

Prehistoric Settlement in the Tarragona Region of North-East Spain: Results from the Ager Tarraconensis Survey

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BACKGROUND

Between 1985 and 1990 a field survey project - the *Ager Tarraconensis* Survey - examined the landscape in the hinterland of the Roman city of Tarraco with the objective of investigating the impact of a Roman provincial capital on its surroundings. The principal results of this survey are published elsewhere and are based primarily on analyses of ceramics collected from the fields (Carreté *et al.* 1995). During the course of this survey lithic artefacts were also collected. Since they provide valuable evidence of human exploitation in the prehistoric period, but were of marginal relevance to the understanding of the classical landscape, the decision was made to present their study separately in this paper.

The survey area lies on the Mediterranean coast of Spain in Catalunya approximately 100km south-west of Barcelona (Fig. 1). The modern town is the capital of its province and lies in a rich agricultural area. The topography of the region is dominated by the Serrelada Pre-litoral which separates the broad coastal plain from the Depressió Central around Lleida. These mountains rise to 1201m c. 35km to the north-west of Tarragona. The chain is cut by a gorge of the river Francolí at Estret de la Riba due north of Tarragona which provides a key natural routeway to the interior. The survey area lies between the coast and the foothills of the mountains and is drained by two north-south flowing rivers, the Francolí and the Gaià (or Gaya - Fig. 2). The land generally slopes gently from the mountains towards the coast with the maximum elevation in the survey area reaching about 300m above sea level in Transect 4, to the north of Valls. In the eastern part of the area the landscape is dominated by a plateau bounded to the east by the comparatively narrow valley of the Gaià and its small tributaries. The plateau narrows to a ridge which meets the sea at Tarragona, where the Roman town is situated. To the east of Tarragona there is thus little land below 100m, although the coastal plain widens again towards Torredembarra. By contrast, in the western part of the survey area the river Francolí flows through a broad plain, the Depressió Valls-Reus, to the south of Valls. The drainage system of the Francolí includes a series of seasonal streams (barrancs) which drain both the mountains to the

north-west and the plateau to the east. Despite its size, the course of the Francolí is comparatively stable as witnessed by the known Roman sites which lie immediately beside it on the first terrace. Further details of the survey area, including its soils and climate, can be found in Carreté *et al.* (1995, 39-44).

RESEARCH DESIGN

Full details of the survey methods are published elsewhere (Carreté *et al.* 1995); the approach is outlined here to provide the background for the interpretation of the lithic finds.

Collection Methods

The area chosen for the survey is shown on Figure 2. Since it would have been impractical to cover the whole region at any reasonable level of intensity within a five-year project, the decision was taken to examine 1km wide sample transects across the landscape. This design provided relatively good coverage of a variety of landscape types, geological deposits and soils within the survey area as well as providing sections across the valleys of the Francolí and Gaià in their different reaches. Within these transects we visited each area and attempted to walk any field which was available and had sufficient soil visibility. This included not only ploughed fields but those which had thin stubble, sparse *maqui* or tree crops on them. Access to areas was not uniformly easy because of different types of land use (including modern settlement and industry, areas of dense *maqui* and forest), and farmers unwilling to permit us entry. Out of the total of 53.7km² encompassed by the transects we were eventually able to walk a total of 11.32km² representing a 21.07% sample.

Each field examined was given a reference number and its boundaries marked on overlays to 1:5,000 maps. These overlays were also annotated with details of any particular concentrations of material noted in the fields. In this paper the transect numbers 1 to 4 and their subdivisions are used both for description in the text and for reference to the illustrations (see Fig. 2). Detailed topographical maps showing the field numbers are published in Carreté *et al.* 1995.

