BENEATH THE SURFACE OF WATER. HYDRAULIC STRUCTURES AND HUMAN SKELETAL REMAINS IN ANCIENT ITALY

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ABSTRACT

Recent findings from the area of Modena, in Northern Italy, have revitalized the debate on the association between human skeletal remains and artificial hydraulic structures. In this paper, our intention is to assemble the relevant archaeological and anthropological data on the matter in order to establish whether these findings are exceptional and isolated or indicate instead a structured and specific cultural behaviour which persists through time.

INTRODUCTION

Recent excavations carried out between S. Lazzaro and Fossalta (Modena, Emilia Romagna) uncovered three human skeletons within a Roman water canal, dated back to the 1st century BC-1st century AD (Fig. 1): they belong to male subjects - a iuvenis, subject A, 16-20 years old, a young adult, subject B, 20-25 years old, and an adult, subject C, 25-30 years old - and were found largely incomplete: only the inferior part of the body of subject A remained, with the skull cut off and placed between the legs, while only the skull and a few shoulder bones of subject B were found. Subject C showed other peculiar features, i.e. the absence of the inferior part of the body and the fact that the arms were tightly tied up behind the back. Moreover all the skeletons were weighed down with bricks, taken from a funerary monument near the canal (Milani 2011: 18).

Another very significant piece of evidence of this kind comes from the Roman colony of Mutina (Modena, Emilia Romagna). In the peripheral area of the settlement at Novi Sad Park a large water-tank was found, dated back to the I-II century AD, with seven human skulls and three human mandibles within the basal layers of the tank. They belonged to at least eight adult subjects and showed skeletal traces of de-fleshing, such as cut marks on the mandibles and also on the occipital bones (Belcastro et al. 2010: 173-174).

These recent findings have revitalized the debate on the association between human skeletal remains and artificial hydraulic structures. In this paper, our intention is to assemble the relevant archaeological and anthropological data in order to establish if these findings are exceptional and isolated or if they suggest instead a structured and specific cultural behaviour which persists through time. This phenomenon does indeed seem to be found in pre-Roman Italy since Prehistoric times.

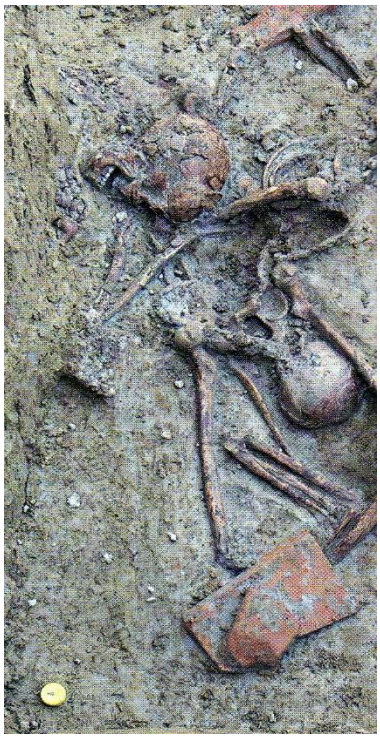

Fig. 1 - S. Lazzaro, Fossalta (Modena): human skeletal remains from a Roman water canal (Milani 2011).

PRE AND PROTOHISTORY

Fabio Cavulli refers to the discovery of a 5-years-old female subject as early as the Neolithic period, coming from a water canal excavated in the settlement of Piancada, Palazzolo sullo Stella (Udine; Cavulli 2008: 136-137). Here we can note other interesting findings also in the Middle and Late Bronze Age. A well in the castelliere of Nivize, now in Croatia, contained human and animal bones and a cremation grave which was placed on the bottom of a 11th century BC canal water at Casalmoro, a LBA settlement near Mantova in Lombardia (de Marinis 1981: 31-33; Moretti 1983: 121).

In the same period significant parallels are found in Greece: within an EBA well in the Athenian Agora a decapitated skeleton was discovered together with a Mycenean cup. Multiple burials were also found in other wells. At Corinth an EBA well contained at least thirty male and female skeletons, at Eleusis a MBA well contained three skeletons and at Argos in a LBA well at least twenty male and female skeletons were found, associated with horse, dog and pig bones (Little, Papadopoulos 1998: 376-378).

THE IRON AGE: NORTHERN AND CENTRAL-SOUTHERN ITALY

A review of the findings in Northern Italy should begin with the human skeletal remains discovered within wells from Emilia Romagna Iron Age contexts. In the urban area of Marzabotto (Bologna, 5th-3rd century BC; Fig. 2) forty-one wells were found and eight of them contained human bones (Gozzadini 1865; Brizio 1889; Sassatelli 1991). Four wells were discovered along the modern State Street 64, the so-called Porretana. Here, according to the catalogue numeration of Giuseppe Sassatelli, well 6 contained a subject in a "seated" position wearing a bronze bracelet. On top of the skeleton there were deer horns and the complete skeleton of a pig, while under it there were the disarticulated bones of a donkey and clay artefacts described as "masks". Well 7 contained three subjects: subject A, about 70 years old, subject B, about 35 years old, and subject C, about 55 years old, all wearing bronze bracelets. The mandibles of subject B were dislocated in a different sector of the well, while subject C was found in a "discomposed" position: in the layers separating the three skeletons disarticulated bones were found belonging to pigs and dogs and deer horns. From well 8 "human bones" were uncovered, associated with two complete vases (amphorae), a complete olla, the skull of a bird and pieces of vine wood. Other "human bones" associated with animal bones, a few pieces of a "large vase", two cups and an iron waste were recovered from a fourth well located 23 m away from well 8.

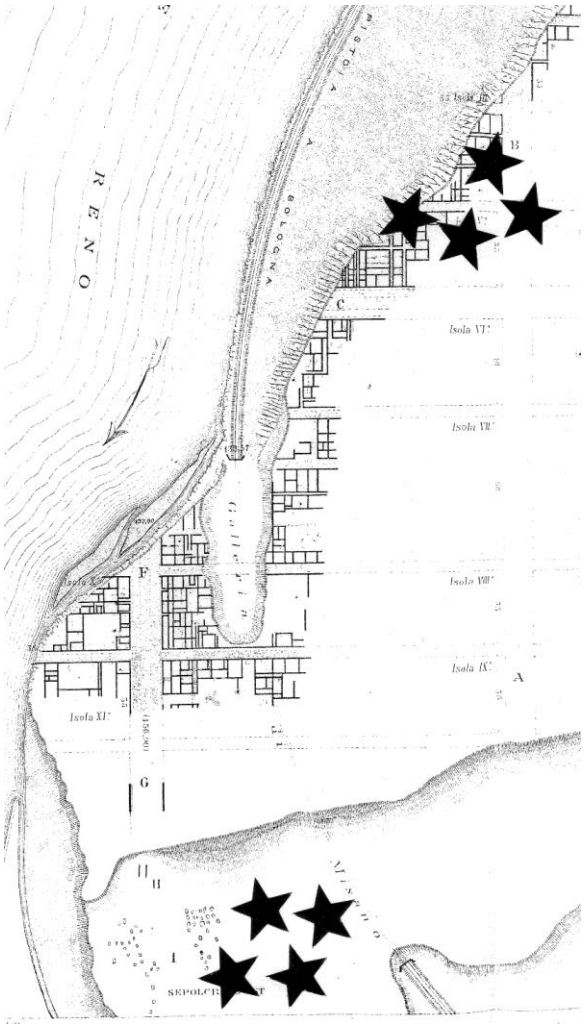

Fig. 2 - Marzabotto (Bologna): urban area of the settlement and positions of the wells with human skeletal remains (digital elaboration by V. Zanoni).

On the acropolis one well was discovered in Regio V, insula 3. This structure contained "human bones" associated with an oinochoe, an iron scythe, an iron key, wild-boar teeth and deer horns. Two wells were investigated in Regio V, insula 4: the first of them contained "human bones", consisting only of the skull and the long arm and leg bones, associated with deer horns, disarticulated wild-boar bones and a clay cylinder, decorated with wave-shaped motifs. Another two subjects were recovered from inside the second well (subject A: "adult"; subject B: 3-4 months old). The infant skeleton was discovered in association with pig and sheep skulls and long bones, fourteen perforated shells and a turtle shell. A well containing partial remains of two subjects wearing bronze bracelets was also discovered in Regio V, insula 5 (subject A: skull and long bones of arms and legs; subject B: complete). On the base of the well seven complete vessels were found, protected by a layer of roof-tile fragments.

Human skeletal remains from wells are attested also in the 5th-3rd century BC settlement of Felsina/Bologna. A well at viale Aldini contained three subjects, all wearing iron bracelets. A layer made of sandstone slabs was found under the skeletons, which covered spindle-whorls, a bronze *situla* and iron wastes. The structure was closed by the disarticulated bones of a horse and a dog. From well near Porta San Mamolo "human bones" were recovered belonging to three subjects, associated with a couple of cups: these were placed within a large dolium together with sheep and chicken bones (Zannoni 1876; Gozzadini 1878).

Again in the 5th-3th century BC area of Felsina/Bologna, Antonio Zannoni noted the presence of two human skeletons within ditches, perhaps serving as drainage canals, which delimited the western sector of Arnoaldi cemetery. They were placed in a dorsal position and had iron fibulas laid on the ribcages as grave-goods (Minarini 2005: 367). With regard to the Certosa cemetery, Zannoni described two well-like structures, i.e. "grave 202" and "grave 210". The first one contained cremated human bones together with two pig jaws, an ox scapula and a bronze fibula. The second was filled with cremated human bones associated with very small dishes and a kylix. The situation of Certosa cemetery is, however, very ambiguous: a re-consideration of the archaeological data seems to indicate that those structures have never been used for water-capture, but they have been realised ad hoc to contain human remains (Zannoni 1876: 356-359).

