

Cantabria and vascongadas, 21,000-17,000 B.P.: Toward a solutrean settlement pattern.

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Introduction

Our knowledge of Paleolithic adaptations has been based principally on the study of artifacts and, increasingly, of faunal remains recovered from archeological deposits. There is, however, a third class of evidence which can provide valuable insights into the operation of past cultural systems: site location. In a little-known, pioneering work published in 1908, R. P. Lorenzo Sierra presented «Notas para el mapa paleontográfico de la Provincia de Santander» to the 1.er Congreso de Naturalistas Españoles in Zaragoza. Since those early days, Paleolithic prehistory turned increasing toward a focal emphasis on typology as the *sine qua non* of what was believed to be a developing scientific discipline. The meritorious practices of increasingly complete artifact retrieval, classification and statistical comparison have often had, however, the unfortunate effect of equating sites with artifact mines. The treatment (theoretically, if not practically) of archeological sites like paleontological localities in this sense utilizes only part of the information which sites can provide, no matter how meticulous and complete the recovery and recording methods used.

To balance the influence of the French school of «typological prehistory», recent years have seen the development of a British school of economic prehistory which places emphasis on faunal remains (and other evidence of subsistence activities), and on the geographical locations of sites within landscapes. A major technique of this school has

been «site-catchment analysis», developed by Higgs, Vita-Finzi and others to attempt assessment of the role of particular sites with regard to potentially exploitable resources located within fixed radii from the sites (see for example, Vita-Finzi and Higgs 1970). The model has been criticized for its rigidity, although provisions have been added to account for walking times in different types of terrain. More seriously, the model implies rather simple, single-minded procurement strategies on the part of mobile hunter-gatherer societies, and does not take into account the very likely possibility of elaborate «logistical strategies» with multi-purpose task «embedding» under certain environmental circumstances (see Binford 1978; n.d.). Despite its mechanistic weaknesses, however, the site catchment notion is useful because it focuses attention on the **roles** of sites as loci of human activities and occupation in relationship to surrounding terrain and potential resources of use in the maintenance of society and individual lives.

Not controlling their food supplies, Paleolithic groups could assure their existence through the development of strategies for the exploitation of regional resources. Given finite resources and a growing human population (see Straus 1977; Cohen 1977), Upper Paleolithic groups, such as those of the Solutrean period (c.21,000-17,000B.P.) in north-coastal Spain (Cantabria - Vascongadas), developed elaborate compound technologies of stone, antler (? cordage and wood) for the procurement of an increasingly diversified spectrum of animals (including riverine, estuarine, littoral and marine species). Many sites contain indications of the use of mass hunting techniques (drives, surrounds) in

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the procurement of red deer (*Cervus elaphus*) and ibex (*Capra pyrenaica*). Small but consistent numbers of choppers and grinding stones in Solutrean collections may attest to increasing utilization of plant foods such as nuts, berries and roots. In addition to the technological developments, changes in the division of labor and in social organization are implied from the direct subsistence evidence. Under conditions of relatively high population density and highly variegated terrain, territorial organization and sophisticated activity scheduling would seem inevitable in order to assure adequate wild food supplies throughout the year. Hunting success depends on accurate information on resource location and condition; such information can be maximized and game can be successfully «managed» through a territorially-based distribution of hunters. Within territories individual families or bands may have foraged independently part of the year and yet congregated at established or opportune times to best take advantage of aggregated resources (by means of communal drives of animal herds, for example), to conduct ceremonies (initiation, fertility and hunting magic, etc.), to exchange mates, etc. The survival of Last Glacial hunter-gatherer groups could well have depended on their territorially-based cooperative abilities to exploit the full wild resources of well-known local environments. The precise placement of sites would have been part of the repertoire of adaptive skills possessed by these groups.

