# SOME MESOLITHIC SITES IN THE PEAK DISTRICT AND TRENT BASIN

# By T. G. MANBY

HE purpose of this paper is to record a series of Mesolithic sites discovered by the late John Lomas during many years of field-work in Derbyshire and to consider the Mesolithic occupation of the area as a whole. A preliminary report on one of these sites was written by John Lomas,<sup>1</sup> but since then further material has been recovered. Mesolithic finds from the limestone area of the Peak and the Trent Basin have been rather sparse and poorly recorded in the past. Sites on the gritstone hills of northeast Derbyshire have long been known<sup>2</sup>; the erosion of the peat on these hills exposes the underlying mineral soil and provides conditions for flint collecting rarely available in the pasturelands of the limestone area (Fig. 2).

# PEAK DISTRICT SITES

By examining the surfaces of fields ploughed for reseeding, John Lomas was able to collect numerous flint artifacts, including recognizable Mesolithic types, from sites on the carboniferous limestone.

Hopton Boneworks (Fig. 3). Site on the magnesian limestone with local pockets of glacial sand and clay at 1,000 ft. O.D. (SK 259548). The material was collected from the surface of a ploughed field that has since been built on.

## Waste.

The raw material is mostly brown flint with small quantities of grey flint and dark grey chert.

		Rejuvenation		
	Cores	flakes	Flakes	Chippings
Brown flint	5	7	17	14
Chert			3	

Cores.

Aı.	Single platformed,	partially worked	1.	(Fig. 3, 1) 12.4 gms.
Β2. Ε,	Two platforms, at Unclassifiable	right angles	2. 2.	used as a corescraper. 11 & 12.4 gms. 14.9 & 8.3 gms.

Lomas, D.A.J., LXXIX (1959), 119-22.
 Armstrong, Proc. Sorby Scientific Soc., I (1929), 79-97.

Core Rejuvenation Flakes.

Class B. Stru	ck off at r	right angles	to the	platform	 5	(Fig.	3,	2)
Class D. Bas	to remov	e apex			 I	(Fig.	3,	3)
Class E. Rid	e flake bat	ttered along	part of	the keel	 1	(Fig.	3,	4)
oole								

# Tools.

The microlithic element is represented by a batterback point (Fig. 3, 5), an obliquely blunted point (Fig. 3, 6) and a truncated blade (Fig. 3, 7), all of flint. Four scrapers



FIG. 2. Map of Mesolithic sites in the Peak District and Trent Basin.



FIG. 3. Mesolithic implements and waste. 1-13 Hopton; 14 Kniveton; 15 Harborough Rocks; 16-17 Parwich Top Farm; 18-20 Parwich Middle Moor; 21-27 Melbourne. (Scale 2/3.)

and a flake with edge-retouch complete the tool content of this site (Fig. 3, 8-12). Additional to these and not directly connected with them is an irregular microlith (Fig. 3, 13) found on the hill-top north of the flint site.

Kniveton (Fig. 3, 14). A single platform core with a few bladescars on two sides. Brown flint, bluish patina, a white-patinated skin remains on the sides, and half the platform not subject to blade striking. Weight 20.1 gms.

Harborough Rocks (Fig. 3, 15). A flint core and a few flakes were picked up on the surface of a ploughed field on the northern side of Harborough Rocks. Chopper core of brown flint, weight 5 gms.

Parwich Top Farm. Collected on the surface of a small ploughed field (SK 184557), three cores and twenty-one flint flakes, all brown flint.

- A1. Single platformed core, partially worked ...... 8.4 gms. (Fig. 3, 16)
- B1. Two parallel platforms ..... 19.7 gms. (Fig. 3, 17)
- E. Irregular core, one edge used as a scraper ..... 13 gms.

*Parwich, Middle Moor.* Collected from the surface of a ploughed field, thirty-one flint flakes, mostly dark brown, a petit tranchet arrowhead, class B, as well as the following recognizable Mesolithic core, core rejuvenation flakes and a scraper.