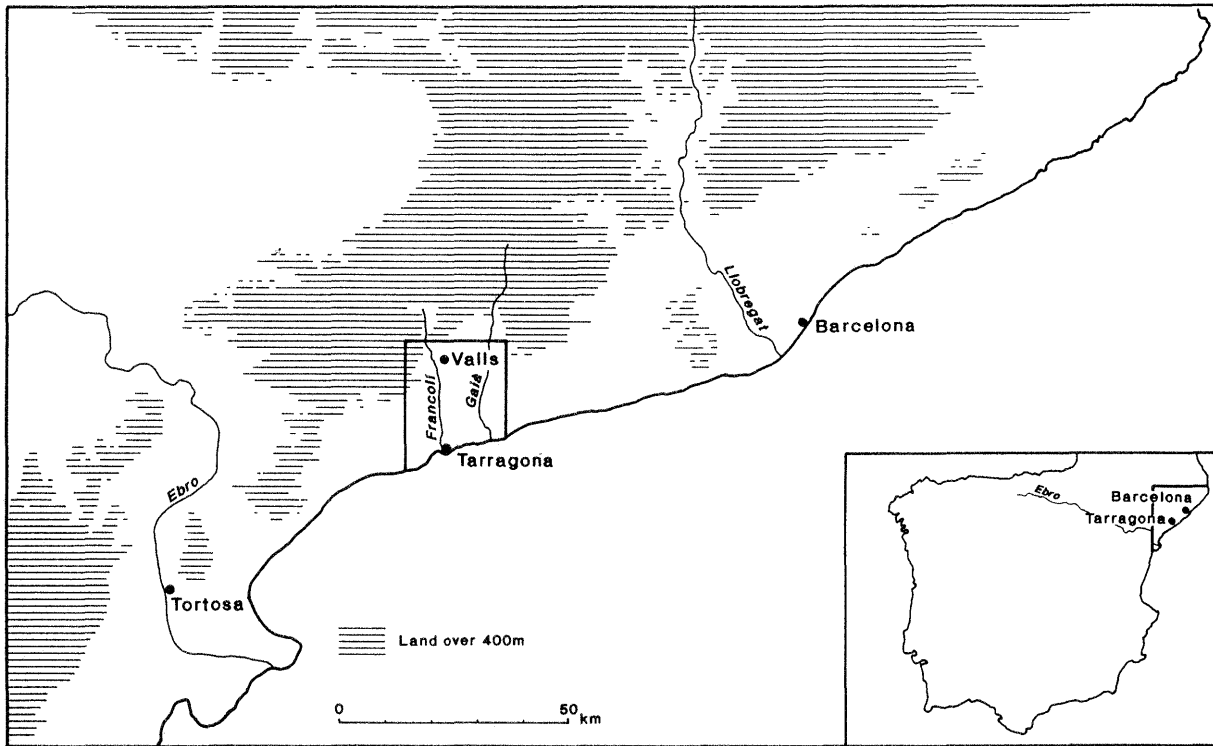


Fig. 1. Map showing the location of the survey area in north-east Spain

The present agricultural fields were used as the basic units for the collection of finds during fieldwalking. Where fields were exceptionally large and could be readily subdivided by features identifiable on the maps this was done. Each field was walked in lines by the individual walkers who were spaced at approximately 5m intervals. It is estimated that this achieved coverage of between 40-50% of field surfaces. The finds from each field were gathered into a single bag, marked with the field number. As most of the fields within the area walked were relatively small (with an average area of 1.04 ha) this level of resolution was felt to be reasonable.

PREVIOUS WORK

Until the present survey, our understanding of the prehistory of the area was based largely on individual findspots resulting from either extensive collection or the excavation of individual sites. For instance, a variety of prehistoric settlement types had been investigated through excavation and, for the Neolithic, a large number of funerary monuments were known (Ripoll Perello and Llongueras Campana 1963). Although useful in providing a chronological framework, as well as information about seasonality and site location, little could be understood from this evidence of the scale and intensity of human activity, or the full range of human behaviour represented.

More helpful in this respect have been general surveys of the region presented for the Middle Palaeolithic (Ripoll Perello and de Lumley 1965) and Neolithic periods (Ripoll Perello and Llongueras Campana 1963; Munoz Amilibia 1965), and survey work by Vilaseca in the vicinity of Reus (1936; 1971; 1973).

ANALYSIS

Against this background lithic analysis was an important subsidiary aspect of the *Ager Tarraconensis* survey. Lithic distributions could potentially prove useful in determining the location and intensity of various types of past human activity in the survey area. Although not designed with them in mind, the transect approach adopted, sampling various topographical, geological and pedological zones, was appropriate to the types of question asked for earlier periods (*cf.* Clapham 1932; Hasel 1938). Lithic artefacts were thus collected within the framework outlined above. Although the field team changed from year to year, the number of individuals competent in flint recognition remained constant, ranging between 30-50% over the five seasons. The figures presented in the following analysis are not therefore 'totals' in any sense, but do represent a consistent proportionate sample of the area walked.

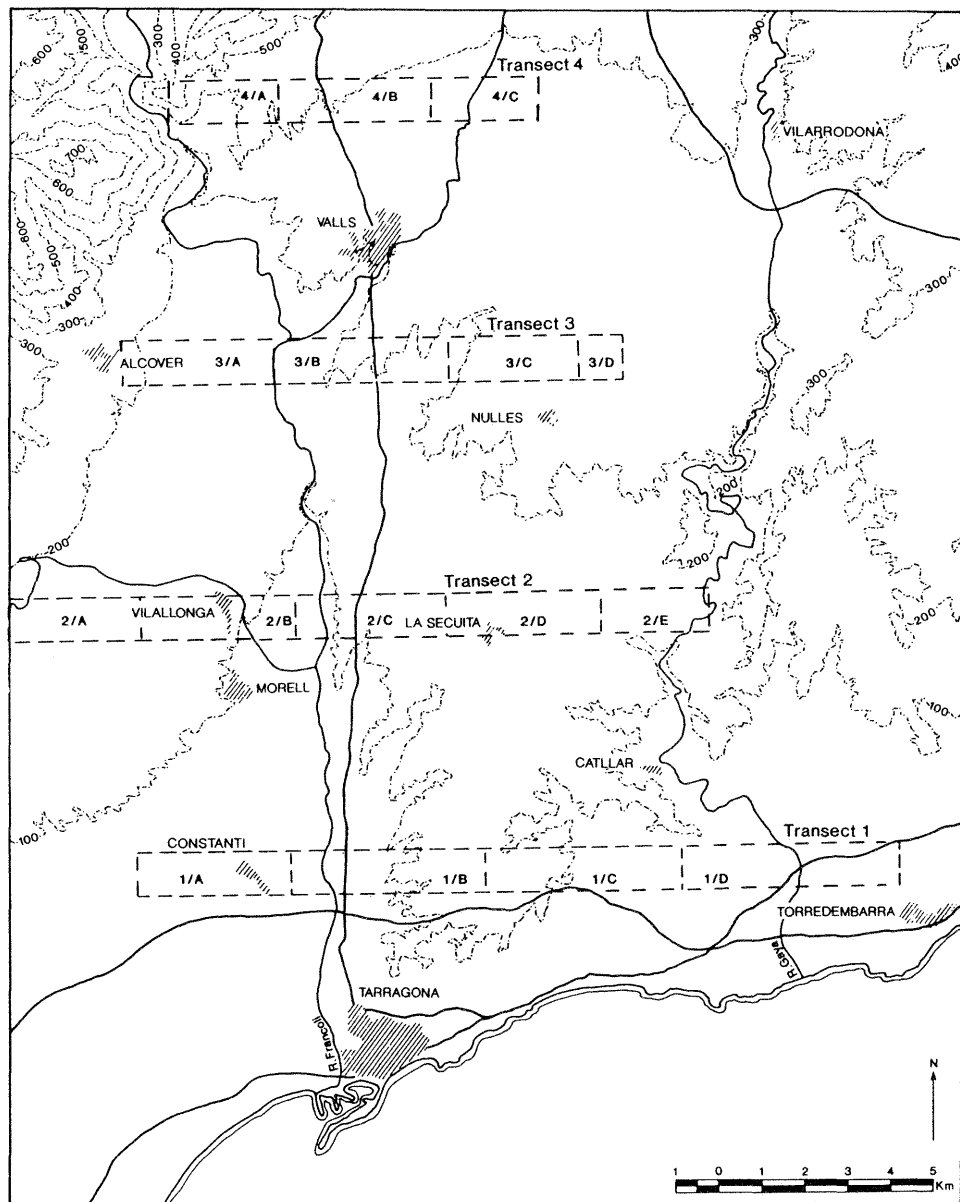


Fig. 2. Map of the survey area showing the layout and numbering of the transects

Following field collection, lithic artefacts were recorded according to a set of criteria reflecting:

1. The intensity of past human activity, expressed as the total number of lithic artefacts per field converted to a total per hectare;
2. the type of behaviour, expressed as the number of artefacts belonging to various functional groups within each collection unit. In line with some well documented ethnographic observations (eg Binford and Binford 1966) and experience elsewhere (eg

Schofield 1991a), scrapers for example were taken as reliable indicators of home-range behaviour, while arrowheads and axes were considered to reflect off-site activities connected with foraging and hunting. The core reduction sequence is expressed by the relative frequency of primary and tertiary waste material and the numbers of cores and core trimming flakes (this is discussed further below);

3. date, expressed as the number of diagnostic artefacts by collection unit.