Given the mobility of the main Solutrean food resources —medium and large-size ungulates— (and variability in the condition and availability of these and other resources such as shellfish, fish, plants, etc.), hunter-gatherers had to respond through patterns of mobility of their own, both seasonally and circumstantially. In recent years various students of prehistoric Cantabria have suggested patterns of strategic site placement and transhumant movements between the coast and mountainous interior as key elements in the subsistence strategies of Upper Paleolithic - Mesolithic hunter - gatherers (Freeman 1973; Bailey 1973, n. d.; Straus 1975, 1976a, 1976b, 1977; Davidson 1976). (Notable concern for site location is also expressed, for example, by Altuna [1972], in his thesis).

Analyses at the sites of La Riera (Posada de Llanes, Asturias) conducted by Dr. J. Altuna and Dr. N. J. Shackleton, and El Juyo (Igollo de Camargo, Santander) by Dr. R. G. Klein, for example, are directed at attempting to determine the seasonality of long series of occupations of caves to test ideas concerning the yearly rounds of Upper Paleolithic-Mesolithic groups under varying environmental (and demographic?) conditions. At the moment, however, indications of Solutrean seasonality are most scanty and unreliable. What is required is a large number of similarly analyzed occupations from penecontemporaneous sites located at different elevations and in different topographic settings.

One set of data which is however available concerns the geographical location and topographic setting of 33 known Solutrean sites in the region, all but 2 of which have been visited by the author. Typical Solutrean artifacts from all but 7 can be found in Spanish museums and other institutions. Solutrean points are said, in various early publications, to have been found in the caves of Caranceja, Fuente del Francés, Bona, Haza, Mirón and Sel (=Cueva del Agua? =Cueva de la Peña?), and although the collections could not be located, these descriptions are, to varying degrees, taken as credible since Solutrean points are such distinctive diagnostics (see Straus [1975a] for details). A Solutrean point found in disturbed circumstances during the 1974 excavations at Rascaño (Mirones, Santander) **may** actually have come from the adjacent cave of Bona, which was apparently being dug at the same time as Rascaño by R. P. Sierra (see Straus n.d.). Various reports of Solutrean materials at Atxurra, Lezetziki and Lumentxa have been positively demonstrated to be erroneous (Straus 1975a). Distributed over an area some 350 km. long by about 30 km. wide, the 33 Solutrean sites, pertaining to a 4000 year period (Straus **et al.** 1978), can provide valuable locational information, adding to our knowledge of Solutrean settlement-subsistence systems.

Problems and Qualifications

Various problems must first be considered. First of all —as we are trying to con-

trol for at La Riera by detailed paleoclimatic reconstruction—is the problem of variable climatic conditions, since the Cantabrian Solutrean spanned at least the «Laugerie» Interstadial and the Würm IV stadial phase just prior to «Laugerie», as well as probably part of the last Würm III cold phase and the very beginning of the «Laugerie» Interstadial (Laville and Leroi-Gourhan personal communications and m. s.). In short, environmental conditions and, therefore, behavioral responses must have varied somewhat during even this relatively short period. Patterns of settlement and movement established under interstadial conditions would no doubt have been modified during stadials. Secondly, all the sites we know of are caves; all the open air Solutrean sites which no doubt once existed have been either deeply buried or destroyed by erosion. Over one hundred years of prospection in Cantabria have failed to locate a single one —not surprising in light of the steep gradients between the Cordillera and coast, substantial rainfall and vegetation. Thus we are obviously lacking a major source of information about Solutrean (and other) systems. This bias must be kept in mind, but should not stop us from making use of those data from caves —excellent sediment traps—which we do possess (see Straus 1979a). Clearly with only 33 sites, we are at any rate dealing with a rather small sample of what was once a large population of sites. It should be noted, however, that some of the sites have thick Solutrean deposits, indicating multiple deposits (at least 20 at La Riera, for example), whereas others seem to have had only one or a few brief occupations.

