

The Etrusco-Roman thermo-mineral sanctuary of Bagno Grande at San Casciano dei Bagni (Siena): aims and perspectives 'behind-the-scenes' of the ongoing multidisciplinary research project

Jacopo Tabolli

Questo contributo offre la cornice teorica e metodologica alla base dello scavo del santuario etrusco-romano del Bagno Grande di San Casciano dei Bagni, in uso almeno dalla fine del III secolo a.C. fino agli inizi del V secolo d.C. Superando la retorica delle "acque sacre" che pervade tanta letteratura archeologica - dove solo raramente l'acqua viene studiata nella sua variabilità - il progetto di ricerca fa dell'acqua termo-minerale della sorgente la principale protagonista dell'indagine. Lo studio della sorgente incanalata nella vasca monumentale del santuario sulla lunga durata, l'analisi medico termale del contesto, la destrutturazione di letture esclusivamente istituzionali di rito e culto, a favore di un'indagine sui singoli attori sociali e infine l'analisi dell'ecosistema economico che ruota attorno al regime delle offerte costituiscono i principali filoni di ricerca. La scoperta del deposito votivo caratterizzato da una successione di ricche deposizioni prevalentemente in bronzo e da offerte vegetali (legna e frutti) diviene l'occasione di porre il contesto più che i materiali stessi al centro della ricerca.

In November 2022, the official announcement by the Italian Ministry of Culture of the discovery of numerous bronze Etruscan and Roman statues from the ongoing excavation at the Bagno Grande of San Casciano dei Bagni, in the province of Siena, at the border between Tuscany, Umbria and Latium¹, brought a small archaeological site of the southernmost part of the province of Siena under international spotlight (fig. 1). This paper aims to present the scientific 'behind-the-scenes', i.e. an overview of the multidisciplinary research in place, with the purpose of situating this excavation within the framework of current studies on thermal and healing sites as well as of overcoming rhetoric and political use associated to the discovery.

The Bagno Grande

The territory of San Casciano dei Bagni constitutes one of the richest geothermal regions in Italy, with a long tradition of use of its thermo-mineral springs². Research in the local travertine quarry, located to the north of the medieval village³, still active today, has revealed the presence of Palaeolithic remains (Lower and Middle Palaeolithic, 300-200 ka), attesting to the human activity, connected with hot springs that were later solidified within the travertine. Neolithic and Bronze Age evidence from the foothills of the mountain of Cetona, where

¹ For the location of the site, see MARIOTTI, TABOLLI 2021a; 2021b.

² CASINI 1395/1402; DA MONTECATINI 1417; SAVONAROLA 1485; BANCHELLI 1536; CARDANO 1548; VIOTTI A CLIVOLO 1552; BACCI 1571; SCHIAVETTI 1585; TINELLI 1605; GHEZZI 1617; MANNI 1617; BOTTARELLI 1688; GIGLI 1722; BASTIANI 1733; NERUCCI 1763; NENCI 1763; BASTIANI 1770; SANTI 1795; GIULI 1833; PURGOTTI 1857; MARIANI 1870; MASSONI 1976; STOPANI 1995; ROSETTI, VALENTI 1997; CHELLINI 2002; BOISSEUIL 2002; FERRETTI 2005; DE GREGORIO 2020; GUARDUCCI 2021; MARIOTTI, TABOLLI 2021a.

³ CUDA, MODESTI 2021.



Fig. 1. San Casciano dei Bagni. The medieval village on map (copyright: J. Tabolli).

San Casciano dei Bagni is located, shows the continuity in the use of such a thermo-mineral landscape and constitutes the premise for the use of the area in the first millennium BCE⁴ (fig. 2). During the first millennium BCE, San Casciano dei Bagni belonged to the territory of the ancient city-state of Chiusi, as evidenced by material culture and funerary ideology, and marked the south-eastern borders of this area, towards Volsinii (Orvieto) and Vulci⁵.

In 2020, a previously unknown Etruscan and Roman sanctuary came to light, with its votive deposit preserved intact and well-stratified inside a pool, built of travertine blocks, that collects natural hot water. The ancient sanctuary and its pool are located less than 10 metres from the Medici hot pools, still in use nowadays as public baths⁶. The ongoing excavation revealed that a semi rectangular Roman portico with at its centre the travertine pool in the form of a ‘bone’ was built at the beginning of the first century CE (most probably around the years of Tiberius’ reign) on top of an earlier Etruscan pool. The portico with its pool was rebuilt multiple times, during the Flavian dynasty, at the end of the 2nd century CE, at the beginning of the 4th century CE, and it was dismantled in the early 5th century CE, when the blocks of the structures were used to fill in the votive pool (fig. 3). The water of the spring at Bagno Grande, emerging at 41.5 degrees Celsius, presents powerful chemical and physical characteristics⁷. The thermo-mineral spectrum has led to the perfect preservation within the ancient sacred pool and the mud of organic and metal finds. From the late 3rd century BCE to the early 5th century CE (i.e., for at least eight centuries) a complex series of votive offerings were deposited within the pool as it is shown by a clear stratigraphy within the deposit. The pre-Roman pool was filled in with two different actions by 30 CE and closed by a thick layer of tiles and bricks. During Imperial times at least six main actions of votive depositions occurred in the southernmost edge of the pool. To a few animal bones correspond a very large

⁴ MARTINI, SARTI 1990; NEGRONI, CATACCHIO 2002; CUDA 2010.

⁵ Most recently MINETTI 2004; IOZZO 2013; MAGGIANI 2014; SALVINI 2014; MARIOTTI, TABOLLI 2021a.

⁶ For the Medici pools see MORELLI 2021.

⁷ TABOLLI, MARIOTTI 2021: 111.



Fig. 2. The Mountain Cetona and San Casciano dei Bagni. In blue the location of Bagno Grande in the valley of Elvella (after Mariotti, Tabolli 2021a).







-  Tiberius' reign
(monumental structure of the main building)
-  Flavian Dynasty
(restoration at the end of the 1st century CE)
-  End of the 2nd century CE
-  Beginning of the 4th century CE
(reconstruction of the western area)
-  Beginning of the 5th century CE
(dismantelling and closing of the shrine)
-  Medici baths on top of the Roman ruins
(1500s)



Fig. 3. The major building phases in the sanctuary of Bagno Grande in Roman times (photo by E. Mariotti).



Fig. 4. Votive deposit into the Etruscan sacred pool (photo by E. Mariotti; copyright: SABAP-SI and Comune di San Casciano dei Bagni).

number of vegetal offerings: intact pinecones (in a region where pine trees have an unknown biogeographical history⁸), a large number of ritually cut wood, and seeds. In addition to the more typical metal offerings representing anthropomorphic figurines, the excavation at Bagno Grande produced exceptional full-size bronze statues and body parts, dating in the late Etruscan period/late Republican to early Imperial period (late 3rd century BCE - 1st centuries CE)⁹ (fig. 4): deities, members of the elite, infants in swaddles (in types previously known only in terracotta¹⁰) and a small “putto” (a young naked boy), body parts and organs, especially ears, breasts

⁸ DI PASQUALE, D’AURIA 2020.

⁹ MARIOTTI, TABOLLI 2021b.