Fig. 3. General view of the bed of the river Francoli at La Maso (photo: Schofield).

RESULTS

The artefacts

A total of 1277 lithic artefacts was recovered from 295 (28.8%) of the 1024¹ fields investigated; 729 fields (71.2%) contained no such artefacts. Of this total, 3.68% (47 pieces) of the artefacts were retouched while the percentage of waste materials was as follows²:

	No.	%
primary waste	30	2.35
secondary waste	233	18.24
tertiary waste	923	72.28
cores	59	4.62
core trimming flakes	32	2.51

Two results stand out: first, an apparently small number of artefacts were retouched (47 in all) of which 69.8% were found in the background scatter and not in concentrations; and second, 68.4% of all lithic artefacts occurred in concentrations. Taken

together, this correlation may be significant. If retouched material was taken as a feature more of on-site habitation than off-site activity, a higher percentage would be expected to occur within the concentrations. The absence of such a pattern suggests that certain activities were predominantly located off-site, something not previously identified in the region (eg by Vilaseca 1973). A further point of note is the low proportion of primary or cortical flakes within the collection (2.35%). The bulk of waste material is tertiary, representing the later stages of the reduction sequence. The distribution of cores is clustered within discrete areas associated with tertiary material, while only 28.6% of cores were recovered from concentrations, suggesting that the later stages of core reduction too were occurring away from habitation areas, probably as part of an embedded procurement strategy within the Francolí valley. Our lack of evidence for the first stage of the reduction sequence is discussed below.

In terms of source material, the lithic artefacts collected are variable, the raw materials including

basalt, quartz and flint, supporting Vilaseca's statement that within the region both clays, sandstones and conglomerates were used for stone tool manufacture (1973, 108). However, flint artefacts make up the bulk of the collection and range in colour from grey and black to translucent yellows and oranges. The cortex is of a light sandy nature, characteristic of gravel-derived flint.

Distance from source requires some consideration as this may be a factor in determining the size of the artefacts as well as providing clues to the nature of the settlement pattern. Examination of the Francolí gravels at La Maso produced heavily rolled nodules of variable size but uniform composition (Fig. 3). If the source of flint was on the Francolí gravels, lithic concentrations (defined below) would have been located up to 5km from this source. Given that fact, curation of existing artefacts within the community may in some cases have been preferable to the collection of fresh materials, and particularly so given the mobility of the communities concerned (see below). This, rather than a chronological explanation, may account for the generally small size of artefacts within the collection. Furthermore, common sense suggests that, under such a system, primary reduction would have taken place at source, prior to the removal of manageable lumps to settlement areas. The absence of primary waste in the source area is explained in terms of natural processes, specifically the river repeatedly scouring the valley floor following late summer storms.

Distribution

The distribution of artefacts within the survey area will be discussed by transect before a general interpretation is presented. For descriptive purposes it was necessary to establish a density scale in order to distinguish concentrations from the background scatter. The measures most frequently adopted for defining such scales are either the mean and standard deviations above and below it (eg Schofield 1991a), or the median and percentile values (eg pottery distributions in Carreté *et al.* 1995). However, as 71.2% of the fields contained no lithic artefacts neither method would have been appropriate. Thus six density levels were defined on the basis of artefact frequency by hectare:

Scale 1	0.1 - 3.0 lithic artefacts per hectare
Scale 2	3.1 - 6.0 lithic artefacts per hectare
Scale 3	6.1 - 9.0 lithic artefacts per hectare
Scale 4	9.1 - 12.0 lithic artefacts per hectare
Scale 5	12.1 - 15.0 lithic artefacts per hectare
Scale 6	>15.1 lithic artefacts per hectare

It should be stressed that with such a high percentage of fields producing no lithic artefacts, any occurrence is significant in terms of the total distribution. Many fields produced only a single artefact whilst the highest density recorded was 44 artefacts per hectare.

In addition to the mapping of densities, concentrations were also noted. These were defined as areas where a consistently high frequency of artefacts (>20 in total) was recovered from more than two adjacent fields. A total of 68.4% of lithic artefacts were recovered from the eight concentrations so defined. The lithic distributions and concentrations are shown on Figure 4 (Transect 1), Figure 5 (Transect 2), Figure 6 (Transect 3) and Figure 7 (Transect 4). The lithic attributes and locational characteristics of each concentration are presented in Table 1. The landscape of each transect is described in detail in Carreté *et al.* (1995, chapter 7).

Transect 1. Lithic finds were relatively few here compared to other parts of the survey area. Although no concentrations were identified, two areas contained a relatively high density of lithics within defined clusters (Fig. 4). Both were close to Constanti (Transect 1/A), one to the west-north-west, the other to the east. They were situated on the west bank of the Francolí in a prominent location just above the 50 m contour and on Quaternary deposits. Each was located during the 1986 season and together they yielded 83.7% of that year's lithic finds from only 8.3% of the fields walked. The two areas can be characterised by their relatively high densities, their locations, and the nature of their assemblages. Tertiary flakes predominated (59%) within the westerly scatter, while a large proportion of the artefacts were of small size. The total collection comprised 10.3% cores and core trimming flakes but no primary waste material was present. These characteristics suggest that prepared cores were imported, perhaps from the Francolí gravels to the east. These scatters either represent Mesolithic hunting camps or later occupation areas exploited for only a short time during seasonal migrations. This would fit the transhumance model suggested for the area from at least the Neolithic with origins possibly as far back as 28,000 BC. (Davidson 1976). This is discussed further below.

