

See discussions, stats, and author profiles for this publication at:
<https://www.researchgate.net/publication/287359754>

Central Iberia around the Last Glacial Maximum: Hopes and Prospects

Article *in* Journal of anthropological research · December 2015

DOI: 10.3998/jar.0521004.0071.406

CITATIONS

2

READS

48

1 author:



[Manuel Alcaraz-Castaño](#)

University of Alcalá

34 PUBLICATIONS 60 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Testing population hiatuses in the Late Pleistocene of Central Iberia: a geoarchaeological approach [View project](#)



Applying luminescence dating techniques to cave deposits [View project](#)

CENTRAL IBERIA AROUND THE LAST GLACIAL MAXIMUM

Hopes and Prospects

Manuel Alcaraz-Castaño

Área de Prehistoria, Universidad de Alcalá (Madrid), C/ Colegios 2, 28801,
Alcalá de Henares Spain. Email: manuel.alcaraz@uah.es

KEY WORDS: Crossing-area model, Solutrean, Protosolutrean, Central Iberia, Spanish Plateau, Las Delicias, Peña Capón

The currently most widely accepted model of population dynamics in Southwest Europe during the Last Glacial Maximum depicts the Iberian Peninsula as a human refugium. However, this refugium was generally thought to be limited to the coastal areas of Iberia, while the interior lands of the Spanish plateau were explicitly excluded as areas of significant human settlement. According to what we have termed the “crossing-area model,” these inner territories supposedly had no Solutrean settlements, only ephemeral visits corresponding to the passage of hunter-gatherers en route between the more favored coastal areas. In this paper we test the validity of this model in light of new data from several sites in Central Iberia, namely from the Madrid Basin and the southeastern foothills of the Central System mountain range. We conclude that the crossing-area model does not explain the current data and therefore should be reassessed. Consequently, we propose to open up new avenues of research aimed at approaching the central region of Iberia in its own cultural and ecological terms.

HISTORICALLY, THE INNER TERRITORIES of the Iberian Peninsula, a large upland plateau (the Meseta) divided in two by the Central System range, have been depicted as being nearly depopulated during the Late Pleniglacial or Marine Isotopic Stage (MIS) 2, and especially during the Last Glacial Maximum (LGM). This is in contrast to the common consideration of the Iberian coastal areas as being part of a southwestern European human refugium during the harshest periods of the last glacial cycle (Jochim 1987). The idea of a totally or virtually depopulated Meseta was widely assumed during most of the twentieth century, and it was articulated as a model during the 1990s. In this paper we first discuss the validity of this model in light of very recent data from the central area of the plateau (referred to here as Central Iberia), corresponding to the Madrid Basin and the southeastern foothills of the Central System mountain range (Figure 1; also see Straus 2015: fig. 1, this issue). Then we propose new hypotheses and avenues of research to study human-environment interactions in Central Iberia around the LGM.¹

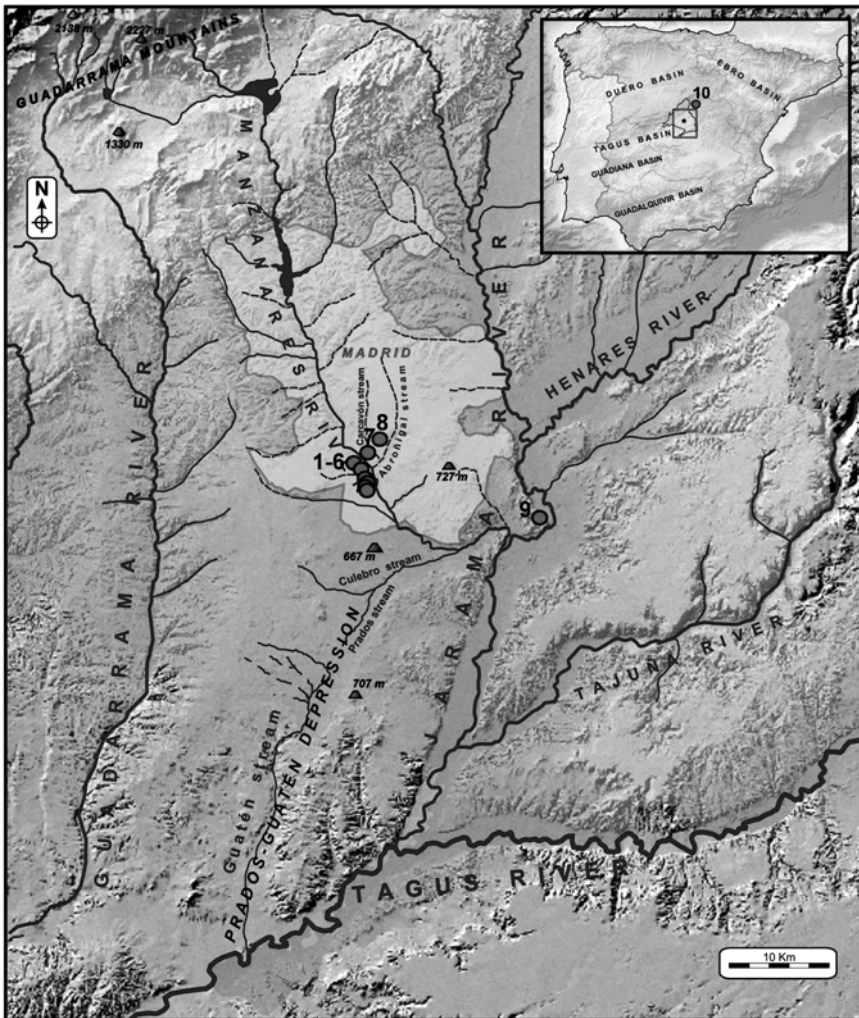


Figure 1. Location of Solutrean sites subject to modern studies in the Madrid basin (Manzanares and Jarama valleys) and the edge of the south-eastern foothills of the Central System range (Central Iberia). (map modified from Alcaraz-Castaño et al. 2015: fig. 1)