¹⁰ DE CAZANOVE 2017; CARROLL 2018.

and arms. Long inscriptions in Etruscan referred to the deity of the sacred spring, the Flere of Havens¹¹, while contemporary inscriptions in Latin referred to the ‘corresponding’ Fons¹². Until November 2022, over 5300 Roman coins were recovered inside the pool, ranging from mid-Republican series to late Imperial ones. The concentration of coins during Imperial times in specific find spots suggests that the deposition occurred in groups, probably following a specific ritual rhythm as well as accompanying the construction and restoration phases of the sanctuary¹³. Fragments of ceramic plates, lids, and jars were also found inside the pool, although in extremely small numbers compared to the bronze offerings. Roman inscriptions found on altars at the edge of the pool testify to the local cults during the 2nd and 3rd century CE of Apollo, Fortuna Primigenia and Isis, while a marble statuette of Hygeia was found inside the pool¹⁴. At the beginning of the 5th century CE, while most of the sanctuary was dismantled, a series of lamps testifies to the continued use of the pool also in early Christian times. While the rising level of the mud has slowly covered the area and the Medici pools still in use are near the main spring, the Bagno Grande remains for the local community the most important spring. In fact, the toponym “Monte Sacro/Sacred Mountain” testifies to the collective memory of the sacred identity of this place¹⁵. It is important to mention here that, alongside the Bagno Grande, the other major thermo-mineral spring of San Casciano, the spring of Ficoncella, where the Medici family built the Terme del Portico, still functions as a SPA (an extended centre of wellness and balneotherapy).

In addition, among the 41 hot springs and pools so far known in the territory of San Casciano, intensive field surveys conducted during 2021-2023 in parallel to the excavation, have revealed archaeological evidence, both Etruscan and Roman¹⁶, only in relation to six of them. In the context of this research project, it is fundamental to stress that although these six springs release water at different temperatures, they are the richest in

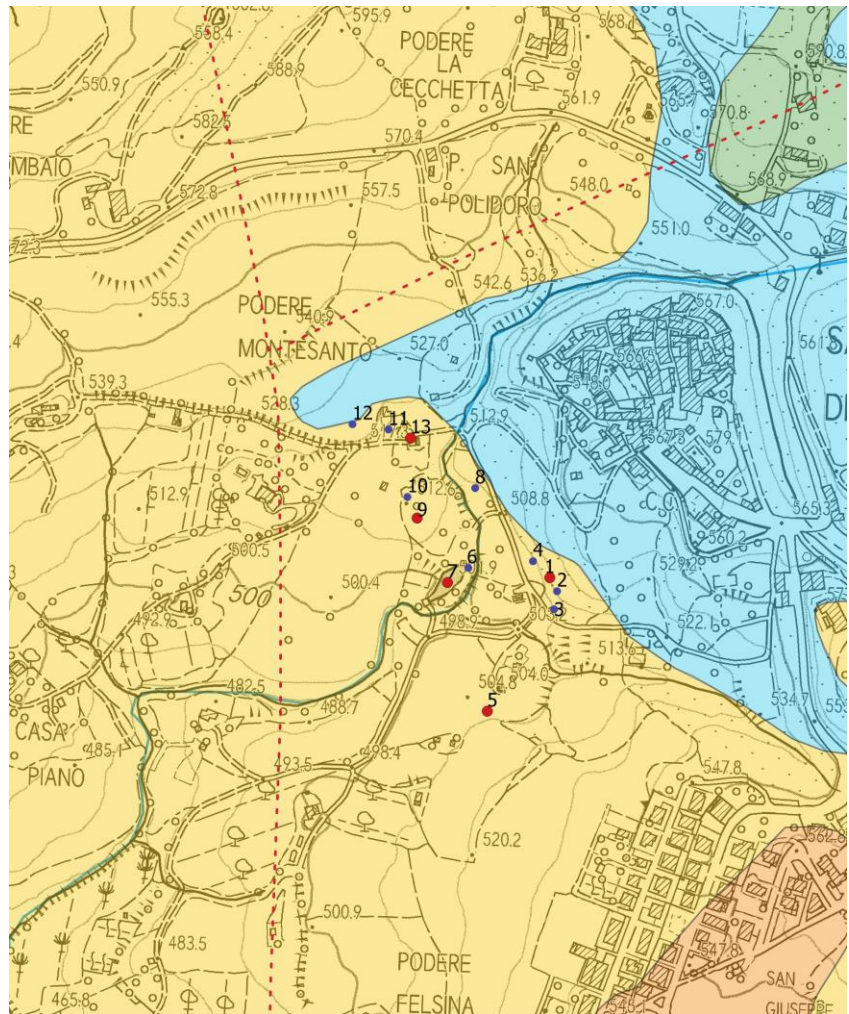


Fig. 5. Location of warm and hot springs around the Bagno Grande. In red, the springs with more than 1 litre per second of water; In blue the springs with less than 1 litre per second of water (after Tabolli, Mariotti 2021).

¹¹ MAGGIANI *forthcoming*.

¹² GREGORI *forthcoming*.

¹³ PARDINI *forthcoming*.

¹⁴ MARIOTTI, TABOLLI 2021a.

¹⁵ MORELLI 2021, with the description of the archival sources.

¹⁶ For the votive deposit (probably part of a sanctuary) of Doccia della Testa see IOZZO 2013 and SALVINI 2014.

terms of chemical and physical properties¹⁷ (fig. 5). This means that for the Etruscans the selection of sites was based on the natural properties of the hot water and most probably because of its medical-therapeutic qualities. This simple assumption illuminates on the research programme developed around the archaeology of the Bagno Grande, aimed to investigate issues of continuity and transformation and especially at allowing for a shift in the perspective of reading 'sacred (hot) waters'.

Before Rome

In Mediterranean and European archaeology, it is generally accepted that the phenomenon of thermal complexes, often associated with natural thermo-mineral groundwater sources (hot or warm¹⁸), is one of the major characteristics of the Roman world. The large number of monographs, collective volumes, papers, exhibitions and international projects that have addressed this topic over time, focusing especially on the architecture and function of these complexes, demonstrates the continuous interest of a well-established research line that has identified primarily the key role of Rome in the dissemination of this cultural phenomenon¹⁹. Recently, there is a growing number of attempts to move beyond the traditional ways of studying Roman bath complexes and their connection to thermo-mineral water²⁰; nevertheless, it is surprising how little consideration has been devoted to the complex range of evidence that precedes Roman times, which often remains elusive, unrecognised and understudied²¹. Even when important publications attempt to address the characteristic *longue durée* of thermo-mineral sites²², the starting point of their use is almost always considered to occur in the Roman period²³. While this may be indeed valid in specific regions of Europe, it is certainly not the case in Italy, where archaeologists have been identifying pre-Roman evidence of the use of thermo-mineral water underneath Roman thermal baths or in sites that do not show any continuity in Roman times.

It is striking to observe that originally Rome had no springs of hot waters in its territory during the first half of the first Millennium BCE, mainly due to the minimum presence of travertine from geothermal origin deposited in the fluvial area of the ancient city²⁴. The first encounter between Roman culture and the already established use of thermo-mineral water took place within the framework of the interactions and later military expansion – in the so-called Romanisation²⁵ process – in the other regions of Italy. Especially Etruria, Sabine and Latium – where votive deposits and sanctuaries connected with hot water (springs and pools) are widely attested at least from the 7th century BCE – offered a direct model for ritual and functional exploitation of hot waters, that Rome inherited and transformed, adding to the natural source the most common use of the hypocaust (*suspensurae*) for the artificial creation of hot water, in a complex interaction with the Greek tradition²⁶.

If during the Hellenistic period (3rd-1st centuries BCE) the evidence is almost widespread all over Italy, the identification of the earlier sites constitutes a fundamental goal. Sites such as the sanctuary of Mefitis in the sacred Ansanto Valley constitute fundamental examples on how healing places connected to thermo-mineral waters can be addressed, also applying a multidisciplinary perspective²⁷. Issues of continuity have been stressed

¹⁷ CASTELLANA 1980; most recently TABOLLI, MARIOTTI 2021.

¹⁸ For a classification of thermo-mineral waters, see DOWGIALLO 2013, with references to the Hydrogeological Commission of Mineral and Thermal Waters, including glossaries and overviews.

¹⁹ See for instance SCHEID 1991; GUÉRIN-BEAUVOIS 2015; SCHEID *et al.* 2015; YEGÜL 1992; GÓMEZ GESTEIRA 2016; ZANETTI 2017.

