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## Once more into the breach: Solutrean chronology

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### SUMMARY

Despite recent attempts to do so, there is no way to subdivide the Solutrean culture-stratigraphic unit into general chronological phases based on radiocarbon dating. The presence, absence and relative frequency of supposedly diagnostic foliate points are variable among individual levels and sites for reasons of functional, stylistic and sampling differences. There are inter-regional differences in the radiocarbon age of the Solutrean phenomenon. Attempts to re-establish a unitarian phylogenetic cultural scheme for SW Europe in the period between 21,000 and 17,000 BP are theoretically sterile and bound to fail.

### RESUMEN

A pesar de unos intentos recientes, no es posible subdividir la unidad cultural-estratigráfica solutrense en fases cronológicas generales de una manera convincente a través de fechas del radiocarbono. La presencia, ausencia y frecuencia relativa de las puntas foliadas supuestamente diagnósticas son variables entre los yacimientos y niveles individuales por razones funcionales, estilísticas o de muestreo. Existen diferencias inter-regionales en la edad por el radiocarbono del fenómeno solutrense. Los intentos de re-establecer un esquema filogenético unitario cultural para el Suroeste de Europa en el período entre 21.000 y 17.000 BP son teóricamente estériles y condenados al fracaso.

Eight radiocarbon dates for the Solutrean sequence in the cave of Las Caldas (San Juan de Priorio, Asturias) have recently been published (along with one for the Magdalenian (EVIN et al. 1983). As with Abri Pataud, Laugerie-Haute, Pégourié, Cueva Morin, Tito Bustillo, La Riera) there are several inversions in the stratigraphic order of the Las Caldas determinations, and interpretation within the range of two standard deviations would seem to be in order.

In an article actually published in late 1983, JORDA, FORTEA, and CORCHON (1982) attempt to reconcile the Las Caldas dates with their culturestratigraphic scheme composed of Middle and Upper Cantabrian Solutrean Phases. Basal level 18, assigned to the «Middle Solutrean», although actually lacking, Solutrean points, was deposited under temperate, humid climatic conditions according to Hoyos (1981:52). But is dated to 19,000±280 BP, a date which would in fact correspond to the Laugerie Interstadial. Level 16 is dated to 19,510\*330 and was deposited under **cool, dry** conditions (with frostweathering). It is assigned to the Middle Solutrean due to the presence of a few laurel leaf points (one or two of which in fact look like willow leaf points [CORCHON 1981: Fig. 4.1. and Fig. 5.1.]) and the absence of concave base or shouldered points. Jordá et al. (1982:14) assign this and all the «Middle Solutrean» levels (through Level 11) to the Laugerie Interstadial (Würm III/IV) as defined in SW France, despite the climatic variability

among levels 17-11 observed by Hoyos (1981) and although they also note that the cold maximum of Würm III is believed to have occurred at 19,500 BP at Abri Fritsch. (In reality that date was only a rough estimate for the undated base of the Fritsch pollen diagram, and climatic amelioration began rapidly afterwards LEROI-GOURHAN 1980:96]). The base of Level 12 at Las Caldas dates to 10,480 ± 260 BP and the top dates to 19,030±320 BP. The level was formed under cool-temperate, dry conditions, reasonably assignable to Laugerie if one were only to consider these two dates in the Las Caldas sequence. However Level 9, formed under **cold** conditions, dates to 19,390±260 BP, also a date corresponding to Laugerie. It contains a couple of shouldered point fragments and a concave base point. Despite its great radiocarbon age, this level is somehow attributed to Dryas I (!) by JORDA et al. (1982:15). Thus in the span of time 19,500-19,000 BP—all supposedly corresponding to Laugerie—there are levels at Las Caldas which formed under two full cycles of conditions ranging from temperate to cold.

Level 7, also classically assignable to the «Upper Solutrean» and deposited under the same cold conditions as Level 9, dates to 18,310±260 BP, a period which could correspond to inter-Laugerie/Lascaux. Following a brief temperate phase described by Hoyos (1981:54) for Level 6, Level 4 shows sedimentological evidence of extrem cold, radiocarbon dated to 17,050±290 BP. But this is a date which corresponds to the Lascaux Interstadial. Level 3, however, has a date almost identical to that of Level 7 (18,250±300

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BP, but was formed during a new relatively mild, humid phase. The Las Caldas series of Solutrean dates, like the larger La Riera series, is beset by problems and permits various chronostratigraphic interpretations in relation to paleoclimatic reconstructions.

