

An investigation of the provenance of lithics from Burry Holms

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Abstract

A preliminary investigation of the lithology of the lithic materials from Burry Holms and comparison with the equivalent raw materials in the local drift deposits has demonstrated that the materials were available locally. The immediate source of the materials may have been either a till of pre-Devensian age and of Irish Sea provenance, or a deposit reworked from such a till. The Devensian tills and fluvioglacial gravels close to Burry Holms yield only a very small quantity of flint, most of which is rather unlike the dominant flint type amongst the artefacts. Either the Devensian deposits were very carefully searched for their rare white-cortex flints, or, more likely, another, now vanished source was exploited.

The non-flint lithologies were mainly used for smaller artefacts, presumably because of the poorer knapping properties of those materials. White patinated flint dominates amongst all artefact classes, however, and strongly coloured flint is rare. The relative proportion of flint and non-flint cores closely matches the proportion of retouched artefacts in those materials. All object identified as blade cores are flint, although non-flint blades are found.

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Background

The investigation of the Burry Holms lithics included both a survey of the material held in the collections of the National Museum of Wales, and an examination in the field of representative localities within the some of the possible source units within the drift succession.

Survey of Collections

The survey of the lithic collections from Burry Holms was undertaken in two stages. In the first stage all material >1cm was examined. This was extremely time-consuming and during the second stage the sampling was reduced to retouched artefacts and cores >1cm only. Examination of the material was by binocular microscope and/or handlens. No thin-section investigation of the material was attempted. For this reason the lithological classes described here remain provisional. In several cases the discrimination of the

classes is based on rather subjective criteria, but which nonetheless provide a basis for comparison of the use and origin of the materials.

Description of raw materials

Flint

Flint appears to be represented by two groups of material. Firstly there is a small group of material with a strong colour, usually a yellowy-brown, often present with natural fractures and an abraded and/or impacted external surface. The second group comprises a spectrum of white and grey lithologies from material with a very good conchoidal fracture and a very fine texture, through to pieces with a saccharoidal texture and a hackly fracture, which is often rather straight. These material are often rich in fossils, particularly foraminifera (best seen in the finest material), bryozoans (common in white opaque materials) and sponge spicules (found in all groups of material).

F1 Coloured flint

This category of flint includes examples with a strong brown or yellow colouration, together with examples with an overall pink colour.

F2 Grey and mottled flint with good conchoidal fracture

This material typically includes larger pieces in which the inhomogeneity of the flint becomes apparent. The best flint typically has a white colour (and therefore grades into F3 below), whereas the grey blotches (burrows?) frequently contain vugs of euhedral quartz.

F3 White opaque flint with good conchoidal fracture

This opaque flint has a milky appearance, a good fracture and lacks inclusions.

F4 Finely saccharoidal marble-like flint

This category comprises finely saccharoidal mottled flints of a slightly translucent lithology giving rise to a marble-like lustre. The colour varies from white to grey, typically with diffuse boundaries between the two colours. The discrimination of this material and type F2 above is based on the lustre, but this is somewhat subjective.

F5 Coarsely saccharoidal flint

This type embraces white opaque flints which are either coarsely saccharoidal, or granular in appearance through the presence of abundant (now mouldic) inclusions. These inclusions are dominantly spicules, although other bioclasts may be present. Certain discrimination between this class of flint and the white altered chert of type C1 below may not always be possible, and requires further investigation. Examples of this lithology have been observed (as burrow fills?) in association with much finer flint material within a single nodule.

Chert**C1 Amber-coloured transparent chert**

This material has a brownish yellow transparent nature when fresh, but appears to age to a white, coarse-grained material. The cortex of this chert is brown with small-scale botryoidal texture. The chert contains abundant inclusions, which appear to include both peloids and bioclasts (probably including spicules). It is tentatively identified as a Mesozoic chert. Where white, this material is not confidently differentiated from the coarsely saccharoidal flint varieties (F5).

C2 Pale grey silicified peloidal limestone

This pale grey lithology is dominated by pale peloids. The sedimentary texture is well preserved. This material is likely to have an origin within the local Carboniferous Limestone succession.