²⁰ PERÉX AGORRETA, ALAIX I MIRÓ 2017; for the case of ancient Italy see most recently ANNIBALETTO *et al.* 2014; BASSANI 2014a; 2014b; 2016; 2021; BASSANI *et al.* 2012; 2019.

²¹ EDLUND-BERRY 2010.

²² See for example COSTA *et al.* 2011; BOISSEUIL 2002; GUARDUCCI 2021.

²³ MATILLA SÉIQUER, GONZÁLO SOUTELO 2017; NOGUERA CELDRÁN *et al.* 2020.

²⁴ The vast majority have a fluvial origin attributable to calcium/bicarbonate equilibrium in surface waters; see CORAZZA, LOMBARDI 1995.

²⁵ KEY, TERRENATO 2001; TRAINA 2006; SISANI 2007; STEK 2013; VERSLUYS 2014; WOLF 2014; BISPHAM 2016; TERRENATO 2019.

²⁶ DE LAINE 1999; FAGAN 1999; 2001; for the highly debated connection between Greek and Roman models of public baths in Hellenistic Italy see NIELSEN 1983; 1985; DE LAINE 1988; 1989; 1992. For the link between thermo-mineral resources and the adoption of the hypocaust, see the well-known case of Gortys in Arcadia from the 3rd century BCE (GINOUVÈS 1962: 349-361; BOUDON 1994).

²⁷ ONORATO 1960; BOTTINI *et al.* 1976; RAININI 1980; ANTONINI 1981; RAININI 1985; GAMBINO 1991; COARELLI 1998; CERCHIAI 1999; RAININI 2003; DE CAZANOVE 2003; CAIAZZA 2005; LUSCHI 2005; 2006; MELE 2008; GUZZO 2013; PETRACCIA 2014; FRANCONI 2017.

for the key role of Southern Etruria sites such as the *Aquae Caeretanæ* at Pian della Carlotta in Cerveteri²⁸ or the sanctuary of *Aquae Apollinaris* at Stigliano²⁹, with evidence dating back to the late 7th-early 6th century BCE³⁰.

Looking at Internal Etruria, in southern Tuscany, a large number of sites document continuity of use such as the spring of Fucoli with the nearby sanctuary of Sillene at Chianciano Terme³¹, or Buca delle Fate at Rapollano Terme in the complex of Campo Muri³². In the area of Siena, at the votive deposit of Acqua Borra/Sant’Ansano a Dofana (Castelnuovo Berardenga, Siena), no interruption in the cult is observed from the 4th-3rd centuries BCE until now³³. In the case of the thermal sanctuary of Sasso Pisano - dating from the late 5th/4th century BCE to the 3rd century CE and located south of the province of Pisa, where based on the preliminary publication³⁴, the porticos and main structures as well as votive offerings preceded the Roman period, the articulation of spaces can be understood only if we take into account the seasonal movement of the thermo-mineral spring (with water temperature over 48 degrees Celsius). The orientation of the sacred structures reflects this movement, although this has never been pointed out in literature, especially in relation to the late 5th century BCE portico. In Umbria at the sanctuary at Colle Arsiccio (at Magione, province Perugia) continuity in prayers and acts of devotion close to the ancient Etruscan and Roman sanctuary has been well-attested until the past century³⁵.

This brief overview shows that despite the impressive amount of early evidence, in pre-Roman studies the research on hot water contexts has played until now a minor role, compared to studies of later periods. The dramatic circumstance that many excavations remain unpublished or only preliminarily published is one of the main reasons for the ‘pre-Roman cut off’ from the discourse on the ancient use of hot waters. This marginalised role is in direct contrast to an impressive number of extremely generic references to archaeological sites linked to the water (cold or hot) and especially to the vague concept of “sacred waters”: over 4000 papers and chapters in volumes in pre-Roman archaeology and over one hundred exhibitions³⁶ address “sacred waters”. Often based on the assumption derived from the ancient written sources that “*nullus enim fons non sacer* (no spring is indeed not sacred)” (SERV. *Aen.* 7, 84)³⁷, it is surprisingly easy to find in literature references to votive deposits linked to hot sacred waters or springs, without any real interest in the water itself. Despite an implicit understanding of the deep link, especially from a pre-Roman perspective, between the sphere of water and the sacred character of a site – in which often very little structural elements were needed³⁸ – when it comes to the analysis of votive offerings deposited in such a context, the vast majority of studies are focused on their materiality, typology, chronology, function, and ritual or cult meaning³⁹. In all these cases the value, role and importance of water itself is always presumed but only rarely investigated with the same methodological rigour that is devoted to material finds.

²⁸ See most recently CHELLINI 2002: 87-87, with previous bibliography.

²⁹ GIGLIOLI 1930; DEL CHIARO 1961; GASPERINI 1963; 1976; 1988: 27- 35, 98; BROISE, JOLIVET 1991: 79-95; LOMBARDI, VENTURA 1997; CHELLINI 2002: 162-163.

³⁰ For the site of Bagni della Regina at Veii, with a possible early votive deposit (8th-6th centuries BCE) associated to the thermo-mineral spring with iron-rich carbonated water, see most recently FUSCO 2019, 26-27, with previous bibliography.

³¹ RASTRELLI 1993a: 351-367; 1993b: 463-476; HAYNES 2014: 91-94; PAOLUCCI 2021: 62-63.

³² ASAT 1992: 325, n. 87, MAZZESCHI 1976: 89, LECCHINI, MAZZINI 1983: 31-35; CHELLINI 2002: 162-163; VILUCCHI 2009; 2011; ACCONCIA 2012: 95, n. 391.

³³ TONDI 1334; PICCOLOMINI 1901; DUFOURCQ 1907: 2015-2019; ASAT 1992: 302, no. 4; VALENTI 1995: 341-344; TABOLLI 2019.

³⁴ TARGIONI TOZZETTI 1774; COLONNA 1975; MAGGIANI 1978; ESPOSITO 1987-1988; BROISE, JOLIVET 1991; ASAT 1992: 281-282; ESPOSITO 1997; PRO 1997-1998; CHELLINI 2002: 173-177; MAGGIANI 2003; ESPOSITO, MARTINELLI 2004; ESPOSITO 2006; ESPOSITO *et al.* 2008; ESPOSITO 2011; 2013; CUNIGLIO *et al.* 2015.

³⁵ For the 1934 discovery of the site by Umberto Calzoni see TRIPPETTI 2014; most recently see MORANDINI 2020, with previous bibliography.

³⁶ The number has been counted based on iDAI.bibliography/Zenon. For the exhibitions see for example NAVA, RUSSO 1999; PAOLUCCI 2003.

³⁷ GIONTELLA 2012.

³⁸ COLONNA 1976-1977; MAGGIANI 1999; 2003.

³⁹ HUGES 2017a; DRAYCOTT 2017.

Water first

Research focused on pre-Roman sites associated with thermo-mineral waters exhibits an impressive lack of studies that would move beyond a purely archaeological perspective⁴⁰ and employ hydrogeology to understand the spatial, physical, and chemical characteristics of the waters. In fact, such characteristics had a critical role in the selection of the sites themselves – as we are observing in the area of San Casciano⁴¹ – especially in terms of the associated rituals and cults. In addition, the wide range of temperatures between different water sources/springs – from warm to hot – may have determined the types of votive offerings that were deposited in each context, a fact that again has been rarely pointed out in literature⁴². A series of incomplete attempts from archaeologists to address hydrogeological characteristics of specific water sources in ancient Italy resulted in lists of water sources that however remained marginalised by the archaeological data and the constructed narratives⁴³. At the same time, general hydrogeological studies hardly address the presence of archaeological evidence linked to geothermal resources, with rare exceptions focusing on the disturbance of groundwater in archaeological studies⁴⁴. An additional gap in the relevant scientific literature is the lack of a comprehensive analysis of the palaeo- and archaeoenvironment. Minor exceptions exist; however, they are mostly focused on the palaeoenvironmental and palaeoclimatic evolution of biostratigraphical sequences sedimented through the Last Glacial and the Holocene (ca 12000 years), with an approximate evaluation of the biogenetic productivity⁴⁵. Papers adding new insights about the thermal water influence on the environment and the settled human communities are poorly represented and do not seem to provide significant contributions⁴⁶. This is in direct contrast to the necessity of contextualising each archaeological deposit and its associated spring or pool within its specific micro- and macro-environment.