- 1: El Sotillo, 2: Santiago, 3: El Cojo, 4: Martínez, 5: Valdivia, 6: Nicasio Poyato,
- 7: Las Delicias, 8: Puente de los Tres Ojos, 9: Valdocarros, 10: Peña Capón

THE CROSSING-AREA MODEL FOR THE LGM SETTLEMENT OF CENTRAL IBERIA

The idea of a mostly uninhabited Iberian plateau during the coldest stages of the Upper Paleolithic was first put forth by Breuil and Obermaier (1913:15). Since then, other scholars have insisted that the harsh environmental and climatic

conditions of this interior and upland region were the main factors behind the lack of permanent settlements during the MIS 2 and the LGM (Corchón 1997; Davidson 1986; Sauvet and Sauvet 1983; Straus 1991; see Delibes and Díez 2006). During the 1960s, some Spanish authors highlighted the bifacial industries found in the Manzanares Basin (Madrid) in the early twentieth century as showing a focus of Solutrean settlement in Central Iberia (Almagro 1960). However, these bifacial industries have been widely dismissed, mainly because they were collected without stratigraphic control and their cultural attribution is confusing (Alcaraz-Castaño et al. 2012), including possible assignment of at least some to a leaf-point Mousterian (see Freund 1952).

The currently most widely accepted interpretation of the LGM occupation of Central Iberia was proposed by Straus et al. (2000), based on previous interpretations (e.g., Straus 1991). These workers accepted some Upper Paleolithic presence in the interior of Iberia prior to the Magdalenian, but it was interpreted as “occasional uses of or ephemeral visits to the less oceanic parts of the Peninsula during the LGM *sensu lato*” (Straus et al. 2000:561). The authors proposed that sites such as Olga Grande and Cardina in the Côa Valley (Portugal), Peña Capón in the upper Tagus Basin (Guadalajara), and El Sotillo in the Manzanares Valley (Madrid) do not reflect actual settlement of these territories, just the passage of humans across these “less favored areas” (Straus et al. 2000:562; see also Straus 2012). We term this interpretation of the population dynamics of inner Iberia during the LGM “the crossing-area model.” The basis of this model can be summarized as follows:

1. Data corresponding to the LGM in the Iberian plateau are limited to a few sites.
2. These data denote occupations of short duration, as reflected in low density and single-layered sites.
3. The interpretation of the interior sites as evidence of population movements between the coastal areas of Iberia can explain the typological and stylistic similarities between Solutrean stone tools and graphic expressions (rock and portable art) of the Cantabrian, Mediterranean, and Atlantic territories.
4. Climate and environment in the upland regions of the Iberian plateau were too harsh during the LGM to allow for permanent human settlement.

In our view, the main strengths of the crossing-area model are as follows:

1. Its basic claims are in consonance with an interpretation assumed in the Spanish literature for more than a century.
2. Until recently the model’s shortcomings have been few and problematic. Sites such as Peña Capón, although more recently excavated than the Manzanares Valley sites mentioned above and containing undoubtedly Solutrean industries, also lacked modern studies and chronometric dates (Alcolea et al. 1997b). Furthermore, the presence of some rock

art depictions assigned on stylistic grounds by some specialists to the Solutrean in Central Iberia (Alcolea et al. 1997a) has been widely considered to be proof not necessarily of permanent human settlement in this area, just of occupations of undetermined duration.

3. The vast majority of Upper Paleolithic sites discovered in Central Iberia during the recent decades are Magdalenian—in other words, post-LGM (Jarama II, Enebrales, El Monte and Estebanvela, among a few others; see [Cacho et al. 2012](#)).

Recent studies of Iberian population dynamics during the Upper Paleolithic have not been able to contradict this model (Schmidt et al. 2012) and even have explicitly supported it on the basis of paleoclimate simulations (Burke et al. 2014:44).

NEW DATA FOR NEW HYPOTHESES

Although until very recently the crossing-area model has reasonably explained the archaeological record of Central Iberia, it is our position that some new data enable us to call it into question. These data come basically from two sites located in the Tagus River basin: Las Delicias, a classic open-air site in the Manzanares Valley (Madrid) that has recently been reexcavated, and Peña Capón, a rockshelter near the southern foothills of the Central System range (Sorbe Valley, Guadalajara), where recent analyses of lithic and faunal materials have been conducted. Geoarchaeological, chronometric, and paleoecological information from these sites allow us to explore a number of new hypotheses concerning the settlement of Central Iberia during Solutrean times. They also suggest that the crossing-area model was biased by the poor quantity and quality of data available from the interior regions of Iberia.

