

The Radiocarbon dating of Mesolithic Human Remains: an annotation project

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This is to introduce what I hope will be an ongoing set of papers in *Mesolithic Miscellany*. The first of these follows, written in collaboration with Canadian colleagues. I feel that some explanation is required for what is a project in data management. Its starting place is my experience in putting together a recent paper on burial chronology for the proceedings of the MESO2005 conference (Meiklejohn *et al.* 2009).

In that paper we encountered the problem of the highly erratic publication of radiocarbon dates. While clearly reflecting the proprietary nature of these dates, it can make it extremely difficult to obtain a full picture of the state of dating for any given type of archaeological information. To provide context, in the aftermath of presenting a preliminary paper at Belfast, it took over six months of intensive work to gather the information appearing in the paper's appendix, without which the paper could not have been written. And this length of time was still required even though the database used in the paper had been started over a decade earlier, rooted in a paper that appeared thirty years ago (Newell *et al.* 1979).

The core issue of data availability has been exacerbated over time. The sheer number of dates has accelerated over the years, making any database for a given period or phenomenon of enormous size. One result of this acceleration is that, in a counterproductive way, regular publication of date lists in *Radiocarbon* is, for practical purposes, finished. Laboratories that ceased publication earliest were generally those producing the most dates. As an example the Groningen laboratory, whose dates are central to Mesolithic archaeology, published their last datelist in 1972 (Vogel and Waterbolk 1972). The only large laboratory critical to work on the Mesolithic that is still publishing regular lists is Oxford, in *Archaeometry*, and it has only published three lists in the past seven years, not a criticism of the laboratory but a statement on the volume of dates and time required to prepare lists.

As a result of the above, dates get published in an almost infinite variety of sources, many difficult to locate and access, even with the strength of web-based tools. As a user and collator of dates for over thirty years, I previously published several short notes on burial chronology in the earlier incarnation of this newsletter. I therefore felt that it might be useful if the results of the work done for the Belfast paper were more widely disseminated. While core information is presented in that appendix, such tabulation overlooks much detail, and is already out of date. The editor has kindly suggested that the results would be a useful within *Mesolithic Miscellany*. I have limited this to dating of burials for two reasons, one being my long-term research interest in burial and its interpretation. The other is that to provide a full listing of dates for any region of the European Mesolithic is an enormous task, well beyond the publication capacity of this newsletter. Simply surveying dates for European Mesolithic burials is also beyond the scale of a single article. I will therefore attack this task by region and the first of these papers follows, on Portugal.

A few further comments are necessary. The focus will be on directly dated burials, and will highlight radiocarbon and associated stable isotope results. Calibrated figures for the dates are provided with several cautions. Firstly, calibration is dependent on the program used. Different programs produce different results, as do different versions of the same program. Secondly, isotope correction affects the results, and is dependent on assumptions made about the relationship between readings and diet. Where are the limits placed? Further, though we seem to have a reasonable understanding about marine correction, possible correction for fresh water fish in the diet looms in the shadows like a giant troll. The raw figures for radiocarbon and associated stable isotopes therefore continue to be critical. I therefore ask colleagues to always include raw values when they initially publish dates, or indicate where the raw dates are published. Dates published as calibrated but without raw base figures are impossible to interpret, especially if none of the other critical values are supplied (standard error of original date, isotope values and isotope value limits used, calibration programme used). Finally, I would ask that others that read this article, and datelists to follow, let me know if they have dates that they would be willing to see appear here, either unpublished or in sources that may not be readily accessible to all readers of this journal.

References

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Radiocarbon dating of Mesolithic human remains in Portugal

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As outlined in the preceding short paper, this is the first in a series on direct dating of Mesolithic human skeletal remains. We have begun with Portugal because it is at the southwest corner of Europe and is an area where we have all had experience in the analysis of skeletal material (figure 1). Future papers will expand north and east.

We will group information by site, giving radiocarbon dates and, when available, associated stable isotope results. We will provide a brief summary, focusing on material directly dated to the Mesolithic. However, this series will also comment on materials assumed to be Mesolithic, but whose dating shows them to be either older or younger, and on material thought to be Mesolithic but otherwise undated. We stress that even critical analysis of skeletal provenance can sometimes be in error, as has been shown by the revision of a number of Upper Palaeolithic finds using direct radiocarbon dating of bone (e.g. Vogelherd/Stetten ob Lontal; Conard *et al.* 2004). Some actually now enter the Mesolithic.