Thirdly, there is the serious theoretical problem of dealing with sites with no sure «fossil director» artifact types. In the absence of Solutrean points or other certain contradicting bits of evidence (other kinds of «fossil directors» such as harpoons, C^{14} dates, etc.), it is impossible oftentimes to know if mid-late Upper Paleolithic assemblages might be «Solutrean», such is the degree of coinpositional variability among collections of individual culture - stratigraphic units (see Straus 1975b, 1979b). Only the widespread application of chronometric dating techni-

ques can liberate us from the dangers and circularity of dating by artifacts. In any event, the notion of «archeological cultures» is at best only a heuristic classificatory device.

All **caveats** considered, the information presented in Table 1 nonetheless gives us an impression of where Solutrean hunter-gatherers chose to locate at least some of their sites.

Elements of the Solutrean Settlement Pattern

The sites have been grouped by river systems, as it is our belief that, logically, the major rivers of Cantabria provided the principal means of access between the coastal plain and interior (as they do today). The alignment of Solutrean sites along such systems is striking (see Figure 1). Such linear coast-Cordillera arrangements of sites are most clear in the cases of the Ríos Nalón, Sella (plus Ríos Cabras and Gueña), Saja-Besaya, Pas and Miera-Bahía de Santander. The four paired central Vizcayan sites (Santimamiñe and Atxeta, Atxuri and Bolinkoba), while not in the same drainage, are associated with valleys (Ria de Guernica - Rio Oca and Ibaizabal system) separated by a low (c. 200 m.) pass above Amorebieta. Given this patterning, it is easy to imagine other such alignments along the Ríos Deva (Asturias-Santander), Nansa, Asón, Deva (Guipúzcoa) and Urumea, where in each case the present sample of sites only includes 1-2, located either near the river mouth or well upstream.

It is difficult to speak of precise distances for various reasons, linear (air) distances are deceptive due to the variably accented terrain; so-called walking distances are subjective approximations, based on our careful yet personal scrutiny of 20th century 1:50,000 maps and knowledge of the landscape; hall distances to the coast (and elevations) would have varied somewhat depending on the extent (and fluctuation) of sea-level regression. Present estimates (assuming tectonic stability) made in other areas run the gamut from 85 m. to 130 m. or more for mull glacial conditions c. 18,000 B. P. (see