Las Delicias and the Solutrean in the Manzanares Valley

Las Delicias is one of numerous sites that were excavated in the middle and lower Manzanares Valley (Madrid) at the beginning of the twentieth century (Alcaraz-Castaño et al. 2012). Although it was traditionally assigned to the Lower or Middle Paleolithic, recent excavations in two multilayered areas of the site (Sectors I and II) have shown that its lithic collections mostly consist of thinning or bifacial reduction flakes, as well as foliate preforms abandoned at different stages of the reduction process (Figure 2). Together with geomorphological, lithostratigraphic, chronometric, and palynological results, these data have shown Las Delicias to be a Solutrean lithic workshop consisting of a palimpsest of occupations focused on the production of foliate pieces. OSL dates have given minimum ages for this processes of 18.2 ± 1.3 ky BP (Sector I, level IIb) and 12 ± 0.8 ky BP (Sector II, level 3b) (Alcaraz-Castaño et al. 2015).

Both sectors excavated at Las Delicias consist of multilayered archaeological deposits (Figure 2); both show most of the phases of the bifacial *chaîne opératoire*, including procurement; and both yielded high artifact densities. These traits are not typical of sites corresponding to simple, ephemeral visits or places that were

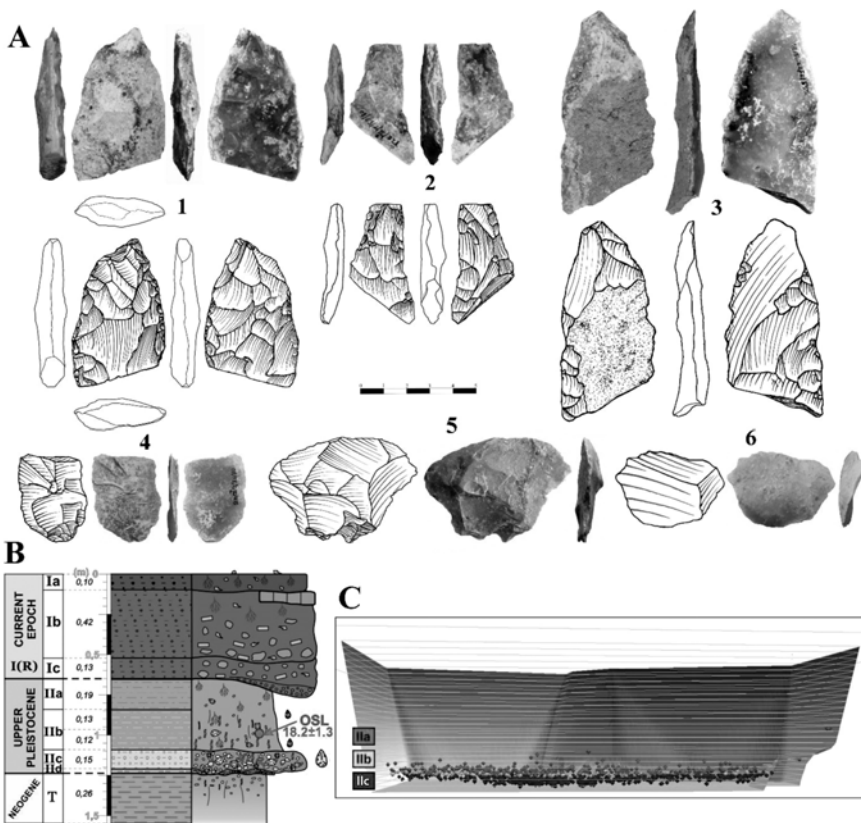


Figure 2. **A:** Bifacial preforms abandoned in the middle-final stages of the reduction process (1–3), and bifacial reduction flakes (4–6) from Las Delicias–Sector I, level IIc.

B: Stratigraphic profile from Las Delicias–Sector I. **C:** Vertical distribution of lithic findings in Las Delicias–Sector I deposit. Level IIc contained 1,210 lithic items in 10 sq. m (modified from Alcaraz-Castaño et al. 2015: figs. 4, 8, 9, and 10).

just used occasionally, as predicted by the crossing-area model; rather, they denote some degree of intensive and recurrent use of the surrounding territory.

Las Delicias is the first Solutrean site in the Manzanares Valley to be excavated with modern methods that has archaeological deposits in secure stratigraphic position and yielded chronometric and paleoenvironmental data. This has rekindled the importance of the bifacial assemblages recovered in the unsystematic excavations on the Manzanares terraces during the early twentieth century as proofs of the Solutrean occupation of the valley. According to modern reanalyses (Baena and Carrión 2002; Martínez de Merlo 1984), most of these assemblages are undoubtedly Solutrean. Furthermore, recent salvage excavations in the area have revealed other Solutrean evidence (Tapias et al. 2012). In sum, at least eight Solutrean sites (and probably more) can be currently recognized in the

Manzanares Valley, in an area of around 5.5 square km (Figure 1). Moreover, in the nearby Jarama River valley (Figure 1), a laurel leaf point was identified among the lithics from a late-nineteenth-century excavation at the site of Valdocarros (Baena and Carrión 2002), thus widening the area of Solutrean settlement in the Madrid Basin. As is the case with Las Delicias, most of these sites are focused on flint procurement and knapping activities and hence can be considered to have been lithic workshops (Baena and Carrión 2002). However, in some of them, such as El Sotillo, Nicasio Poyato, Martínez, and El Cojo, the significant number of retouched tools (Figure 3) reveals that foraging and consumption activities also took place there. Altogether, these data suggest that the Manzanares Valley functioned as an organized territory for human activity during the Solutrean. In fact, for a recurrently frequented lithic workshop that includes evidence of the procurement of the raw material—as is the case of Las Delicias—the most parsimonious interpretation is that the toolmakers were also exploiting the biotic resources of the surrounding environment.

