Proc. Univ. Bristol Spelaeol. Soc., 1989 **18**(3), 390–394

CHARTERHOUSE WARREN FARM SWALLET, MENDIP, SOMERSET

RADIOCARBON DATING EVIDENCE

by

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ABSTRACT

The site of Charterhouse Warren Farm Swallet, reported in full in Levitan *et al.* 1988, is discussed in relation to the radiocarbon dating results which became available after the full report was completed. Seven dates have been obtained, three from SERC funded submissions to the Oxford Radiocarbon Accelerator Unit, and four from NERC funded submissions to the Scientific Services Radiocarbon Laboratory. These dates show three distinct phases of activity. The earliest phase is the initial deposition, around 3100–2500 BC, of bones that later occupied the Upper Cave Fill in Mitchell's and Bone Chambers. The second phase is the progressive filling of the Entrance Shaft, commencing around 2500–2150 BC, and filling very rapidly until about 2460–1995 BC by which time nearly fifteen metres of deposit had accumulated. The five metre zone between Horizons 2 and 4 is shown to have resulted from extremely fast accumulation; possibly a single infilling event. The rest of the Entrance Shaft filled at a slower rate of about one metre per 100 years. The third phase, only hinted at by a single date from a human bone, is the re-opening of the caves during the Iron Age (c. 360–5 BC). It is unlikely, however, that human access was actually possible. These results are interpreted as indicating a definite difference between the Upper Cave Fill and the Entrance Shaft Fill (of which Debris Cone 1 is a constituent), and that the lower part of the Entrance Shaft was deliberately filled by man. No clear interpretation is offered for the human bone dated to the Iron Age other than to say that some sort of access was possible.

INTRODUCTION

The site of Charterhouse Warren Farm Swallet has been fully described in a previous paper, and the reader is referred to that paper for detail concerning the excavations, finds and interpretations (Levitan *et al.* 1988). In that paper the problem of fully interpreting the evidence in the absence of absolute dating evidence was discussed at length, and the interpretations given were, therefore, tentative. A second paper deals more specifically with the taphonomic aspects of the sequence, and some of the arguments advanced in that paper are relevant here (Levitan and Smart, forthcoming). Results from radiocarbon dating are now available and are described and discussed below.

RADIOCARBON DATING

Seven bone samples were submitted for radiocarbon dating, three to the Oxford Radiocarbon Accelerator Unit, funded by a grant from the Science and Engineering Research Council (SERC), and four to the Scientific Services Radiocarbon Laboratory, Glasgow, funded by a grant from the Natural Environment Research Council (NERC). The results are listed in TABLE 1. It should be noted that in the following discussion, all references to periods of time expressed in years are given as calibrated ranges. This is because 'the central date is only one possible result within this band width' (Pearson 1987, 102). Calibration has been calculated using the curves given in Stuiver and Pearson (1986), Pearson and Stuiver (1986) and Pearson *et al.* (1986) and a standard error of $\pm 2\ \sigma$.

The locations of the samples may be divided into three groups, as shown in TABLE 1. These provide an outline sequence for the Entrance Shaft Fill and give an idea about the age of the Upper Cave Fill (Bone and Mitchell's Chambers).

TABLE I—*Radiocarbon dating results*

Sample No.	*Lab. No.*	*Sample*	*Location*	*Date (bp)*	*Date (Cal.)*
ENTRANCE SHAFT					
	BM-731	aurochs	Entrance Shaft: Horizon 1	3245 ± 37	1625–1440 BC
USF-393	OxA-1559	human scapula	Entrance Shaft: Horizon 2	3790 ± 60	2460–2240 BC
USF-394	OxA-1560	human femur	Entrance Shaft: Horizon 4	3760 ± 60	2460–1995 BC
BC.DC1-841	OxA-1561	aurochs skull	Debris Cone 1 (Entrance Shaft)	3870 ± 60	2500–2150 BC
BC.DC1-103	SRR-3451	bovid pelvis	Debris Cone 1 (Entrance Shaft)	3615 ± 155	2460–1550 BC
BONE CHAMBER					
BC.DC2-185	SRR-3449	bovid tibia	floor of Bone Chamber	4130 ± 75	2920–2500 BC
MITCHELL'S CHAMBER					
MC.DC2-196	SRR-3450	human humerus	slope in Mitchell's Chamber	2145 ± 65	360–5 BC
MC.DC2-304	SRR-3452	aurochs atlas	base of Mitchell's Chamber	4340 ± 60	3100–2790 BC

Notes:
1. Sample number coding: USF = Entrance Shaft fill; BC = Bone Chamber; MC = Mitchell's Chamber; DC1 = Debris Cone 1; DC2 = Debris Cone 2.
2. $\delta^{13}C$ values: −20‰ (assumed) for OxA dates; −24.7‰ SRR-3449, −20.9‰ SRR-3450, −25.9‰ SRR-3451, −24.7‰ SRR-3452.
3. Dates are quoted at the $\pm 1\sigma$ level of analytical confidence.
4. All calibrated dates are quoted at the $\pm 2\sigma$ level of confidence.
5. The large uncertainty range for SRR-3451 is due to the poor state of protein preservation in the sample (<1.5 g collagen).

