,700 ±160 BP (on worked antler) to 9,350 ± 90 BP (on resin "cake") (Reynier 2005, Table 4.1).

The TAG cores with evidence of bladelet detachments could relate to the Early Mesolithic and/or the first part of the Later Mesolithic. It is more debatable as to whether any could relate to the final part of the Later Mesolithic, when a range of tiny microlith forms appear. Roberts (1999, 48-50) suggests that in the South West these tiny microlith forms appear in the early seventh millennium BP. However she stresses that the degree to which these and earlier microlith assemblages overlap is uncertain. A sample of bladelet scars on Crazelowman cores gives an average width of 6.6 mm, within a range of 3 mm to 11 mm. It is possible that some of the narrower bladelets could have been used for the microscalene triangles and rods etc. of this final part of the Later Mesolithic, but the wider bladelets are most unlikely to be of this period.

The end of the Mesolithic is conventionally dated as c. 5,500 BP, but more radiocarbon dates are needed to clarify this. At present the youngest dated English Mesolithic assemblage reported by Barton and Roberts (2004, 346) is a well-stratified assemblage at Stratfords Yard, Buckinghamshire, which includes tiny microliths and has a radiocarbon date of c. 5,900 BP.

These TAG bladelet cores could therefore be Early Mesolithic (giving an earliest date of c. 10,000 to 9,500 BP) and/or the early part of the Later Mesolithic, with a few possibly dating to the final part of the Later Mesolithic (giving a latest date of say 6,000 to 5,500 BP).

Since these bladelet cores have come from a number of TAG lithic scatter sites, they obviously are unlikely to have come from the same period of time within the Mesolithic. They (or most) may be the result of a few major knapping episodes or a number of smaller knapping sessions. Alternatively they may represent sporadic Mesolithic activity in the area spread over several thousand years.

Conclusion

The 279 core and 75 core fragments show a considerable level of knapping activity at some sites in the TAG collection area, but with a low level elsewhere. Crazelowman Farm 6 acres (site 36) and Pool Anthony OS 1790 (site 34), for example, have an average of 43 cores and 12 core fragments each, whereas 22 sites only have an average of three cores and one core fragment each.

The "exhausted" and abandoned cores are particularly informative in providing primary evidence of on-site knapping of flint and both dark chocolate and lighter coloured Greensand chert. These cores at the end of their productive life would (like chips and some other debitage) have been discarded at the place of knapping when of no further use, since there would have been no point in a knapper taking them elsewhere.

The cores provide evidence of a variety of knapping technologies, ranging from simple to somewhat complex reduction strategies. The core evidence suggests considerable Mesolithic activity in the area, as well as more limited activity in the Late Neolithic period. As regards the latter period, the Greensand chert radial cores present a very different chronological raw material picture than that suggested by Berridge (1987) at Nether Exe. In the present writer's opinion, much more evidence is needed before conclusions can be reached on the role of Greensand chert in the Devon Neolithic period, [*note Mrs Nan Pearce found a Neolithic polished Greensand chert axe in East Devon which is in the Exeter RAM Museum*].

The Portland chert 13 gm exhausted core and *flanc de nucléus* provide rare primary South West evidence of on-site knapping of this material. Whether from Portland or a nearer contemporary coast, the question arises as to why this chert was brought to Crazelowman Farm from some distance away to be knapped. Also of considerable interest is that Greensand chert classified cores weigh on average over 27% more than flint cores. One possible reason for this is that flint sources were further away than chert sources, so that knappers tried to get all possible tool-blanks off flint core, but could be less particular with more locally available chert. However these weight differences might alternatively be more to do with the customs, traditions and practices of the various groups that would have frequented the TAG area at various times, rather than being based on distance from source.

A few cores suggest knapping by trainees. Jacobi (2004) highlighted this possibility at Gough's Cave in Somerset and Cooper (2006) found similar evidence at Launde, East Leicestershire. Many other lithic reports are silent on this subject, despite it probably representing a significant element in total knapping activity in all prehistoric periods.

With 56 finds, the c. six acre field at Crazelowman Farm produced 20% of the 279 cores from 32 sites. Obviously since this was a surface collection it is not possible to quantify Crazelowman prehistoric activity. However, it is interesting to note that more surface cores were found at Crazelowman than at the Powell Early Mesolithic site at Hengistbury Head. Excavations at this Dorset site (Barton 1992) uncovered a major site with over 37,000 lithic finds. While Crazelowman may or may not have the same potential, there seems little doubt that it has more to offer, should the opportunity ever come up to more work there.