Peña Capón and the Solutrean in the Upper Tagus Basin

Peña Capón is a northwest-oriented rockshelter (861 m above sea level) in a limestone formation close to the southeastern foothills of the Central System in the upper Tagus Basin (Sorbe Valley, Guadalajara). It was discovered in 1970 and was the object of a preliminary publication in the late 1990s (Alcolea et al. 1997b). Recently, a more in-depth study of the lithics and faunal remains, including the radiocarbon dating of several bone samples, was conducted. This study, centered on the Protosolutrean layer, also documented the oldest examples of pre-Magdalenian portable graphic art from the Iberian interior (Alcaraz-Castaño et al. 2013).

The archaeological deposit of the rockshelter comprises, from top to bottom (Figure 4), a surface level (1) containing mixed Magdalenian and Upper Solutrean materials, including shouldered points; a Middle Solutrean level (2) with laurel leaf points; a Protosolutrean level (3) with Vale Comprido points; and a level containing undiagnostic lithic products produced mostly on quartz, from which a date in the range of the Gravettian was obtained. Radiocarbon dates and some lithic artifacts from each layer are shown in Figure 4. Both the lithics and the fauna from the Proto- and Middle Solutrean occupations point to the use of Peña Capón as a residence and hunting camp (Alcaraz-Castaño et al. 2013).

The sequence of Peña Capón has no parallel in Central Iberia up to the present time, and hence it is of paramount importance to testing the crossing-area model. The recurrent use of the site by hunter-gatherers during several episodes of the MIS 2, including the LGM, is not proof of an ephemeral use of the rockshelter; indeed it suggests the contrary at least during one part of the LGM. Furthermore, although no other Solutrean sites have been found so far in this area of the upper Tagus Basin, in the nearby rock art sites of El Reno and El Cojo caves (both 9 km from Peña Capón), and also in Los Casares cave (76 km away), several examples of arguably pre-Magdalenian depictions—probably of Solutrean age on stylistic grounds—have been described (Alcolea and Balbín 2013). Therefore, we propose

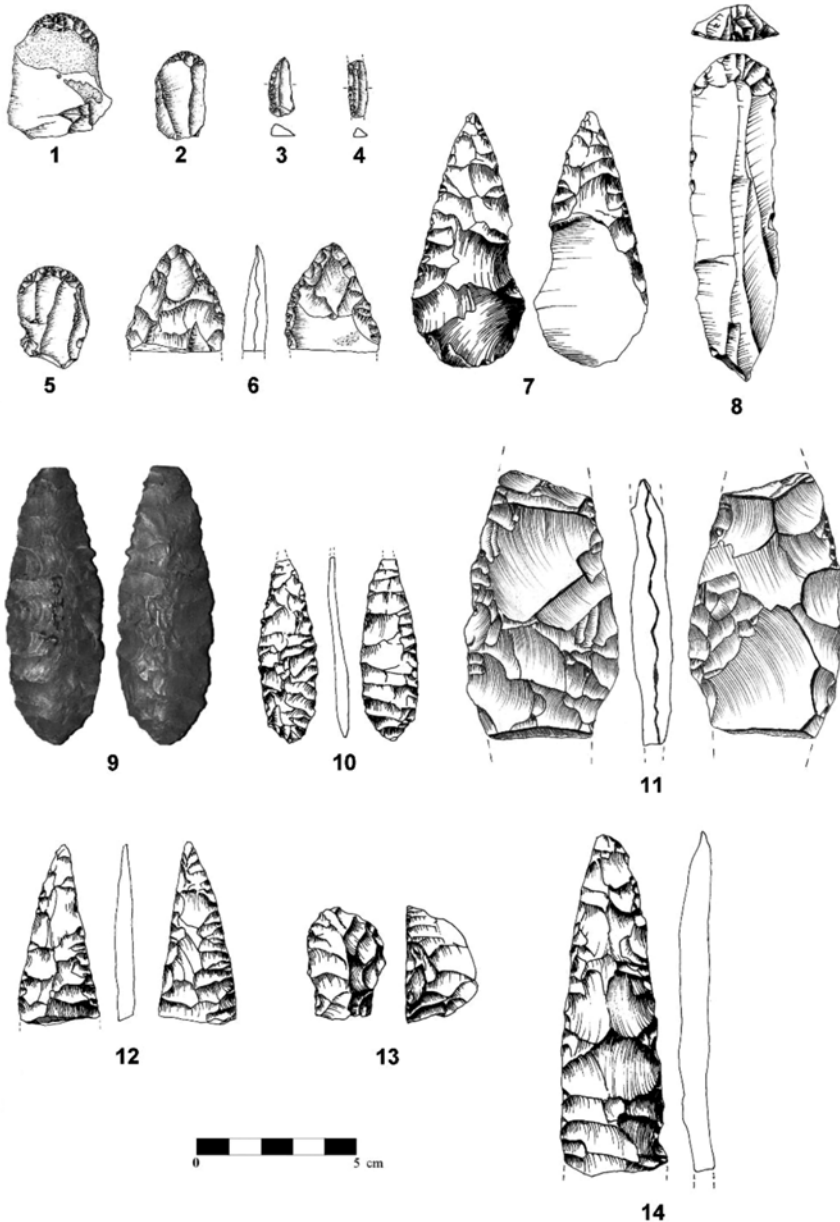


Figure 3. Retouched tools and foliate points (mostly finished or broken in the very last phase of production) from Solutrean sites of the middle and lower Manzanares Valley.