In the same period ceremonial areas of Emilia Romagna are also significant. At S. Polo d'Enza, Campo Servirola, two wells were discovered which contained human skeletal remains (Reggio Emilia; Macellari 1995). In the so-called "pozzo del margine" a human mandible was found together with disarticulated pig bones and deer horns: the structure also contained miniature cups and chalices, a red-figured Attic crater, a double-handled olla, reels, loom-weights and seven ingots with the "ramo secco" mark (Fig. 3; Fig. 4). "Human bones" were also discovered on the bottom of a second well, the so-called "pozzo del centro". Three large stones closed off an inner, deeper part of the structure, which contained disarticulated human bones alongside animal bones (Fig. 5; Fig. 6). A third well, situated again at S. Polo in the probable urban context of Viottolo dei Tedeschi, contained other "human bones" associated with animal bones. They lay on the very bottom of the structure and were covered by bricks and roof-tile fragments (Scarani 1963: 521-522).

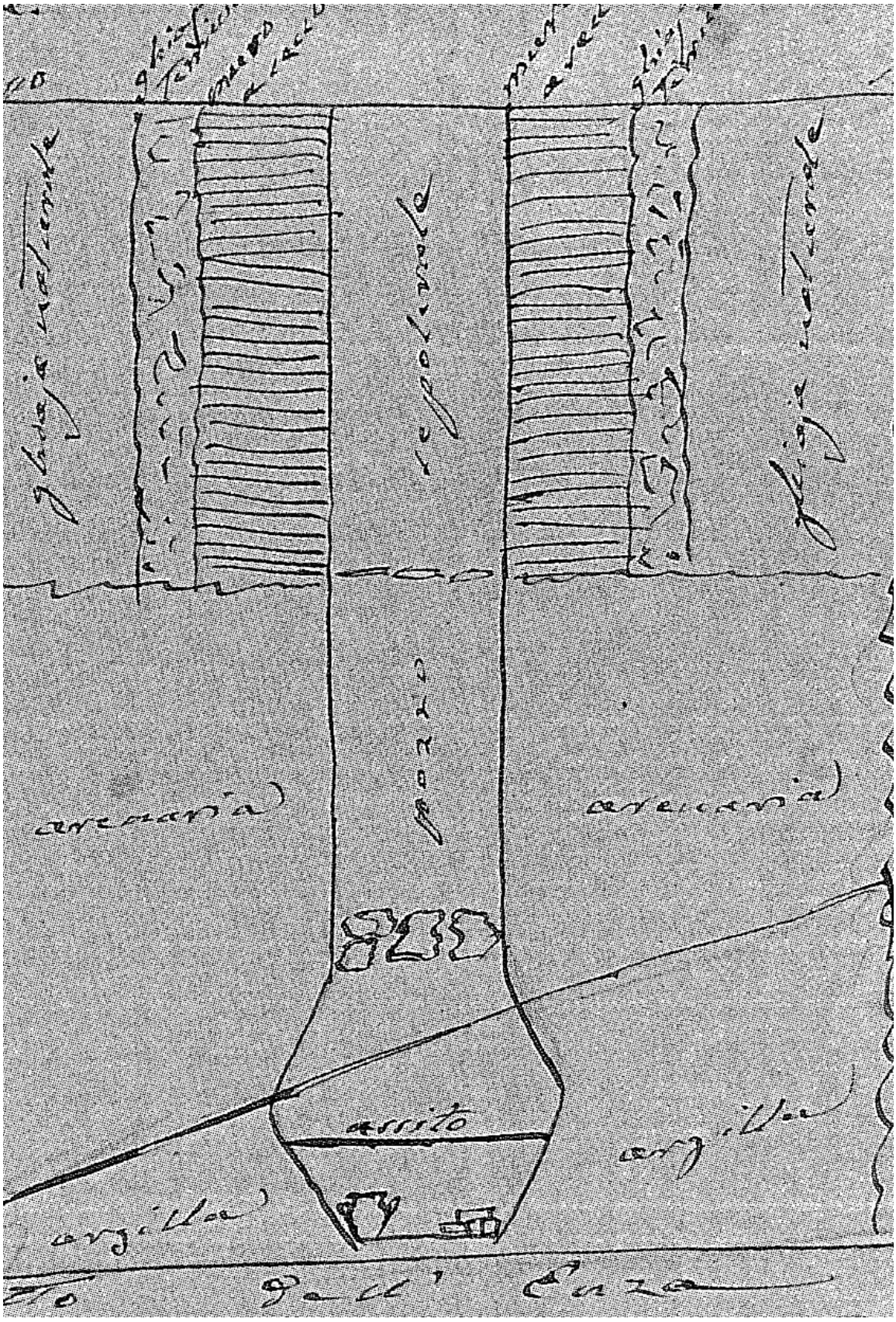

Fig. 3 - S. Polo d'Enza, Campo Servirola (Reggio Emilia): structure of "pozzo del margine" (Macellari 1995, Fig. 6).

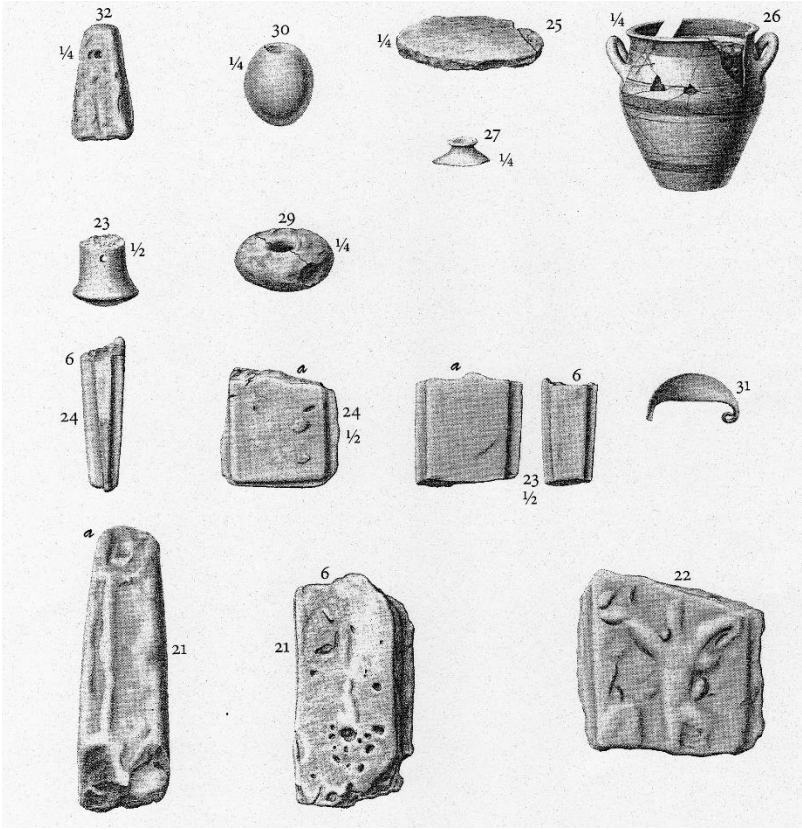

Fig. 4 - S. Polo d'Enza, Campo Servirola (Reggio Emilia): artefacts from "pozzo del margine" (Macellari 1995, Fig. 7).

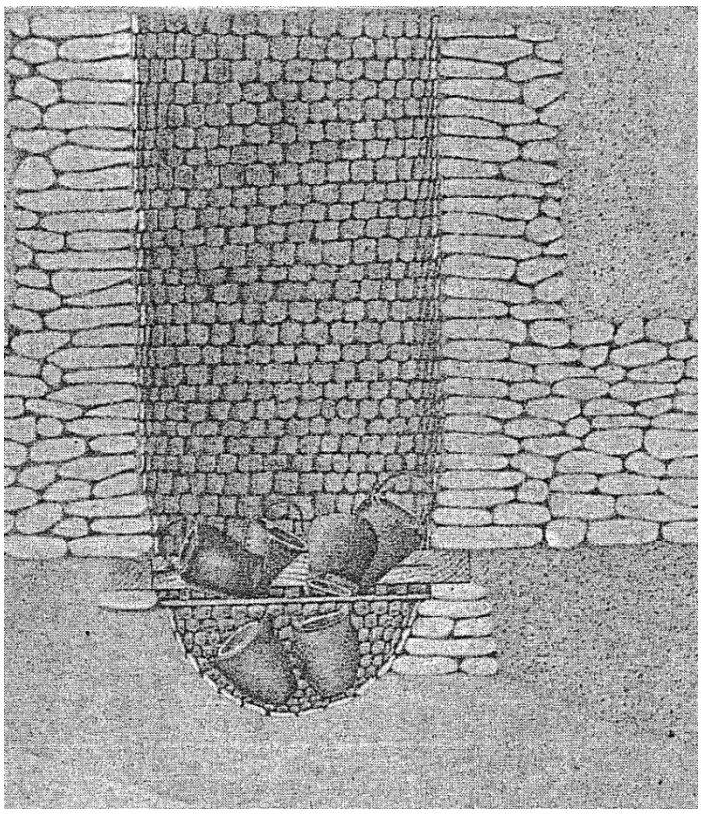

Fig. 5 - S. Polo d'Enza, Campo Servirola (Reggio Emilia): structure of "pozzo del centro" (Macellari 1995, Fig. 4).