In addition to the surface collection, a Neolithic polished axe was brought to our attention by the land-owner at Mas Clara (Transect 1/C field 272). This may represent part of what is believed to be a general pattern of off-site exploitation of the uplands during the Neolithic period.

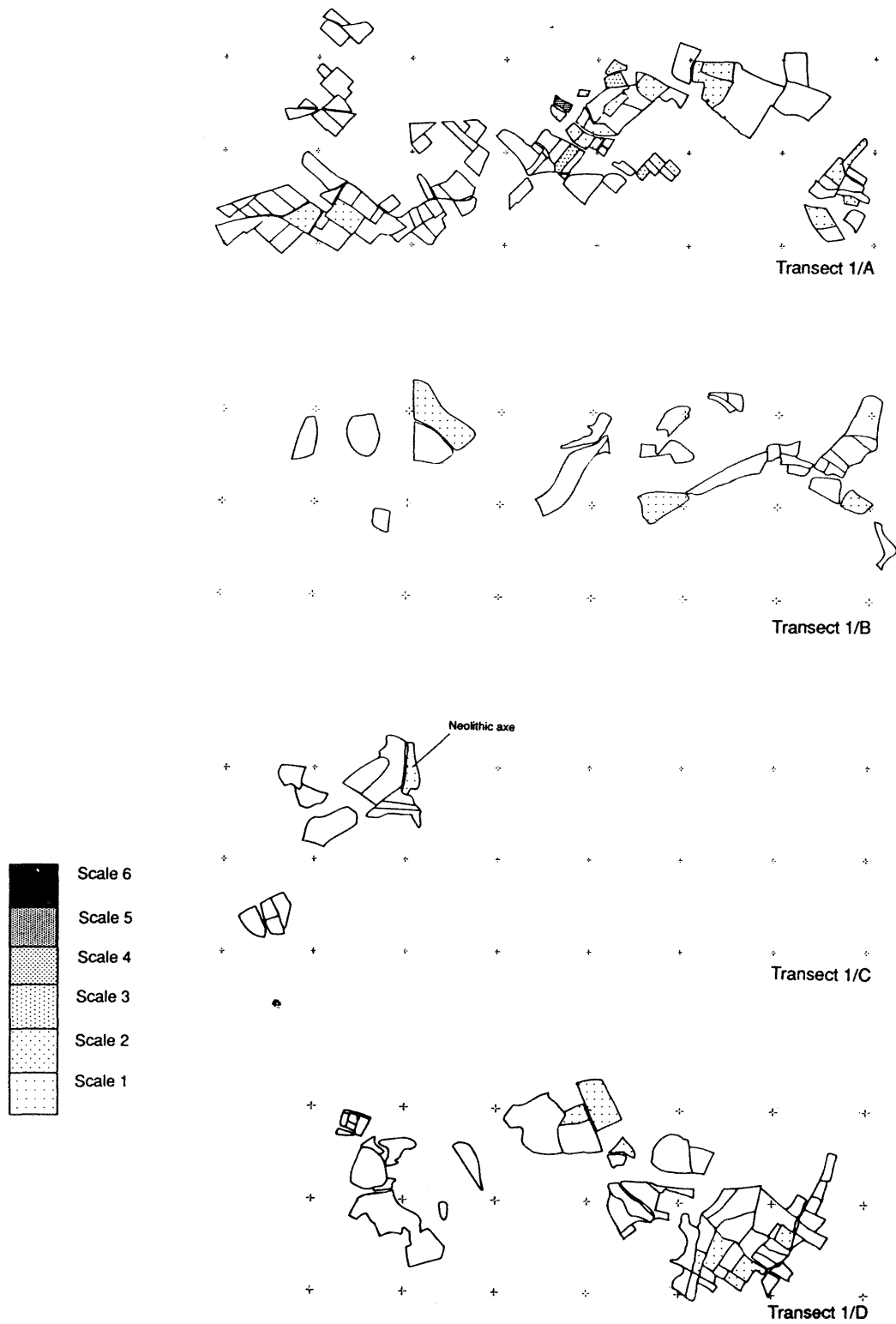


Fig. 4. Distribution of lithic artefacts in Transect 1 (for density scales see text and drawn key)