Basal Level 1 at La Riera, which, like Las Caldas 18, lacks Solutrean points, probably dates to at least 20,500 BP, based on the standard deviations of three radiocarbon determinations. The fine sediments of this level (and Levels 2-3) were deposited under temperate, humid climatic conditions, according to sedimentological and palynological analyses by H. LAVILLE and ARL. LEROI-GOURHAN respectively (STRAUS et al. 1981, 1983). However the large blocs within Level 1 were probably deposited during an earlier cold episode. Level 4, which has a large number of shouldered points —Levels 2-3 already have fragments of a willow leaf and two shouldered points— dates in excess of 20,000 BP and was formed under cold conditions, as were Levels 5-8 above it. Disregarding one obviously aberrant date, Level 8 also seems to date to around 20,000 BP or slightly more. Environmental conditions change with Level 9 to relatively temperate and humid. Level 10 probably dates to around or slightly after 20,000 BP, based on one  $^{14}\text{C}$  determination, whereas the one date from Level 12 could be as old as 18,000 BP (or as young as 16,500 BP). The Level 14 radiocarbon date is clearly too young, as is one of the two Level 15, which was also deposited under temperate, humid conditions. The second  $^{14}\text{C}$  determination for Level 15 suggests an age of 17-18,000 BP, as does the unique date for Level 16. It is uncertain whether evidence of frost-weathering in Level 16 is meaningful or not. The sequence of Solutrean point-bearing levels at La Riera ends with Level 17, deposited under temperate, humid conditions (as was Level 181, and dated to 17,000 BP by two  $^{14}\text{C}$  determinations. The complete lists of Las Caldas and La Riera radiocarbon dates are given in Table 1.

Alternate chronological hypotheses can be formulated for both sites, **assuming** the general validity of the pollen zonal scheme used in SW France (Table 2). Approximate interstadial boundaries for that region are most recently defined by RENAULT-MISKOVSKY and LEROI-GOURHAN (1981) as follows: Tursac: 24,000-23,000 BP; Laugerie: 19,900-18,500 BP; Lascaux: 18,000-16,500 BP. Their validity is not yet adequately tested in Cantabrian Spain.

Based on paleoclimatic interpretations and on the existence of inverted or clearly aberrant  $^{14}\text{C}$  dates and given the broad error ranges associated with the dates, either hypothesis seems plausible for both sequences. As I have argued repeatedly (see STRAUS 1983, with references), the presence or absence of particular Solutrean point types does not necessarily constitute evidence for the existence of real, gene-

ralized cultural phases within this 3-4000 year period. One should be particularly cautious about creating and advocating such stage subdivisions when there are still few well-excavated, well-dated sites, and when even these may have sampling problems due to the small areas of excavation. In addition, the precision and resolution of any radiocarbon dates at this period may not be great enough to accurately and securely place levels within brief climatic phases which are, to begin with, not all that precisely dated themselves, nor demonstrably identical in timing and/or existence in Aquitaine and Asturias. Any schemes such as those proposed in Table 2 should be understood as working hypotheses requiring further testing.

Light can be shed, however, on the broader questions of the age of the «Solutrean» typology and technology in SW Europe by consulting the complete list of radiocarbon dates from sites in SW and SE France and N and E Spain (Table 1). Not included are recently published dates for Hornos de la Peña which fall into this age range, since the cultural associations of the determinations are not known (BURLEIGH et al. 1982). Likewise the problematical dates from Urtiaga F and Lezetxiki III are not included, although they might relate to Solutrean-age levels without Solutrean points. The Lower Salpêtrian dates from La Salpêtrière are also excluded, along with a few patently recent dates for levels with Solutrean materials.

Two points emerge from these data: (1). There is no clearcut absolute chronological ordering of «Lower», «Middle», and «Upper/Final» Solutrean «phases». Some typologically «Lower» or «Middle» Solutrean assemblages are chronologically quite recent; some typologically «Upper» Solutrean assemblages are chronologically rather old. The sequence at the type site of Laugerie-Haute is unique, and even there one can choose between a «long» and a «short» radiocarbon chronology. (2). There seem to be regional differences in the age of the Solutrean phenomenon, although **in general terms** it spans the period between ca. 21,000-17,000 BP. The Aquitaine levels are almost all old (21,000-19,300). The E and SE French dates are generally younger (20,000-17,000), like the ones from Cantabrian Spain. Although there are questions concerning the cultural assignment of the oldest and most recent dates from E. Spain, the Solutrean (**sensu lato**) there seems to span the whole range of time from ca. 21,000-ca. 17,000 BP.