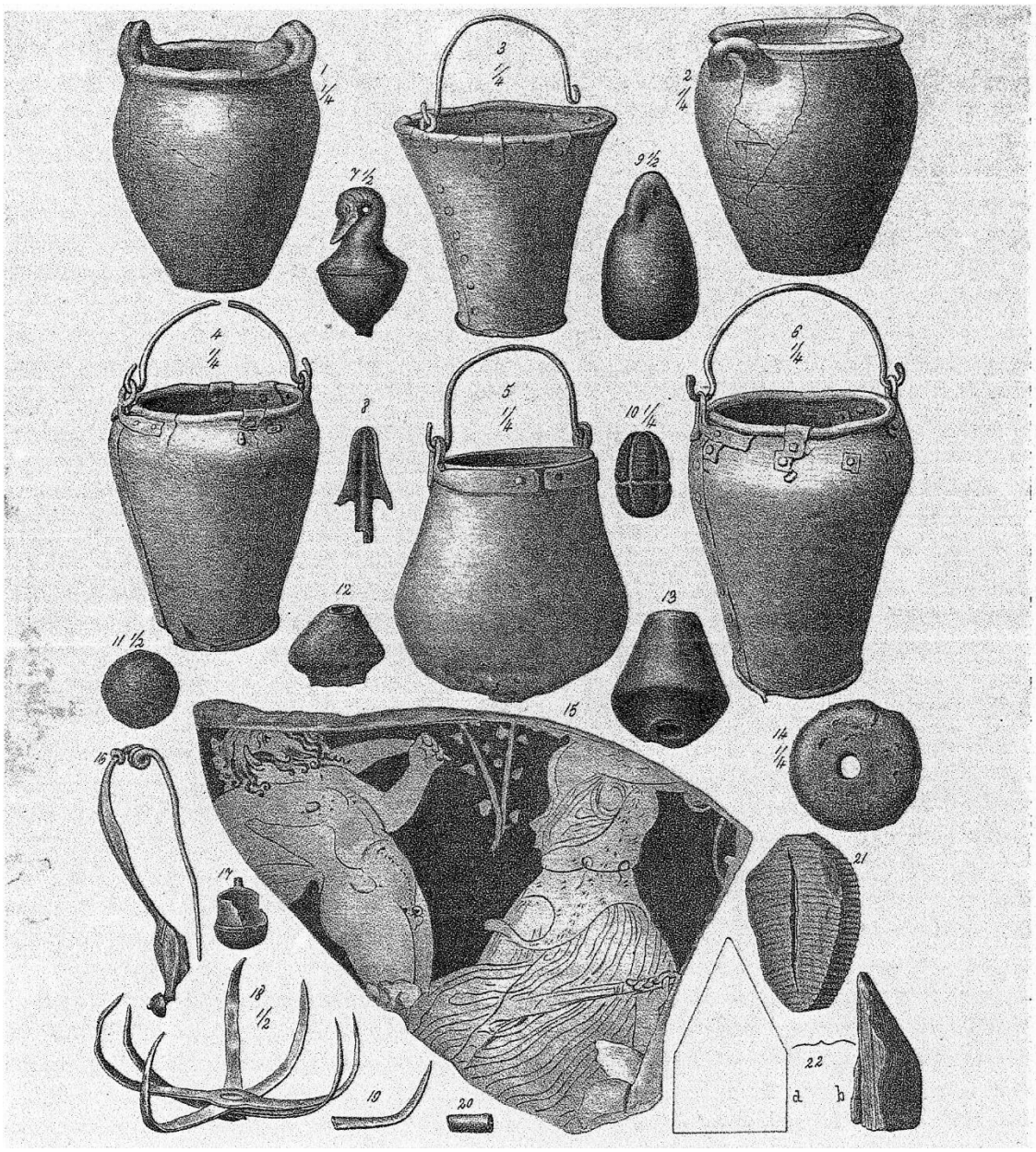

Fig. 6 - S. Polo d'Enza, Campo Servirola (Reggio Emilia): artefacts from "pozzo del centro" (Macellari 1995, Fig. 5).

Other findings are very rare outside of Emilia Romagna and we can recall only evidence from Laion, Gimpele (Bolzano, Trentino Alto Adige; Pisoni 2006-2007): the well was part of a larger settlement complex, maybe a handcraft atelier, and was closed in the 4th-3rd century BC. The basal layers of the structure contained a human femur belonging to an "adult" subject, ox bones and ceramic fragments (Fig. 7).

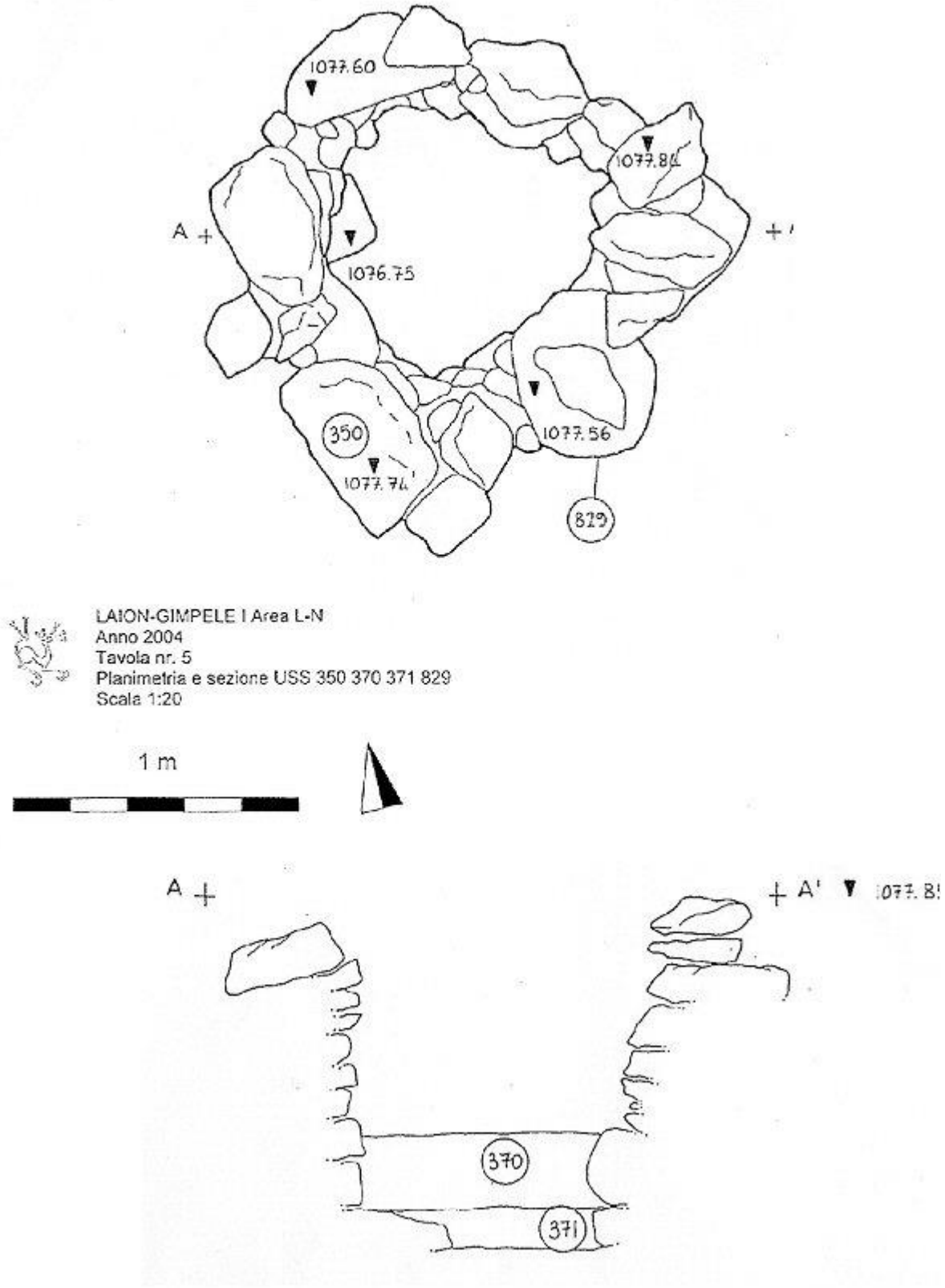

Fig. 7 - Laion, Gimpele (Bolzano): structure of the well (digital elaboration by Search Roma).

As concerns the Roman period, at the very end of the Iron Age, we must mention the cases of Covo, Covello, Pascolo (Bergamo, Lombardia) and Angera, Fondo Geppi (Varese, Lombardia): the well from Covo contained a sort of cyst made of bricks and roof-tiles, filled with "human bones" which

belonged to an "adult" subject and a "non-adult" subject which showed traces of intentional breaking. The cistern from Angera contained a "little skull" probably belonging to a non-adult (Castiglione 1878: 303-304; Carta Archeologica della Lombardia 1992: 76-77).

With regard to Central Italy, Backe Forsberg published the complex of Bridge Building at S. Giovenale (Viterbo; Latium) and paid particular attention to the well of Fosso del Pietrisco and its contents. The structure, dated back to the 5th century BC, was filled with disarticulated human bones belonging to a 25-30 year-old subject; they were associated with dog bones and bronze and ceramic fragments (Fig. 8; Fig. 9; Backe Forsberg 2005).