Portuguese Mesolithic human material is dominated by skeletons from shell middens. The best known are those from the sites on the Rio Muge at the head of the Tagus (Tejo) estuary, first excavated in 1863. When “The skeletal remains of Mesolithic Man in Western Europe” was published (Newell *et al.* 1979) only the three main sites on the Muge were considered securely dated to the Mesolithic, no further sites were listed in any subsidiary category (older, younger, unknown/unclear), and there were no direct dates on human bone. The list now includes fifteen sites, of which seven still lack directly dated human material. Although the Muge sites still dominate in terms of published work, there are an equal number of sites with dated material from the Sado valley in the Alentejo. The following discussion will be by region and site, beginning with the Muge region, followed by the Sado and the single site from coastal Alentejo. To date, the only loose human bone (LHB) find is from the site of Fiais.

The discussion below emphasizes the radiocarbon dating rather than details of the archaeology or anthropological analysis of the skeletal material. Accordingly, the bibliographic details are limited. In providing latitude and longitude we have relied on a GIS plotting programme (<http://terrill.ca/maps/finder/>), realizing that the exact location of some sites has never been described or mapped. Use of this programme has resulted in some site placements differing from those in earlier sources. We report longitude readings using the Greenwich meridian (some Portuguese and Spanish sources use either the Lisbon or Madrid meridians).

Calibration of direct dates has been done as in Meiklejohn *et al.* (2009) using CALIB version 5.0.1 and a 1σ range. The reservoir effect used is the Portugal marine mean, 256 ± 29 , with limits for pure marine and pure terrestrial of -12 and -20. Calibration uses the ^{13}C value, a value of -16 giving a marine input of 50 percent, one of -18 an input 75 percent etc. The percent was calculated to the nearest whole number (e.g. -17.2 gives a marine input of $2.8(=20-17.2)/8$ or 35 percent).

1. SITES WITH DIRECTLY DATED HUMAN REMAINS

Muge complex and related sites in the Ribatejo

The three sites in the Muge valley, Moita do Sebastião, Cabeço da Arruda and Cabeço do Amoreira (henceforth Moita, Arruda and Amoreira) comprise one of the largest collections of multiple burials from a single site complex in the Mesolithic. They were also the first to be extensively excavated, beginning in 1863 at Moita, continuing in 1865 at Arruda and in 1892 at Amoreira. Further excavation occurred between 1930 and 1937, between 1952 and 1967, and in new ongoing excavations starting in 2000. Limited publication of the pre-1952 material and absence of records (now available, see below) meant that in 1979 (Newell *et al.* 1979) the most that could be said was that though the finds made between 1952 and 1967 were demonstrably Mesolithic, the association of earlier finds was unclear. Intrusive burial into Mesolithic midden contexts could not be excluded.

This situation has been clarified by direct radiocarbon sampling of human material that we began in 1983. The age and Mesolithic association is now sure. However, still unresolved issues surround the overall site inventories, in large part due to curatorial issues (see below under the various sites), now partially solved by publication of previously unavailable early site records (Cardoso and Rolão 1999/2000).

That there were other sites in the Muge valley has never been in doubt, as seen in maps published by Roche (e.g. Roche 1965). Two of them, Fonte do Padre Pedro and Flor da Beira, were apparently destroyed and very little skeletal material is preserved in the Serviços Geológicos in Lisbon. Brief mention of them is made below in the section looking at undated sites. Cova da Onça, just to the south of the Muge valley, has recently provided directly dated human material though with little additional contextual information. The location of the five known shell middens of the Muge valley, all within ~3 km of each other, is mapped in detail by van der Schriek and colleagues (2007). The dated Muge sites have a total range from ~6300 to 7600 bp as determined by the available dates. The single Magos date is contemporary with Moita.



Figure 1 (left): map of Portugal and key locations mentioned in the text.

Figure 2 (below): Amoreira mound in 1999 (photo: Nicky Milner)





Figure 3: Excavation by Mirjana Roksandic of a child burial at the base of the Amoreira midden, found during cleaning back the section in 2000 (Photo: Nicky Milner).