C3 Dark silicified limestone

These dark grey to black cherts are similar to those commonly found with the Carboniferous Limestone

C4 Silicified peloidal mudstone

These dark khaki cherts are fine grained, but show a peloidal texture on some faces. The rock shows a strong bedding fabric marked by thin tabular voids, encrusted with dark material, probably Mn oxides. These voids may represent fossils, perhaps of plants. The origin of these cherts is unknown, but if the voids are plant fossils, that would make a Carboniferous origin likely.

Object Name	C1	C2	C3	C4	C5	S1	F1	F2	F3	F4	F5	unworked	too small	total	final total
adze sharpening flake										1				1	1
awl								1						1	1
backed blade	1												1	2	1
blade core							2	8	4	2	6			22	22
burin							2	1			1			4	4
core		3		1	1		3	20	1	3	12	1	10	55	44
core rejuvenation blade								2		2	3			7	7
core rejuvenation flake		1						1	2		3			7	7
crested blade										1	1		1	3	2
double ended scraper								1						1	1
end scraper								1			2			3	3
knife								2						2	2
microburin								1		1	2			4	4
microdenticulate								6	1	3	7			17	17
microlith	1	4	2		1		3	9	6	12	39		3	80	77
retouched blade									1		2			3	3
retouched flake							1	1			2			4	4
scraper						1	3	8	3		13			28	28
utilised object								1						1	1
<i>Total</i>	<i>2</i>	<i>8</i>	<i>2</i>	<i>1</i>	<i>2</i>	<i>1</i>	<i>14</i>	<i>63</i>	<i>18</i>	<i>25</i>	<i>93</i>	<i>1</i>	<i>15</i>	<i>245</i>	<i>229</i>

Table 1. Distribution of raw material classes by object type. For description of lithological classes see text.

C5 Silicified mottled grey/white rock with isolated large calcite crystals

This strange lithology may represent silicified chalk. The mottling appears to be bioturbation. Some examples bear a few isolated quartz grains too.

Other siliceous sedimentary rocks***S1 Fine quartzitic sandstone***

Some specimens of white siliceous sandstones and siltstones were observed, which were strongly suggestive of derivation from the orthoquartzites of the Millstone Grit.

Others

Single examples of artefacts or debitage in a variety of sedimentary materials occurred. These lithologies included a possible claystone ironstone, a quartz rich tuff, a pale chert bearing large quartz grains (similar to some material from the Greensand).

Raw materials and artefact types

The distribution of raw material amongst the object types is illustrated in Table 1. The relatively small number of examples of some of the object type precludes detailed analysis (the class frequencies are too low for chi-square tests) of their raw material. Of the object types only, cores, blade cores, microdenticulates, microliths and scrapers have more than 10 examined examples. Table 2 summarizes their raw materials.

Object	No. of flint	No. non-flint	%non-flint
<i>Core</i>	39	5	11.4
<i>Blade Core</i>	22	0	0
<i>Microdenticulate</i>	17	0	0
<i>Microlith</i>	69	8	10.4
<i>Scraper</i>	27	1	3.6
total	174	14	7.4

Table 2. The occurrence of flint and non-flint raw materials in those object classes with more than 10 examined examples.

If only the data for retouched artefacts are examined (i.e. excluding the cores and rejuvenation flakes/blades), there are 10 non-flint artefacts, of which 8 are microliths and 141 flint artefacts, of which 69 are microliths.

There does appear, therefore, to be particular use of non-flint materials for the smaller classes of objects.

Field investigations***Broughton Bay***

Broughton Bay contains small exposures of a succession including a lower, bedded till and an upper massive till. Campbell & Bowen (1989) have described the lower till as containing a small proportion of clasts of western derivation, together with marine shells, along with the dominant northerly-derived clasts. The upper till is apparently more consistently northern in its derivation. The upper till is overlain by soliflucted material. Only the upper till and solifluction deposits are currently well-exposed.

The exposures of upper till and soliflucted deposits yielded a few small flints, dominantly of strongly yellowed small fractured flints, but also including one small (3.5cm) flint nodule with a white cortex. Besides the flints, the tills contain a large proportion of various silicified lithologies from the Carboniferous Limestone and also yielded one small pebble of the amber chert (type C1 above) .