In this perspective, at Bagno Grande, since the creation of the project, we planned a consistent hydrogeological reading of the entire valley and every site identified in the survey⁴⁷, based on available geological maps and previous studies. Prof. Marco Petitta, from Sapienza University of Rome, is leading the hydrogeological components of the research. In particular, since 2022 variations in the thermo-mineral characteristics and in the temperatures have been highlighted and viewed against archaeological deposit in the sacred pool at Bagno Grande (fig. 6). Samples have been collected from groundwater springs and from the mud/concretional deposits with the aim of conducting specific geochemical analyses⁴⁸. Over the next months, specific isotopic analytical studies will be carried out⁴⁹, in addition to a basic characterisation of chemical-physical parameters and major ions content: on selected sites, dO18 and dC13 analyses both in waters and sediments will be performed, respectively for Dissolved Inorganic Carbon⁵⁰ and for CaCO₃ deposits (including travertines and karst concretional rocks)⁵¹. Possibly, additional isotopic characterisation will be carried out for sulphates (dS34 and DO18) and for Sr87/Sr86 in groundwater and in rock formations. This short overview of the analysis carried out - and planned for the next months - demonstrates our determination to place the hot spring of Bagno Grande at the core of our research and we are confident that through this approach we will also promote a different understanding of sacred hot waters in the studies of pre-Roman and Roman archaeology.

⁴⁰ The most recent example is in the narrative by SARRACINO 2021.

⁴¹ TABOLLI, MARIOTTI 2021.

⁴² ORTOLANI, PAGLIUCA 2008.

⁴³ CHELLINI 2002; GIONTELLA 2012.

⁴⁴ HOLDEN *et al.* 2006.

⁴⁵ CARRARA 1994; BERTINI *et al.* 2008; 2014; MANCINI *et al.* 2020.

⁴⁶ MARITAN *et al.* 2011.

⁴⁷ The survey in TABOLLI, MARIOTTI 2021 was planned following the 1979/1980 unpublished dissertation by G. Castellana (1980).

⁴⁸ PENTECOST 2005.

⁴⁹ MOOK 2001; AELION *et al.* 2010.

⁵⁰ GONFIANTINI, ZUPPI 2003.

⁵¹ CLARK, FRITZ 1997.



Fig. 6. The Roman sacred pool (photo by J. Tabolli; copyright: SABAP-SI and Comune di San Casciano dei Bagni).

Medicine beyond Religion

While there are many generic references to sacred hot waters and their connection to the concept of “healing”⁵², only few specific studies have investigated the link between thermo-mineral water resources and ancient medicine, and especially balneotherapy [a complementary therapy that uses mineral and/or thermal waters from natural springs, mud, and other traditional remedies to treat pathological conditions], and even fewer have looked at pre-Roman contexts, attempting to address specific evidence of medical practices⁵³. Despite the fact that the Etruscans have been widely known for their knowledge of medicine, and notwithstanding comprehensive studies on Etruscan medicine⁵⁴, we lack an analysis of the evidence from geothermal contexts. Most archaeological studies have focused on the votive offerings representing early stages of life, organs to be treated, pathologies and diseases; nonetheless, in most of these studies we observe a multitude of generic or mistaken references to medicine⁵⁵. On the other hand, in medical publications in balneotherapy, ancient evidence is presented in the introduction, while relevant references tend to be generic and imprecise, and quotations are used

⁵² BACKER 2013 (in relation to the “healthscapes”); most recently DRAYCOTT 2019.

⁵³ SCHEID *et al.* 2015; see also TURFA, BECKER 2013; AMPOLO, CORDANO 2020; most recently JAILLET 2020.

⁵⁴ After TABANELLI 1963; for a complete bibliography see TURFA 2012.

⁵⁵ For example, see COMELLA 1986: 78; for the X-ray studies on the uteri from the sanctuary of Fontanile Legnisina (Vulci, Italy) see ALLEGREZZA, BAGGIERI 1999; for more on this issue see TURFA 2016; BECKER, TURFA 2017.



Fig. 7. Surgical Gouge (photo by F. Marsili, copyright: SABAP-SI and Comune di San Casciano dei Bagni).

to create merely a narrative, often filled by clichés⁵⁶. The proximity of the deposition of votive offerings to water sources has led scholars to assume the healing power of the water under divine protection, without analysing the hydrogeological characteristics of the water source, in relation to the surrounding environment. The opportunity to study votive evidence, which is in itself a large and complex dataset, in relation to the hydrogeological and geochemical analyses of their respective hot water sources, while at the same time contextualising them, can revolutionise our studies on ancient balneotherapy. The premise of this research line is that because hot waters show significant variability in their composition, relevant medical treatments differed from site to site, similarly to what happens today⁵⁷. Nevertheless, the connection between the complex system of votive offerings in pre-Roman Italy and the type of water, as well as variations that can be related to different body parts and ailments, has never been properly investigated. Furthermore, the location and spatial articulation of springs and pools have rarely been looked at with the purpose of analysing *in situ* treatments, as opposed to Roman thermal baths in which the function of the different spaces has been read under the lens of ancient medicine⁵⁸.

The circumstance that in the votive deposit of the sacred pool of Bagno Grande a bronze surgical gouge⁵⁹ (fig. 7) has been identified together with bronze anatomical ex votos – among which two polivisceral plates⁶⁰ stand out in terms of accuracy in the representation of opened torsos (fig. 8) – is another proof of medical practice that probably took place in the sanctuary. Although it is almost impossible to neatly separate ancient religion from healing within the context of the pre-Roman and Roman sanctuary, the evidence from San Casciano

⁵⁶ E.g., RUTH *et al.* 1996.

⁵⁷ CHELESCHI *et al.* 2020.

⁵⁸ BASSANI 2019.

⁵⁹ TABOLLI *forthcoming*.

⁶⁰ For a synthesis on the polivisceral plates see most recently FABBRI 2019: 105-115.



Fig. 8. Polivisceral plate (photo by E. Mariotti and F. Marsili; copyright: SABAP-SI and Comune di San Casciano dei Bagni).

provides a clear medical perspective to the healing practice, which goes beyond the presence of Asclepius or Hygea in Roman times, as it is attested by the altar discovered in 1585 at Bagno Grande and by the marble statuette found in 2020, close to the travertine altars⁶¹.

Deconstructing institutional religion

In the studies of Etruscan and Italic history of religion, traditional approaches have always focused on the institutional role of religion, in parallel to what has been defined, for the case of Greece as the “collective *polis* religion”⁶². Understanding which divinities were associated with different sacred places – natural springs and pools amongst them – is a constant effort by archaeologists and historians of religion⁶³. At the same time, the knowledge of the internal structuring of the cult (including priests, officials, etc.) has been read as part of a strict institutional religion. In the case of pre-Roman Italy, with the absence of primary ancient written sources, this understanding has been based either on Latin and Greek narratives and epigraphical evidence, or on the archaeological record (mainly the study of votive offerings⁶⁴). Once a divinity has been identified – frequently applying names and characteristics from the Latin or Greek pantheon, thus oversimplifying a much more complex substratum – there is often the effort to link directly ritual evidence to the cult with the evident risk of trivialising a much more complex ancient religious concept. In fact, the co-presence of different deities in the same sacred place should not be read only as part of an institutionalised religion but also as promoted by individual agents (faithful, followers, etc.). This is particularly evident in the cases of thermo-mineral sacred waters, where a non-univocal presence of deities often corresponds to a multifaceted record of votive offerings and ritual practices.