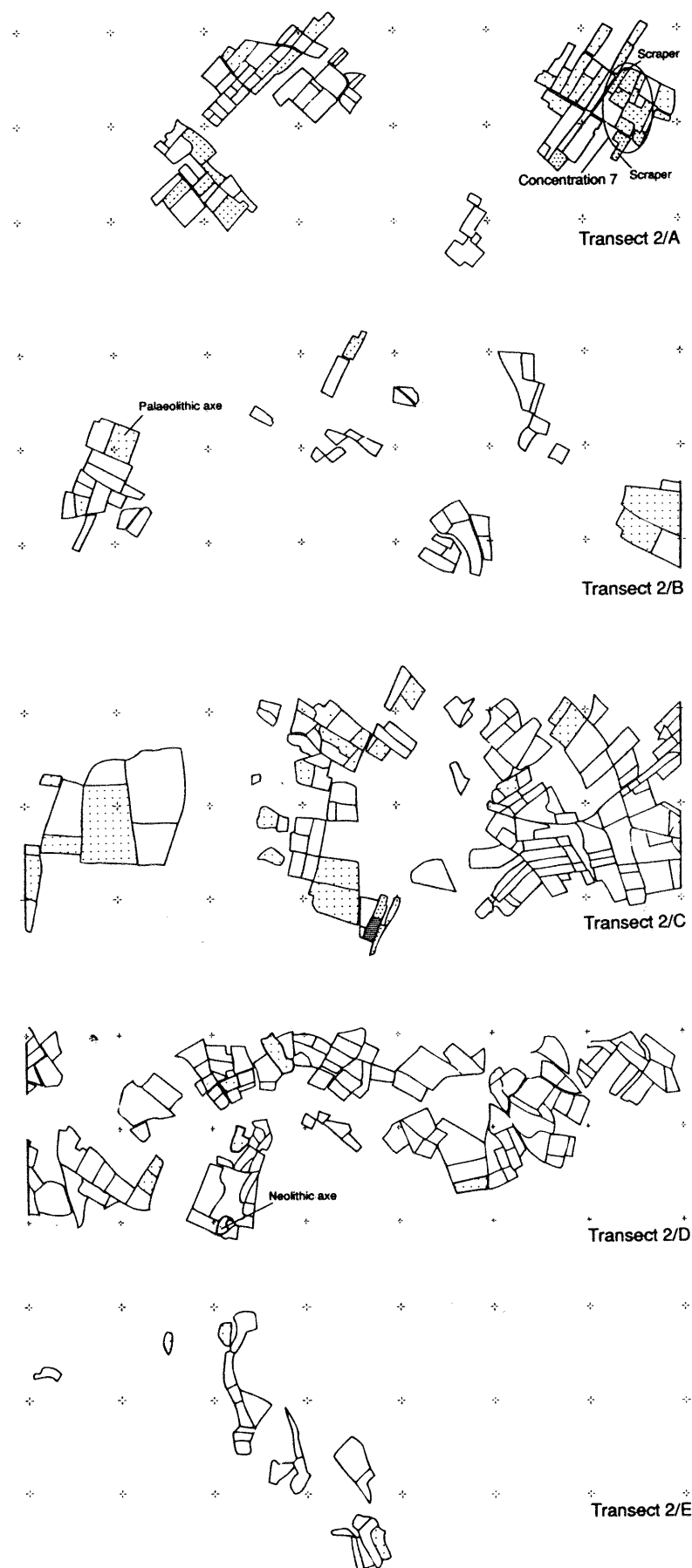


Fig. 5. Distribution of lithic artefacts in Transect 2 (for density scales see text and drawn key on fig.4)

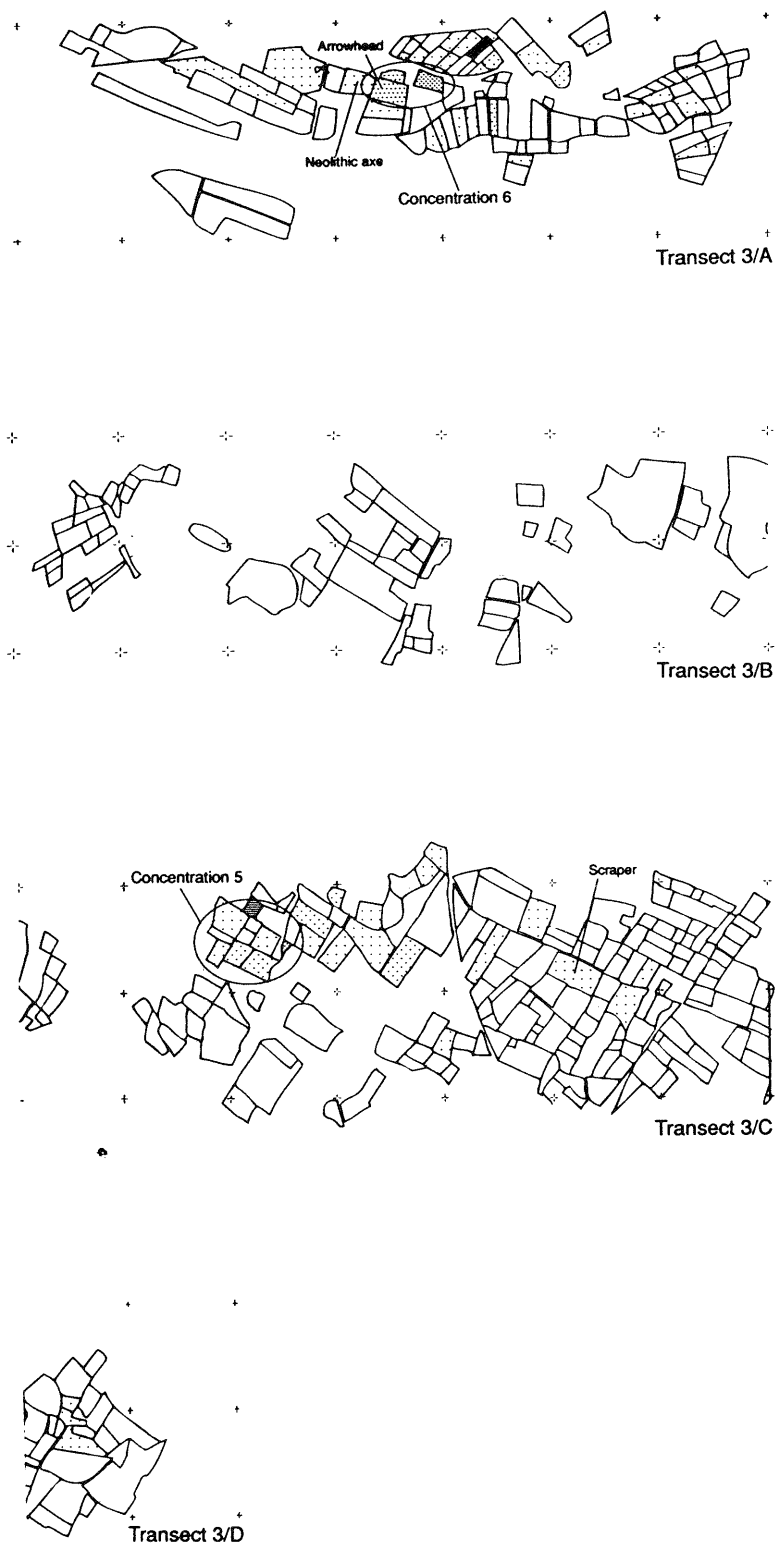


Fig. 6. Distribution of lithic artefacts in Transect 3 (for density scales see text and drawn key on fig.4)