1–6: El Sotillo (after Martínez de Merlo 1984: figs. 9 and 11). 7–8: Nicasio Poyato (after Baena and Carrión 2002: figs. 4.21 and 4.23). 9–10: Martínez (after Conde et al. 2000: fig. 1 and pl. I). 11–13: El Cojo (after Baena and Carrión 2002: figs. 4.14 and 4.26), and 14: Puente de los Tres Ojos (after Tapias et al. 2012: fig. 7).

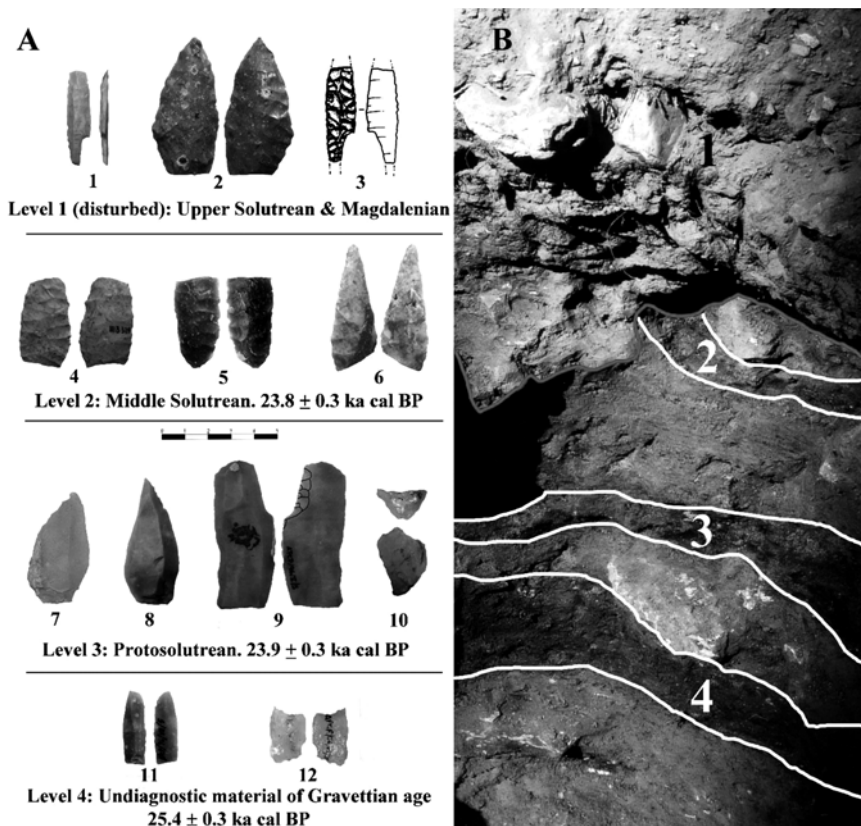


Figure 4. **A.** Lithics and dating results from the Peña Capón sequence. **B.** Photo from the 1970 excavation of the Peña Capón stratigraphic sequence. Archaeological levels are highlighted in white; the dark line separates the disturbed layer 1 from the rest.

1: “Mediterranean-type” shouldered point, 2, 4–6: laurel leaf points, 3: “Cantabrian-type” shouldered point (after Alcolea et al. 1997b: fig. 8.7), 7–8: Vale Comprido points, 9: endscraper on a wide blade with inverse flat retouch, 10: carinated bladelet core made on quartz, 11: retouched bladelet, 12: notch on a hyaline quartz flake.

that Peña Capón was not the product of an isolated occasional visit to this region, but rather was part of an organized settlement during Solutrean times. In fact, the presence of a sequence comprising Magdalenian, Upper Solutrean, Middle Solutrean, Protosolutrean, and perhaps Gravettian occupations suggests that these territories were in use by hunter-gatherers during a prolonged period of time. This should lead researchers to study this area of Central Iberia on its own cultural and ecological terms, and not necessarily as a subsidiary region of the coastal areas.

HOPES AND PROSPECTS

For the first time, we now have solid data (geoarchaeological, chronometric, technological, and paleoecological) on the LGM settlement of Central Iberia. Both

the Manzanares Valley and the upper Tagus Basin have evidence that confirms previously ambiguous data on the Solutrean settlement of Central Iberia, hence enabling us to question the crossing-area model. These data can be summarized as follows:

1. In the middle and lower Manzanares Valley, an important cluster of Solutrean sites revealed both specialized workshops showing an intensive and recurrent exploitation of the surrounding lithic resources as well as related occupations with evidence of foraging and consumption activities.
2. Near the southeastern foothills of the Central System is evidence of a prolonged sequence of human settlement, starting probably in the Gravettian and including at least Protosolutrean, Middle Solutrean, Upper Solutrean, and Magdalenian occupations. The material expression of this settlement is thus far only represented in the Peña Capón rockshelter, but the entire sequence has reliable parallels in the regional rock art.

Together, these data enable us to suggest a regional development of Upper Paleolithic technocomplexes in Central Iberia, including Late Pleniglacial times. Together with other Solutrean evidence in more peripheral areas of inner Iberia, such as those of the open-air Côa Valley sites (Portugal) ([Aubry et al. 2012](#)), possibly Maltravieso cave (Extremadura) ([Canals et al. 2010](#)), or even El Palomar cave (Albacete, Castile-La Mancha) ([Córdoba and Vega 1988](#)) and the open-air site of Valverde (interior Galicia) ([Lombera et al. 2012](#)), the Central Iberia data suggest the existence in these interior territories of more organized and permanent LGM settlements than previously thought.