Cabeço da Amoreira (Muge), Ribatejo

- **Nature and location of site:** Shell midden on the south bank of the Muge River; 39.10 N, -8.67 W (figures 2 and 3).
- **First excavated:** 1892 by Paula e Oliveira
- **Later excavations:** 1930 to 1933 (da Serpa Pinto, dos Santos Jr. and Ataide); 1958 to 1967 (Roche and da Veiga Ferreira); 2000 to 2006 (Rolão and Roksandic); 2007 to present (Bicho).
- **Number of individuals:** 34 according to Roksandic and Baros (forthcoming), 13 from excavations in the 1930s, 16 from the 1960s and five from the most recent work. This figure supercedes the figure of 26 provided by Cunha and Cardoso (2001).
- **Primary description of human remains:** No study of the full collection. A brief survey of the remains was made by Cunha and Cardoso (2001).
- **Direct dates on human bone:** Three, two from burials excavated in 2000 and 2001 (Roksandic 2006; Rolão and Roksandic 2007), and one from an earlier burial reported by Cunha and colleagues (Cunha and Cardoso 2001; Cunha *et al.* 2003). The date given individual CAM-00-01 is reported here for the first time. An earlier date from this individual on a different element (TO-10218) was ~700 years younger. Both samples had a low collagen yield.
- **Other dates known:** Three, on charcoal or bone, ranging from 6050 ± 300 (Sa-194) to 7030 ± 350 (Sa-195) (Delibrias and Roche 1965).
- **Diagnosis and Discussion:** Securely dated to the Mesolithic.

Date (bp)	Number	Burial (if known)	13C	15N	cal. BP	cal. BC
6550 ± 70	TO-10225	CAM-01-01	-19.3	8.2	7460-7320	5410-5370
6850 ± 40	Beta-127450	7	-16.5	---	7490-7430	5540-5480
7300 ± 80	TO-11819-R	CAM-00-01	-16.3	---	7940-7770	5990-5820



Figures 4 and 5: left- profile of Arruda in 1983 with David Lubell (photo: Christopher Meiklejohn); right- skeletal removal at Arruda in 2000 (Photo: Jose Rolão).

[Figure 4 is reversed and is Amoreira, not Arruda](#)

Cabeço da Arruda (Muge), Ribatejo

- **Nature and location of site:** Shell midden on the north bank of the Muge River, approximately 1 km northeast of Amoreira; 39.11 N, -8.66 W (figures 4 and 5).
- **First excavated:** 1865 by da Costa
- **Later excavations:** 1880 (Ribeiro); 1892 (Paula e Oliveira); 1937 (da Serpa Pinto, dos Santos Jr. and Ataíde); 1964 and 1965 (Roche and da Veiga Ferreira); 2000, when the profiles were reinforced (Rolão and Roksandic).
- **Number of individuals:** Varying numbers of burials have been suggested, in large part related to the absence of records. Newell *et al.* (1979) estimated over 100 burials, while detailed analysis of the collection in the 1980s, together with earlier records produced an initial MNI of 97 (Jackes and Lubell 1999: MR independently found the MNI to be 96), extended on further archival work to 105, including burials excavated in the 1960s but misplaced until 2001 (Jackes and Meiklejohn 2004), based on the material held in Lisbon (the state of the collection in Porto precludes the production of a full inventory). Two further individuals in burial context were excavated in 2000, together with two metacarpals that could have been associated with any of the previously excavated burials.
- **Primary description of human remains:** There is no published full inventory of the complete collection, though full inventories have been at least three times; in the 1980s by CM and MJ; in 1995 by Cunha and colleagues; and recently by MR. The most complete discussion of the material is the demographic analysis of Jackes and Meiklejohn (2004). Various elements of the collection have been used in other studies.
- **Direct dates on human bone:** A total of eight, five from the burials excavated prior to 1964 (TO-354 to 360), and two from material excavated in 2000 (TO-10216 and 10217). The earlier dates were initially published by Lubell and Jackes (1985) and Meiklejohn *et al.* (1986), the later set by Roksandic (2006). A final date by Beta on individual 6 (Cunha *et al.* 2003) is unexpectedly over half a millennium earlier than all of the other dates.
- **Other dates known:** Three are available. Two on charcoal are 5150 ± 300 (Sa-196) and 6430 ± 300 (Sa-197), said to date the top and bottom of the midden (Delibrias and Roche 1965). A date of 7410 ± 70 (TO-10215) is from charcoal found within the thorax of CA-00-02 (TO-10216).
- **Diagnosis and Discussion:** Securely dated to the Mesolithic. Discussion of burials from Muge usually involves this site or Moita. The Saclay dates should be treated with caution, in view of the analytic procedures used. However, the lower charcoal date (Sa-197) came from the top of the skeleton layer of the 19th century excavations and generally overlaps the direct burial dates (except for TO-356). The two sets are therefore generally consistent. It should also be noted that numbering and lettering of the collections from various excavations has been inconsistent, making for a number of errors in the literature (see discussion in Jackes and Meiklejohn 2004). That there are other dating queries can be seen in the discrepancy between TO-10216 (burial CA-00-02) and the charcoal within the thorax of the same individual (TO-10215) (after calibration the two are discrepant by ~500/600 years).