Conc. number	Transect number	Field numbers	No of flints	Percent retouch	Percent cores	Percent primary flakes	Percent tertiary flakes	Topog (height range m)	Geology	Aspect
C1	4A	1013 1014 1015	22	0	0	0	90.9	258-262	Carboniferous, slates, andesites sandst. & congloms	steep sided
C2	4A	999 1002 1005-1011	32	0	6.3	9.4	71.9	280-323	Carboniferous, slates, andesite sandst. & congloms	S facing
C3	4B	903-905 922 923	54	1.9	7.4	1.9	79.6	290-317	Quaternary, angular, poorly sorted congloms	SE facing
C4a	4B	933-946	87	4.6	3.5	1.2	82.8	268-288	Quaternary, angular, poorly sorted congloms	S facing
C4b	4B	947-956	156	1.9	2.6	1.9	86.5	270-296	Quaternary, angular, poorly sorted congloms	S facing
C4c	4B	957-968 970-975	360	2.5	3.3	2.9	81.7	265-290	Quaternary, angular, poorly sorted congloms	S facing
C5	3C	429 437 439-444	29	0	3.5	3.5	58.6	190-215	Quaternary, crusts and silts	NW facing
C6	3A	1174 1176 1177	26	15.4	11.5	0	69.2	163-168	Quaternary, angular, poorly sorted congloms	level ground
C7	2A	1210 1217-1226 1228 1229	33	15.2	6.1	0	75.8	146-157	Quaternary, angular, poorly sorted congloms	E facing
C8	4B	866 878 976-978	29	3.5	3.5	0	93.1	290-296	Quaternary, angular, poorly sorted congloms	S facing

Table 1. Analysis of lithic concentrations within the survey area. Field numbers listed here can be identified in the maps contained in Chapter 6 of Carreté et al. (1995).

Transect 2. The distribution is characterised by a single concentration - Concentration 7 - at the west end (Transect 2/A) and a number of lower density scatters elsewhere. This transect also produced three of the four Palaeolithic artefacts to be recovered from the survey (Fig. 5), two of which were found in Concentration 7.

Concentration 7 was set on an east-facing slope 1km south of the Riera de la Selva, a tributary flowing east into the Francolí. It measured 400m east-west by 550m north-south and contained a relatively high percentage of retouched artefacts including a scraper. Two cores were recovered but no primary

waste. Within the concentration were two Palaeolithic artefacts: a flake and part of an axe. The flake was broken and believed to be of Palaeolithic date in view of the degree of abrasion and the technological similarity between it and the other Palaeolithic artefacts recovered both in the survey and previously (Ripoll Perello and de Lumley 1965). The axe fragment represented part of a Mousterian hand-axe manufactured from a locally occurring grey/brown metamorphosed limestone. Although Concentration 7 seemed discrete, it appears to be the focus of a wider low density scatter which extended for a further 400m westwards and contained a further scraper and cores.

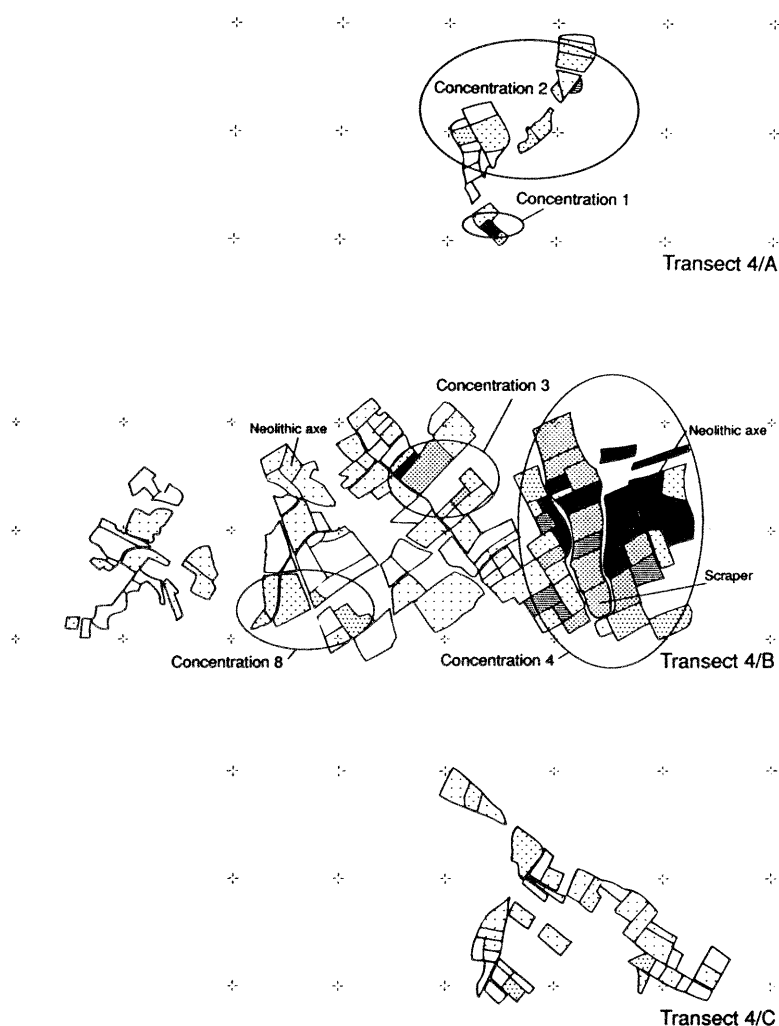


Fig. 7. Distribution of lithic artefacts in Transect 4 (for density scales see text and drawn key on fig. 4)

Concentration 7 and its associated scatter probably represented a temporary camp visited periodically by mobile groups, certainly during the Middle Palaeolithic period and probably into the Mesolithic. A further scatter 1 km to the west (also in Transect 2/A) was similar, characterised by a low density distribution with isolated retouched artefacts, scrapers and cores.

For about 3.5km east of Concentration 7 down the slope across the Riera de la Selva, virtually no lithic artefacts were recovered despite the high intensity of survey coverage. The only find of note was a third Middle Palaeolithic axe, also manufactured from local metamorphosed limestone. This appears to confirm the area's importance for Middle Palaeolithic off-site activity.

To the east, the Francolí floodplain produced a low density and highly dispersed lithic distribution. Most isolated finds were of waste material, representing the latter stages of core reduction and no evidence for primary reduction was recovered. There was, however, one example of an isolated core and a single small cluster located immediately east of the N-240 road at Mas dels Quarts (Transect 2/C fields 756-63). This produced sixteen artefacts including two cores and a scraper.