⁶¹

⁶² See for instance EIDINOW 2011 with relevant bibliography.

⁶³ SCHEID 2008; BUONOPANE, PETRACCIA 2014.

⁶⁴ FABBRI 2004-2005; 2010; 2019; HUGHES 2017b.

Over the last twenty years a significant shift has taken place, from studies on institutional religion to new research on contextual approaches⁶⁵ and the concept of “Lived Ancient Religion” (LAR)⁶⁶. This approach focuses on the entire spectrum of actions related to religion and cult, as these are performed and experienced by people. In addition to the deinstitutionalisation of religion, this has resulted in the exploration of a multitude of perspectives from the part of individual agents, with the distinct advantage of focusing on differences rather than similarities in the study of ancient religious sites. However, together with single agents, the role of agglutinant groups subject to continuous negotiation⁶⁷ in a sacred place is yet to be understood in studies on pre-Roman Italy.

In this perspective, Bagno Grande functions as a key case study to identify elements of rupture and continuity in the religious use of this sanctuary connected with sacred thermo-mineral waters. In fact, the extremely complex record of evidence within the sanctuary during the Etruscan and Roman periods can be only partially related to the cult of single deities (looking at the inscriptions, Flere of Havens, Apollo and Fons in the earliest periods, and later Fotuna Primigenia, Hygea and Isis)⁶⁸. On the contrary, there is abundant evidence of conflicting identities, relations and patterns of relations exemplified by the ritual depositions of the various offerings. The research is investigating diachronically the multiple variants visible within the sacred pool and in the space around it, with the purpose of understanding agent-based and group-based ritual and cult actions. For example, the late 2nd century BCE reconstruction of the rim of the sacred pool, was accompanied by the presence of lead *vestigia* placed into carved footprints and ‘earprints’ (figg. 9-11). These are not ‘simple’ anatomical votives but recall the physical and metaphysical interaction between each faithful and the sacred water with its deities – thus their understanding implies moving beyond traditional readings of institutional religion.



Fig. 9. *Vestigia* on the rim of the sacred pool (photo by E. Mariotti; copyright: SABAP-SI and Comune di San Casciano dei Bagni).

⁶⁵ STEK 2009.

⁶⁶ RÜPKE *et al.* 2018; GRAHAM 2021.

⁶⁷ LICHTERMAN *et al.* 2017.

⁶⁸ MAGGIANI *forthcoming*; GREGORI *forthcoming*.



Fig. 10. Vestigia on the rim of the sacred pool (photo by E. Mariotti; copyright: SABAP-SI and Comune di San Casciano dei Bagni).



Fig. 11. Vestigia on the rim of the sacred pool (photo by E. Mariotti; copyright: SABAP-SI and Comune di San Casciano dei Bagni).

Hot springs as economic resources

Over the past thirty years, there has been an increase in studies on ancient economic resources during the first millennium BCE⁶⁹, often within the context of landscape archaeology; however, thermo-mineral water is

⁶⁹ Especially after AMPOLO 1990.

rarely addressed as a significant economic resource in pre-Roman Italy⁷⁰. Despite historical and social transformations throughout the centuries, geothermal sites are in fact extremely resilient, with use that in many cases continues until today. For instance, the exploitation of geothermal energy that so densely and problematically is developing in the Italian landscape often encounters archaeological sites in the same location where industrial development is set to take place⁷¹. This demonstrates the persistent connection to the hot water and the continuous, although different, use of this resource, while highlighting the importance of preventive archaeology for the protection and enhancement of the cultural landscape. It is interesting to point out that to such a powerful resource, that certainly played a significant role in ancient topography as well as economy⁷², corresponds a range of archaeological evidence, from small votive deposits to sanctuaries, where the accumulation of wealth played a fundamental role within the complex system of making (material) offerings to the deities. The growing interest in understanding pre-Roman sanctuaries from an economic point of view⁷³ emphasises the importance of reconsidering the economic system centred on hot water. The impressive amount of metal offerings found near hot pools and springs – and in many times within the hot water itself – testifies to the process of accumulation of wealth. From the Archaic to the Hellenistic periods, metal offerings were mainly in the form of small bronze figurines, while gradually with the Romanisation, coins substituted metal offerings, thus indirectly confirming the value attributed to this natural resource (fig. 12)⁷⁴.



Fig. 12. Concentration of Roman coins in the sacred pool (photo by E. Mariotti; copyright: SABAP-SI and Comune di San Casciano dei Bagni).

⁷⁰ GRIFONI CREMONESI 2005; GROPPi 2006.

⁷¹ GUERMANDI, ROSSENBACh 2013.

⁷² Geothermal resources characterised so deeply the economy of different areas (see MANZELLA *et al.* 2019) that the profound crisis that has affected thermal regions in Italy over the past ten years, resulted in the dramatic collapse of several villages and small towns, where activities connected to the thermal world constituted a mono-economy (e.g., Chianciano Terme or Fiuggi). For most of these regions, a new development of local economies certainly does not pass through a renewed intensive exploitation, but from a cultural offer that diversifies its targets and in which the rediscovery of the ancient use of hot water in close connection to the natural environment and cultural landscape could play a fundamental role.

⁷³ BENTZ, HEINZELMAN 2021.

⁷⁴ TABOLLI 2021, 32-35, with previous bibliography.

For the study of the votive deposit from the sacred pool at Bagno Grande we have been exploring the circulation of artefacts in relation to their stratigraphic units within the hot pool at San Casciano, moving beyond the cultural biography of each find and focusing on their economic value. This is achieved through a consistent metrological study, following promising recent trends that have identified certain pre-Roman measuring systems⁷⁵. The progressive transformation of the offerings into coins supports our hypothesis and suggests looking at the complex role of this sanctuary as a place for storing and placing capital under divine protection inside the pool with hot water.

At the same time the analysis of the raw materials and technologies used for the creation of selected finds was conducted since 2021 in collaboration with the National Council of Research, Institute of Applied Physics “Nello Carrara” on the technological components of the bronze statues (including XRF analyses in combination with the use of Laser Induced Plasma/Breakdown Spectroscopy (LIPS/LIBS), with micro-Raman, IR (FTIR) and X Ray Diffraction) that revealed the entire spectrum of raw materials applied within the turetic process.



Fig. 13. The western group of bronze statues around a wooden trunk (photo by E. Mariotti; copyright: SABAP-SI and Comune di San Casciano dei Bagni).

Behind-the-scenes

In conclusion, throughout a consistent interaction between archaeology and hydrogeology, and in dialogue with thermal medicine, history of religion and ancient economy – but also with physics, chemistry and the other disciplines involved –, the excavation at the Bagno Grande of San Casciano dei Bagni aims to focus on thermo-mineral water as a key resource to unlock our understanding of healing and sacred places in pre-Roman and Roman Italy. In addition, this multidisciplinary investigation of an archaeological site associated with thermo-mineral waters will determine how elements of continuity and change were at the core of the Roman reception and reinterpretation of healing thermo-mineral sites. The ground-breaking element of this project is to completely reverse the perspective that has been adopted so-far in the studies of archaeological thermo-mineral sites in pre-Roman and Roman archaeology, placing water at the core of the action. Beyond the discovery of the bronze statues (fig. 13), the extremely well-preserved context through the excavation constitutes the real opportunity to develop new avenues for research.

Jacopo Tabolli
Dipartimento di Studi Umanistici
Università per Stranieri di Siena
E-mail: jacopo.tabolli@unistrasi.it

⁷⁵ MAGGIANI 2001; 2002; 2012; 2022; see also PULCINELLI 2017. For Bagno Grande, see BISCHERI *forthcoming*.