Date (bp)	Number	Burial (if known)	13C	15N	cal. BP	cal. BC
6360 ± 80	TO-356	N (Lisbon)	-15.3	12.5	6930-6730	4980-4780
6620 ± 60	TO-10217	CA-00-01	-18.1	10.5	7430-7320	5480-5370
6780 ± 80	TO-355	D (Lisbon)	-18.9	10.3	7620-7490	5670-5540
6960 ± 70	TO-359	42 (Lisbon)	-17.2	11.8	7670-7520	5720-5570
6970 ± 60	TO-354	A (Lisbon)	-19.0	12.2	7790-7670	5840-5720
6990 ± 110	TO-360	III (Lisbon)	-17.7	11.2	7770-7570	5820-5620
7040 ± 60	TO-10216	CA-00-02	-17.9	10.6	7780-7660	5830-5710
7550 ± 100	Beta-127451	6 (Porto)	-19.0	---	8380-8200	6430-6250



Figure 6: Cova da Onça (Photo: Pedro Alvim)

Cova da Onça (Magos), Ribatejo

- **Nature and location of site:** Shell midden on the north bank of the Magos River; 38.99 N, -8.68 W (approximate location ~10-15 km south of the Muge sites) (figure 6).
- **First excavated:** Midden sites on the Magos were mentioned by Ribeiro (1880), at the time of his work at Muge.
- **Later excavations:** To our knowledge no further excavation has occurred.
- **Number of individuals:** Recent work by one of us (MR) suggests an MNI at least 36, eight juveniles and 28 adults (Roksandic and Cunha, forthcoming).
- **Primary description of human remains:** No study of the material has been published. Leonard and Roksandic (forthcoming) discuss caries rates in this population.
- **Direct dates on human bone:** One. Cunha *et al.* (2003) do not indicate which element was dated.
- **Other dates known:** None.
- **Diagnosis and Discussion:** The date places the material securely within the Mesolithic, contemporary with the sites at Muge. It is noted in a map within the survey of Iberian Mesolithic sites by Gonzalez Morales and Arnaud (1990) and has been indirectly cited in other studies.

Date (bp)	Number	Burial (if known)	13C	15N	cal. BP	cal. BC
7140 ± 40	Beta-127448	Not identified	-17.2	---	7790-7690	5840-5740



Figure 7: A view towards Moita (Photo: Pedro Alvim)

Moita do Sebastião (Muge), Ribatejo

- **Nature and location of site:** Shell midden on the south bank of the Muge River, less than a kilometer WNW of Amoreira; 39.11 N, -8.68 W (figure 7).
- **First excavated:** 1863 by da Costa and Ribeiro.
- **Later excavations:** 1880 (Ribeiro), 1885 and 1892 (Paula e Oliveira) and from 1952 to 1954 (Roche and da Veiga Ferreira). The last set of excavations occurred after the site had been bulldozed in 1951, allowing horizontal areal exposure of the basal layers and the skeletal deposit.
- **Number of individuals:** The various published inventories are inconsistent, as discussed in our recent attempt to clarify the demography of the site (Jackes and Meiklejohn 2008). Newell *et al.* (1979) only considered the Roche/Veiga Ferreira collection to be demonstrably Mesolithic and, based largely on Ferembach (1974), gave the number of individuals as 40 to 44. The total number, including material from the earlier work has always been problematic. The estimated MNI of Jackes and Lubell (1999) was 79, raised to 85 in our more detailed analysis (Jackes and Meiklejohn 2008). Work by Jackes and Alvim (2006) also suggests that there may have been more skeletons that have not survived in the collection.
- **Primary description of human remains:** This is the only Muge site with a description of the collection, by Ferembach (1974), centred on the work of the Roche/Veiga Ferreira excavation. However, as discussed elsewhere (Jackes and Meiklejohn 2008), this study was incomplete. As an example, where Ferembach reported data on 428 teeth from the site the figure available to Meiklejohn *et al.* (1988), based on work in 1984 and 1985, was 889. Various elements of the collection have been used in other studies.
- **Direct dates on human bone:** Six dates have been obtained, all consistent and suggesting a total period of use of the site for burial of ~400 to 450 years. The five dates from Isotrache (TO) were published by Lubell and colleagues (Lubell and Jackes 1985; Meiklejohn *et al.* 1986) on identified individuals. The Beta date is published by Cunha *et al.* (2003).
- **Other dates known:** Two charcoal analyses are available and are generally consistent with the skeletal dates: 7080 ± 130 (H-2149/1546) and 7350 ± 350 (Sa-16) (Delibrias and Roche 1965). The calibrated H-2149/1546 date is older than the calibrated dates on human material, suggesting that old wood may be involved. [H-2119/1546, note correction, was published in Roche 1972, p.139](#)
- **Diagnosis and Discussion:** Securely dated to the Mesolithic. The core set of dates for this site came from the same work as described above for Arruda. In this case the age range of the skeletons is consistent with the early charcoal dates. The groundwork for a discussion of the archaeology of this site is examined in the ongoing work of Jackes and Alvim (2006), which depends in part on material published by Cardoso and Rolão (1999/2000).