On the eastern terrace of the Francolí, finds were even more widely dispersed, with only nine lithic artefacts from a 3km stretch, despite the high number of fields walked. All but one of the artefacts represent waste material; the exception is the butt of a Neolithic polished axe manufactured from basalt. Its location,

on high ground immediately west of La Secuita (Transect 2/D field 526), is of interest and may serve to explain the highly dispersed settlement and land use suggested by the surface collection results. As has been suggested for the chalk downland of southern England (Schofield 1991b), the distribution of axes and arrowheads will reflect extractive off-site activities in the Neolithic. These artefacts are the

archaeological manifestation of hunting and woodland management or clearance and consequently occur as a dispersed distribution in the previously wooded areas between settlement zones. The occurrence of these diagnostic artefact classes with low density spreads of other broadly contemporary artefacts further reflects this.



Fig. 8. View of the barranc, and its wider physical setting, where it crosses the area identified as Concentration 4 (photo: Schofield)

Transect 3. The distribution in Transect 3 contained a few higher density scatters and concentrations set against a low density background (Fig. 6). At the west end of the transect Concentration 6 (Transect 3/A) and an isolated high density scatter to its north-east were found in close proximity together within a low density background scatter covering an area roughly 600 m sq. Both Concentration 6 and the high density scatter were located on level ground adjacent to a seasonal stream, the Torrent de Font Major, which runs east into the Francolí. Significantly Concentration 6 contained a higher percentage of retouched material than any other in the survey area (15.4%), a higher percentage of cores (11.5%), and a higher percentage of scrapers (7.7%). Of the retouched material one artefact was a barbed and tanged arrowhead of Bronze Age date, while immediately to the west of the concentration, the butt end of a Neolithic polished axe, manufactured from local ironstone basalt, was found.

Most of the background scatter comprised unretouched tertiary waste material which probably represents the off-site curation of existing artefacts. The few higher density peaks within that distribution may represent what Bogucki refers to as 'grazing stops' (1987, 6) or temporary camps, depending on their date. These have rarely been identified through surface collection or regional survey largely because their archaeological correlates have not been clearly defined. Although generally this remains the case, in view of the differences in density exhibited within this small area of the Francolí valley, it can be suggested that both the home-bases and their off-site associations have been recognised.

Immediately east of the Francolí (Transect 3/B) two fields produced three artefacts in an otherwise blank area. One of these was retouched and again suggests off-site foraging and exploitation of the valley bottom.

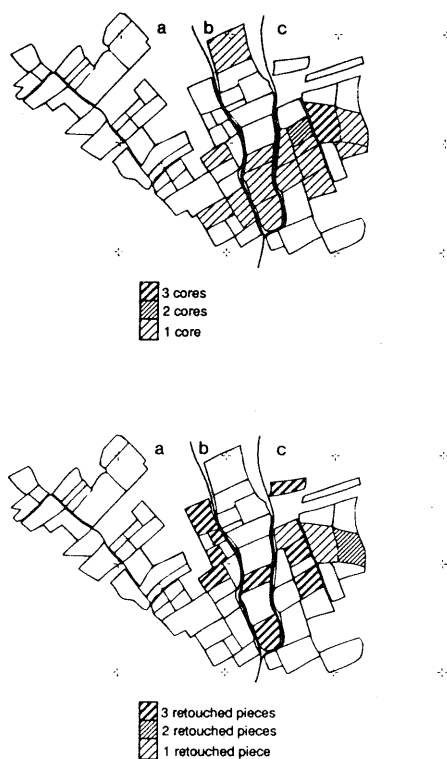


Fig. 9. Distribution of lithic artefacts in Concentration 4 in Transect 4: a) retouched artefacts; b) cores

A further 4km east at Bella Vista (Transect 3/C), set on the crest of an area of higher ground sloping west to the Riera de Vallmoll, is Concentration 5 with a wider distribution spreading east from it. As at Constanti, the majority of lithic artefacts from the 1987 season (72.1%) came from the fields in this concentration (9.0% of the fields investigated that year). Concentration 5 affords comparison with Concentrations 1 and 2 in Transect 4 to the north (described below). It contained a similar number of artefacts and no retouched material. All three had similar locations in prominent positions overlooking tributaries of the Francolí. In the case of Concentration 5, two points can be made about its immediate environs. First, although the concentration itself produced only one core in a total of twenty-nine artefacts (3.45%), the surrounding scatter contained nine cores out of thirty-nine artefacts (25.71%). This clearly represents a difference in emphasis between the concentration (at a prominent location) and the surrounding scatter (on level ground set back from the terrace edge) and again suggests that key tasks were occurring off-site. All that was apparently happening on-site was that people were 'living'; no clear indication of the types of activities has been identified. Second, a Middle Palaeolithic scraper was recovered from this area. This was manufactured from metamorphic rock, again of local origin, and appears broadly contemporary with other finds described so far. According to Ripoll Perello and de Lumley (1965), scrapers predominate in Middle Palaeolithic assemblages in the region, a high percentage occurring for example at La Bobila Sugranes de Reus. *Transect 4.* This transect provides an interesting contrast to the others both topographically and archaeologically (Fig. 7). The land here is at a higher altitude to that in the rest of the survey area and the relief is more pronounced, especially in the west (Transect 4/A). The area is also characterized by more frequent seasonal streams or torrents which flow north to south, joining tributaries and eventually converging on the Francolí (Fig. 8). These streams appear to have had a considerable influence on the distribution of past human activity within this area.

The density and overall distribution of lithic artefacts was far greater in Transect 4 than in any other transect. Of the 155 fields investigated in this transect, only 36 (23.2%) failed to produce lithics, while 39 (25.2%) had a density of greater than 9.1 artefacts per hectare. In addition to a widespread, near continuous off-site scatter, five main concentrations occurred in this transect (one sub-divided into three).

Concentrations 1 and 2 (Transect 4/A) have already been briefly mentioned. Concentration 1 was located on the side of a steep-sided valley adjacent to the Riera de les Guixeres and with restricted views

down the Francolí valley. No retouched artefacts were found here and the concentration comprised almost entirely of tertiary waste material. Concentration 2 was set on a south-facing slope a short distance to the north and, with the exception of two Mesolithic-style blade cores, had a similar composition to Concentration 1. Such areas, between and at the convergence of streams, are typical of Mesolithic site-locations, whether they were used for seasonal occupation or for off-site activity monitoring mobile resources within the valley below.