B1. Core with two platforms parallel, dark brown flint with a

# TRENT BASIN SITES

Melbourne, Castle Pit Hill. The site is a low hill summit at 150 ft. O.D., south of the river Trent, with a red marl subsoil. The flint industry was first discovered after the field had been ploughed in 1959, and further collecting followed. The site had been contaminated by later occupation as a leaf-shaped arrowhead, some pressured flaked flint scrapers and sherds of Iron Age pottery were also picked up on this hill.

### Raw Material.

Flint was the sole raw material used on this site; all struck flakes are in sharp condition. Apart from a small amount of grey flint, translucent orange flint and some dull yellow flint, dark brown flint sometimes with grey spots was the principal material. Some of this brown flint has patches of a brown nodular skin, and some has a thick white-patinated layer over old fractured surfaces, sometimes with iron-staining as well. The varying cortex of the flint shows that it is of beach pebble origin. This is confirmed by a number of unworked pebbles collected on the site with the flint waste and implements. These pebbles, eight in number, weigh 7.6, 41.5, 47, 59, 69, 75, 114, 125 gms. respectively, and measure 1.1 to 3 in. long. These are well-rounded pebbles or fragments of nodules with a patinated skin over the fractured surfaces. All these pebbles are to varying extents pock-marked on their surfaces by salt action, and some have patches of smooth soft lustre produced by sand blasting, a feature found on some of the flakes. All these features indicate that the pebbles had lain on a beach above the high-tide mark.



Fig. 4. Mesolithic implements and waste. 1-22 Melbourne; 23 Calke. (Scale 2/3.)

Waste.					Rejuvenation
	Cores	Flakes	Blades	Chips	flakes
Dark brown flint	64	688	4	23	47
Patinated flint	32	395	3	53	IO
Grey flint	5	IO		2	2
Orange flint		3			
Yellow flint	I	4		_	
Burnt flint	4	34		6	I
Totals	106	1134	7	84	60=1391

## Cores.

The cores are generally symmetrical and well worked, one of them to very small proportions (Fig. 3, 23).

AI.	Single platformed, partially worked (Fig. 3, 21-23)	38	converted to	
			core scrapers	II
A2.	Single platformed, worked all round	9	converted to	
	о .		core scrapers	4
B1.	Two platforms, parallel	2		
B2.	Two platforms at right angles	9		
B3.	Two platforms, intermediate angle (Fig. 3, 25)	16	converted to	
			core scrapers	3
Cı.	Three platforms	6		
D.	Chopper or keeled (Fig. 3, 24)	6		
E.	Unclassifiable	20	converted to	
			core scrapers	5
	The weights of these cores are shown in graph form	(Fi	ig. 5)	





Core	Rejuvenation Flakes.	
Α.	Struck off at the same plane as the platform (Fig. 3, 26)	14
В.	Struck off at right angles to the platform	13
С.	Struck off oblique to the platform (Fig. 3, 27)	14
D.	Base to remove apex	6
E.	Ridge flake, battered along part of the keel	3
Un	classifiable rejuvenation flakes	14
Micro	aliths	

#### Microliths.

Three small obliquely blunted points (Fig. 4, 1-3), a batterback point (Fig. 4, 4) and a broken triangle (Fig. 4, 5).

#### Truncated Blades.

Two stout blades are diagonally truncated (Fig. 4, 6-7) and a third has retouch along the sides (Fig. 4, 8). Another blade has secondary working on one side of the point and along a small portion of the back (Fig. 4, 9).

#### Scrapers.

Twelve end scrapers (Fig. 4, 10-11), ten broad scrapers (Fig. 4, 12-14), a disc scraper (Fig. 4, 15) and two triangular scrapers (Fig. 4, 16).

#### Gravers.

Gravers are few, a double angle-graver (Fig. 4, 17), an angle-graver (Fig. 4, 18) and a large double core-graver (Fig. 4, 19). There are five graver spalls (Fig. 4, 20-21).