Date (bp)	Number	Burial (if known)	13C	15N	cal. BP	cal. BC
6810 ± 70	TO-135	“CT” (Lisbon)	-15.3	13.4	7420-7290	5470-5340
7120 ± 40	Beta-127449	16 (Porto)	-16.8	---	7750-7660	5800-5710
7160 ± 80	TO-134	41 (Lisbon)	-16.7	11.2	7830-7660	5880-5710
7180 ± 70	TO-132	24 (Lisbon)	-16.8	11.9	7830-7680	5880-5730
7200 ± 70	TO-133	29 (Lisbon)	-16.9	10.4	7860-7700	5910-5750
7240 ± 70	TO-131	22 (Lisbon)	-16.1	12.2	7840-7690	5890-5740

Sado complex (Alentejo Province)

While the Muge sites are well known, the large collections of material from the Sado valley in the Alentejo were largely ignored until the 1980s. The middens stretch along roughly 15 km of the river, with a small number on smaller tributary streams. They are less tightly clustered than in the Muge valley, but still geographically close. There has been only limited site-specific publication of the archaeology or skeletal series. First discovered in the 1930s (Barradas 1936; Marchand 2001), initial excavation occurred from 1955 to 1966 by the National Archaeological Museum under the direction of Manuel Heleno, and much of the skeletal material was lifted *en bloc*, and in at least some cases sealed in paraffin. Heleno, an historian rather than archaeologist, became director of the National Museum of Archaeology in Lisbon in the 1930s, and did not publish any of the work. The earliest readily accessible sources are by Arnaud (1985, 1989), who began a program of research on the Sado sites in 1981 but reported no further burials (see also Arnaud 2000).

As at Muge, the midden burials were at the base of the sites, as recorded for the majority of the Muge burials, although archaeological details differed (e.g. burial goods, burial type). Early published dates, largely on shell (Bicho 1994; Zilhão 1993), cannot be said to date the burials. New direct dates (see below) confirm the Mesolithic affinities of the Sado burials in the same manner as at Muge. Limited information is available for specific sites and the primary information on the burials comes from the brief overview by Cunha and colleagues (2002). Marchand (2001) lists eleven sites, with seven yielding human skeletal material, three of these providing direct dating. It should be noted that site size and number of burials is not correlated.

Cabeço das Amoreiras, Alentejo

- **Nature and location of site:** Medium-sized shell midden (~1270 m²) on the southwest bank of the Sado River; 38.26 N, -8.38 W.
- **First excavated:** 1955-1966 by National Archaeological Museum under Manuel Heleno.
- **Later excavations:** 1984/86 by José Arnaud.
- **Number of individuals:** Six individuals were excavated by Heleno.
- **Primary description of human remains:** No site specific study of the material has been published.
- **Direct dates on human bone:** One, described by Cunha *et al.* (2002). We are concerned that the 13C value of the individual dated from this site (-20.8) is outside the range of Sado individuals obtained by Maria Hillier (in litt. to MJ 18/11/08) from four Sado sites, including Amoreiras. Initial work by Hillier on Sado individuals produced C:N ratios outside the acceptable range, suggesting the possible presence of exogenous carbon from paraffin. A clearer understanding of this issue for all the Sado sites must await publication of full details on the dated Sado bone and the completion of Hillier's work.
- **Other dates known:** two, on charcoal and shell, 5990 ± 75 (Q-(AM85B2a)) and 6370 ± 70 (Q-(AM85B2b)) (Arnaud 2000; Marchand 2001).
- **Diagnosis and Discussion:** Securely dated to the Mesolithic and not to be confused with the very similarly named site at Muge. Direct dating places the material roughly contemporary with the burials at Muge. The date is earlier than both the shell and charcoal dates (Marchand 2001). In the absence of commentary on the date and possible contamination, especially the issue of the use of paraffin in the preservation of the burials, interpretation of this and the other direct dates on Sado midden burials should be made with considerable caution.