Further east, in the area south and east of Masmolets (Transect 4/B), three concentrations and an extensive off-site scatter were located. Concentration 8, set on a gentle south-facing slope 500m east of the Riera Torrent del Serraller, produced 29 artefacts including a single retouched piece and a core. There was no primary waste material and the bulk of the collection was tertiary. Its composition was similar to that of Concentration 3 to the north-east, although the overall frequencies were greater; four cores were found here as well as a retouched item and a primary flake.

The largest concentration, both in area and artefact frequency, was Concentration 4 (divided below into 4a, b and c). This produced 603 lithic artefacts in 43 fields (mean number of 14.02 per field) set on a gentle south-facing slope and divided into three discrete sections by seasonal streams or barrancs (Fig. 8). By dividing the concentration, a number of differences emerge in the composition of the assemblages (Fig. 9). For example, in Concentration 4a, 4.6% of the artefacts are retouched as opposed to 2.0% in 4c and 1.9% in 4b. Similarly cores are more frequent in Concentrations 4a and 4c than they are in 4b. Spatial patterning was also revealed. Scale 6 scatters, for example, tend to cluster along the edges of barrancs except at the southern end of the area which may have been inaccessible during flood. The concentration also displays evidence for the presence of activity areas. Figure 9 shows the distribution of cores and retouched artefacts within the concentration. One field in Concentration 4c has the highest number of retouched artefacts with their density gradually declining westwards, while an adjacent field has the highest number of cores, the frequency here declining to the east and west.

Concentration 4 appears to represent an occupation area used repeatedly over many years, perhaps for more permanent settlement. This is supported both by the relative frequency of scrapers and the total density of artefacts. An indication of date is provided by two diagnostic artefacts, one a possible arrowhead, another a Neolithic axe fragment (the only one from the survey to be found within a concentration). A blade core was also found

suggesting Mesolithic activity within the area.

The background scatter, which in this transect tends to fill the spaces between concentrations, contained mostly single items of waste material. Variations in density occurred only to the east in the form of small higher density peaks in the distribution without variations in composition.

Transect 4 therefore provided both a significantly higher density of lithic artefacts than elsewhere in the survey area and a more extensive overall distribution. It remains now to consider this in relation to the other transects and to offer interpretations of the settlement and land use strategies in the prehistoric period.

INTERPRETATION

The pattern to emerge, therefore, is one of high density and the widespread occurrence of lithic artefacts on higher ground in Transect 4 with discrete localized concentrations and areas of off-site activity further south. The most dispersed activity was in Transect 1 closest to the coast. This pattern can be interpreted in a number of ways. One possibility is that the pattern is the product of the many natural processes working within the valley system. On the whole this appears unlikely, however, as low density clusters and individual findspots occurred in most parts of the survey area irrespective of geology or topography. The only area which appears to have suffered in this way is the valley floor. Here torrents will have scoured the surface, removing traces of prehistoric occupation such as evidence of the primary working areas where nodules were located and reduced prior to transportation.

Assuming then that the distribution of prehistoric material does reflect with some accuracy the nature of past human behaviour, the following general observations can be made:

1. The distribution of diagnostic artefacts suggests that much of the area was being exploited between the Middle Palaeolithic and the Bronze Age. The majority of diagnostic artefacts were found away from concentrations and not within them and this may reflect the types of activity they represent. Axes and arrowheads, for example, are extractive tools used almost entirely off-site within the extended territory which surrounded the occupation areas. Such items should occur less frequently on occupation sites where their presence will result more from loss or breakage within the domestic context. Much of the survey area also produced evidence for off-site behaviour in the form of retouched artefacts and cores occurring away from concentrations.
2. These off-site scatters tend to encircle and enclose concentrations. This is consistent with the model of

human behaviour devised by Foley (1981) in which the home-range is characterised by high artefact density (generated over time through accumulation and repetition), and the secondary and occasional home-range by loss, discard and waste resulting from certain types of specialised activity (Foley 1981, 5).

One interpretation for this evidence, and that favoured here, would be to regard it in terms of population mobility perhaps comparable in form - if not scale - to transhumance systems described in the area early this century (Fribourg 1910; Higgs 1976; Davidson 1976, 1980; Chapman 1979; Guilaine *et al.* 1982). In terms of the points made by Cribb (1991) in his review of evidence for nomads in the archaeological record, Concentration 4 may be a focus for summer occupation, with its large area of settlement resulting from years of repeated occupation in a favoured spot adjacent to the barrancs which linked higher pasture with the lowlands. The wider distribution of discrete and more ephemeral concentrations nearer the coast would, in these terms, represent winter occupation. Some of these concentrations probably represent Mesolithic or earlier human activity, though the majority are regarded as being of later prehistoric date. The acquisition of lithics for tool manufacture was embedded within this general pattern of mobility, a strategy made easier by the fact that a dry valley within which flint occurred as a raw material would have made an ideal route for transhumant groups to follow in the summer months.

In conclusion, therefore, the general distribution of human behaviour within the survey area supports that of Lourdes Montes Ramirez (1984, 87), that in north-east Spain, the key factor in settlement location was accessibility, both between and within valley systems, a point generally characteristic of nomadic groups. It is perhaps not surprising, on reflection, that our encounters with shepherds and flocks of sheep during the survey bore a strong correlation with the discovery of lithic concentrations.

Notes

¹Only those fields walked in 1986-90 are considered; the team walking in 1985 collected no flints.

²The core reduction sequence is divided here into five classes of lithic material. Another approach (adopted, for example by Brown 1991) is more refined, but includes artefact classes which may not be adequately represented in cases where collection bias has occurred. Core reduction is, by definition, both reductive and sequential so primary waste material (ie flakes with >50% cortex) will tend to reflect the early stages and tertiary waste (<1% cortex) the later stages of that process. This approach has previously been adopted for a field survey in the upper Meon valley, Hampshire, England (Schofield 1991b).

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