The lower till exposures were degraded, slipped, overgrown and partially covered by boulders of the sea defences. The foreshore in front of the outcrop yielded a few pebbles of chert (including type C1) and coloured flint, but not necessarily derived from the immediately adjacent till.

The bedrock at the eastern end of the bay comprised a unit of dolomitised limestone with zebra rock and large calcite filled vugs, many with haematized rims. The immediately overlying rocks include a basal section rich in laminated cherts.

Rhossili Bay

The section appears to comprise two heads (the lower apparently resting on a concealed till with onshore movement indicators according to Campbell & Bowen 1989) separated by gravels. The lower head is dominated by degraded red siltstone, the upper by fragmented quartz conglomerates. The intervening gravels include boulders up to 40 cm, in a rather chaotic mix of material, dominated by Coal Measures siltstones and ironstone concretions. As with the Burry Holms gravels, the proportion of claystone ironstone concretions is very large, and mobilisation of the iron has led to cementation of the gravels, particularly towards their base.

The gravels yielded a single coloured flint during this visit.

General Comments

Although the locations and deposits visited yielded material equivalent to the Burry Holms lithics, and they could represent potential sources, several factors need to be borne in mind:

1. there was a very low frequency of the utilised lithologies in these deposits. The Broughton till yielded several specimens from a few metres of section, but most were too small to be useful. Flint did not appear within the counted clast assemblages at any of Campbell's sites in the area, although being noted as present.

2. the greatest ease of collection of material was from an area of the beach in Broughton Bay where beach processes had allowed the size sorting of 2-4cm. similar processes would have enhanced the retrievability of the flint in prehistory.

3. the evidence that the earlier till deposits contain significant quantities of Irish sea material, contributing a proportion to the ice moving across the floor of the present sea to the NW of the site is important – for these areas would have been on the Mesolithic coastal plain. Where large rivers cut the Quaternary deposits of the coastal plain, there may have been direct access to those now inaccessible deposits (the Devensian tills bearing reworked material, and perhaps to pre-Devensian deposits as well).

All the lithologies present in the lithic assemblage could have been sourced locally. Although comparisons can be made between the lithic assemblage and clast population of local Quaternary deposits, this may be of only limited utility. The most flint-rich deposits are not presently accessible, but probably would have been in Mesolithic times. Those flint-bearing deposits seen today are simply later reworking of Irish Sea drift, by the valley glaciers moving into Carmarthen Bay from the N and NE. I would suggest that it is in those areas of the (now-offshore) earlier tills, and any river deposits reworked from them, that the source of the Burry Holms lithics should be sought.

Discussion

The lithic assemblage is dominated (87% of examined objects) by flints with a white patination, some recrystallization and frequent vugs of euhedral quartz within burrows and fossil moulds. The majority of the preserved cortical fragments are smoothed (57%), commonly with impact marks (41%) suggestive of reworking of the flints within a fluvial or beach environment, rather than simply glacial transport.

Only a very small proportion (6%) of the artefact collection is formed from strongly coloured flint. Similarly, only 5% of the cortical material is strongly coloured, and a further 6% shows a pale chalky cortex with a thin brown or yellow coloured zone in the flint immediately beneath.

Interpretation of the assemblage is hindered by poor understanding of the distribution and nature of flint in the various local drift deposits. Flint and chert are not sufficiently common for the collection of statistically meaningful assemblages. However, it is possible to present questions about the nature of the choice of raw material:

1. strongly coloured flints appear relatively rarely in artefact collections, but are apparently dominant in the drift localities sampled. Is this because the white flints

were preferentially collected because of their knapping properties or larger size, or was it because a different source (or sources) of raw material were being utilised?

2. The use of non-flint materials seems to have occurred preferentially in microliths (8 of 10 retouched non-flint artefacts; compared with 69 of 148 retouched flint artefacts). Does this reflect the non-flint materials having smaller pieces with consistent fracture, suitable only for the smaller implements, or is there another factor?

The question of the ratio of cores:retouched artefacts for different raw materials had been raised previously. In this study 5 non-flint cores were examined (and 10 retouched artefacts) compared with 61 flint cores (and 148 retouched artefacts). This does not support the suggestion of any discrepancy in their relative frequency.

Acknowledgements

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References

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