BIBLIOGRAPHY

- ACCONCIA V., 2012, *Paesaggi etruschi in terra di Siena. L'agro tra Volterra e Chiusi dell'età del Ferro all'età romana*, BAR S2422, Oxford.
- AELION C.M., HOHENER P., HUNKELER D., ARAVENA R., 2010, *Environmental Isotopes in Biodegradation and Bioremediation*, Boca Raton (FL).
- ALLEGREZZA L., BAGGIERI G., 1999, “Come leggere i votivi anatomici”, in G. BAGGIERI, M.L. RINALDI VELOCCIA (eds.), *L'antica anatomia dell'arte dei donaria (Ancient Anathomy on the Art of Votive Offerings)*, Rome: 34-76.
- AMPOLO C., 1990, “Aspetti dello sviluppo economico agli inizi della repubblica romana”, in W. EDER (ed.), *Staat und Staatlichkeit in der frühen römischen Republik. Akten Symposiums Berlin*, Berlin: 382-483.
- AMPOLO C., CORDANO F., 2020, *Giovanni Pugliese Carratelli e la medicina antica*, Milan.
- ANNIBALETTO M., BASSANI M., GHEDINI F. (eds.) 2014, *Cura, preghiera e benessere. Le stazioni curative termominerali nell'Italia romana*, Padova.
- ANTONINI R., 1981, “Dedica osca a Mefite Aravina dalla valle d'Ansanto (Av)”, in *AION* 3: 55-60.
- ASAT: M. TORELLI (ed.) with C. MASSERIA, M. MENICETTI, M. FABBRI, 1992, *Atlante dei siti archeologici della Toscana*, Rome.
- BACCI A., 1571, *De Thermis*, Venice.
- BAKER P., 2013, *The Archaeology of Medicine in Graeco-Roman World*, Cambridge.
- BANCHELLI M., 1536, *De omni genere februm*, Venice.
- BASSANI M., 2014a, “I santuari e i luoghi di culto presso le sorgenti termominerali”, in ANNIBALETTO *et al.* 2014: 143-160.
- BASSANI M., 2014b, “Per una carta distributiva degli spazi sacri alle fonti curative”, in ANNIBALETTO *et al.* 2014: 161-188.
- BASSANI M., 2016, “Soltanto “*salus per aquam*”? Utilizzi non terapeutici delle acque termominerali nell'Italia romana”, in J. BONETTO, M. SALVADORI, A.R. GHIOTTO, P. ZANOVELLO, M.S. BUSANA (eds.), *I mille volti del passato. Scritti in onore di Francesca Ghedini*, Rome: 879-891.
- BASSANI M., 2019, “Shrines and Healing Waters in Ancient Italy: Buildings, Cults, Deities”, in BASSANI *et al.* 2019: 9-20.
- BASSANI M., 2021, “Beyond Health. The Exploitation of Termomineral Sources in Artisan Activities”, in BENTZ, HEINZELMAN 2021: 79-98.
- BASSANI M., BRESSAN M., GHEDINI F. (eds.), 2012, *Aquae Salutiferae. Il termalismo tra antico e contemporaneo, Atti del Convegno Internazionale*, Montegrotto Terme.
- BASSANI M., BOLDER-BOOS M., FUSCO U. (eds.) 2019, *Rethinking the Concept of “Healing Settlements”: Water, Cults, Constructions and Contexts in the Ancient World*, Oxford.
- BASTIANI A., 1770, *Analisi delle acque minerali di S. Casciano de' Bagni e dell'uso di esse nella medicina di Annibale Bastiani Medico ai detti bagni*, Florence.
- BASTIANI J.F., 1733, *De' Bagni di S. Casciano*, Montefiascone.
- BECKER M.J., TURFA J.M., 2017, *The Etruscans and the History of Dentistry*, New York.
- BENTZ M., HEINZELMAN M. (eds.), 2021, *Archaeology and Economy in the Ancient World, Proceedings of the 19th International Congress of Classical Archaeology (Cologne/Bonn 2018)*, Heidelberg.
- BERTINI A., MINISSALE A., RICCI M., 2008, “Use of Quaternary travertines of central-southern Italy as archives of paleoclimate, paleohydrology and neotectonics”, in *Alpine and Mediterranean Quaternary*, 21, Issue 1: 99-112.
- BERTINI A., MINISSALE A., RICCI M., 2014, “Palynological approach in upper quaternary terrestrial carbonates of central Italy: Anything but a ‘mission impossible’”, in *Sedimentology*, 61, Issue 1: 200-220.
- BISCHERI M., *forthcoming*, “La giusta misura. Bronzetti a figura umana e valori metrologici”, in E. MARIOTTI, A. SALVI, J. TABOLLI (*forthcoming*).

- BISPHAM E., 2016, "Una, nessuna o centomila romanizzazioni?", in M. ABERSON, M.C. BIELLA, M. DI FAZIO, P. SANCHEZ, M. WULLSCHLEGER (eds.), *L'Italia centrale e la creazione di una koiné culturale? I percorsi della 'romanizzazione*, Bristol: 5-16.
- BOISSEUIL D., 2002, *Le Thermalisme en Toscane à la fin du Moyen Âge* Rome.
- BOTTARELLI G., 1688, *De i Bagni di San Casciano*, Florence.
- BOTTINI A., RAININI I., ISNENGI COLAZZO S., 1976, "Valle d'Ansanto. Rocca S. Felice (Avellino). Il deposito votivo del santuario di Mefite", in *NSc* 30: 359-524.
- BOUDON, V., 1994, "Le role de l'eau dans les prescriptions médicales d'Asclépios chez Galien et Aelius Aristide", in R. GINOUVÈS *et al.* (eds.), *L'eau, la santé et la maladie dans le monde grec*, *BCH Suppl.* 28, Paris: 157-68.
- BROISE H., JOLIVET V., 1991, "Le bain en Étrurie à l'époque hellénistique", in Y. THÉBERT (ed.), *Actes de la table ronde organisée par l'École française de Rome* (Rome 1988), Rome: 79-95.
- BUONOPANE A., PETRACCIA M.F., 2014, "Termalismo e divinità", in ANNIBALETTO *et al.* 2014: 217-245.
- CAIAZZA D., 2005, "*Mefitis Regina Pia Iovia Ceria*. Primi appunti su iconografia, natura, competenze, divinità omologhe e continuità culturale della *Domina Italica*", in *Italica Ars. Studi in onore di Giovanni Colonna per il premio I Sanniti (Libri campano sannitici 4)*, Alife: 129-217.
- CARACCILO G. 2021, "Prima degli scavi: le iscrizioni pro salute dal Bagno Grande", in MARIOTTI, TABOLLI 2021a: 187-191.
- CARDANO G., 1548, *Contradicentium medicorum*, Nürnberg.
- CARRARA C., 1994, "The Travertine Formation of Canino (Viterbo, central Italy): Chronolithostratigraphic and isotope geochemical characteristics. Environmental and climatic significance", in *Alpine and Mediterranean Quaternary* 7, Issue 1: 73-90.
- CARROLL M., 2018, *Infancy and Earliest Childhood in the Roman World: 'A Fragment of Time'*, Oxford.
- CASINI F., 1395/1402, *Tractatus de balneis*, Siena.
- CASTELLANA G., 1980, *Indagini geologiche sulle sorgenti termominerali di San Casciano dei Bagni in provincia di Siena*, unpublished dissertation, San Casciano dei Bagni.
- CERCHIAI L., 1999, "Appunti sui culti di Marica e Mefite", in *Ocnus* 7: 235-241.
- CHELESCHI S., GALLO I., TENTI S., 2020, "A comprehensive analysis to understand the mechanism of action of balneotherapy: why, how, and where they can be used? Evidence from in vitro studies performed on human and animal samples", in *Int J Biometeorol*, 64 (7): 1247-1261.
- HELLINI R., 2002, *Acque sorgive salutari e sacre in Etruria (Italiae Regio VII). Ricerche di topografia archeologica*, *BAR International Series* 1067, Oxford.
- CLARK I.D., FRITZ P., 1997, *Environmental Isotopes in Hydrogeology*, Boca Raton, FL, DOI: 10.1201/9781482242911.
- COARELLI F., 1998, "Il culto di *Mefitis* in Campania e a Roma", in G. GRECO, S. ADAMO MUSCETTOLA (s cura di), *I culti della Campania antica: atti del convegno internazionale di studi in ricordo di Nazarena Valenza Mele* (Naples 1995), Rome: 185-190.
- COLONNA G., 1975, "*Ager Populoniensis*: Sasso Pisano", in *StEtr* 43, *REE*: 201-202.
- COLONNA G., 1976-77, "La dea Etrusca *Cel* e i santuari del Trasimeno", in *RStorAnt* 6-7: 45-62.
- COMELLA A., 1986, *I materiali votivi di Falerii*, Rome.
- CORAZZA A., LOMBARDI L., 1995, "La geologia di Roma: Centro Storico", in *Memorie descrittive della Carta Geologica d'Italia*, 50: 179-208.
- COSTA A., PALAHÍ L., VIVÓ D. (eds.), 2011, *Aquae sacrae: agua y sacralidad en la Antigüedad*, *Actas de la Reunion internacional*, Girona.
- CUDA M.T., 2010, "Alle origini della sacralità: la Grotta Lattaia di Cetona", in *Hintial: il sacro in terra d'Etruria, Atti del convegno promosso dalla Quinta Commissione consiliare Attività culturali e turismo (Soci, Florence 2009)*, Florence: 15-29.
- CUDA M.T., MODESTI V., 2021, "San Casciano dei Bagni nella preistoria", in MARIOTTI, TABOLLI 2021a: 23-32.