Therefore, in our view the time has come to question the role of the Iberian plateau as a mere crossing-area during the coldest stages of the Upper Paleolithic, and instead to approach these inland territories on their own cultural and ecological terms. Population breakdowns in large areas of the plateau during particular climatic crises should not be ruled out, and contacts with other regions of Iberia should be addressed. However, current data do not point to understanding the interior Solutrean settlement as exclusively related to the sporadic passage of people between the coastal areas of the peninsula. Other explanations must be considered to place this record in the context of the Iberian Solutrean, such as mutual contacts or exchanges with groups from other regions. In fact, long-distant exchange has been posed as a possible explanation for the presence of lithic raw materials from the northern Meseta and the Central System in several Solutrean (and Gravettian) sites of the Côa Valley ([Aubry et al. 2012](#)).

Nonetheless, although results derived from the new Central Iberia research imply a considerable increase with respect to previous knowledge, and in our view they are consistent enough to question the crossing-area model, they are still insufficient and too problematic to build new models of human-environment interactions in these territories. This is especially evident in the case of available chronometric and paleoecological data, which are too scarce to propose fine-

grained correlations between population dynamics and climatic and environmental variations in Central Iberia. Peña Capón yielded only one radiocarbon date per level, and those dates were obtained on bones from the 1970 excavation (see [Alcaraz-Castaño et al. 2013](#)). Similarly, in Las Delicias only one OSL measurement per excavated sector has been obtained, and they have to be taken as minimum ages, with one being far younger than the Solutrean. Although these results allow us to propose a preliminary timeframe for the Solutrean of Central Iberia between 23.9 ± 0.3 ky cal ^{14}C BP (the date for the Protosolutrean layer of Peña Capón) and $>18.2 \pm 1.3$ ky BP_{OSL} (the most reliable minimum age for the Middle or Upper Solutrean of Las Delicias – Sector I [see [Alcaraz-Castaño et al. 2015](#)]), stronger chronological data are obviously needed to build a reliable regional sequence. In the same sense, the only paleoecological data for the LGM settlement of Central Iberia are the palynological results obtained from Las Delicias deposits, which could be related only to the very last phases of the Solutrean time range and not to the time of the production or abandonment of the lithics recovered at the site (see [Alcaraz-Castaño et al. 2015](#) for discussion).

Therefore, it is our epistemological responsibility to assume the uncertainty of these data and thus limit our discussion on the LGM human-environment interactions in Central Iberia to a number of hypothetical questions: (1) Were the Solutrean occupations of Central Iberia related to relatively favorable episodes within the otherwise harsh conditions of the LGM? (2) Were they favored by the existence of ecological refugia? Or (3) do they just reflect the adaptability of Upper Palaeolithic hunter-gatherers to harsh environments?

We propose that, in order to answer these questions, research should be directed at the following objectives:

1. Since karstic environments in the Iberian plateau are few compared with the coastal areas of the peninsula, archaeological field surveys should be focused on locating open-air sites. These surveys face a number of difficulties (see [Arrizabalaga et al. 2014](#)), especially in urban areas (notably Madrid, its suburbs and surrounding cities). In the Manzanares Valley, the number of Solutrean sites destroyed as a consequence of urban development and construction is undoubtedly high. However, other fluvial contexts of inner Iberia are yet to be explored.
2. In order to test hypothetical contacts between Solutrean hunter-gatherers from the interior and those from the coastal areas, it is important to search for the lithic raw materials exploited in sites such as Peña Capón and Las Delicias in the Cantabrian, Portuguese, and Mediterranean assemblages. Studies of lithic raw material sources and human mobility—especially including least-cost path analyses, such as those developed for the sites of the Côa Valley—are an excellent basis for this research ([Aubry and Mangado 2006](#); [Aubry et al. 2012, 2015](#)).
3. As mentioned above, we need more reliable data from the currently known Solutrean sites and collections. In this regard, it is of paramount importance to re-excavate the key site of Peña Capón, which will

enable us to study the site formation processes as well as to acquire new samples for chronometric and paleoecological analyses. Although access to this site presents significant difficulties since it is often underwater (see Alcaraz-Castaño et al. 2013), we are currently trying to solve them.

We hope that some of these objectives can be accomplished very soon. At least some of them will be addressed in a research project in which the author, together with other researchers, is currently involved. This project, “Testing Population Hiatuses in the Late Pleistocene of Central Iberia: A Geoarchaeological Approach,” is focused on the study of population dynamics in Central Iberia during the Late Pleistocene. Of course, research in other areas of inner Iberia, and especially on the northern Meseta, where no Solutrean evidence is known thus far, is also urgently needed.

NOTE

This work was presented in the session “The Human Settlement of Western Europe during the Last Glacial Maximum” of the XVII World UISPP Congress held at Burgos (Spain). I wish to thank Prof. L. G. Straus for his invitation to participate in this session, and also for his constructive comments on the manuscript of this paper. I also thank Prof. Dr. Gerd-Christian Weniger for his cooperation. Part of the writing of this paper was done in the Neanderthal Museum (Germany), supported by a Marie Curie Intra European Fellowship within the 7th European Community Framework Programme. The text was lightly edited by L. G. Straus.