Date (bp)	Number	Burial (if known)	13C	15N	cal. BP	cal. BC
7230 ± 40	Beta-125110	skeleton 5	-20.8	---	8150-7980	6200-6030

Arapouco, Alentejo

- **Nature and location of site:** The most northwesterly of the Sado sites, a medium-sized shell midden (~1175 m²) on the southwest bank of the Sado River; 38.32 N, -8.49 W.
- **First excavated:** 1955-1966 by National Archaeological Museum under Manuel Heleno.
- **Later excavations:** To our knowledge no further excavation has occurred.
- **Number of individuals:** Thirty-two individuals were excavated by Heleno.
- **Primary description of human remains:** No site specific study of the material has been published.
- **Direct dates on human bone:** One, described by Cunha *et al.* (2002, 2003).
- **Other dates known:** One, on shell from the middle level of the midden, 7420 ± 65 (Q-2492).
- **Diagnosis and Discussion:** Securely dated to the Mesolithic and almost identical to the age of the dated material at Cabeço das Amoreiras, though the skeleton appears to be slightly older than dated shell from the mid-levels of the site.

Date (bp)	Number	Burial (if known)	13C	15N	cal. BP	cal. BC
7200 ± 130	Sac-1560	skeleton 2 ^A	-16.9	---	7920-7680	5970-5730



Figure 8: Pez from the Sado valley floor 1983 (Photo: Christopher Meiklejohn).

Cabeço do Pez, Alentejo

- **Nature and location of site:** The most southeasterly and the largest of the Sado middens (~4000 m²); 38.25 N, -8.33 W (figure 8).
- **First excavated:** 1955-1966 by National Archaeological Museum under Manuel Heleno.
- **Later excavations:** 1983 by José Arnaud.
- **Number of individuals:** Between thirty-two and thirty six individuals were excavated by Heleno.
- **Primary description of human remains:** No site specific study of the material has been published.
- **Direct dates on human bone:** Two, apparently on the same individual, described by Cunha *et al.* (2002, 2003).
- **Other dates known:** Four dates are known, but there are interpretive problems with two of them. The two apparently secure dates, on shell, are 6430 ± 65 (Q-2496) and 6730 ± 75 (Q-2497), in essential agreement with the skeleton dates. A younger date of 5535 ± 130 (Q-2499) is considered doubtful by Gob (1990), while an even younger date (3565 ± 50 ; Q-2498) is rejected.
- **Diagnosis and Discussion:** Securely dated to the Mesolithic though clearly the youngest of the three Sado sites with directly dated material. More, but still preliminary, data have been published on this site than the other Sado sites.

Date (bp)	Number	Burial (if known)	13C	15N	cal. BP	cal. BC
6740 ± 100	Sac-1558	skeleton 4	-19.3	---	7620-7470	5670-5520
6760 ± 40	Beta-125109	skeleton 4	-22.6		7640-7580	5690-5630



Figures 9 and 10: left- Samouqueira 1984 (Photo by David Lubell); right- Samouqueira main trench 1984 (Photo by David Lubell).

Mira/coastal Alentejo complex (Alentejo Province)

A number of Mesolithic sites have been recovered from the coastal area south of the Sado valley, some in the valley of the Mira and extending further south (see e.g. Zilhão 1993). Though clearly a regional site cluster they do not show the site density characterising either the Muge or Sado valleys. So far only one of these sites has yielded directly dated human material in a Mesolithic context and that of a limited nature. A second site has yielded material in a probable Mesolithic context, but without a direct date.

Samouqueira I, Alentejo

- **Nature and location of site:** Coastal open air site south of Sines and north of the Mira River; 37.87 N, -8.79 W (figures 9 and 10).
- **First excavated:** 1984 by a joint Canadian/Portuguese team (see Lubell *et al.* 1989, 2007).
- **Later excavations:** The site was excavated further by the Portuguese in 1985 and 1992. No further skeletal material has been reported.
- **Number of individuals:** Two partial skeletons occurred in a context indicating surface movement and the mixture of archaeological levels.
- **Primary description of human remains:** The material has been described in Lubell and Jackes (1985), and Lubell *et al.* (1989, 2007).
- **Direct dates on human bone:** A date on the second of the two individuals was published by Lubell and Jackes (1985) and by Meiklejohn *et al.* (1986).
- **Other dates known:** two other dates are known, one on mammal bone, the other on shell (see Lubell *et al.* 2007). The first of these, 5190 ± 130 (Beta-11722), is from a square and level adjoining that in which the human remains were recovered and shows the degree of disturbance in the site. The shell date 7520 ± 70 (ICEN-729) is unfortunately from an unknown context, but suggests long-term use of the site.
- **Diagnosis and Discussion:** Though the dated individual is securely dated to the Mesolithic the site is not intact. Both individuals appear to have been disturbed (post depositional) and partial inhumation burials and give us little sense of the full nature of burial at the site. It should be noted that Tavares da Silva and Soares (2006) date both specimens to the Neolithic, something they have also done in earlier publications. We feel that this is not in agreement with the date obtained, a position also taken by Zilhão (1998).