- CUNIGLIO L., HOSKING D. J., SARTI S., 2015, "Castelnuovo Val di Cecina (PI). Il santuario termale di Sasso Pisano. Sistemazione idrogeologica, restauro e valorizzazione dell'area archeologica: alcuni spunti di riflessione", in *Notiziario della Soprintendenza per i Beni Archeologici della Toscana* 10: 340-345.
- DA MONTECATINI U., 1417, *Tractatus de balneis*, Florence.
- DE CAZANOVE O., 2003, "Le lieu de culte de Méfitis dans les *Ampsantia valles*. Des sources documentaires hétérogènes", in *Sanctuaires et sources dans l'antiquité. Les sources documentaires et leurs limites dans la description des lieux de culte. Actes de la table ronde organisée par le Collège de France, l'UMR 8585 Centre Gustave-Glotz, l'École Française de Rome et le centre Bérard* (Naples 2001), Naples: 145-179.
- DE CAZANOVE O., 2017, "Anatomical votives (and swaddled babies): from republican Italy to Roman Gaul", in J. DRAYCOTT, E.J. GRAHAM (eds.), *Bodies of Evidence. Ancient anatomical votives past, present and future*, London-New York: 63-76.
- DE GREGORIO M., 2020, "Ficoncella e acqua santa. *Aquæ salutiferæ* nella Toscana meridionale", in *Rivista di Storia dell'Agricoltura*, 60, 2: 89-117.
- DE LEINE J., 1988, *Recent Research on Roman Baths*, in *JRA* 1: 11-32.
- DE LEINE J., 1989, "Some Observations on the Transition from Greek to Roman Baths in Hellenistic Italy", in *MeditArch* 2: 111-25.
- DE LEINE J., 1992, "New models, Old Modes: Continuity and Change in the Design of Public Baths", in H.-J. SCHALLES, H. VON HESBERG, P. ZANKER (eds.), *Die römische Stadt im 2. Jahrhundert n. Chr.*, Cologne: 257-275.
- DE LEINE J., 1999, "Benefactions and urban renewal: Bath buildings in Roman Italy", in J. DE LEINE, D.E. JOHNSTON (eds.), *Roman Baths and Bathing, Proceedings of the First International Conference on Roman Bath England (30 March-4 April 1992)*, *JRA*, 37: 67-74.
- DEL CHIARO M. A., 1961, "Saggio di esplorazione archeologica del territorio di Tolfa e Allumiere (provincia di Roma)", in *Rendiconti della Pontificia Accademia dei Lincei*, 16: 108-116.
- DI PASQUALE G., D'AURIA A., 2020, "Paesaggi attuali e materiali archeobotanici: il caso del Pino domestico a Pompei", in A. ANGUSSOLA, M. IADANZA, R. OLIVITO (eds.), *Paesaggio Domestici. L'esperienza della natura nelle case e nelle ville romane Pompei, Ercolano e l'area vesuviana*, Rome: 175-179.
- DOWGIALLO J., 2013, "Summary of the history and bibliography of the IAH Commission on Mineral and Thermal Waters (CMTW)", in *Environ Earth Sci* 70: 2923–2928, DOI 10.1007/s12665-013-2650-2.
- DRAYCOTT J., 2017, *Bodies of evidence: ancient anatomical votives past, present and future*, London-New York.
- DRAYCOTT J., 2019, *Roman domestic medical practices in central Italy: from the middle republic to the early empire*, New York.
- DUFOURCQ A., 1907, *Étude sur les Gesta Martyrum romains*, II, Paris.
- EDLUND-BERRY I., 2010, "Hot, cold, or smelly: the power of sacred water in Roman religion, 400–100 BCE", C.E. SCHULTZ, P.B. HARVEY (eds.), *Religion in Republican Italy*, Cambridge: 162-180.
- EIDINOW E., 2011, "Networks and Narratives: A Model for Ancient Greek Religion", in *Kernos*, 24, 9-38.
- ESPOSITO A.M., 1987-1988, "Scavi e scoperte. 34. Sasso Pisano (Com. di Castelnuovo Val di Cecina)", in *StEtr* 55: 510-514.
- ESPOSITO A.M., 1997, "L'edificio termale etrusco di Sasso Pisano", in *Archeo. Attualità del passato*, 146: 58-61.
- ESPOSITO A.M., 2006, "Castelnuovo val di Cecina (PI). Il complesso sacro-termale etrusco di Sasso Pisano", in *Notiziario della Soprintendenza per i Beni Archeologici della Toscana* 1, 2005: 224-232.
- ESPOSITO A.M., 2011, "Le *Aquae* del Sasso: sacralità, salute e bellezza", in S. RAFANELLI, P. SPAZIANI (eds.), *Etruschi. Il privilegio della bellezza*, Perugia: 122-129.
- ESPOSITO R., 2013, "Castelnuovo Val di Cecina (PI). Sasso Pisano-*balnea*: il restauro di una vaschetta in terracotta", in *Notiziario della Soprintendenza per i Beni Archeologici della Toscana* 8, 2012: 437-439.
- ESPOSITO A.M., MARTINELLI M., 2004, "A Sasso Pisano un complesso sacro-termale etrusco", in *Archeologia Viva*, 103: 64-67.