#### Fabricator.

A fabricator of patinated brown flint with a smooth end and battered side (Fig. 4, 22) is a doubtful Mesolithic implement, but one has been found at the Oakhanger, Hampshire, Mesolithic site.<sup>3</sup>

Calke, Furnace Farm. A core was picked up on the hillside above the farm where soil had been removed during the building of the new reservoir. Class B3 core (Fig. 4, 23) used as a core-scraper, bluish-white patinated flint. 27.3 gms.

All the Mesolithic material described above has been deposited in Derby Museum with other Derbyshire finds in the Lomas Collection.

# THE MESOLITHIC OCCUPATION OF THE SOUTHERN PENNINES AND THE TRENT BASIN

Mesolithic sites have long been known on the gritstone hills of the southern Pennines, especially in the Sheffield area<sup>4</sup> and further north in the Huddersfield area.<sup>5</sup> But in the portion of northern Derbyshire between the Yorkshire border and the edge of the Peak District limestone Mesolithic sites are few, as they are on the limestone plateau itself (Fig. 2). The very high gritstone moorland of Bleaklow and Edale Moor has so far produced very few traces of Mesolithic occupation. Mr. D. Heys of Oldham has searched an extensive portion of the Bleaklow range and found microliths and Mesolithic cores on Cold Harbour Moor and in the Snake Pass. Cown Rock, south of Glossop, has produced a small quantity of flint waste of possible Mesolithic aspect.<sup>6</sup> In Longdendale, a Mesolithic site has been found on the gravel hill overlooking the river Etherow that was occupied by the Roman fort of Melandra. Preserved in the Buxton Museum is a quantity of waste from this site comprising flakes and blades of brown flint, white patinated flint and dark chert; also four flint cores of class AI, one converted into a graver, a batterback microlith and part of a scraper, both of brown flint.

On the northern side of Longdendale, in Lancashire and Cheshire, Mesolothic sites are numerous on Brushes Moor, Boar Flatt, Swinshaw Moor and Tintwistle Moor.<sup>7</sup> These sites are found between 1,000 and 1,250 ft. O.D. on

 <sup>&</sup>lt;sup>3</sup> Rankine, P.P.S., XXVI (1960), 250, Fig. 5.16.
 <sup>4</sup> Radley and Marshall, Y.A.J., XLI (1963), 81-97.
 <sup>5</sup> Petch, Early Man in the District of Huddersfield, 1924, 51-2.

<sup>&</sup>lt;sup>6</sup> Manchester Museum.

<sup>7</sup> Petch, 23-9.

a shoulder of the gritstone moorland between the slope of the dale and the slope up to the high moorlands of the Featherbed Moss-Holme Moss ridge. Similar sites may exist on the Derbyshire side of the Dale.

Mesolithic sites seem to be unknown on the gritstone hills along the western side of the limestone plateau, but on the very western edge of the Pennine Range Mesolithic flints have been found on the sandstone ridge of Alderley Edge. From Castle Rock, Alderley Edge, are reported batterback, trapezoidal and crescent microliths.8 In the Chester Museum from this site are five flint and chert cores, a graver spall of brown chert and flint and chert waste. From this site, too, the Manchester Museum has flint and chert waste, microblades, core rejuvenation flakes and a batterback of black chert.

Previous Mesolithic finds from the limestone plateau have been few; Bateman found two microliths, both rods, during barrow excavations in Staffordshire at Blore and Castern.9 A number of microliths were found during the early excavations of High Wheeldon Cave<sup>10</sup>; unfortunately, most have been lost as only a fine scalene triangle of good quality black chert remains in the Buxton Museum. The Peakland Archaeological Society's current excavation at this cave has produced another microlith, a scalene triangle of patinated flint, also the likely Mesolithic layer within the cave. Layer (d) has yielded a flint core-trimming flake and fractured deer bones associated with the remains of horse, brown bear and deer.<sup>11</sup> A single flint batterback microlith comes from Seven Ways Cave, Wetton, and from the nearby Darfur Ridge Cave on Ecton Hill comes a flint scalene triangle and a possible blade core.<sup>12</sup> The Peakland Archaeological Society's excavation of Dowel Cave, Dovedale, has produced a bone point with split bones and fish remains from layer (e) which is of Mesolithic date on stratigraphical evidence. The quantity of Mesolithic material from these cave sites is small, suggesting only casual occupations; however, the caves do provide suitable conditions for the preservation of bone implements and food bones. Future cave-excavations should provide further evidence when care is taken to search for microliths in the likely Mesolithic layers.<sup>13</sup>