Date (bp)	Number	Burial (if known)	13C	15N	cal. BP	cal. BC
6370 ± 70	TO-130	skeleton H2	-15.3	16.5	6930-6750	4980-4800

2. SITES WITH POSSIBLE MESOLITHIC HUMAN REMAINS BUT WITHOUT DIRECT DATES

Seven sites, two from the Muge, four from the Sado and one from the Mira valley, are reported to have human skeletal remains attributable to the Mesolithic, but without radiocarbon results from the skeletal material itself. They are listed below in alphabetic order.

Barrada do Grilo (Sado), Alentejo

- **Nature and location of site:** Shell midden on an easterly tributary of the Sado River, size not known; 38.27 N, -8.32 W.
- **First excavated:** 1955-1966 by National Archaeological Museum under Manuel Heleno.
- **Later excavations:** To our knowledge no further excavation has occurred.
- **Number of individuals:** No information is available beyond mention by Marchand (2001) that burials were recovered from the site.
- **Primary description of human remains:** No study of the material has been published.
- **Direct dates on human bone:** None.
- **Other dates known:** None.
- **Diagnosis and Discussion:** There is a possibility that the material recovered is Mesolithic, but considerable caution is advised. Later levels of the site were analyzed by Santos and colleagues (1972), and Marchand (2001) indicates that the site had late Mesolithic and Chalcolithic levels.

Fiais (Mira), Alentejo

- **Nature and location of site:** An encampment and bone bed on a terrace of the Rio Mira approximately 10 km from the coast; 37.57 N, -8.61 W.
- **First excavated:** 1986 by J.M. Arnaud and D. Lubell.
- **Later excavations:** Arnaud continued excavation of this site from 1987 to 1989. No further human bone was apparently recovered.
- **Number of individuals:** It is suggested by Lubell *et al.* (2007) that the piece, a fragment of skull, may indicate the nearby presence of an as yet undiscovered human burial.
- **Primary description of human remains:** The piece is mentioned by Lubell *et al.* (2007) but has not been described.
- **Direct dates obtained:** None
- **Other dates known:** Six dates have been obtained, three on bone, two on charcoal and one on shell, with an age range of 6180 ± 110 (ICEN-141) to 7310 ± 90 (ICEN-103) (Lubell and Jackes 1988; Lubell *et al.* 2007).
- **Diagnosis and Discussion:** The contained material and dates obtained indicate a pure Mesolithic site. Though the human bone recovered in A9 appears to be in clear Mesolithic context, a direct date would confirm the attribution.

Flor da Beira (Muge), Ribatejo

- **Nature and location of site:** Shell midden on the north bank of the Muge River, less than 1 km NNE of Moita; 39.11 N, -8.68 W.
- **First excavated:** In the 19th century. We have not been able to discover the year and the excavator.
- **Later excavations:** We have found no record of further excavation.
- **Number of individuals:** Recent work by one of us (MR) suggests an MNI of 4 or 5 for materials present in the Serviços Geológicos in Lisbon.
- **Primary description of human remains:** The material has not been described.
- **Direct dates obtained:** None.
- **Other dates known:** None.
- **Diagnosis and Discussion:** This site (along with the next) was identified in the 19th century as one of the shell middens later attributed to the Mesolithic. Although such an association is not improbable direct dating of surviving material is desirable.

Fonte do Padre Pedro (Muge), Ribatejo

- **Nature and location of site:** Shell midden on the north bank of the Muge River, ~2 km west of Flor da Beira; 39.12 N, -8.69 W.
- **First excavated:** In the 19th century. We have not been able to discover the year and the excavator.
- **Later excavations:** We have found no record of further excavation.
- **Number of individuals:** Recent work by one of us (MR) suggests an MNI of two or three for materials present in the Serviços Geológicos in Lisbon, a child and one or two adults.
- **Primary description of human remains:** The material has not been described.
- **Direct dates obtained:** None.
- **Other dates known:** None.
- **Diagnosis and Discussion:** This site (along with the previous) was identified in the 19th century as one of the shell middens later attributed to the Mesolithic. Although such an association is not improbable direct dating of surviving material is desirable.

Poças de São Bento (Sado), Alentejo

- **Nature and location of site:** Shell midden on a southern tributary of the Sado River, second in size to Cabeço do Pez at ~3570 m²; 38.26 N, -8.44 W.
- **First excavated:** 1955-1966 by National Archaeological Museum under Manuel Heleno.
- **Later excavations:** 1987-1988 by José Arnaud and Lars Larsson.

