Once documented, the context was excavated using appropriate tools: trowels, picks, or, in the case of deep modern deposits such as those found in certain areas of the *casale*, a small Bobcat backhoe (Fig. 2.13).[52]

Sections were drawn in certain circumstances: to show the shape of cuts, or to record major sequences (the north and west sections of site BII, or the south section of site FI-II). Other sections were reconstructed from levels across a particular area, while in one case (the robbing of the *dolia* in the *cella vinaria* in AI) the topography of the surface was recovered by taking a cloud of three-dimensional points with a Total Station. Finds were kept in labelled bags and a ten-litre sample of occupation and some construction layers was taken for flotation. Dry-sieving through a 10 mm mesh was used only rarely: for the drain in Area D, where the high number of coins and a good density of pottery seemed to require it, for some of the late floor surfaces at the monastery and in the case of several midden deposits in Area F. This led to a distressing absence of animal bones from Roman and Byzantine contexts: the one rich sieved deposit, the large drain in Area D, had few bones, and most of these were unfortunately disposed of by mistake. At Area B few deposits containing any significant amount of bones were recorded, leaving the medieval village south of the winery the only area from the site which produced bones.

The excavation and dating of the cemetery
Corisande Fenwick

The cemetery excavation was conducted by archaeologists, some of whom had anthropological training, and in close consultation with the project anthropologist Francesca Candilio (Fig. 2.14). A single context recording system was used, allowing tomb structures, grave cut, fill(s) in proximity to the skeleton and the skeleton itself to be recorded textually, digitally and with photographs. All articulated skeletons, no matter how poorly or partially preserved, were classified as primary burials and assigned a context number as a Human Remains Unit (HRU). The recording system was developed to encourage the integration of archaeological and anthropological methodologies in the field.[53] The HRU context sheet thus recorded general information (trench, HRU number and plans), archaeological data (stratigraphic information, grave typology, location, orientation, type of deposition), associated finds (type, location in respect to the body) as well as anthropological data (age, sex and anatomic connection) and taphonomy (corpse arrangement and post-burial

[52] Usually driven by Andrea Di Miceli.

[53] For a full discussion of our methodology, its rationale and refinement with relevant bibliography, see Dufton and Fenwick (2012).

activities).[54] Skeletons were planned digitally from photographs, using targets and Electronic Distance Measurement (EDM) plots. This technique saved much time by avoiding the necessity to plan skeletons in the field. The skeletal remains were bagged on the spot according to gross body part (that is: right arm, pelvis) and then taken to the on-site laboratory for the physical anthropologists to wash and examine. Although composed of several context numbers (skeleton(s), burial fill(s), cut, tomb walls and so on), post-excavation each grave was designated a single archaeological entity or 'group' designated by the prefix 'T'.[55]

The constant use of the churchyard in the Middle Ages often made it impossible to distinguish between the fills in grave pits and the soil into which the graves were cut. The problem was compounded by the shallowness of many burials. Despite careful trowelling, most grave cuts could not be distinguished during excavation and graves lacking a structure were often not recognized until the top of a bone (usually the cranium) was exposed. In addition to primary burials, the cemetery produced a large amount of disarticulated human bone that was not systematically collected. This material was classified at the time of excavation into one of the following categories:
1) loose bone from cemetery (random disarticulated bone from the general cemetery fill not associated with a particular burial or discrete feature). This material was not collected for analysis and was later reburied.
2) ossuaries (disarticulated bone placed in pits or built structures). These were excavated as separate contexts, but bones were reburied and not collected.
3) disturbed burials (concentrations of bone in graves, from earlier skeletons disturbed during the construction of the tomb or from later burials in the same tomb). This material was excavated as part of a particular grave fill and kept for analysis.

Dating medieval cemeteries is often challenging. Finds are frequently sparse, artefact chronologies are broad and dates are therefore often given on stylistic grounds. At Villamagna, these problems were exacerbated by the difficulty in establishing the relative chronology of different zones. Many walls divided and subdivided the trenches BI, BII and CII into different areas which could not be stratigraphically related to each other. Consisting

[54] The in-field documentation was revised over the years; initially we used an Italian anthropological recording sheet together with a Human Remains Unit Sheet, causing unnecessary duplication of data and translation issues. In later years, a bilingual integrated recording sheet was devised, which worked well. The in-field analysis of anatomic connections and taphonomy is sometimes called 'anthropologie du terrain' or 'antropologia funeraria sul campo.' See Duday (2009).
[55] Tomb (T) groups can be accessed using the online database.

of hundreds of overlapping and intercutting burials in a very small area, it was difficult to establish the relative phasing of individual graves. Radiocarbon dating has the potential to resolve these difficulties by accurately dating graves in the absence of grave goods.[56] In Italy, however, radiocarbon dating in medieval contexts has been conducted on a small scale (fewer than five samples per site), which typically dates cemeteries only to the early or late medieval periods. At Villamagna, we established a radiocarbon dating programme within a Bayesian framework with the aim of refining the chronological resolution for the medieval period.