Recently Mr. D. Vallence has collected typical Mesolithic flint cores and core rejuvenation flakes from isolated spots on Brassington Moor. He also located a small Mesolithic site on a hill above Pike Hall and obtained from it two batterbacks, two obliquely blunted points and two truncated blades, also two double-ended scrapers, three single-ended scrapers, and a disc scraper. Other material from this site includes a class AI core, a graver spall and flakes of brown and white flint. From this site Mr. F. Radford has a batterback, an end-scraper as well as two cores and flakes and blades of brown flint and a flake of black chert. Also in Mr. Radford's collection is a fine trapezoid microlith in patinated flint from Rock Hurst Farm, Aldwark, and a pair of Mesolithic flint cores found near the railway-line at Longcliffe.

8 Varley, J. Chester and North Wales Arch. Soc., XXIX (1932), 51-2.
9 Clark, The Mesolithic Age in Britain, 1932, 108.
10 Jackson, D.A.J., LXXI (1951), 72.
11 Peakland Arch. Soc. Newsletter, 8 (1952), 7.
12 Thomas and Moor, P.A.S. Newsletter, 18 (1962), 9.
13 Bramwell, D.A.J., LXXIX (1959), 100-3, Fig. 12.3; P.A.S. Newsletter, 19 (1963), 10-12.

Antler and bone points with Mesolithic flint and chert implements have been reported from the Shacklow site. Monsal Dale,<sup>14</sup> but no detailed reports are available.

The magnesian limestone hills of north-east Derbyshire also attracted Mesolithic occupation to the caves and shelters of the Creswell area: there are obliquely blunted points, truncated blades and micro-burins from the Upper Middle Zone of Mother Grundy's Parlour.<sup>15</sup> Armstrong reported Mesolithic occupation material from the top of the brown solifluction earth of Ash Tree Cave, Whitwell,<sup>16</sup> and from Yew Tree Shelter, Creswell,<sup>17</sup> but the writer could not identify any actual artifacts from the latter site amongst the Armstrong Collection in Sheffield Museum. The rock shelter of Whaley no. 2 has produced a typical Mesolithic industry of geometric microliths comprising six batterback points, five scalene triangles, a long trapeze, a "Horsham" point, also two double-angle gravers, an end-scraper, an obliquely blunted point, all in lightly patinated brown flint. There is much flint waste of brown and white patinated flint and some chert with a class AI core and five core rejuvenation flakes of classes A to E respectively.<sup>18</sup> Armstrong described this as a Creswellian site, but no definitely recognizable Upper Paleolithic artifacts are present amongst the material from this cave in the Armstrong Collection. This raises the question of the cultural affinities of the human female skull found buried at the back of the cave which Armstrong regarded as Upper Paleolithic.<sup>19</sup> Brothwell, in his report on this skull.<sup>20</sup> was unable to support Armstrong's interpretation of ritual killing and brain eating connected with the skull, and regarded the damage to it as the result of fragmentation due to crushing after burial. The lack of actual Creswellian finds from this site suggests that the skull is more likely to be Mesolithic. Associated with it were a truncated blade, an obliquely blunted point and a portion of a bone harpoon with a barb,<sup>21</sup> rather like points P22, 24, 61, 98 from Star Carr.<sup>22</sup> In this case, the skull, along with the Tilbury skeleton and the Macarthur Cave skull,<sup>23</sup> is one of the few skeletal remains of Mesolithic man found in Britain.

Further finds from these limestone hills are typical Mesolithic cores from Scratta Wood near Whitwell, and further south a site is reported from Kirbyin-Ashfield, Notts.,<sup>24</sup> but no details are yet available.