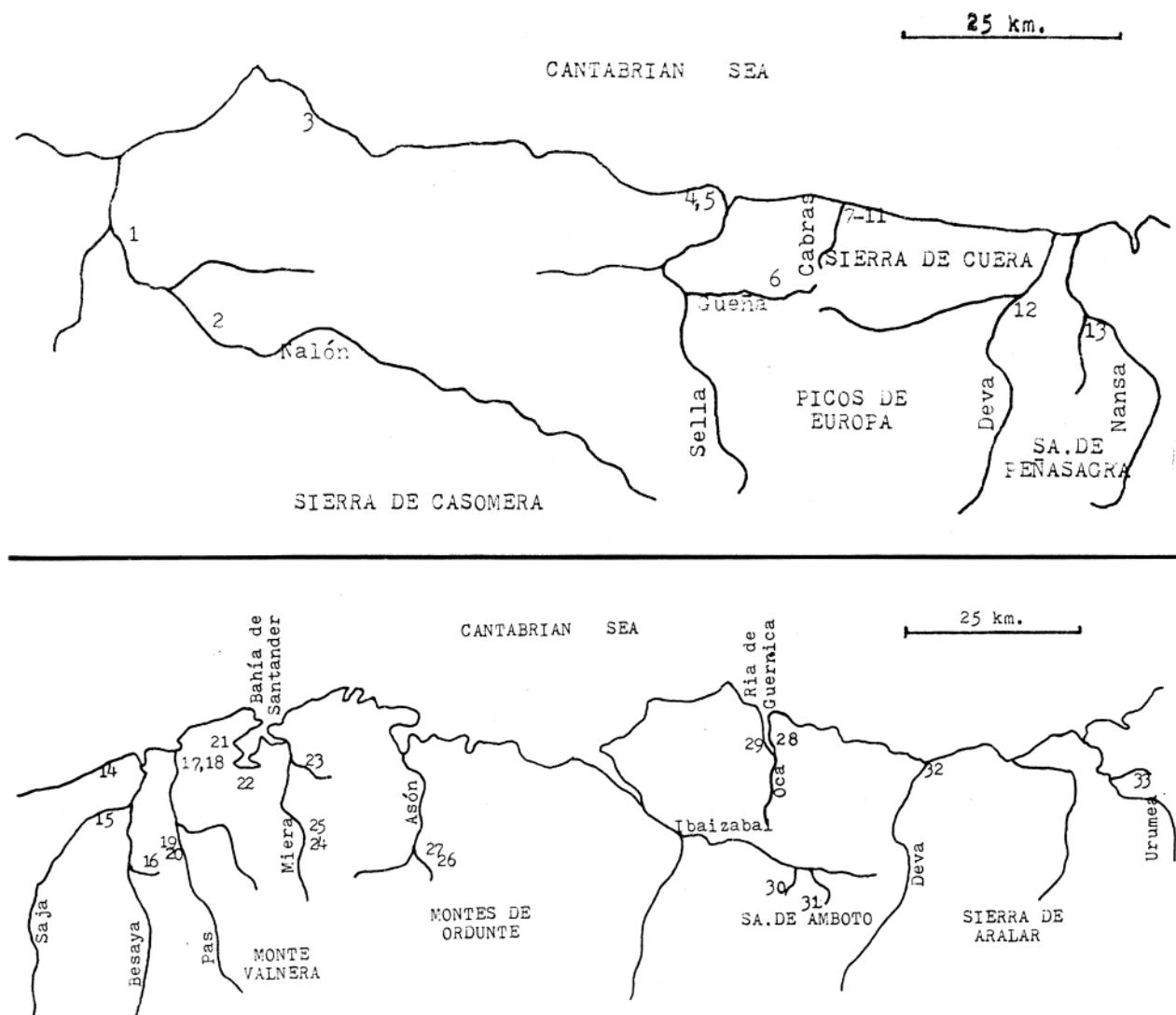


FIGURE 1.

1. Peña de Candamo.	9. La Riera.	18. El Pendo.	27. La Haza.
2. Las Caldas.	10. Tres Calabres.	19. Castillo.	28. Santimamiñe.
3. Cueva Oscura (Perlora).	11. Balmori.	20. La Pasiega.	29. Atxeta.
4. Cova Rosa.	12. Cueva del Sel.	21. Camargo.	30. Atxuri.
5. El Cierro.	13. Cueva Chufín.	22. Cueva Morín.	31. Bolinkoba.
6. El Buxu.	14. Altamira.	23. Fuente del Francés.	32. Ermittia.
7. Coberizas.	15. Peña de Caranceja.	24. El Salitre.	33. Aitzbitarte.
8. Cueto de la Mina	16. Hornos de la Peña.	25. Bona.	
	17. Cobalejos.	26. El Mirón.	

CLIMAP 1976). We have somewhat arbitrarily chosen the 100 m. isobath as a reasonable compromise, partly because it is marked on Spanish naval charts. Some sites have no doubt been lost to sea-level transgression, but in any event the Last Glacial coastline off Can-

tabria was close in distance (5-12 km.) and outline to that of today, unlike the case of the coast of Aquitaine c. 18,000 B. P. (see charts 127 & 128, Instituto Hidrográfico de la Marina, Cádiz).

Despite these interpretive difficulties, it is clear that Solutrean occupations were situated somewhat bimodally: near the present coast and near the footslopes of the Cordillera or Picos de Europa, both of which were locally glaciated at the time. There are, however, some sites which seem intermediate in location. These include, for example, Aitzbitarte, Cueva Morín and El Pendo. Generally, the near-coastal sites are at and surrounded by the lowest elevations, whereas the sites farthest from the shore (Bolinkoba, Atxuri, Haza, Mirón, Salitre, Bona, Castillo, Pasiega, Hornos, Chufín, Sel) are obviously in very high, mountainous areas. However the distances are so relatively short in all cases as to not require major treks in order to exploit very different habitats. There is no evidence of Solutrean occupation on the Meseta or in the Ebro Basin to the south of the Cordillera (with the dubious exception of Cuscobilo, Navarra), so movements seem to have been confined to the narrow strip represented by our sample. Limited contacts between this region and Pyrenean France are suggested by the presence of a few Cantabrian concave-base points in Basque and Pyrenean sites (see Straus 1978).