Entrance Shaft

The Entrance Shaft was sampled at five points including the previously published date:

(*a*) Horizon 1 (aurochs find);
(*b*) Horizon 2 (the Beaker horizon);
(*c*) Horizon 4 (the flint dagger horizon);
(*d*) the base of the fill as seen in Bone Chamber (Debris Cone 1);
(*e*) the possible debris cone associated with the fill (Debris Cone 1 in Bone Chamber).

The Horizon 1 date has been discussed previously (Levitan and Smart (forthcoming) quote the relevant papers). The dates for Horizons 2 and 4 are more or less synchronous (the date ranges being 2460–2240 BC and 2460–1995 BC respectively). Horizon 3, a relatively sterile layer, may, therefore, have accumulated extremely quickly, possibly a single event. The two Debris Cone 1 results are rather conflicting, though one result (BC.DC1-103) is from the low protein sample and may be unreliable. The other result

BC.DC-841) gives a date range of 2500–2150 BC, possibly about 100 years earlier than Horizons 2–4, though with considerable overlap in ranges (FIG. 1). There is no doubt about the sample's provenance as it was securely located at the very base of the Entrance Shaft as revealed in Bone Chamber (Levitan *et al.*, 1988, 194 and Figs. 16, 33). The other sample (BC.DC1-103), located about 2 m from BC.DC1-841 is probably from aurochs (Levitan *et al.*, 1988, plotted as aurochs on Fig. 33). Its range overlaps considerably with the other dates, so may be seen to be of the same general order as the other Entrance Shaft Fill dates.

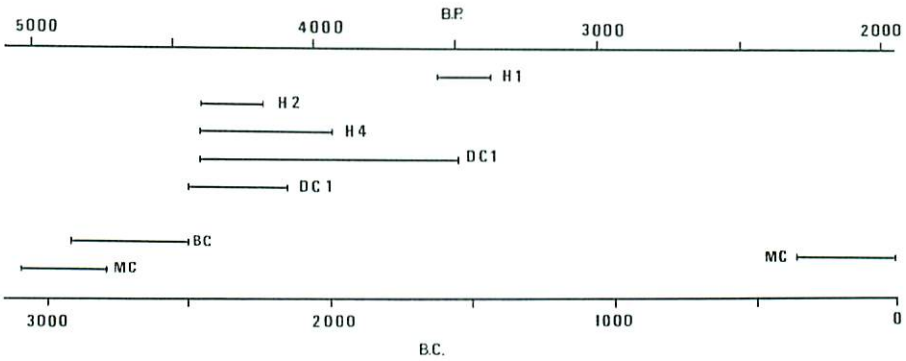

FIG. 1—CALIBRATED RADIOCARBON DATING SEQUENCE, CHARTERHOUSE WARREN FARM SWALLET
Key: Entrance Shaft Fill—H1 (Horizon 1), H2 (Horizon 2), H3 (Horizon 3), DC1 (Debris Cone 1); Upper Cave Fill—BC (Bone Chamber), MC (Mitchell's Chamber)

Upper Cave Fill

The Upper Cave Fill, derived from a talus cone in Mitchell's Chamber, was sampled at three locations:

(*a*) from near the top of the boulder slope which joins Mitchell's and Bone Chambers, and probably close to the original location of Debris Cone 2 (MC.DC2-196);

(*b*) from the base of the boulder pile and at the Mitchell's/Bone Chamber 'junction' (MC.DC2-304);

(*c*) from Bone Chamber, close to Debris Cone 1 (BC.DC2-185).

The last two have date ranges of 3100–2790 BC and 2920–2500 BC respectively. Their date ranges overlap considerably, but they are apparently earlier than the earliest part of the Entrance Shaft fill. Whether the fact that they may be as much as 200 years or so apart means that Debris Cone 2 (the talus cone that was the original deposit before debris flow activity dispersed the bones) was accumulating over this period of time is uncertain, but this is certainly possible. The third sample is very much later, and is later even than the Entrance Shaft samples (date range 360–5 BC). This indicates that the Upper Cave was open at some time during the Iron Age, and the fact that this sample is a human bone implies some form of human activity (though not necessarily access).