These facts tend to suggest that the presence or absence of particular fossil director point types in given sites or levels is dependent on regional stylistic differences and on functional considerations (as well as sampling error). Furthermore they support the notion that the Solutrean of SW Europe represents a technological stage in which both inter-regional contacts and **convergence** played significant roles. One

Site	Level	Lab. No.	Date BP (Libby half-life)	Solutrean "Stage"
<u>SW FRANCE</u>				
Abri Fritsch	8d	Gr N-5499	19,280±230	"Upper"
Roc de Sers	--	Gif-3609	19,230±300	"Upper"
Laugerie-Haute	H1(1=2)	GrN-1888	20,890±300	"Lower"
" "	12d	GrN-4573	20,750±150	"Lower"
" "	12a	GrN-4446	20,810±230	"Lower"
" "	12a	Gr N-4469	20,160±100	"Lower"
" "	5	GrN-4495	19,740±140	"Upper"
" "	5	GrN-4442	19,600±140	"Upper"
" "	2	GrN-4441	20,000±240	"Final"
" "	2	GrN-4605	19,870±190	"Final"
La Tannerie	--	Ly-2228	18,020±270	"Upper"
<u>EASTERN FRANCE</u>				
Solutré	240-250cm	Ly-1533	19,590±280	"Middle"
" "	210-250cm	Ly-1534	17,310±470	"Middle"
" "	9b	Ly-316	17,150±300	"Middle"
" "	8b	Ly-314	16,740±300	"Middle"
<u>SE FRANCE</u>				
Oullins	D	Ly-1984	20,100±500	"Upper"
" "	9	Ly-1985	20,060±450	"Upper"
" "	7	Ly-799	19,710±400	"Lower"
" "	6	Ly-798	19,360±420	"Lower"
Tête de Lion	E-F*	Ly-847	20,650±800	"Lower" (?)
" Sâlpétrière	(?)	MC-2449	21,600±70	"Lower/Middle"
" "	il	MC-1370	19,100±500	"Middle"
" "	il	MC-1372	18,700±500	"Middle"
" "	13	MC-2085	20,500±300	"Middle"
Chabot	2a	Ly-698	18,200±400	"Lower"
" "	2	Ly-699	17,770±400	"Lower"
<u>NORTHERN SPAIN</u>				
Aitzbitarte	VIII	GrN-5 993	17,950±100	"Upper"
Ekain	VIII*	I-	20,900±450	?
Chufin	1	CSIC-258	17,420±200	"Upper"
La Riçra	17	GaK-6445	16,900±200	"Upper"
" "	17	GaK-6444	17,070±230	"Upper"
" "	16	GaK-6983	18,200±610	"Upper"
" "	15	GaK-6449	15,600±570	"Upper"
" "	15	UCR-1272A	17,225±350	"Upper"
" "	14	UCR-1271A	15,690±310	"upper"
" "	12	GaK-6446	17,210±350	"Upper"
" "	10	GaK-6447	19,820±390	"Upper"
" "	8	GaK-6450	15,860±330	"Upper"
" "	8	GaK-6981	20,690±810	"Upper"
" "	4	GaK-6984	20,970±620	"Upper"
" "	1*	UCR-1270A	19,620±390	?
" "	1*	Ly-1783	20,360±450	?
" "	1*	BM-1739	20,860±410	?
Las Cañdas	18*	Ly-2429	19,000±280	"Middle" (?)
" "	16	Ly-2428	19,510±330	"Middle"
" "	12 base	Ly-2426	19,480±260	"Middle"
" "	12 top	Ly-2425	19,030±320	"Middle"
" "	9	Ly-2424	19,390±260	"Upper"
" "	7	Ly-2423	18,310±260	"Upper"
" "	4	Ly-2422	17,050±290	"Upper"
" "	3	Ly-2421	18,250±300	"Upper"
<u>EASTERN SPAIN</u>				
Parpalló	4.0-4.25m	Birm-521	17,900±340	"Solutreo-gravettian"
" "	4.75-5.0m	BM-861	18,080±770	"Upper"
" "	6.25-7.75m	Birm-520	20,170±380	"Lower" (?)
" "	6.5-7.0m	BM-859	20,490±800	"Lower"
Les Mallaetes	III	KN-I/918	16,300±1500	"Upper"
" "	Va	KN-I/919	20,140±460	"Middle"
" "	VI	KN-I/920	21,710±650	"Lower" (?)

Table 1. Radiocarbon Dates for the Colutrean.

Sources: Bazile-Robert 1979; Bofinger and Davidson 1977; Delibrias and Evin 1974, 1977; Evin et al. 1983; Fortea and Jordá 1976 Roudil 1980 Straus et al. 1978, 1981; Altuna 1984.

\* no Colutrean points found

must not forget that SW Europe ca. 21,000-17,000 BP was not the only place or time in which leaf-shaped and shouldered lithic points were manufactured in prehistory.

Table 2. Alternate Chronostratigraphic Schemes for the La Riera and Las Caldas Solutrean.