The coastal plain sites are usually located in very sheltered spots (dolinas, enclosed valleys or south-facing slopes of ridges, etc.). Orientations are almost uniformly toward the south and/or west. They are generally not exposed to sea winds. Many are low *vis à vis* local relief (eg. El Pendo, Cobalejos, El Cierro, the Posada sites, Fuente del Francés, etcétera), and are best lit in winter when the sun is low on the SW horizon (see Carballo 1960:23). A notable exception to these norms is Altamira: but in this case neither the form nor the precise orientation of the original cave mouth is known. The Llera sites around Posada de Llanes, the El Carmen sites near Ribadesella and the Santander Plain sites in particular, were chosen for their excellent sheltered locations and orientation. They are also located centrally on what would have then been even more extensive, largely open, rolling grasslands or heaths (with localized woods and thickets) -ideally situated for the exploitation of ungulates grazing on these pastures or taking shelter and browsing in

the small valley-side woodlands (when present). In addition, these sites would have been well-placed for the exploitation of littoral and estuarine resources, at most an hour's walk to the north, or for hunting caprids on nearby steep coastal ranges (especially in the case of Posada, with the Sierra de Ciera beginning at less than 2 km. from the sites). Shellfish gathering or mountain hunting expeditions from these central spots could easily monitor the location of other useful plant and animal resources, and gather raw materials (eg. flint and quartzite) **en route**. Finally, the coastal plain sites all have good avenues of access to the hinterlands via major river valleys or, at least, via low passes (as in the case of Posada, with the Cabras-Gueña pass at 390 m.). Insofar as it is possible to measure relative importance of sites (length, repetitiveness, multiplicity of activities among occupations, etc.) by such inadequate indicators as thickness and horizontal extent of deposits, size of **extant** artifact and faunal collections, etc., it seems safe to say that the major Solutrean occupations of Cantabria were all at near-coastal sites (Cueto de la Mina, La Riera, Altamira, Aitzbitarte). Even otherwise important interior sites such as Castillo had very thin Solutrean deposits and relatively small collections, generally speaking. This may suggest that the upland sites might have been used for specialized and/or short-term human occupations. A possible exception to this might be the unpublished site of Las Caldas, which is however in low country. There are, of course, sites in the coastal area which also suggest short, specialized occupations, perhaps as auxiliary stations to nearby sites of greater scale (eg. Caranceja near Altamira, Atxeta near Santimamiñe, Tres Calabres, Coberizas and Balmori near Cueto de la Mina and La Riera, El Cierro near Cova Rosa). Without very precise dating, naturally, these speculations will remain just that.

The other basic group of sites —generally in the interior not far from the Cordillera and at usually fairly high elevations—bear another set of characteristics. They do not seem to be as closely oriented with regard to favorable solar exposure, but they are usually situated so as to have excellent dominant views of valleys. Most of them are in high, exposed positions, surrendering comfort and

ease of access for strategic placement overlooking gorges, passes, box canyons, etc. Some combine a number of strategic features such as long-distance visibility along a major valley, dominance of a defile and proximity to a pass between two valley systems (eg. Castillo group, Atxuri, Bolinkoba). Sites with remarkable strategic views over wide areas include Peña de Candamo and Altamira (although the latter is near the coast). Many sites are associated with box canyons or small, steep-sided enclosed valleys off major valleys: Buxu, Las Caldas, Hornos de la Peña, Mirón, La Haza, Aitzbitarte. Others dominate deep, narrow gorges, sometimes at confluences of two or more valleys: Chufín, Carranceja, Bona, Salitre, Ermittia (the latter in steep, rugged country, but near the usually abrupt Guipúzcoan coast). All of these features would have been useful in spotting and hunting herd animals, perhaps by such techniques as communal drives and surrounds, making good use of natural traps and constrictions to the movement of game. Animals moving between high and low pasture, for example, could be driven from main valleys into side valleys, trapped (using moveable fences, nets, positioned hunters and other persons, etc.) and killed. Or they could be intercepted at gorges, especially in association with river crossings. With the views most of these sites afford, the human groups would have had advance warning of herd approach either by direct sighting or by signalling from monitoring parties.