A few Mesolithic finds have come from the coal measure hills between the gritstone and magnesian limestone at Unstone and Dronfield<sup>25</sup> and at Birley Spa, where Mr. L. H. Butcher has collected obliquely blunted points, truncated blades and batterbacks with flint and chert waste.<sup>26</sup>

- <sup>14</sup> Bramwell, P.A.S. Newsletter, 18 (1962), 17.
  <sup>15</sup> Armstrong, J. Royal Anth. Inst., XXVIII (1925), 167; Clark, 19-21, Fig. 3.
  <sup>16</sup> Armstrong, D.A.J., LXXVI (1956), 59.
  <sup>17</sup> Heathcote, D.A.J., LIX (1938), 81.
  <sup>18</sup> Clark, P.P.S., V (1939), 87, Fig. 7.
  <sup>19</sup> Armstrong, Arch. N.L., I (1948), 5-6.
  <sup>20</sup> Brothwell, Man, LXI (1961), 113-6.
  <sup>21</sup> British Museum (Natural History).
  <sup>22</sup> Clark Frequentions at Star Carr, 1054, 140.

- <sup>22</sup> Clark, Excavations at Star Carr, 1954, 140.
   <sup>23</sup> Wells, Proc. Univ. Bristol Spel. Soc., 8 (1959), 179-85. But see Oakley, P.P.S., XXIX (1963), 426-7.
   <sup>24</sup> Swinnerton, Trans. Thoroton Soc., LIV (1950), 70.
- <sup>25</sup> Armstrong Collection, Sheffield City Museum.
   <sup>26</sup> Sheffield City Museum.

Mesolithic sites known from the Trent basin are few; the Melbourne site close to the Trent has produced the largest assemblages of Mesolithic implements and waste from the area. Some Mesolithic material was incorporated in the mound material of Swarkeston Lows, barrow 4, comprising an obliquely blunted point, a double end-scraper, and four ordinary end-scrapers, all of flint.27 Swinnerton mentions further Mesolithic sites lower down the Trent at Thrumpton, near Long Eaton; Wollaton Park, Nottingham; and Besthorpe, near Newark, but no details are reported.<sup>28</sup> On the western side of the Trent basin two obliquely blunted points, four batterbacks, microblade cores and flakes, all of flint, come from Westwood Farm, Tuxford.<sup>29</sup> The dry heathland of the Sherwood Forest seems to have been avoided except for a site mentioned by Swinnerton at Ollerton.<sup>30</sup> The Jurassic Ridge of Lincolnshire, along the eastern side of the Trent basin, has a large number of sites on it in the Scunthorpe area<sup>31</sup> and in the Grantham area<sup>32</sup>; further to the west an obliquely blunted point on a long slender blade of brown flint comes from Broughton.<sup>33</sup>

# Cultural Connections.

The total quantity of Mesolithic material from Derbyshire is inadequate for statistical study; even the Melbourne site is too poorly represented by microliths for a full comparison to be made with other microlithic industries. The use of Derbyshire chert on Mesolithic sites in the southern Pennines shows that the Peak District was frequented by Mesolithic groups in search of raw material. The fine quality black chert that outcrops along the sides of the Wye Valley between Buxton and Bakewell would have been a very convenient source of tool-making material, far more convenient for the Mesolithic occupants of the gritstone hills of the southern Pennines than the distant sources of flint in East Yorkshire. The occurrence of Derbyshire chert as far distant as Alderley Edge, Longdendale, the moors west of Huddersfield, the Sheffield area and Whaley shows the extent of the Mesolithic connections of the Peak District. The area can be considered an integral part of the southern Pennine Mesolithic province. No such connection can be demonstrated between the Peak District and the Trent basin sites; on these sites chert is unknown, but the beach flint-pebbles from Melbourne are likely to have been obtained on the Lincolnshire coast and to indicate the connections of this site with the East Coast.

It is possible to consider the Derbyshire Mesolithic occupation within the framework of the southern Pennine area as a whole, for while finds from the Peak District are scanty, the exploitation of the area as a source of raw material was considerable. The Mesolithic industries of the southern Pennines

<sup>27</sup> Greenfield, D.A.J., LXXX (1960), 23, Fig. 8.22-6.