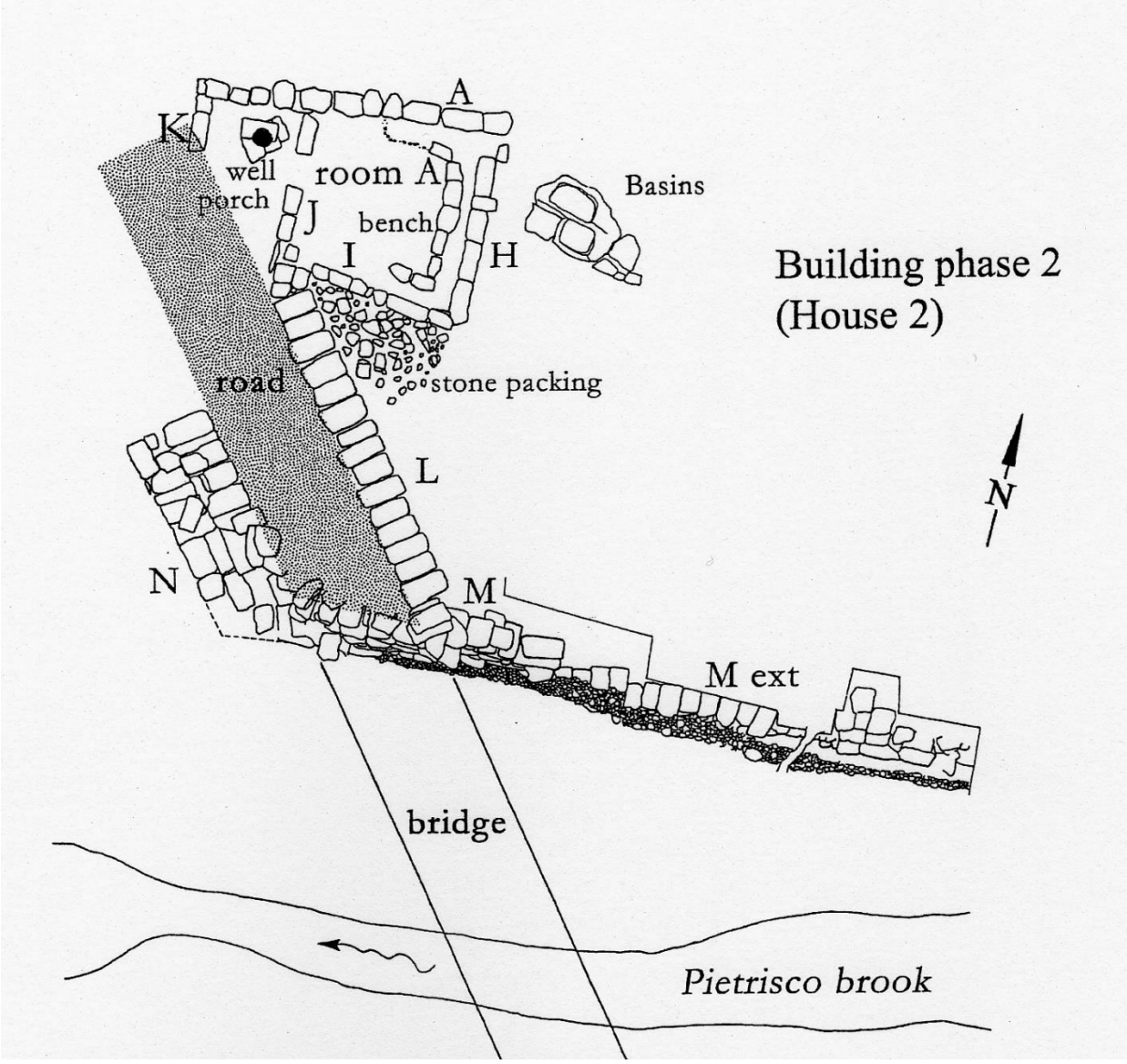

Fig. 8 - S. Giovenale, Bridge Building (Viterbo): plan of phase 2 (Backe Forsberg 2005, Fig. 44a).

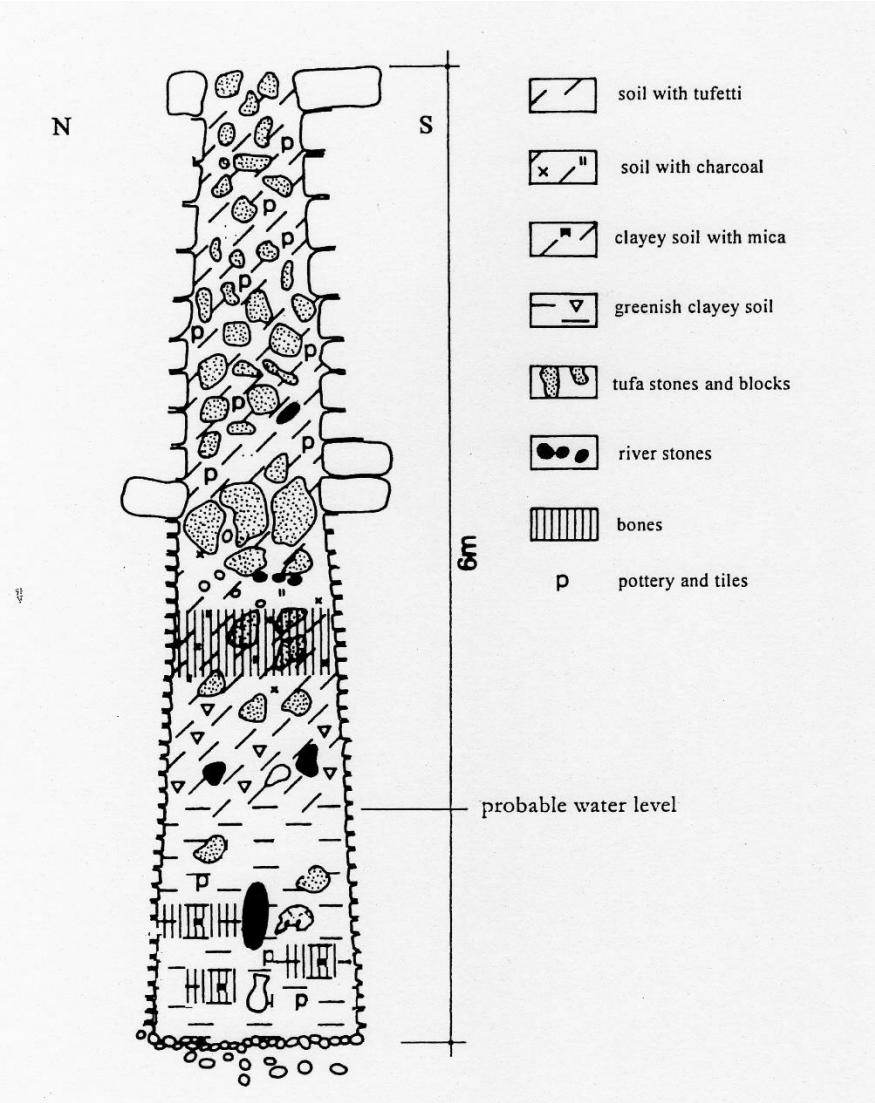

Fig. 9 - S. Giovenale, Bridge Building (Viterbo): structure of the well (Backe Forsberg 2005, Fig. 53).

For the 4th-3rd century BC cases from Artena, Civita (Viterbo, Latium) and Orentano, Ponte Gini (Grosseto, Tuscany; Fig. 10) are worthy of note. At Artena the partial skeleton of a "young" subject was found in a water cistern at the settlement, in association with ceramic fragments and bronze vases. At Orentano two "adult" male subjects were discovered in a drainage canal, described as a "fossato", near the defensive structures of the settlement (Ciampoltrini 1996: 189-196; Bonghi Jovino 2007: 459).

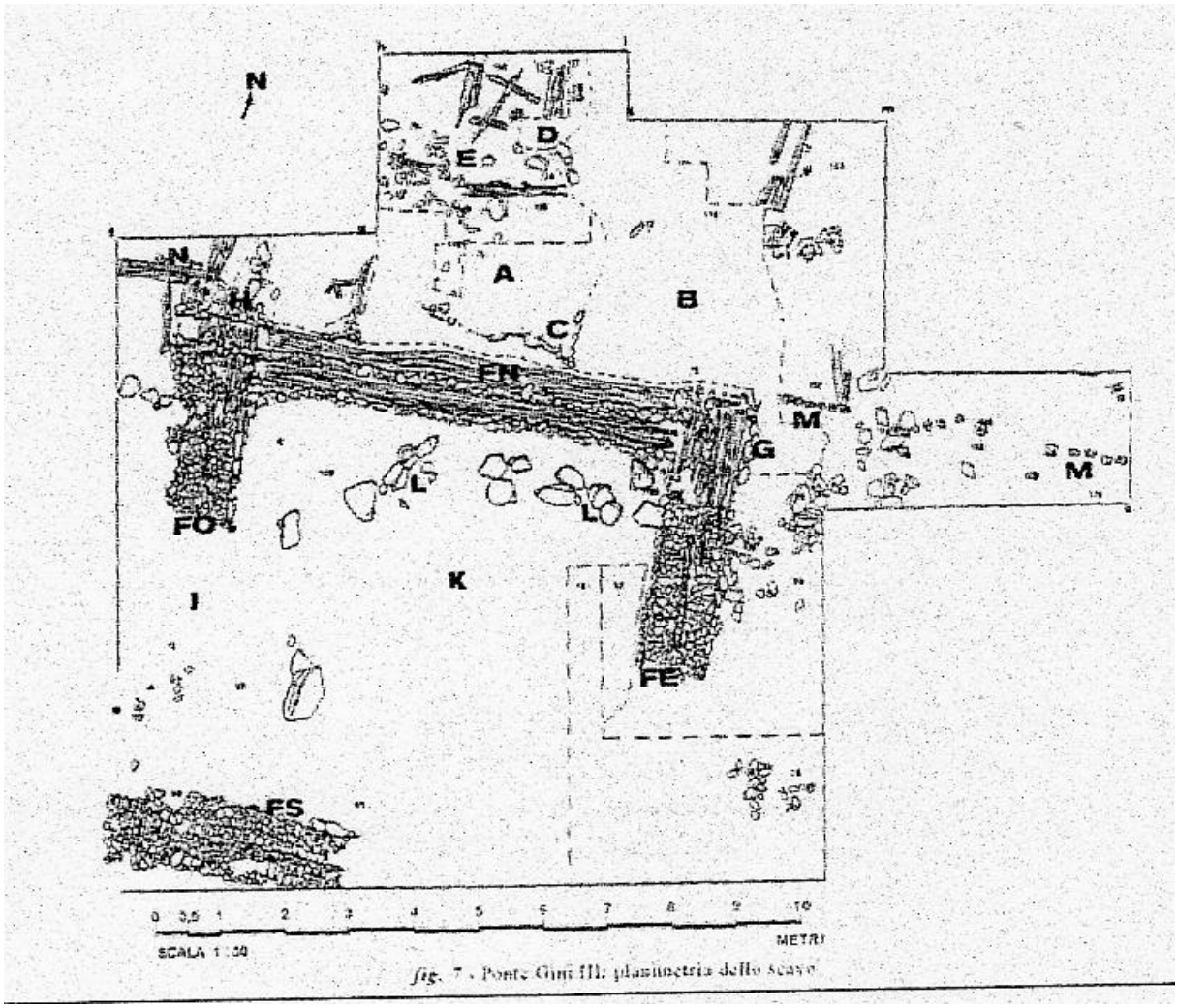

Fig. 10 - Orentano, Ponte Gini (Grosseto): the ditch and the defensive structures (Bonghi Jovino 2007, Fig. 8).