Despite these clear strategic advantages, most of these sites are high, windy, cold and generally less protected than the coastal plain sites. They would have been far less tenable during Last Glacial winters than the low, sheltered sites, and may have been used for special purposes (base camps for hunting parties or actual hunting stands?) at various times by «expeditions» from the coast, or at least just seasonally (presumably in summer) by transhumant groups. While, because of the shortness of coast-mountains distances, the hypothesis of universal winter-summer transhumance may be overly simple, it deserves testing with biological indicators of seasonality. A combination of movements to the interior by full groups **and** by special task groups,

depending on climatic and «economic» conditions, on season and on anticipated objectives of each move, is suspected.

A final observation may be made preliminarily concerning the clear patterning of Solutrean-age sites in Cantabria. Most of the alignments or clusters of Solutrean sites include examples of cave art. The following caves with art representations are known to contain only Solutrean archeological deposits: Buxu, Candamo, Chufín, Haza and Pasiega (see Straus 1975a, 1974). The following art caves have Solutrean and other Upper Paleolithic deposits: Hornos de la Peña, Pendo, Morín (Oso), Altamira, Castillo, Salitre, Riera, Balmori, Cueto de la Mina, Coberizas, Cova Rosa, Santimamiñe and Atxuri (see González Echegaray 1978). Many other art localities without any known archeological deposits are situated very Solutrean sites (eg. Les Pedroses, Herreras, Quintanal, Cullalvera, Covalanas, Santián, Las Monedas, Las Chimeneas, La Clotilde, Las Aguas, Micolón, etc.). The place of the Solutrean in rupestrial art, minimized by Breuil, has long been upheld by Jordá (most recently in Jordá 1977), and striking similarities between engraved scapulae from the Solutrean deposit at Altamira (and the «Lower Magdalenian» of Castillo) and rupestrial engravings in several caves have long been noted, most recently by Almagro (1976) in a detailed study. Whatever artistic, symbolic, magical or other significance the cave art may have, the sanctuaries may well have had territorial significance, as meeting places for bands pertaining to larger endogamous, dialectic units (?). Fission and fusion among contemporary hunter-gatherer groups is a wellknown phenomenon related to environmental, subsistence and social factors. Matte exchange, initiation and group hunting are three possible major reasons for aggregation in Last Glacial Cantabria. The art sanctuaries—inwhich the **act** of art was probably more important than the result—may have played key roles on both pragmatic and supernatural planes: teaching/initiation, game management-hunt planning/magical control of animal fertility, movements and procurement. That no major cluster or alignment of Solutrean sites is without its sanctury (s), is certainly significant.