Twenty-four radiocarbon dates are now available for the medieval cemetery at Villamagna[57] (below, Table 7.4). Our preferred Bayesian model for the chronology of the church and cemetery at Villamagna is shown in Fig 7.73, with a summary of the archaeological information included in the model given in Fig 7.74, below.[58] This model shows good overall agreement ($A_{overall}$ = 69.4%) and shows the potential of systematic radiocarbon sampling for refining chronologies of artefact-poor medieval cemeteries and associated buildings and

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[56] Targeted radiocarbon dating programmes within a Bayesian framework are increasingly popular and have produced accurate chronologies at a resolution of less than a century for medieval cemetery sites such as St Mary Spital in London: (Sidell, Thomas and Bayliss 2007) and Wharram Percy (Bayliss *et al.* 2007).

[57] The Oxford Radiocarbon laboratory analysed fifteen samples in 2011, funded by a Franklin Research Grant from the American Philosophical Society. On the basis of these results, a further ten samples were selected to refine our chronological model and analysed in 2012 by the NERC-AHRC National Radiocarbon Facility (NRCF grant NF/2011:/1/10). All of our radiocarbon samples were human bone from discrete individuals. True replicate measurements were deliberately obtained from **HRU 5123*** to test the validity of the measurements; following standard practice these were merged before calibration. All fourteenth century dates were calibrated using OxCal v 4.1 (Bronk Ramsey 1995; 1998; 2001; 2009) using the IntCal09 calibration curve of Reimer *et al.* (2009). Carbon and nitrogen stable isotope analysis showed that marine resources did not form a significant proportion of the diet at Villamagna, see Nitsch, p. 000. The chronological model for the site presented is therefore unlikely to be significantly affected by the diet of the individuals. See Bayliss *et al.* (2007) for the potential bias of a high marine diet on radiocarbon measurements.

[58] See Buck *et al.* (1992) and Buck *et al.* (1996) on Bayesian modelling. For a full discussion of the model, see Fenwick's *Radiocarbon Report*, published online. The refined date distribution produced by the Bayesian model is known as a *posterior density estimate*; these distributions are based on probability and are printed in italics when expressed as date ranges in the text together with the name of the model parameter.

providing a significantly more detailed picture of the population that lived and died here.[59] At Villamagna, radiocarbon provided clear evidence of several chronologically discrete phases of burial, which would not have been available from any other method. Our stratigraphic analysis had revealed multiple phases of burial across Area B which we assumed spanned the sixth and fifteenth centuries. Bayesian modelling allowed us to both link up the different burial zones and significantly refine our understanding of the medieval period as follows:

1. Our earliest burials date to the ninth and tenth centuries, far later than we had initially assumed, and contemporary with a phase of renovations to the church and residential occupation of Area A.
2. Our excavations did not uncover the main cemetery zones contemporary with the tenth- to thirteenth-century monastery: relatively few of our excavated burials date to the monastic period, which is characterized by three discrete cemetery phases punctuated by the construction of the bell tower and cloister.
3. The earthen cemetery which provides the bulk of our skeletal sample is narrowly dated to the fourteenth century, revealing intense use over three to four generations.

Environmental Sampling

Kevin Williams

Environmental remains were collected when observed during routine trowelling and during the limited dry-sieving that occurred, as discussed above. Hand-collected remains were predominantly limited to larger bones, shells and some charcoal. Most ecofacts were collected through flotation using a probabilistic sampling strategy, that is, contexts were sampled when the excavators determined they had potential for recovery of environmental remains. Sampling was limited to sealed contexts and fills although this was not always completely determinable at the time of collection. Ten-litre samples were collected in plastic bags.

A flotation tank was built using locally sourced materials and furnished with a 1 mm mesh to capture the residue, with a 300 mm sieve to recover the light fraction. Size of sample was measured by volume of water displacement and recorded. Samples were then placed into the tank and water was added continuously to aid disaggregation.

The heavy residues were then placed on trays and the light fractions collected in paper. Both

[59] One sample (OxA-26148) appeared to be contaminated and was excluded from the overall model, see Fenwick, *Radiocarbon Report*.