The situation at Vignanello, Molesino, and Falerii, Civita Castellana - Fondo Paolelli (Viterbo, Latium, 7th-6th century BC) appears interesting as well, but it seems very difficult to define the actual stratigraphic and chronological relationships between the human skeletons and the hydraulic structures. In the ceremonial context of Vignanello three "infant" burials were found near well N, which was filled with roof-tiles, fragments of columns and other architectural clay elements. At Falerii "human bones" belonging to at least two "non-adults" were located within stone cysts with rich grave-goods (Fig. 11). They come from an urban area which was likely used for handcraft activities and contained large subterranean cisterns (Baglione, De Lucia Brolli 2007-2008: 870-882).

Evidence of association between hydraulic structures and human bones is also attested in Southern Italy: the inhumation of a "non-adult" was excavated near a water cistern at Monte Sannace (Bari, Puglia, 4th-3rd century BC) and the disarticulated bones of a 40 year-old woman were discovered within a water cistern at Vaste, Fondo S. Antonio (Lecce, Puglia; Fig. 12; Fig. 13), which dated back to the 2nd century BC (Nonnis Marzano, Sublimi Saponetti 1995; Bianchi 2000).

The presence of human skeletal remains within wells can also be observed outside of Italy, particularly in France, Great Britain and Greece (see Table 1).

Site	Structure	Human	Date	Other observations
Greece				
Athens, Agora, IV:19	Well	"Adult"	7th-6th BC	Probable epilepsy
Athens, Agora, G5:3	Well	Multiple burials of foeti, newborns and an adult	5th-2nd BC	Dogs, horses, pigs, turtles and birds
Delos, House of Fourni	Cistern	Two adults	2nd-1st BC	Decapitation and immobilisation
France				
Nanteuil-sur-Asine	Well	"Adult"	4th-3rd BC	Horse
Bavay	Well	Two "adults" One non adult	2nd-1st BC	Dog
Aulnat	Well	"Adult"	1st BC	Fleshing skull
Great Britain				
Carrawbourgh	Well	Two subjects	1st AD	Skulls Dogs

Table 1

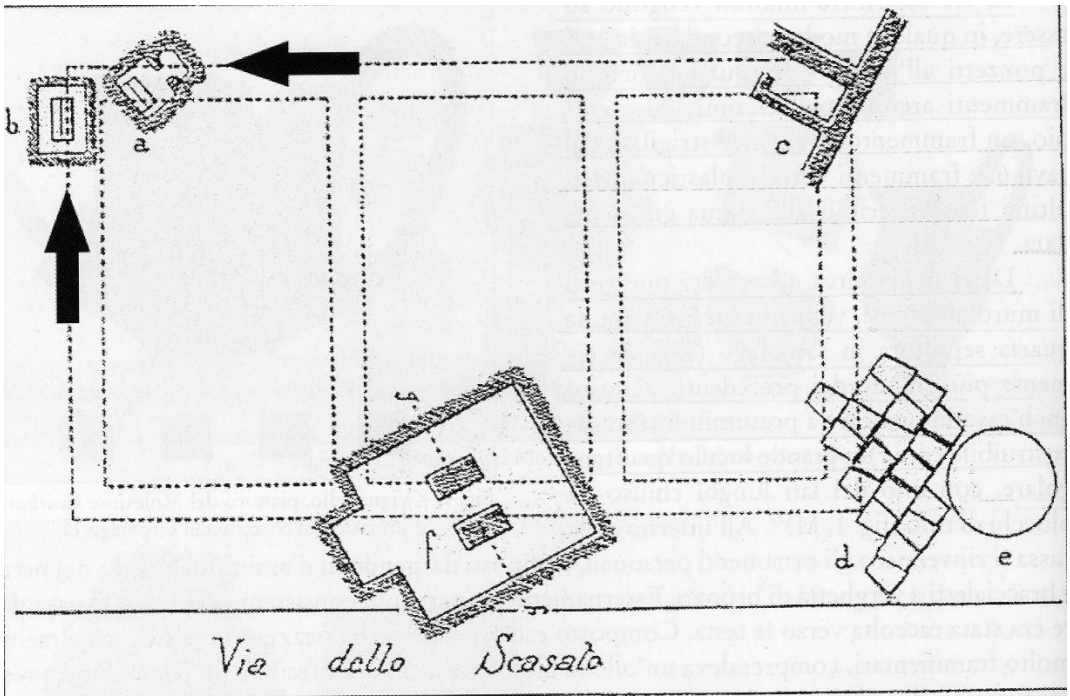

Fig. 11 - Falerii, Civita Castellana, Fondo Paolelli (Viterbo): plano f the excavations area (Baglione, De Lucia Brolli 2007-2008, Fig. 10).

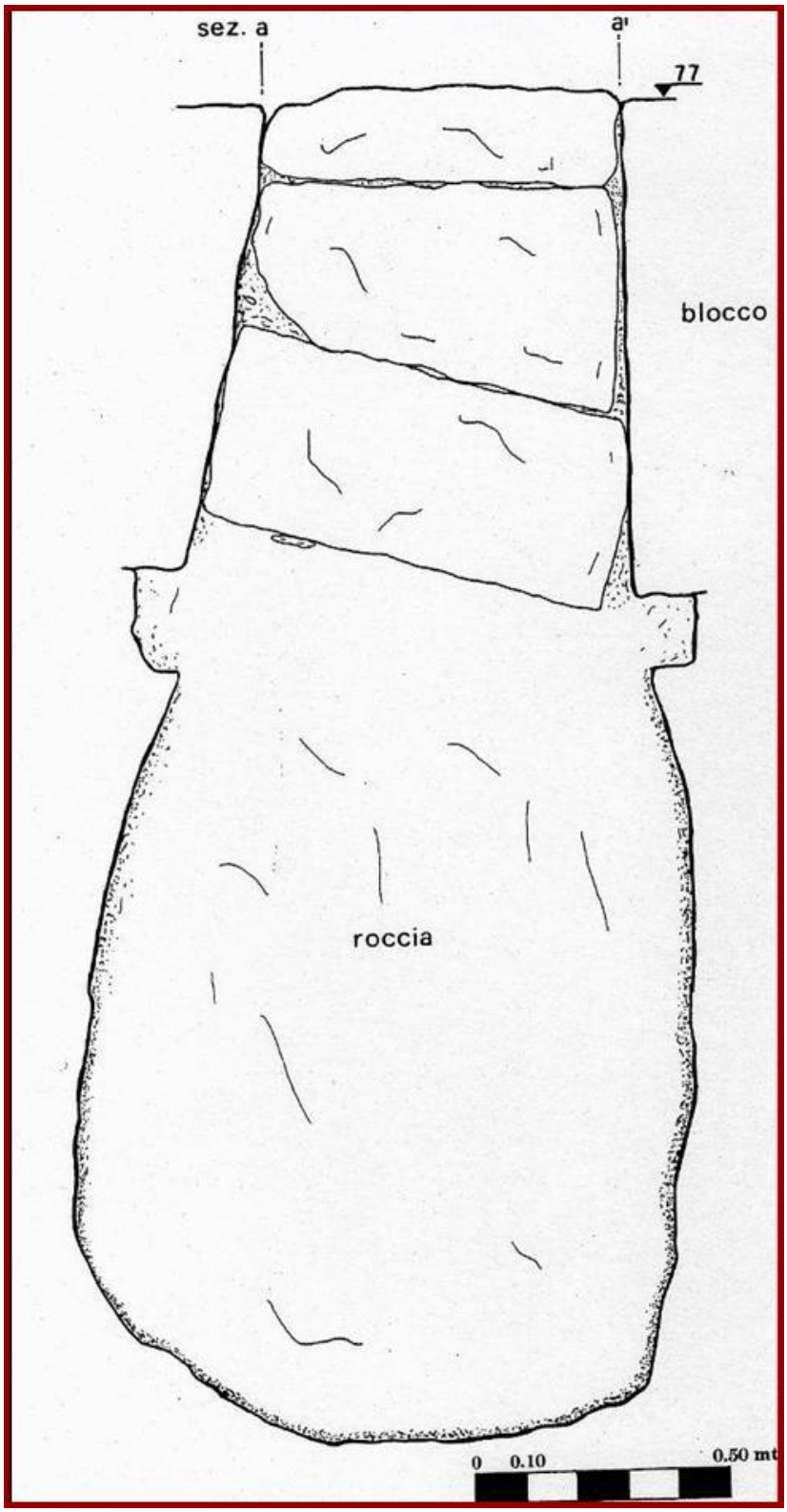

Fig. 12 - Vaste, Fondo S. Antonio (Lecce): the srtucture of the water cistern (Nonnis Marzano, Sublimi Saponetti 1995, Fig. 1).