1. I am grateful to my colleagues at Las Delicias and Peña Capón for their work, and especially to Drs. Javier Alcolea, Rodrigo de Balbín, Manuel Santonja, and Javier Baena for their helpful comments. I have used the word “we” in this paper to acknowledge their input, but any errors in interpretation are my own.

REFERENCES CITED

- Alcaraz-Castaño, M., J. Alcolea, R. de Balbín, M. A. García Valero, J. Yravedra, and J. Baena. 2013. Los orígenes del Solutrense y la ocupación pleniglaciaria del interior de la Península Ibérica: Implicaciones del nivel 3 de Peña Capón (valle del Sorbe, Guadalajara). *Trabajos de Prehistoria* 70(1):28–53. <http://dx.doi.org/10.3989/tp.2013.12101>
- Alcaraz-Castaño, M., M. López-Recio, M. Roca, F. Tapias, I. Rus, J. Baena, J. Morín, A. Pérez-González, and M. Santonja. 2012. Nuevos datos sobre el yacimiento paleolítico de Las Delicias: Un taller solutrense en el valle del Manzanares (Madrid, España). *Espacio, Tiempo y Forma, serie I, Prehistoria y Arqueología* 5:427–46. <http://dx.doi.org/10.5944/etfi.5.2012.5352>
- Alcaraz-Castaño, M., M. López-Recio, F. Tapias, F. Cuartero, J. Baena, B. Ruiz-Zapata, J. Morín, A. Pérez-González, and M. Santonja. 2015. The human settlement of Central Iberia during MIS 2: New technological, chronological and environmental data from the Solutrean workshop of Las Delicias (Manzanares River Valley, Spain). *Quaternary International*. doi:10.1016/j.quaint.2015.06.069

- Alcolea, J. J., and R. de Balbín. 2013. "El Arte rupestre Paleolítico del interior peninsular," in *Arte sin artistas, una mirada al Paleolítico*, pp. 187–207. Museo Arqueológico Regional, Comunidad de Madrid.
- Alcolea, J. J., R. de Balbín, M. A. García Valero, and P. J. Jiménez. 1997a. Nouvelles découvertes d'art pariétal Paléolithique á la Meseta: La grotte del Reno (Valdesotos, Guadalajara). *L'Anthropologie* 101:144–63.
- Alcolea, J. J., R. de Balbín, M. A. García Valero, P. J. Jiménez, A. Aldecoa, A. B. Casado, B. de Andrés, S. Ruiz Pedraza, P. Sainz Rubio, and N. Suárez Rueda. 1997b. "Avance al estudio del poblamiento paleolítico del Alto Valle del Sorbe (Muriel, Guadalajara)," in *II Congreso de Arqueología Peninsular (Zamora 1996) I, Paleolítico y Epipaleolítico*. Edited by R. de Balbín and P. Bueno, pp. 201–18. Zamora: Fundación Rei Alfonso Henriques.
- Almagro Basch, M. 1960. "Prehistoria," in *Manual de historia universal*, tomo I. Madrid: Espasa-Calpe.
- Arrizabalaga, A., J. Ríos-Garaizar, and D. Álvarez-Alonso. 2014. The past is out there: Open-air Palaeolithic sites and new research strategies in the Cantabrian region (northern Iberia). *Quaternary International* 364:181–87. <http://dx.doi.org/10.1016/j.quaint.2014.07.051>
- Aubry, T., and X. Mangado. 2006. "The Côa Valley (Portugal): Lithic raw material and the reconstruction of Upper Palaeolithic settlement patterns," in *Notions de territoire et de mobilité: Exemples d'Europe et des premières nations en Amérique du Nord avant le contact européen*. Edited by C. Bressy, A. Burke, P. Chalard, and H. Martin, pp. 41–49. Liège: ERAUL 116.
- Aubry, T., L. Luis, J. Mangado Llach, and H. Matias. 2012. We will be known by the tracks we leave behind: Exotic lithic raw materials, mobility and social networking among the Côa Valley foragers (Portugal). *Journal of Anthropological Archaeology* 31:528–50. <http://dx.doi.org/10.1016/j.jaa.2012.05.003>
- . 2015. Adaptation to resources and environments during the Last Glacial Maximum by hunter-gatherer societies in Atlantic Europe. *Journal of Anthropological Research* 71:523–44. <http://dx.doi.org/10.3998/jar.0521004.0071.404>
- Baena, J., and E. Carrión 2002. "Los materiales solutrenses," in *La Colección Benta del Museu d'Arqueologia de Catalunya: Una nueva mirada a la prehistoria de Madrid*. Edited by C. Blasco, pp 79–130. Barcelona.
- Breuil, H., and H. Obermaier. 1913. Institut de Paléontologie Humaine. Travaux exécutés en 1912. *L'Anthropologie* XXIV: 1–16.
- Burke, A., G. Levavasseur, P. M. A. James, D. Guiducci, M. Arturo Izquierdo, L. Bourgeon, M. Kageyama, G. Ramstein, and M. Vrac. 2014. Exploring the impact of climate variability during the Last Glacial Maximum on the pattern of human occupation of Iberia. *Journal of Human Evolution* 73:35–46. <http://dx.doi.org/10.1016/j.jhevol.2014.06.003>
- Cacho, C., J. A. Martos, J. Jordá-Pardo, J. Yravedra, C. Sesé, L. Zapata, B. Avezuela, J. Valdivia, M. Ruiz, I. Marquer, I. Martín-Lerma, and J. M. Tejero. 2012. Human landscapes of the Late Glacial Period in the interior of the Iberian Peninsula: La Peña de Estebanvela (Segovia, Spain). *Quaternary International* 272–273:42–54. <http://dx.doi.org/10.1016/j.quaint.2012.03.012>
- Canals, A., A. Rodríguez-Hidalgo, L. Peña, E. Mancha, M. García-Díez, S. Bañuls, I. Euba, J. M. López-García, N. Barrero, L. Bermejo, F. J. García, D. Mejías, M. Modesto, A. Morcillo, V. Aranda, and E. Carbonell. 2010. "Nuevas aportaciones al Paleolítico superior del suroeste peninsular: la cueva de Maltravieso, más allá del santuario