		HYPOTHESIS I		HYPOTHESIS II	
Aquitaine	Phases	La Riera Levels	Las Caldas Levels	La Riera Levels	Las Caldas Levels
Lascaux	Interstadial	17-18	3		
	Cold Episode in Lascaux	16	9-4		
Lascaux	Interstadial	9-15	14-10	17-18	3
Laugerie	Lascaux Stadial	4-8	17-15	16	9-4
Laugerie	Interstadial	1*(fines), 2-3	19-18*	9-15	14-10
Tursac/Laugerie	Stadial	1 (blocs)		4-8	17-15
Tursac	Interstadial(?)			1*, 2-3	19-18*

\* Basal levels lacking Solutrean points.

## BIBLIOGRAFIA

- ALTUNA, J.  
1972. Fauna de mamíferos de los yacimientos prehistóricos de Guipúzcoa. *Munibe* 22: 1-464+28 láminas.  
1984. *The prehistory of Ekain cave* *Current Anthropology* 25: 529-30.
- BAZILE-ROBERT, E.  
1979. *Flore et Végétation du Sud de la France pendant la dernière Glaciation d'après l'Analyse anthracologique*. Unpublished thesis, University of Montpellier.
- BOFINGER, E. and I. DAVIDSON  
1977. Radiocarbon age and depth: a statistical treatment of two sequences of dates from Spain. *Journal of Archaeological Science* 4: 231-243.
- BURLEIGH, R.; J. AMBERS and K. MATTHEWS  
1982. British Museum natural radiocarbon measurements XV. *Radiocarbon* 24: 262-290.
- CORCHON, M.S.  
1981. El yacimiento de la Cueva de Las Caldas. *Excavaciones Arqueológicas en España* 115 59-257.
- DELIBRIAS, G. and J. EVIN  
1974. Sommaire des datations 14C concernant la préhistoire en France, I. *Bulletin de la Société préhistorique française* 71: 149-156.  
1980. Sommaire des datations 14C concernant la préhistoire en France, II. *Bulletin de la Société préhistorique française* 77: 215-224.
- EVIN, J.; J. MARECHAL and G. MARIEN  
1983. Lyon natural radiocarbon measurements IX. *Radiocarbon* 25: 59-128.
- FORTEA, J. and F. JORDA  
1976. La Cueva de Les Mallaetes y los problemas del Paleolítico superior del Mediterráneo español. *Zephyrus* 26/27 129-166.
- HOYOS, M.  
1981. Estudio geológico de la Cueva de Las Caldas. *Excavaciones Arqueológicas en España* 115: 11-56.
- JORDA, F.; J. FORTEA and M.S. CORCHON  
1982. Nuevos datos sobre la edad del Solutrense y Magdaleniense medio cantábrico. Las fechas C-14 de la Cueva de Las Caldas. *Zephyrus* 34/35: 13-16.
- LEROI-GOURHAN, ARL.  
1980. Interstades würmiens: Laugerie et Lascaux. *Bulletin de l'Association française pour l'Etude du Quaternaire* (3): 95-100.
- MARIEZKURRENA, K.  
1979. Dataciones de radiocarbono existentes para la Prehistoria Vasca. *Munibe* 31: 237-255.
- RENAULT-MISKOVSKY, J. and ARL. LEROI-GOURHAN  
1981. Palynologie et archéologie: nouveaux résultats, du Paléolithique supérieur au Mésolithique. *Bulletin de l'Association française pour l'Etude du Quaternaire* (3/4): 121-128.
- ROUDIL, J.L.  
1980. Circonscription de Languedoc-Roussillon. *Gallia Préhistoire* 23: 427-471.
- STRAUS, L.G.  
1983. El Solutrense Vasco-Cantábrico: Una Nueva Perspectiva. *Centro de Investigación y Museo de Altamira, Monografías* 10.
- STRAUS, L.G.; BERANLDO DE QUIROS, F.; CABRERA, V. and CLARK, G.A.  
1978. Solutrean chronology and lithic variability in Vasco-Cantabrian Spain. *Zephyrus* 28/29: 109-112.
- STRAUS, L.; ALTUNA, J.; CLARK, G.; GONZALEZ, M.; LAVILLE, H.; LEROI-GOURHAN, A.; DE LA HOZ, M.M. and ORTEGA, J.  
1981. Paleoeology at La Riera. *Current Anthropology* 22: 655-682.
- STRAUS, L.; CLARK, G.; ALTUNA, J.; GONZALEZ, M.; LAVILLE, H.; LEROI-GOURHAN, A.; DE LA HOZ, M.M. and ORTEGA, J.  
1983. Excavaciones en la Cueva de La Riera (1976-1979): Un estudio inicial. *Trabajos de Prehistoria* 40: 9-58.