John. 22 February 2013

To follow:- Appendix on North Devon Link Road cores.

Bibliography covering cores, microliths and mircroburins.

Appendix: TAG North Devon Link Road core finds

These comprise 15 cores and five core fragments. Only seven sites have core evidence, as detailed in Table NDLR 2, with the two sites at Blatchworthy producing 10 of the 15 cores. Tables similar to those of the main core report follow, in case it is decided to incorporate the NDLR evidence into this.

Table NDLR 1. Core finds.

CLASSIFIED CORES	n
Radial	1
Other (including 2 exhausted)	5
UNCLASSIFIED	
Exhausted	2
Roughly flaked lumps	6
Burnt/heavily patinated	-
Tested/failed	-
Other	1
TOTAL CORES	15
CORE FRAGMENTS	5

The radial core is from Blatchworthy SS 884 172 (site 77) (the number is uncertain but is possibly 58). While it is a radial core it is by no means a classic example. The "other" unclassified core is also from Blatchworthy SS 884 172 (number 42). It is definitely a core, but the features are not clear enough to classify it further.

Table NDLR 2.

Site core finds	Radial	Other	Unclassified	TOTAL	Core

		classified			fragments
Blatchworthy SS 884 172 (site 77)	1	3	2	6	
Blatchworthy SS 881 173 (site 76)		1	3	4	1
Tiv 3 SS 9845 1383 (site 34)			1	1	4
Lurley Farm SS 924 152 (site 75		1		1	
Three other sites			3	3	
TOTAL	1	5	9	15	5

The “three other sites” are Little Rackenford SS 864 190 (site 78) (one roughly flaked lump), Tiv 1 - field centred at SS 9830 1365 (site 30) – (one roughly flaked lump) and Tiv 5 – (one roughly flaked lump).

There were no core bags from Phase 1 sites Tiv 2, Tiv 4 or UP1.

Nor were there any core bags from Phase 2 sites Pincombe Corner, Lower Webbery, Lower North Combe or (apart from one “possible” core fragment) Webbery Moor (site 76).

Table NDLR 3. Raw material of other classified cores.

Material	n
Flint	3
Greensand chert	1
Material uncertain due to patination	1
TOTAL	5

The radial core from Blatchworthy SS 884 172 (site 77|) is flint.

Table NDLR 4. Cortex of other classified cores.

Cortex type	n
Unabraded, relatively thick	
Unabraded, relatively thin	1
Abraded but well defined	2
Abraded and very thin	1
No cortex	1
TOTAL	5

Table NDLR 5. Core classification.

TYPOLOGY (Clark)	n
One platform – removals part way round	1
Two platforms – opposed	2
Two platforms – at right angles	1
Three or more platforms	1
TOTAL	5

MORPHOLOGY	n
Prismatic	3
Other	2
TOTAL	5

DETACHMENTS	n

Flake/bladelet	4
Flake/blade/bladelet	1
TOTAL	5

CONDITION	n
Little life left	1
Exhausted	2
Abandoned – problems	2
TOTAL	5

The two “other” in the Morphology table comprise a 17 gm dark chocolate chert core from Lurley Farm (site 75) and a flint core of similar 17 gm weight from Blatchworthy SS 884 172 (site 77). The Lurley example (number unclear, possibly 6) is basically a well made prismatic core which produced good quality bladelet blanks. Then the knapper took off several short almost squarish flake detachments from across the back of the bladelet flaking face. This Lurley core is a text book example of how cores *cannot* be classified as *either* flake *or* blade/bladelet cores. The Blatchworthy core (number 25) has an atypical shape, which is accentuated by the detachments.

As regards weights, the flint radial core from Blatchworthy SS 884 172 weighs 48 gms. The five classified cores include three of flint, all from Blatchworthy SS 884 172, with a weight range from 17 to 39 gms and an average of 25 gms. The other two classified comprise a 17 gm dark chocolate chert core from Lurley Farm and a 48 gm core of uncertain material (due to patination) from Blatchworthy SS 8815 1735 (site 76).

John. March 2013.