- **Number of individuals:** Fifteen skeletons were recovered in the earlier work at this site.
- **Primary description of human remains:** No site specific study of the material has been published.
- **Direct dates on human bone:** None.
- **Other dates known:** The site has given three dates on charcoal and shell ranging from 6780 ± 65 (Q-2494) to 7040 ± 70 bp (Q-2493) (Arnaud 2000), indicating general contemporaneity with Cabeço do Pez.
- **Diagnosis and Discussion:** The information known to date (Cunha *et al.* 2002, 2003) suggests that the material should be Mesolithic, including apparent location of the burials at the base of the midden, but confirmation is desirable.

Vale de Romeiras (Sado), Alentejo

- **Nature and location of site:** The smallest of the shell middens, apparently on the south bank of the Sado River and measuring only ~ 54 m²; 38.24 N, -8.36 W.
- **First excavated:** 1955-1966 by National Archaeological Museum under Manuel Heleno, excavations which apparently removed the shell midden *in toto*.
- **Later excavations:** No further excavation occurred.
- **Number of individuals:** Twenty-six skeletons were recovered from this small midden. Information known to date on the skeletal material is from Cunha and colleagues (2002).
- **Primary description of human remains:** No site specific study of the material has been published.
- **Direct dates on human bone:** None
- **Other dates known:** Three dates have been obtained, one on animal bone and two on shell, with an age range of 7130 ± 110 (ICEN-144) to 7390 ± 80 (ICEN-150) (Arnaud 2000).
- **Diagnosis and Discussion:** As at Poças de São Bento the information known to date (Cunha *et al.* 2002) suggests that the material should be Mesolithic, including apparent location of the burials at the base of the midden, but confirmation is desirable.

Várzea da Mó, Alentejo

- **Nature and location of site:** Shell midden on the northeast bank of the Sado River, a few hundred metres west of Pez; 38.25 N, -8.34 W.
- **First excavated:** 1955-1966 by National Archaeological Museum under Manuel Heleno, but no burials were apparently located at this time.
- **Later excavations:** A single burial was apparently recovered in unpublished excavations in 1985 (Cunha *et al.* 2002; Marchand 2001).
- **Number of individuals:** Information available suggests that a single individual was recovered (Cunha *et al.* 2002).
- **Primary description of human remains:** No description of the material has been published.
- **Direct dates on human bone:** None.
- **Other dates known:** A single date on shell has been published, 7110 ± 50 (ICEN-273).
- **Diagnosis and Discussion:** As at Poças de São Bento and Vale de Romeiras the information known to date (Cunha *et al.* 2002) suggests that the material should be Mesolithic, including apparent location of the burials at the base of the midden, but confirmation is desirable.

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Postgraduate research projects

On May 29th 2009 a Mesolithic postgraduate student conference was held at the University of York. This is the second one – the first took place in 2006, as reported in Mesolithic Miscellany 18.1. In this section, Ed Blinkhorn provides an overview of the day and the talks. Abstracts for the conference can be found at: <http://sites.google.com/site/mesolithicstudents/Home>. This review is followed by a number of short accounts from MPhil and PhD students on their research projects. I would be very pleased to receive more abstracts for future issues.

A Review of the 2nd Gathering Our Thoughts Postgraduate Mesolithic Conference, York 2009

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It is a refreshing and welcome diversion from a postgraduate degree to find out about those which others are pursuing, at whatever level, and the “Gathering Our Thoughts” 2009 conference afforded the occasion to do just that. Conceived as an opportunity for emerging Mesolithic talent to present their research to their contemporaries and meet those people at different cutting edges of earlier Holocene archaeology, the conference offered a stimulating and varied array of papers. It was as tricky organising the many papers into themes on the day as it is grouping them here, though with hindsight broad trends did surface.

The relationship between person and beast formed one such trend. Nick Overton (Cambridge University Archaeological Unit) explored faunal assemblages by embedding within a form of *chaîne opératoire* both human and animal. Though necessarily prioritising the former, he emphasised the interaction of the two as the formative unit of interpretation, using examples from across Europe. John Piprani (University of Manchester) argued that the dog burials at Skateholm, Sweden, can provide an innovative construction of Mesolithic personhood by stressing animals’ contribution to and status within the community, both species maintaining various positions within it.

Amy Gray Jones (University of Manchester) addressed the physical processes involved in the funerary practices of northwest Europe, highlighting and elevating in her interpretation the technical skill and sensory experience involved in the manipulation of corpses. Also engaging with mortuary traditions was Rosalind