TABLE 1.
SITE LOCATION CHARACTERISTICS*

SITES (BY PROVINCES) (ASTURIAS)	VALLEY SYSTEM	ORIENTATION	DISTANCE FROM MODERN COAST				LINEAR DISTANCE TO -100m. ISOBATH	SITE ELEVATION	SURROUNDING ELEVATIONS					
			LINEAR DISTANCE	WALKING DISTANCE	LINEAR DISTANCE TO -100m. ISOBATH				ABOVE SEA LEVEL	ABOVE NEAREST DRAINAGE	w/i 1km. radius	w/i 5km. radius		
			WSW	12	15	19			200	185	300	15		
Candamo	Nalón	WSW	12	15	19	200	185	300	284	120	596	10		
Caldas	"	S	27	39	34	160	5	284	5	120	596	80		
Oscura	Espasa	N	2	2	14	50	3	125	5	5	265	0		
Cova Rosa	Acebo (Sellas)	SSE	4	4	11	55	25	423	26	26	556	0		
Cierro	"	SSE	2	2	9	57	0	142	40	542	0			
Buxu	Gueña- Sella	WSW	12	25	19	350	25	578	100	578	35			
Coberizas	Cabras	NW	2	2	10	60	0	197	10	724	0			
Cueto de la Mina	Calabres (Cabras)	S	2	2	10	35	15	74	20	724	0			
Riera	"	W	2	2	10	30	5	74	20	724	0			
Tres Calabres	"	SW	2	2	10	30	10	74	20	724	0			
Balmori	(Calabres)	SE	1	1	9	20	0	65	0	724	0			
Sel	Deva	?	11	18	16	600	0	1081	600	1214	20			
(SANTANDER)														
Chufín	Nansa	NNW	12	16	17	140	20	365	80	920	30			
Altamira	(Saja-Besaya)	NNE	4	4	10	150	90	167	60	292	0			
Caranceja	Saja	NNE	7	8	13	75	5	187	65	794	35			
Hornos de la Peña	Tejas- Besaya	S	18	23	24	280	60	520	160	820	80			
Pendo	(Pas)	S	8	8	14	80	5	203	70	278	0			
Cobalejos	Pas	S	7	7	13	80	7	180	10	278	0			
Pasiega	Pas	S	17	20	24	180	80	355	60	820	35			
Castillo	Pas	E	17	20	24	190	100	355	60	820	35			
Camargo	Bahía de Santander	S	7	7	13	30	10	100	15	300	0			
Morín	"	NNW	12	12	19	65	15	220	20	459	0			
Fuente del Francés	Aguanaz- Miera	SW	9	9	20	25	4	180	10	340	0			
Salitre	Miera	W	23	30	34	500	180	814	300	1408	180			
Bona	"	W	21	25	32	200	20	712	170	1036	120			
Haza	Asón	SSW	20	23	32	280	75	723	75	957	55			
Mirón	"	WNW	20	23	32	300	95	723	75	957	55			
(VIZCAYA)														
Atxeta	Ria de Guernica	N	8	8	15	20	1	265	0	447	0			
Santimamiñe	"	S	5	5	12	150	70	447	25	558	0			
Bolinkoba	Elorrio- Ibaizabal	ESE	28	35	37	350	65	941	200	1296	100			
Atxuri	Manaria- Ibaizabal	SSW	28	33	37	?	?	529	160	1068	100			
(GUIPÚZCOA)														
Ermitia	Deva	WNW	2	3	13	125	125	431	0	610	0			
Aitzbitarte	Landarbaso- Urumea	WSW	8	15	15	220	20	457	100	551	20			

* Distances approximate & rounded to nearest km.; site elevations approximate & rounded to nearest 5m.

Conclusions

The Solutrean-age inhabitants of Cantabria utilized their narrow, zonally diverse environment in full, systematic fashion. Each major coastal plain sector (especially when near probable inlets or estuaries and entry points to the interior) and each major river valley system contains sites. The coastal sites seem usually to have been chosen for their sheltered and central locations. The hinterland sites (and certain particular near-coastal sites where a true plain is lacking) were clearly selected for strategic reasons related probably to the hunt, with apparently less regard for comfort. It should be said that caves are so numerous in heavily karstic, limestone Cantabria, that we are dealing with a real case of **choice** among many possible alternative occupation loci on the part of Solutrean and other Upper Paleolithic groups.

The problems which need to be resolved now involve the theoretical scale (area per group) of hunting territories for the exploitation of mobile red deer and ibex (plus horse and bison), the development of a precise Solutrean chronology based on detailed reconstruction of climatic oscillations and on radiocarbon dating, and the ascertainment of the seasonality of individual occupations. When this is done, then we will begin to approximate an understanding of settlement patterns in this interesting period.

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