<sup>28</sup> Swinnerton, 69-70.
29 Nottingham University Museum.

<sup>&</sup>lt;sup>20</sup> Swinnerton, 70.
<sup>31</sup> Dudley, Early Days in North-West Lincolnshire, 1949, 35-41.
<sup>32</sup> Clark, P.P.S.E.A., VII (1934), 422; Bowen, Rep. Lincs. Archit. & Arch. Soc., 3 (1948), 103-8.
<sup>33</sup> Nottingham University Museum.

have received the most detailed study around Huddersfield and Sheffield. especially in the former area, largely as a result of the work of the late Francis Buckley in the 1920's and 1930's. Buckley recognized two basic Mesolithic industries which he called the broad blade and the narrow blade industries<sup>34</sup>: these were renamed the non-geometric and geometric industries by Clark.<sup>35</sup> The non-geometric industry, represented by the sites of Warcock Hill<sup>36</sup> and Lominot, sites 2 and 3,<sup>37</sup> is dominated by obliquely blunted points, truncated blades, batterbacks, whilst rare forms like triangles and basal retouched points occur occasionally. The geometric industry is dominated by neat microliths, scalene triangles, batterbacks, rods and sub-triangles; less frequent are obliquely blunted points, isosceles triangles, trapezoids, rhomboids, crescent and pear-shaped points; and rarely trapezes, shouldered and "Horsham" points. The whole industry is typified by the March Hill site, Marsden.38

The chronological relationship between these two industries has never been established by true stratigraphy in the podsolised mineral soil beneath the peat. Woodhead tried to use the depths of the flints in the soil beneath the peat covering as an indication of their age, and constructed a composite section to illustrate this based on the Warcock Hill finds.<sup>39</sup> This section must be disregarded as it does not represent an actual sequence, but is composed of finds made some distance apart. Typologically the non-geometric industry is the more primitive, and Rankine has recently suggested that the industry should be re-apprized for possible affinities with the Maglemosian culture. The Maglemosian is represented in an early phase at Star Carr and Flixton Carr<sup>40</sup> in East Yorkshire and several sites in southern England, especially at Thatcham, Berks.<sup>41</sup> The implement assemblages from the Pennine nongeometric sites are limited in comparison with the Star Carr industry. The flint axe is only represented at Ringstone<sup>42</sup> in the southern Pennines with typical Maglemosian microliths, indicating that Maglemosian groups did penetrate into the Pennines, and an axe-sharpening flake from Radcliffe, Lancs.,<sup>43</sup> shows that they even reached the Irish Sea basin. The Derbyshire site at Birley Spa belongs to this non-geometric industry: the black chert used must have been obtained from the Peak District. Actual evidence of Maglemosian occupation of the Peak District is the bone point from Dowel Cave, Dovedale, which resembles the bone spear-points of the Thatcham, Berkshire, Maglemosian site.<sup>44</sup> In the acid, moorland soil of the southern Pennines all evidence of bone and antler artifacts has vanished, only the flint and stone tools remaining. If the implement assemblages of the southern

- <sup>35</sup> Clark, Mesolithic Age in Linear 1
  <sup>36</sup> Buckley, 3-7.
  <sup>37</sup> Clark, 23-4, Figs. 5, 6.
  <sup>38</sup> Petch, 26, Fig. 4.
  <sup>39</sup> Woodhead, History of the Vegetation of the Southern Pennines, 1929, 12-7, Fig. 6.
  <sup>40</sup> Clark, Star Carr, 184-91; Moore, P.P.S., XIV (1950), 101-8.
  <sup>41</sup> Wymer, P.P.S., XXVIII (1962), 329-61.
  <sup>42</sup> Davies and Rankine, Y.A.J., XL (1960), 209-10, Fig. 1.
  <sup>43</sup> Spencer, Trans. Lancs. & Ches. Ant. Soc., LXII (1950-1), 196-200, Plate XX.
  <sup>44</sup> Wvmer, 351, Fig. 13.

<sup>&</sup>lt;sup>34</sup> Buckley, A Microlithic Industry from the Pennine Chain, 1924, 1.