- extremeño de las manos,” in *El Paleolítico superior peninsular: Novedades del siglo XXI*. Edited by X. Mangado, pp. 199–218. Monografies del Seminari d’Estudis i Recerques Prehistòriques 88, Universitat de Barcelona.
- Conde, C., E. Carrión, and J. Baena. 2000. Los modelos de explotación de los recursos líticos durante el Pleistoceno de la región de Madrid. *SPAL: Revista de Prehistoria y Arqueología de la Universidad de Sevilla* 9:145–66. DOI: [10.12795/spal.2000.i9.07](https://doi.org/10.12795/spal.2000.i9.07)
- Corchón, M. S., ed. 1997. *La cueva de La Griega de Pedraza (Segovia)*. Arqueología en Castilla y León, Memorias 3. Zamora: Junta de Castilla y León.
- Córdoba, B., and L. G. Vega. 1988. “El Paleolítico de la Sierra del Segura: Proyecto de investigación.” In *I Congreso de Historia de Castilla-La Mancha*, Vol 3: Pueblos y culturas prehistóricas y protohistóricas, part 1, pp. 79–85. Ciudad Real: Junta de Comunidades de Castilla-La Mancha.
- Davidson, I. 1986. “The geographical study of Late Paleolithic stages in Eastern Spain,” in *Stone Age prehistory*. Edited by G. N. Bailey and P. Callow, pp. 95–118. Cambridge: Cambridge University Press.
- Delibes, G., and F. Díez. 2006. “¿Una Meseta desolada? Estado actual de la investigación sobre el Paleolítico superior en las regiones interiores de la Península Ibérica,” in *El Paleolítico superior en la Meseta Norte española*. Edited by G. Delibes and F. Díez, pp. 11–40. Valladolid: Universidad de Valladolid.
- Freund, G. 1952. *Die Blattspitzen des Paläolithikums in Europa*. Bonn: Quartär-Bibliothek 1, Ludwig Röhrscheid Verlag.
- Jochim, M. A. 1987. “Late Pleistocene refugia in Europe,” in *The Pleistocene Old World: Regional perspectives*. Edited by O. Soffer, pp. 317–32. New York: Plenum Press.
- Lombera Hermida, A. de, X.-P. Rodríguez, X. Rabuñal, A. Ameijenda, F. Martínez, M. Soares, A. Pérez, and R. Fábregas. 2012. El yacimiento de Valverde (Monforte de Lemos, Lugo, Galicia, España) y las primeras evidencias de poblamiento en el Pleniglacial del NO de la Península Ibérica. *Espacio, Tiempo y Forma*, serie I, *Prehistoria y Arqueología* 5:363–82. <http://dx.doi.org/10.5944/etfi.5.2012.5379>
- Martínez de Merlo, A. M. 1984. El Paleolítico Superior en el valle del Manzanares: El yacimiento de El Sotillo. *Boletín del Museo Arqueológico Nacional* 11:47–68.
- Sauvet G., and S. Sauvet. 1983. *Los grabados rupestres prehistóricos de la cueva de la Griega (Pedraza, Segovia)*. Corpus Artis Rupestris 1, Palaeolithica Ars 2. Salamanca.
- Schmidt, I., M. Bradtmöller, M. Kehl, A. Pastoors, Y. Tafelmaier, B. Weninger, and G-C. Weninger. 2012. Rapid climate change and variability of settlement patterns in Iberia during the Late Pleistocene. *Quaternary International* 274: 179–204. <http://dx.doi.org/10.1016/j.quaint.2012.01.018>
- Straus, L. G. 1991. Human geography of the Late Upper Paleolithic in western Europe. *Journal of Anthropological Research* 46(2):259–78.
- . 2012. El Solutrense: 40 años de reflexiones por un arqueólogo norteamericano. *Espacio, Tiempo y Forma*, serie I, *Prehistoria y Arqueología* 5:27–36. <http://dx.doi.org/10.5944/etfi.5.2012.4768>
- . 2015. The human occupation of southwestern Europe during the Last Glacial Maximum: Solutrean cultural adaptations in France and Iberia. *Journal of Anthropological Research* 71:465–92. <http://dx.doi.org/10.3998/jar.0521004.0071.401>
- Straus, L. G., N. Bicho, and A. C. Winegardner. 2000. The Upper Palaeolithic settlement of Iberia: First-generation maps. *Antiquity* 74:553–66.

Tapias, F., M. López-Recio, I. Manzano, M. Alcaraz-Castaño, J. Morín, C. Sesé, L. Dapena, A. Alarcón, J. Yravedra, and C. Arteaga. 2012. Geoarqueología y paleontología de los depósitos de Pleistoceno Superior del antiguo arroyo Abroñigal (Cuenca del Manzanares, Madrid): el yacimiento del Puente de los Tres Ojos. *Cuaternario y Geomorfología* 26 (1–2):105–32.