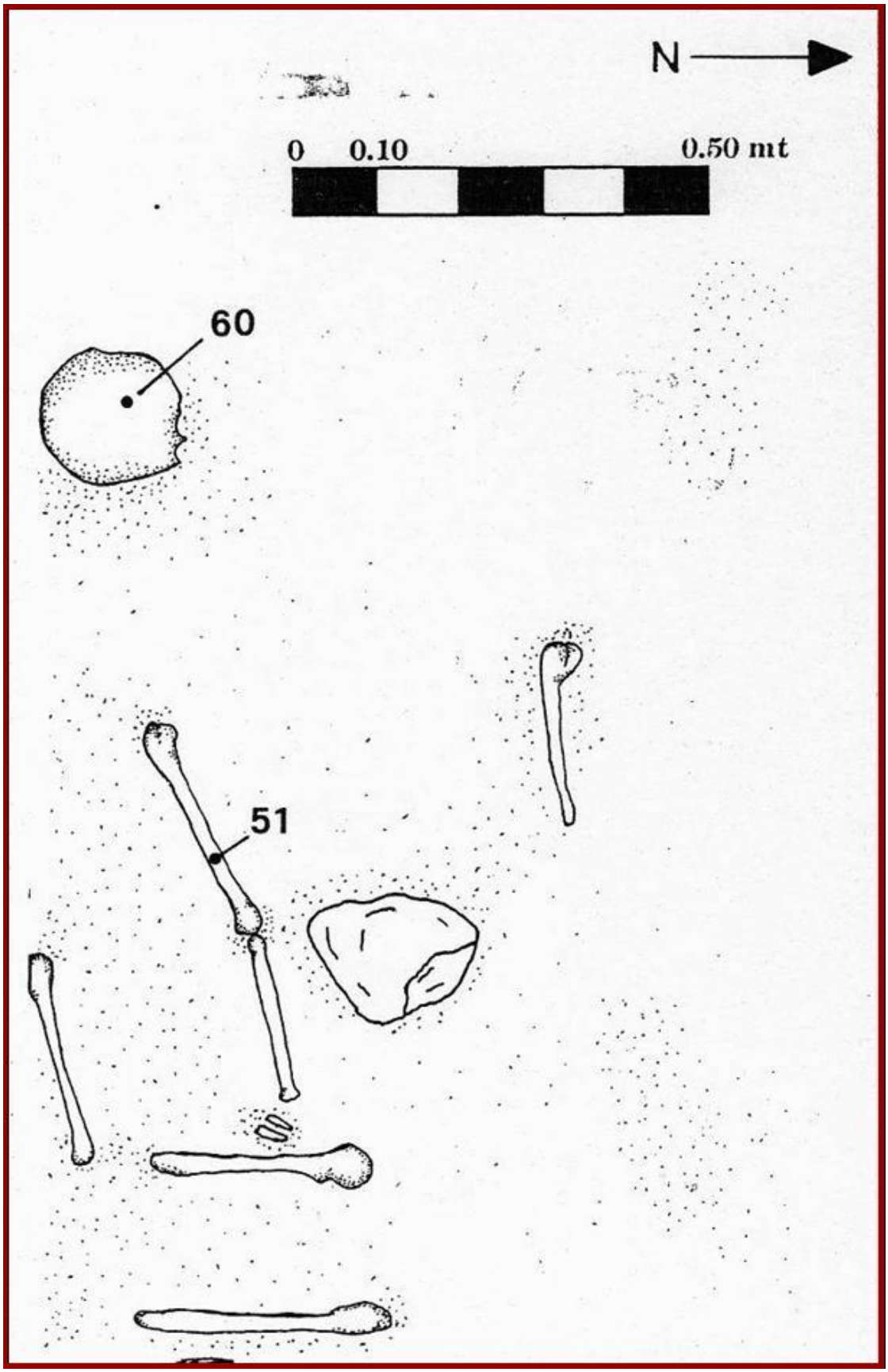

Fig. 13 - Vaste, Fondo S. Antonio (Lecce): disarticulated human bones from the water cistern (Nonnis Marzano, Sublimi Saponetti 1995, Fig. 2).

HUMAN AND ANIMAL

The wells of Marzabotto and Bologna were discovered and excavated by Giovanni Gozzadini, Edoardo Brizio and Filippo Sansoni in 1862-1887 and human remains were macroscopically examined by local doctors. If the definition of sex is to be still considered valid, as well as the definition of a 'non-adult' age based on the analysis of dental eruption, adult skeletal class ages need to be re-calibrated. Diagnoses have indeed been defined on the basis of arthritic degeneration of bones and the level of fusion of cranial junctures. However these elements no longer seem decisive in identifying the skeletal age of adult subjects in absence of other criteria, in particular the examination of pubic bone according to the ISCAN method (Cattaneo, Grandi 2004: 167).

The macroscopic analyses of the skeletons didn't indicate any macro-sign or macro-trace of pathologies and/or traumas. The apparent dislocation of the mandible as well as the broken up nature of the skeletons are well described in the archaeological sources, but we can say hardly anything about the actions of anthropic, i.e. intentional, or taphonomic, i.e. natural and post-depositional phenomena in the absence of osteologic confirmation. On the other hand, the same considerations can be applied to the osteologic material from S. Polo: it was found and published in 1875-1876 by Gaetano Chierici and Pellegrino Strobel, but pathological analyses were never carried out.

What we can surely observe in the evidence from Northern Italy is that the subjects were all male, except for a female individual from Marzabotto, and they were probably all adult, with the exception of a newborn subject, again from Marzabotto. We may add that three wells from Marzabotto and one from Bologna contained complete skeletons and seven wells, four from Marzabotto, one from Bologna and two from S. Polo, instead contained disarticulated "human bones", the type of which was not better described. Moreover we can say that two wells from Marzabotto contained only skulls and long bones and one well from S. Polo contained an isolated human mandible. The remains from Covo and Varese also seem to be isolated bones, where the findings were made in the 19th century: here the anthropological data are not available in the associated literature.

Interesting results came from the anthropological analyses conducted on the femur from Laion found during the 2000-2004 excavations: the femur showed a longitudinal post mortem fracture and teeth-markings, probably made by a small mammal. What is significant is that the bone was radiocarbon dated back to the 7th-5th century BC, but it was instead found in a 3rd-2nd century BC context and it is in fact a fossilised bone (Tecchiati 2011: 57).

In Central Italy, the situation can be summarised as follows: the subjects were probably all male, but the subjects from Falerii are only described as "non-adult", the subject from Artena as "young" and the subjects from both S. Giovenale and Orentano as "adult". The osteologic deposit from S. Giovenale was composed of seven isolated bones. In comparison with Northern Italy, here we may note the higher diversity among the age classes of the subject s and that complete skeletons are more frequent than isolated remains. No signs of pathologies and/or traumas were identified on the bones. Descriptions of the positioning of the bodies were also not available in the specific literature, despite the fact that these discoveries of osteologic deposits were quite recent: 1975-1984 for S. Giovenale, 1980-1981 for Artena, 1992 for Falerii and 1995-1998 for Orentano. With regard to Southern Italy, medical analyses were conducted on the subject from Vaste, found in 1974: the skeleton was found largely incomplete, with total absence of the ribcage and spine bones, and it showed many traces of stress and occupational markers and arthritic degeneration on the arm and leg bones.

Proceeding from this evidence, it clear that isolated bones have some sort of significance. In the cases examined above, some kind of selection was applied to the skeletons and this procedure involved

only some of the skeletal districts, i.e. the skull and the long bones of arms and legs (humeri, ulnae, radii, femuri, tibiae and fibulae). In the absence of more detailed information at our disposal, we can only hypothesis that the selection was practiced after death, probably after the complete degeneration of tissues and articulations, and sometimes very long after death, as attested by the presence of one certain fossilised bone. We cannot say if the femur from Laion was accidentally intercepted during the realisation of the well or intentionally sought out, picked up from a more ancient grave and then re-placed within the structure. However, the total isolation of the bone, the association with animal bones and ceramic fragments and the collocation on a flat stone, which closed the bottom of the well, suggest the second interpretation. Furthermore, the presence of fossilised human bones intentionally re-used or re-placed in more recent contexts can be observed in other settlements, such as the seven femurs of adult subjects from Frattesina di Fratta Polesine (Rovigo, Veneto, 10th-9th century BC; Bellintani, Cassoli 1984) and the two femurs from Concordia Sagittaria, Teatro/Quartiere ovest (Venezia, Veneto, 10th-9th century BC; Di Filippo Balestrazzi 1996: 202-204). Concerning European contexts, we can note here the interesting case of Howe (Orkney, Scotland, Great Britain), where human bones radiocarbon dated to the 8th-7th century BC were found in the yard of a 4th-3rd century BC structure known as a Roundhouse (Arnit, Ginn 2007: 115-117).

Animal bones found in wells are also usually disarticulated bones and were indeed the result of selection procedures similar to these applied on human skeletal remains, which conserved only skulls and long bones. On examination, it is possible to state that bones belonged to recurrent faunal taxa, both domestic and non-domestic, and that they recurred in regular forms of association. When compared quantitatively, the more frequent bones were: pig (4), dog (4), cattle (3), wild-boar (2), donkey (1), horse (1), turtle (1) and chicken (1). The findings of deer horns, discovered within four of the examined wells, are also quite peculiar.

Approached quantitatively, the more frequent associations were: pig, dog and deer horns (2), wild-boar and deer horns (2), pig and turtle (1) and dog and horse (1). This kind of evidence is also attested within other hydraulic structures of Iron Age Italy, in which, however, human skeletal remains were not found (see Table 2). In particular, we can observe the frequency of: dog (7), pig (5), cattle (4), birds (3), turtle (3), fish (3), deer (3), wolf (2), wild-boar (2), fox (2), horse (1) and chicken (1). Deer horns were also discovered within three of these structures: unlike the wells with human bones, here not only the horns are attested, but rather other parts of the skeletons. Wolf, fox and fish bones were not found in the wells with human remains.

Lastly we may note that neither human nor animal bones had been exposed to water: this seems to suggest that they were placed in wells, cisterns and canals after the exhaustion of water sources.

OBJECTS

Artefacts were discovered in nine of the considered wells and they can be divided into two groups: artefacts worn by human subjects and artefacts found within the structures but not directly associated with human bones. The first group comprises metal objects only, exclusively bracelets (*armillae*) and *fibulae*: bracelets were found on the arm bones while fibulae were laid on the ribcage. The second group includes many artefacts categories which also often recurred in other wells without human remains (see Table 3), i.e. closed ceramic forms such as *ollae*, *dollii*, *amphorae*, *oinochoai*, open vase shapes such as cups and Attic craters and miniature ceramic vases in the form of cups and calices. We can also add bronze vases such as *situlae*, metal instruments including keys, metal ingots, metal wastes and finally weaving equipment such as reels, spindle-whorls and loom-weights and other clay elements such as decorated cylinders and masks.