<sup>35</sup> Clark, Mesolithic Age in Britain, 1932, 26.

Pennine non-geometric sites are compared with recognized Maglemosian industries in other parts of England, similar microlith/scraper/graver types are apparent, but the tranchet-sharpened flint axe is scarce. The range of microlith types resembles that of the Shapwick, Middlezoy and Dozmare Pool sites in south-western England and the Broxbourne and Colne Valley sites in south-eastern England<sup>45</sup> rather than the early, richer industries of Star Carr<sup>46</sup> and Flixton Carr.<sup>47</sup>

The geometric industry is represented at Fox Hole Cave, Hopton, Melandra, Melbourne and Whaley no. 2. This industry is the commonest and most widespread of British Mesolithic cultures, and Clark has recently shown its affinities with the French Sauveterrain industry.48 The origin and development of the industry and its connections are still extremely obscure, partly because of the one-sided nature of the material available for study and the difficulty of dating the sites. The geometric industry is very well represented on the open moorland sites of the southern Pennines and is the commonest and most characteristic Mesolithic culture of the area.

## Dating.

The dating of Mesolithic sites in this country is only possible when the implements are found in a deposit datable by pollen analysis or C.14 dating. The early Maglemosian site of Star Carr belongs to the Early Boreal Period or zone V, the C.14 date for the occupation being  $7638 \pm 209$  B.C.<sup>49</sup> The geometric industry at Peacock's Farm, Cambridgeshire, came from a Late Boreal deposit of zone IVc with a C.14 date of  $5650 \pm 150$  B.C. for the cccupation.<sup>50</sup> A small series of Mesolithic flints was found in a rock cleft at Stump Cross in the west Yorkshire Pennines, in mud that formed in the early part of the Atlantic Period or zone VIIa<sup>51</sup> with a C.14 dating of  $4300 \pm 310$ B.C. A zonation early in the Atlantic Period is also given for the geometric industry at White Gill in north-east Yorkshire.52

On the moors of the southern Pennines the Mesolithic sites are in the mineral soil beneath the blanket bog-peat. The basal layers of this peat are particularly difficult to date by pollen analytical means, but the growth of peat began on the higher, poorly drained summits at the Boreal/Atlantic transition and continued to grow and spread during the Atlantic and Sub-Boreal Periods.<sup>53</sup> The Mesolithic flints in the mineral soil below the peat are earlier than its initiation, but by what duration cannot be gauged. The peat

<sup>45</sup> Wainwright, P.P.S., XXVI (1960), 193-201.

<sup>46</sup> Clark, 96-114.

<sup>47</sup> Moore, 107-8. 48 Clarke, P.P.S., XXI (1955), 14-9.

Glatke, r. r. S., NAI (1955), 14-9.
 Godwin, Walker and Willis, Proc. Royal Soc., B. 147 (1957), 364.
 Clarke and Godwin, Antiquity, XXXVI (1962), 19-21.
 Walker, P.P.S., XXII (1956), 23; Godwin and Willis, Amer. J. of Sci. Radio Carbon Supplement, 1, 63.

ment, 1, 03. 52 Dimbleby, The Development of British Heathlands and their Soils, 1962, 111-3. 53 Conway, J. of Ecology, 42 (1954), 117-47. The dating of the Mesolithic industries in the Yorkshire Pennines has recently been discussed by Radley and Marshall and by Davies, Y.A.J., XLI (1963), 96, 67-9.

over the Warcock Hill "North Site" began to form in the Atlantic Period,<sup>54</sup> so the non-geometric industry could date to Boreal times. For reasons of geography, the westward penetration of the Maglemosians into the Pennines would be later than the occupation of the Lake Flixton sites.<sup>55</sup> This westward expansion probably occurred in later Boreal times when the rising waters of the North Sea were drowning the Maglemosians' hunting-grounds in the North Sea basin.56

The geometric industry sites are also covered by blanket bog-peat, but the Peacock's Farm, Stump Cross and White Gill sites show that the industry flourished in the Late Boreal and Early Atlantic Periods.