INTERPRETATION

It seems reasonably clear that the Entrance Shaft fill and Debris Cone 1 are part of the same fill and that they accumulated separately from the rest of the Upper Cave Fill on the basis of the taphonomic analysis (Levitan and Smart, forthcoming). The dating evidence also indicates a difference between the deposits, though this difference may not be very great (FIG 1). Three 'phases' of activity appear to have occurred:

1. Deposition of bones either in entrance to Main Aven or in Debris Cone 2 c. 3100–2500 BC. This date range may not represent the full time range and, since it is the age of the bones, may not precisely represent the age of Debris Cone 2 because the bones may have originally accumulated further up in the Main Aven before being introduced into Mitchell's Chamber. Debris flow activities may have commenced while accumulation was still occurring, but accumulation would have ceased around 2500 BC whilst debris flows could have continued after that time.

2. Fill of the Entrance Shaft, commencing c. 2500–2150 BP. The seven metres of fill between Debris Cone 1 and Horizon 4 may have accumulated over approximately 100 years, and the six metres of fill comprising Horizons 2, 3 and 4 then accumulated extremely quickly. Horizon 3, therefore, may be interpreted as a deliberate, and very considerable dump of material that took place in a very short period of time, separating Horizons 4 and 2 which appear to be of approximately the same date (c. 2460–1995 BC). The date of 1295 ± 37 bc (uncal.) (BM-731) quoted in Levitan *et al.* (1988, 200) is calibrated to 1625–1440 BC and is from about four metres above Horizon 2, thus indicating a slower rate of deposition after Horizon 2. There was a further five metres of deposit above BM-731 before Iron Age levels are reached, so the rate of deposition for Horizon 1 appears to be in the order of one metre per 100 years. The accelerated rates of fill for Horizons 2–4 (six metres in possibly less than 10 years) and for Horizon 4-Debris Cone 1 (one metre per 14 years) imply deliberate infilling by human agency. These calculations should not be taken as definite since many more dates would be required to back them up, but they do indicate something of the *order* of rates of infill. Certainly Horizon 3 would have to have been a catastrophic natural event for this amount of material to have accumulated in so short a time. The six metres of deposit occupies the Entrance Shaft which measures approximately eight by two metres overall (Levitan *et al.*, 1988, Fig. 10). Assuming Horizon 3 to be of the same thickness in the unexcavated part of the Entrance Shaft, this is 96 m^3 of deposit.

3. Reopening of caves. The human humerus dated to 360–5 BC indicates that bone was able to accumulate within the cave during the Iron Age. The lack of any occupation debris implies that the cave was not actually used by man (possibly not accessible), so it may be that the opening was either very small or that the entrance route was too difficult. Whatever the explanation, this date gives a tantalizing indication of continued accumulation within the caves long after the initial bone fills. The Entrance Shaft is certainly not a likely candidate for the reopening as Iron Age deposits there are only six metres below ground level (Levitan *et al.*, 1988, 199–200). The only other likely candidate is the Main Aven. One method of investigating this farther is to explore the upper parts of the Main Aven, but as this would involve a risky climb there are no immediate plans to carry this out.

CONCLUSION

The dates confirm one of the possible interpretations set out in the original paper, and must alter the basis for the other possibilities. Thus it now appears evident that the Entrance Shaft Fill was probably largely made up of deliberate infilling by man (at least up to the level of Horizon 2), the third option discussed by Levitan *et al.* (1988, 231–2). The state of preservation of artefacts in Horizons 4 and 2 implies that these deposits were carried down rather than thrown in (*ibid.* 232). This scenario is given fuller treatment in Levitan and Smart (forthcoming). It should, however, be noted that the radiocarbon dates do not necessarily reflect *date of deposition*. The human bones with cut marks have parallels in some of the Neolithic long barrows, and at these sites this evidence has been argued to represent curation (*ibid.* 232–3). The deposition of the bones, therefore, may have occurred hundreds of years later.

The fill of the Upper Cave, previously thought to be derived from a single debris cone in Mitchell's Chamber (which possibly accumulated over a long period of time and was subject to a series of debris flows), can now be seen to comprise also an element of much later activity, with an hiatus of about 2,000 years (FIG. 1). This Iron Age 'phase' does not imply that human access was possible; indeed the evidence argues against it. A more likely explanation is that there were surface burials (similar to those at the top of the Entrance Shaft), and bones from these fell into the cave at this time.

The seven radiocarbon dates obtained have helped enormously in the interpretation of the deposits within the swallet, and have pointed to the tantalizing probability of the caves being reopened some time during the Iron Age. Although no further work at the site is envisaged at present, there is obviously still a great deal of potential.

ACKNOWLEDGEMENTS

The authors are grateful to the two funding bodies, SERC and NERC, for making funds available to date the seven samples described above.

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(manuscript received 29 April 1989)