Site	**Animals**	**Objects**	**Date**
Tarquinia, Civita	Dog, ox, sheep, pig	/	7th BC
Este, Meggiaro (Padova)	Pig foeti, cattle, turtle, mallard	Miniature cups	6th-4th BC
S. Polo (Reggio Emilia)	Dog, pig, cattle, chicken, duck, wild-boar, deer	*Situlae*, craters, arrow-point, fibulae, spindle-wohrls, reels, *aes rude*	5th-3rd BC
Podere Ortaglia (Pisa)	Cattle, pig, horse, deer, wolf, fox, turtle	Cups, *kotylai*, *skyphoi*, Attic vases	5th-3rd BC
Monte Castagneto (Reggio Emilia)	Deer horns Cattle bones	Fibulae, glass-paste beads, ivory dice	4th-3rd BC
Rubiera (Reggio Emilia)	Deer bones, wolf, turtle, owl	*Oinochoai*, *ollae*, *situlae*, loom-weights	4th-3rd BC
Pyrgi, Temple A, South well (Rome)	Fox	Clay elements, votive clay objects, red-slip vase, bronze *simpulum*, bronze coins	4th-3rd BC
Pyrgi, Temple A, West well (Rome)	Dog, sheep	Clay elements, votive clay objects, Attic vase, *amphora*,	4th-3rd BC
Locri, Centocamere, Temple of Aphrodite	Dogs		4th-3rd BC
Marzabotto, *Regio* IV, *insula* 3 (Bologna)	Deer horns	Fibula, bracelet, *situla*	Celtic period
Marzabotto, *Regio* V, *insula* 2 (Bologna)	Deer horns, wild-boar teeth	*Dolii*, Greek vases, axe, clay cylinder	Celtic period
Marzabotto, *Regio* VI, *insula* 2 (Bologna)	Deer horns	Biconic vase, mug, axe	Celtic period
Bazzano (Modena)	Pig, chicken, peregrine	10 bronze vases, *dolii*, amphorae, *guttus*, keys, nail, coins	3rd-1st BC
Veio, Pian di Comunità and Piazza d'Armi (Rome)	Dog	/	/

Table 2

It is of great significance that these objects were usually whole and that they were protected by artificial arrangements: a dolium, two cyst-shaped structures made by roof-tiles and bricks and two intentional closures made by large stone slabs. It is more difficult to explain the presence of the decorated clay cylinders: at Marzabotto we can find six of these elements, the so-called *kioniskoi*, but we know the exact provenance for only two of them: the well in insula 4 and the well from House of Latunies, a metal-workshop in Regio V, insula 2 (Brizio 1889: 319-322). Even if their real function still remains unclear, the decorative motifs of waves, dolphins and fish seem to suggest a probable pertinence to the sphere of water and perhaps to wells themselves (Manino 1971: 246-247; Pizzirani

2005).

Site	**Objects**	**Date**
Verucchio, Pozzo del Monte (Rimini)	*Skyphos*, cups, miniature vases, miniature *kantharoi*, clay figurines, bronzes	8th-6th BC
Rome, temple of Victory on the Palatine	*Olla*, cup	7th-6th BC
Burrasca (Reggio Emilia)	*Ollae*, cups, mugs, *oinochoai*, *dolii*, *situla*	6th-5th BC
Rondineto (Como)	*Ollae*, St. Valentin Attic vase, loom-weights	6th-5th BC
Taneto (Reggio Emilia)	*Oinochoai*, mugs, cups, scythe	5th BC
Rubiera (Reggio Emilia)	*Oinochoai*, *ollae*, *olpe*, miniature vase, miniature bucchero vase, bronze cist	4th-3rd BC
Marzabotto, *Regio* V, *insula* 5 (Bologna)	Seven complete vases, *oinochoe*	Celtic period
Marzabotto, *Regio* V, *insula* 4 (Bologna)	Spindle-wohrls	Celtic period
Marzabotto, *Regio* VII, *insula* 3 (Bologna)	Roof-tiles	Celtic period
Marzabotto, *Regio* VII, *insula* 3 (Bologna)	Roof-tiles Pebbles	Celtic period
Musile (Venezia)	Bronze disk with goddess *Reitia*	4th-1st BC
Bologna, palazzina Pallavicini	*Amphorae*, *olpai*, *guttus*, lamps, *situla*, coins, nail	3rd-1st BC

Table 3

DISCUSSION

Ancient cultures regarded wells, cisterns and canals in a very peculiar way. In pre-Roman Italy, for instance, water structures included in ceremonial areas were often used as *favissae*, i.e. structured deposits which employed de-functionalised hydraulic arrangements in the placement and keeping of ritual objects (Hackens 1963; Bouma 1996: 51). Here we can recall that this interpretation incorporates the wells from Este, Meggiaro (Padova, Veneto, 6th-4th century BC; Ruta Serafini 2005), Peccioli, Podere Ortaglia (Pisa, Tuscany, 5th-3rd century BC; Betetto 2005) and Orvieto, Cannicella (Perugia, Umbria, 5th-3rd century BC; Stopponi 2008). On the other hand, the discoveries of other categories of artefacts, such as metal wastes, metal ingots, metal instruments and metal vases could suggest that wells were used as general storage-places as well: Monica Miari proposed this interpretation for one of the wells at S. Polo d'Enza, Campo Servirola ("pozzo del margine"; Miari 2000: 86-92) and the same consideration could be made in respect to the well from Bazzano (Modena, Emilia Romagna, 3rd-1st century BC; Casini 1878), which contained ten bronze vases, coins, nails and five keys. The question of the so-called "pozzi-deposito" (storage-wells) is particularly evident in 4th-6th century AD Emilia Romagna structures and has been very well treated by Sauro Gelichi: indeed he reviewed and collected several cases of Roman and post-Roman hydraulic structures that, during times of social and political instability, were chosen for the placement of coins, metal artefacts and even ritual objects (Gelichi 1994: 41-48).

With particular regard to Etruscan culture, we can note that wells played an ambiguous role. On the one hand, they were places of daemons and iconographic evidence illustrates that these kinds of structures, which cut into the ground and touched deep water, were associated with the wolf-head or dog-head daemon and invested with a strong chthonic symbolism (Gianferrari 1995: 134-135; Domenici 2009: 175-178). On the other hand, wells were regarded as having oracular properties: for example, the sortes used for ceremonial issues in the sanctuary of Fortuna Primigenia at Praeneste (Palestrina, Roma, Latium; Coarelli 1987: 68-69) were kept within a well and in some cases, especially on 5th-3rd century BC mirrors, the prophetic head of Urphe/Orpheus is depicted emerging from a well (Bagnasco Gianni 2009: 405-407). Mauro Menichetti has further pointed out that water itself was deeply connected with oracular powers and was probably involved in procedures of hydromancy (Menichetti 2008: 218).

Another interesting aspect can be observed in Greco-Roman culture. Athens wells B1 from Dipylon and well V from Agora contained defixiones employed in order to exorcise the ghosts of "tombless dead" and in those cases wells can be described as places of ghosts and the restless dead, who were probably placed within or near the wells themselves (Jordan 1985: 207).

In general, we can say that hydraulic structures are significant in ancient imagerie because of two intrinsic features: they cut into and across the ground and they contain water. As holes which cut into the ground they represent a link between the Above and the Under, where chthonic powers dwell and act, and they are connected to the inhabitants of the Underworld such as daemons, oracles or even ghosts. In this sense wells could have played the role of media between two different dimensions, according to a forma mentis which seems to allude also to the symbolic value of Roman culture mundus (Coarelli 2000: 285-292).

Water itself can be described as a medium: it separates what is above and what is under its surface, but simultaneously it allows a kind of communication between them and it is then a permeable membrane which can also be crossed and this passing is often a synonym of death, metamorphosis, purification and renovation. In Etruscan culture this natural element is strictly linked with god Bacchus and his eschatological aspects (Massa Pairault 2001). In this sense we may interpret the presence of vine wood and of ceramic and bronze vases. Because of their shapes and function, these

objects were probably linked to water distribution or the practice of water ablutions, this according with a theory already proposed for Celtic wells (Vidal 2003: 82).

The animal bones seem to bear the same ambiguous nature. Indeed they belong to faunal taxa which are connected with the Underworld, passage into the Underworld, particularly with regards to dog, horse and turtle, and, particularly with respect to the deer horns, the gods of the Underworld (Bottini 1992: 87; Gambari, Tecchiati 2004; Muggia 2004: 195). The instance of deer horns is very significant: because of their half-moon shape they have been frequently associated with the goddess Hecate and this connection may be confirmed by the findings of deer horns in and/or near rock fissures and water sources; at S. Giovenale, for instance, the horns from the Semi-Subterranean Building were probably used for sinking sacrifices (7th-6th century BC; Olinder, Pohl 1981: 80-83).

In general, we may observe that water, hydraulic structures and the materials which we could find in them, were in touch with the Other and that these places were regarded as potentially dangerous, and so, rather than being just simply abandoned, they also needed to be closed and sealed by means of ceremonial procedures once they had gone out of use (D'Agostino 1999). These procedures appear to consider the deposition of selected artefacts categories and selected vase-shapes, usually complete, which were placed and protected by special arrangements. Other potential indications of symbolic closures of wells' life-cycles could be the findings of keys, sometimes considered an attribute of the Italic goddess Reitia, and weaving equipment (Marzatico 1996: 55-58). The connection between spindle-whorls, reels, distaffs and notions of birth and death, beginning and end, opening and closure, often personified by the mythological Moirae, has been already proposed by some scholars (Cottica, Rova 2006; Gleba 2009).

Dog bones seem to participate in the same ritual sphere. In fact, dog remains within archaeological contexts often indicate the end of a structure's life-cycle. This can be noted in the sites of Bologna, Viale Aldini, Este, Meggiaro, and Laion, Gimpele. Wells from Bologna and Este were indeed closed by layers containing dog bones, while the Blockbau house near the well from Laion was abandoned in 3rd-2nd century BC and the complete skeleton of a dog was placed under its threshold (Pisoni, Tecchiati 2010). In Southern Italy we can recall the case of the Lavello sanctuary (Potenza, Basilicata, 3rd-2nd century BC): here the sacellum was abandoned and covered by collapsed architectural elements and the deposition of dog skeletons (De Grossi Mazzorin 2008: 75).