## Environment.

The Mesolithic cultures were based on a hunting and food-gathering economy, though the scarcity of surviving animal remains makes it difficult to study the hunting activites. Deer, wild cattle and wild pig would be the principal large animals hunted; fishing and fowling would add their contribution, as the pike and other fish-bones at Dowel Cave show. The plentiful hazel shrubs must also have provided a convenient item of diet; hazel nuts were found with flints at Stump Cross.<sup>57</sup>

The Boreal phase, represented by the pollen zones V and VI, had a warm, dry climate, especially towards the end of the period; this is shown by the spread of warmth-loving trees like oak, elm, lime and alder; a higher treeline than ever before or since; low water levels in lakes and the colonization of bog surfaces by trees.<sup>58</sup> Unfortunately no deposits of this period have been studied by means of pollen analysis in the Trent basin or the southern Pennines. The Trent basin would have been like other parts of lowland England with a spread of pine woodland with hazel and birch at the beginning of zone V. In zone VI birch decreased in importance with the spread of elm, cak, alder and lime, but pine and hazel still dominated the woodland. Mesolithic hunters in the Trent basin would have found pine-covered heathlands on the sand and gravel terraces of the Trent and on the adjacent sandstone areas, whilst hazel would have grown in the damper spots and on the clay soils with oak and alder. On the gritstone hills of the southern Pennines, as elsewhere on the Pennines, pine, with hazel and oak on the lower slopes and increasing birch on the higher ground, would have formed on open woodland. This would have thinned out and become more scrub-like at the highest levels, with a luxuriant fern growth beneath the trees.<sup>59</sup>

The upper limit of the tree growth would have been about 1,600-1,700 ft. if the tree stumps beneath the peat are used as a guide, but scrub would have spread to higher levels, especially in sheltered places. The general distribution of Mesolithic sites in the southern Pennines is between 1,200 and 1,600 ft.,

55 Moore, 101-2.

<sup>54</sup> Woodhead, 17-9.

<sup>56</sup> Godwin, History of British Flora, 1956, 328, Fig. 112.

<sup>57</sup> Harrogate Museum. Davies, 68-9. <sup>58</sup> Godwin, 52, 326. <sup>59</sup> Walker, 23.

in what would have been the upper zone of open woodland. On the limestone of the Peak and north-east Derbyshire, elm would have flourished, but in the former area tree growth would have been limited in areas with thin soils. The dryness of the limestone and sandstone areas like Sherwood Forest would have confined animal and human activities to the places where water was readily obtained.

The Atlantic Period began about 5,000 B.C.; it was a time of increasing wetness, as is shown by the development of raised bogs and the initiation of blanket bogs.<sup>60</sup> In the Lower Trent basin at Hatfield Moors,<sup>61</sup> raised bog started to replace the pine heathland of the Boreal, and oak, elm and birch increased in the district at the expense of pine and birch. On the high, wet summits of Edale Moor and Bleaklow, blanket bog started to grow at the Boreal/Atlantic transition and later spread to lower levels, with cotton grass bog replacing woodland down to 1,200 ft.<sup>62</sup> The pine decreased and its place was taken by alder and oak, which also gradually pushed out the hazel scrub. The limestone areas were not affected by bog growth because of better drainage and an alkaline soil. Elm would have spread and flourished in such areas of calcareous soil during the Atlantic Period, but in the Peak the tree-line might also have been depressed by the action of the wind.

The total effect of this change to the Atlantic Period climate was to replace the open pine woodland at the highest and lowest levels by bog and by a denser wetter woodland between these extremes. On the southern Pennines, the open attractive Boreal woodland was replaced over many hundreds of square miles by bleak uninviting blanket bog, attractive neither to man nor to the animals he pursued for his livelihood. The disappearance of this extensive hunting-ground, and the increased woodland at lower levels, would have made hunting more difficult, and the decline of hazel would have reduced this convenient source of food. These factors together must have had a depressing effect on the living pattern of the Mesolithic peoples.

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- 60 Godwin, 52, 330-1. 61 Smith, New Phytologist, 58 (1958), 21.
- 62 Conway, 138-9.