The real challenge is then to clarify, or try to clarify, the presence of human bones, which could either be explained as an intentional deposition or as an accidental one. Backe Forsberg has already demonstrated that the thesis of accidental deposition due to contingent factors such as floods or earthquakes, cannot be applied to the osteologic deposit from S. Giovenale and her observations could also be considered valid for the other cases considered here (Backe Forsberg 2005: 148-10). With regard to the thesis of intentional deposition, we can assemble some archaeological clues which seem to provide confirmation. Wells contained both complete skeletons and isolated bones, a fact that seems to allude to some selective procedures applied before their definitive placement in the structures and analogous procedures have also been applied to animal bones. In addition, human remains were associated with recurrent and selected animal taxa and recurrent and selected categories of artefacts.

If collocation of human bones in wells could be interpreted as intentional, then we have to explain the reason, or the reasons, behind this intentional placement. This debate has been long on-going and has hypothesised four possible causes: a) wells were re-used as graves; b) wells were re-used as discharge locations; c) wells were re-used as containers for human corpses during periods of high mortality, like plagues and/or wars; d) wells were, in fact, ritual places. Thesis a) appeared to be strongly substantiated through comparison with Celtic "puits funéraires" (Fouet 1958). However, this

is undermined both by the chronology, with the Celtic evidence dating back to the 6th century BC, and by recent re-consideration of their real function as ritual, rather than funerary (Vidal 2003).

With regard to thesis b), we have to recognise the presence of collapsed elements like pieces of columns in the superficial layers of structures. However the univocal interpretation as discharge locations seems to be too reductive: the artefacts recovered here were usually complete and not simply thrown, but rather placed and protected on the bottom of the structures. In addition their deeper spaces were often intentionally closed with large stone slabs or roof-tiles. The same phenomenon is also quite evident in the wells from Pyrgi, where South well and West well were both closed by stone slabs and several fragments of large dolii (Colonna 1988-1989: 13). Finally artefacts recovered from wells were often precious, for instance the Attic vases, and the presence of miniature vases could suggest a non-functional, i.e. symbolic, value of the deposited objects (Zamboni 2009).

Until now, thesis c) could not be suggested for pre-Roman findings, because of the absence or approximation of pathological analyses. This explanation has, however, now been proposed for well G5:3 in the Athenian Agora (5th-2nd century BC; Lagia 2007: 303-304). The structure contained animal bones, belonging to horse, dog, birds, turtles and sheep, and human bones: the latter belonging to at least 450 subjects, i.e. foetuses, newborns, an 11-years-old subject and an "adult" afflicted by skeletal congenital defects. With regard to this peculiar evidence, in the 1940s Angel proposed a possible "catastrophe death" probably connected to a plague or to purification rituals linked with the plague (Angel 1945).

Finally, if it is true that human bones could never have been placed into water when wells where in use, we could discuss the actual abandonment of the settlements. At Marzabotto Vitali hypothesised a link between the wells and the "Celtic" settlement, implicitly asserting a continuity of frequentation and consequently a "co-habitation" of the living and the dead within the same area (Vitali 1992: 90; Bettencourt 2010: 37).

Concerning thesis d), in pre-Roman Italy hydraulic structures with human remains were all found in settlement contexts and, in the absence of other archaeological or epigraphic evidence, we cannot say if the examined wells were really involved in some kind of water cult or if they were devoted to the cult of a particular god. The one exception is the well in the urban area of Musile (Venezia, 5th-1st century BC), in which a bronze disk, decorated with the image of the Italic goddess Reitia, was found (Busana 2008: 38).

The case of S. Polo, Campo Servirola, is instead quite different: on the basis of epigraphic findings, we can say that the site with its canals, cisterns and wells was devoted to the double cult of Vei and Rath, Etruscan names for Demeter and Apollo, and involved in some kind of Wasserkult (Colonna 1987: 432-435; Colonna 2001; Lambrinoudakis 2008). The situation of S. Giovenale is ambiguous: the functional interpretation of Bridge Building still remains very uncertain, although Backe Forsberg has suggested that it was a "funerary house" (Backe Forsberg 2005: 142-143). Among wells without human remains, the South well from Pyrgi, Temple A (Cerveteri, Rome, Latium, 4th-3rd century BC) is also interesting. It contained an inscribed bronze simpulum dedicated to Farthan(s), probably a chthonic daemon similar to Charun (Colonna 1988-1989: 17; 122-123). Lastly, in Iron Age Europe, we recall a case from Carrawborough (Northumbria, Great Britain, 1st-2nd century AD), where the wells within the ceremonial area contained human skulls and artefacts dedicated to the goddess Coventina (Merrifield 1987: 45).

All the hypotheses cited above are based on the logic of a merely opportunistic re-use, in order to exploit already existent containers which had been abandoned and dismissed. We may however ask why only a few wells were chosen for this purpose. This could be due to peculiar features of the

selected wells, such as their topographic locations. For instance, among the forty-one structures discovered at Marzabotto, only eight contained human skeletal remains, and they were concentrated only in Regio V, an area of handcraft workshops, and in the zone of Porretana State Street (Vitali et al. 2001: 88; Locatelli 2005): this was part of a larger complex, which was one of the most ancient axes guiding the ritual foundation of the settlement and which was also defined by votive stipes and votive deposits (Gottarelli 2005; Desantis, Malnati 2009). Concerning the sites of Bologna, S. Giovenale and Orentano, we could also take into account the liminal position of the wells. They were all discovered in the peripheral zones of the settlements, particularly in S. Giovenale, where the well was associated with a typical passage-context or liminal place, i.e. the bridge over Fosso del Pietrisco.

We may also add that watery contexts in general have often been considered, in ancient times, as 'marginal' places for 'marginal' categories of the dead, which we may also gain a sense of in the immobile and dark water in some kinds of natural places, such as marshes and ponds (Wait 1985: 51-56). Human skeletal remains within marshes are also found in Italy. Noteworthy examples are the four subjects - one with its arms tied up behind the back and another afflicted with Down syndrome, both from Rome, Equus Domitiani (Latium, 8th-7th century BC; Filippi 2007-2008) and the two Celtic skulls (war-prisoners?) from Fiavè, Carera (Trento, Trentino Alto Adige, 4th-2nd century BC; Dal Rì, Tecchiati 2002). Lastly, the presence of thermal waters could have served as a focus for human actions and behaviours: chemical analyses, effectuated on the ground, indeed revealed that water from Laion contained high levels of sulphur and had thermal properties which were still known in the 18th century (Pisoni 2006-2007).

Proceeding from all these aspects, it seems impossible for us to say that all the human bones deposits found within hydraulic structures were the result of the same level of or type of actions and we cannot suggest a univocal and absolute interpretation of the evidence. We are however able to recognise coherent patterns in the peculiar sealing procedures cited above and we may note that, although hydraulic structures were not necessarily graves or ceremonial places, they needed ceremonial closures because of their nature and we could therefore theorise that human skeletal remains, as well as animal bones and other artefacts, were also involved in this process.

As Williams has indeed suggested (2004: 264), the dead corpse has value both as a "person" and as an "object" and this could allude to a possible "reification" of the body (Favole 2003; Duday 2010). In this sense, the corpses seem to maintain a certain level of social presence beyond biological death and the dead bodies or parts of them are able to interact with the living on multiple cultural levels, in ways which can be defined as negative - fear of the dangerous dead - or positive - honourable or magical properties connected with powerful people.

For instance the case from Modena Novi Sad has been connected with executions by decapitation, and other forms of punishment could also be recognised in the subjects from Fossalta and S. Lazzaro. Here the probable presence of bindings reminds us of the burials with signs of coercion (Philpot 1991: 71-76), which are above all known in Romano-British contexts and were probably employed in order to immobilise the "dangerous dead" (Äspock 2008: 19-21). Two male adults from the 2nd-1st century BC cistern at Delos, House of Fourni (Greece; Charlier 2008: 62-65) also showed signs of immobilisation: they had been decapitated and their legs were immobilised by means of several iron nails attached to the leg bones.

In pre-Roman Italy, human skeletal remains showed no traces of traumas, violence, coercion or sacrifice. However, the presence of heavy stress markers and arthritic degeneration on bones could reveal that those subjects bore very hard and continuous labour during their lifetimes, maybe as subjected peoples or slaves. On the other hand Bettencourt (2010: 41-42) wrote that the inclusion of

human bones in the spaces of the living had a strong symbolic, magical and positive meaning. They become kinds of "votive objects" or "human relics", to use the definition of Francesco Fedele (2004: 62), and they were employed in order to mark one of the fundamental co-ordinates of human life, i.e. time, because the deposition of human bones in wells seems to state the end of the structures' life-cycles. The strong connection between the placement of human remains and the demarcation of significant moments such as foundation, restructuration and abandonment, of anthropic structures has been already been noted in North-Eastern Italy, with particular regard to non-adults' bones discovered in Veneto and Trentino Alto Adige (Cavada 1994).

The presence of human skeletal remains in significant contexts could therefore be linked with the necessity of breaking the time-space continuum between the dimension of the "before" and the dimension of the "after." In this sense, and according to the ideas of Mircea Eliade (1976: 20), we may say that the deposition of human bones marked the separation between temporal realities which were perceived as ontologically different; with regard to this kind of evidence, we could use the definition of "rites de rupture" coined by Delattre and Séguier (2007: 608).

In conclusion, we could say that the association between hydraulic structures and human bones has to be considered not as simply accidental, but rather as a structured archaeological fact, attested within a wide chronological and spatial range. It alludes to specific behavioural strategies, linked, on the one hand, to the intrinsic nature of wells, cisterns and canals and, on the other hand, to the (ritual) closure of particular places invested with high symbolical values.

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