- ESPOSITO A.M., MARTINELLI M., FARRU M., GRIECO N., SALEMI M., TRAPANI A., 2009, "Castelnuovo Val di Cecina (PI). Il complesso sacro termale e l'Antiquarium di Sasso Pisano", in *Notiziario della Soprintendenza per i Beni Archeologici della Toscana* 4, 2008: 728-743.
- FABBRI F., 2004-05, "Votivi anatomici fittili e culti delle acque nell'Etruria di età medio- e tardo- repubblicana", in *Rassegna di Archeologia classica e postclassica*, 21B: 103-152.
- FABBRI F., 2010, "Votivi anatomici dell'Italia di età medio e tardo-repubblicana e della Grecia di età classica: due manifestazioni culturali a confronto", in *Bollettino di Archeologia online*, 1: 22-32.
- FABBRI F., 2019, *Votivi anatomici fittili. Uno straordinario fenomeno di religiosità popolare dell'Italia antica*, Bologna.
- FAGAN G.G., 1999, *Bathing in Public in the Roman World*, Ann Harbour.
- FAGAN G.G., 2001, "The Genesis of the Roman Public Bath: Recent Approaches and Future Directions", in *American Journal of Archaeology* 105: 403-426.
- FERRETTI V., 2005, *San Casciano dei Bagni, Le terme e il paesaggio*, Ponte Buggianese.
- FRANCIONI V., 2017, "Alcune note sul grande *xoanon* della Mefite d'Ansanto", in *Appellati nomine lupi: giornata internazionale di studi sull'Hirpinia e gli Hirpini* (Naples 2004), Naples: 275-288.
- FUSCO U., 2019, "The Thermo-Mineral Springs at Veii (RM) and its Territory: New Discoveries and Old Excavations", in BASSANI *et al.* 2019: 21-36.
- GAMBINO N., 1991, *La Mefite nella valle d'Ansanto: rilettura dopo duecento anni, 1783-1983*, Rocca San Felice.
- GASPERINI L., 1963, "Materiali epigrafici di età romana dal territorio di Canale Monterano", in *Epigraphica* 23: 26-42.
- GASPERINI L., 1976, *Scoperte archeologiche a Stigliano (Canale Monterano). Guida-catalogo della mostra*, Bracciano.
- GASPERINI L., 1988, "Gli etruschi e le sorgenti termali", in *Etruria meridionale, Atti del Convegno* (Viterbo 1985), Rome: 27-35.
- GHEZZI M., 1617, *De i Bagni di San Casciano*, Ronciglione.
- GIGLI G., 1772, *Diario Sanese*, Siena.
- GIGLIOLI G.Q., 1930, "Canale Monterano. Rassegna degli scavi e delle scoperte nel suolo dell'Etruria nell'anno 1929", in *StEtr* 4: 350.
- GINOUVÈS R., 1962, *Balaneutikè: Recherches sur le bain dans l'antiquité grecque*, BEFAR 200, Paris.
- GIONTELLA C., 2012, «...Nullus enim fons non sacer...». *Culti idrici di epoca preromana e romana (Regiones VI-VII)*, Pisa-Rome.
- GIULI G., 1833, *Storia Naturale di tutte l'Acque Minerali di Toscana e uso medico delle medesime*, Arezzo.
- GÓMEZ GESTEIRA M. (ed.) 2016, *Libro de actas del I Congreso Internacional del Agua Termalismo y calidad de vida* (Ourense 2015), Ourense.
- GONFIANTINI R., ZUPPI G.M., 2003, "Carbon isotope exchange rate of DIC in karst groundwater", in *Chemical Geology*, 197, 1-4, 319-336, [https://doi.org/10.1016/S0009-2541\(02\)00402-3](https://doi.org/10.1016/S0009-2541(02)00402-3).
- GRAHAM E.-J., 2021, *Reassembling religion in Roman Italy*, New York.
- GREGORI G.L., *forthcoming*, "Iscrizioni latine su votivi in bronzo: divinità, devoti, formulari", in E. MARIOTTI, A. SALVI, J. TABOLLI (*forthcoming*).
- GRIFONI CREMONESI R., 2005, "Il rapporto dell'uomo con le manifestazioni geotermiche in Italia dalla Preistoria all'Alto Medioevo", in M. CIARDI, R. CATALDI (eds.), *Il calore della terra. Contributo alla Storia della Geotermia in Italia*, Pisa: 10-26.
- GROPPI C., 2006, "Larderello, geotermia dagli Etruschi al 2004", in *RassVolt* 83: 167-214.
- GUARDUCCI A., 2021, *Le terme della Toscana dal medioevo ad oggi. Storia e beni culturali*, Siena.
- GUÉRIN-BEAUVOIS M., 2015, *Le thermalisme romaine en Italie. Aspects sociaux et culturels aux deux premiers siècles de l'Empire*, BEFAR 364, Rome.
- GUERMANDI M.P., ROSSENBACH K. S., 2013, *Twenty years after Malta: preventive archaeology in Europe and in Italy*, Bologna.
- GUZZO P. G., 2013, "Ipotesi sull'origine del culto a Mefite", in S. BRUNI, G. C. CIANFERONI (eds.), *Δόσις δ'όλιγη τε φίλη τε. Studi per Antonella Romualdi*, Florence: 351-356.

- HAYNES S., 2014, “A closer look at the terracotta sculptures from the sanctuary at I Fucoli near Chianciano Terme”, in *StEtr*, 77: 91-94.
- HOLDEN J., JARED WEST L., HOWARD A.J., MAXFIELD E., PANTER I., OXLEY J., 2006, “Hydrological controls of in situ preservation of waterlogged archaeological deposits”, in *Earth-Sci. Rev.*, 78: 59-83.
- HUGHES J., 2017a, *Votive Body Parts in Grek and Roman Religion*, Cambridge.
- HUGHES J., 2017b, “Souvenirs of the Self, Personal Belongings as Votive Offerings in Ancient Religion”, in *Religions of the Roman Empire*, 3: 181-201.
- IOZZO M. (ed.) 2013, *lacta stips. Il deposito votivo della sorgente di Doccia della Testa a San Casciano dei Bagni*, Florence.
- JAILLET M. 2020, *Îles flottantes et corps guéris : les eaux prodigieuses du lac de Bolsena*, Frontière-s, 7: 5-19.
- KEY S., TERRENATO N. (eds.) 2001, *Italy and the West: Comparative Issues on Romanization*, Oxford.
- LECCHINI E., MAZZINI D., 1983, *Rapolano e il suo territorio*, I, Rapolano Terme.
- LICHTERMAN P., RAJA R., RIEGER A-K., RÜPKE J., 2017, “Grouping Together in Lived Ancient Religion: Individual Interacting and the Formation of Groups”, in *Religion in the Roman Empire* 3: 3-10.
- LOMBARDI L., VENTURA S., 1997, “Stigliano, Terme di”, in *Enciclopedia dell’Arte Antica* 5: 421-422.
- LUSCHI L., 2005, “Per l’etimologia di *Mefitis*”, in *Italica Ars. Studi in onore di Giovanni Colonna per il premio I Sanniti (Libri campano sannitici 4)*, Alife: 109-127.
- LUSCHI L., 2006, “*Mefitis Kaporoinna*”, in *Samnitice loqui: studi in onore di A. L. Prosdocimi per il premio I Sanniti (Libri campano sannitici 5)*, Alife: 259-285.
- MAGGIANI A., 1978, *REE*, in *StEtr* XLVI: 364-366.
- MAGGIANI A., 1999, “Culti delle acque e culti in grotta in Etruria”, in *OCNUS* 7: 187-203.
- MAGGIANI A., 2001, “Pesi e bilance in Etruria”, in C. CORTI, N. GIORDANI (eds.), *Pondera. Pesi e Misure nell’antichità*, Modena: 67-74.
- MAGGIANI A., 2002, “La libbra etrusca. Sistemi ponderali e monetazione”, in *StEtr*, 65-68: 163-202.
- MAGGIANI A., 2003, “Acque ‘sante’ in Etruria”, in PAOLUCCI 2003: 39-43.
- MAGGIANI A., 2012, “Ancora sui sistemi ponderali in Etruria. Pesi di pietra dal territorio fiesolano”, in *MEFRA*, 124-2: 393-405.
- MAGGIANI A., 2014, “La necropoli di Balena. Una comunità rurale alla periferia del territorio di Chiusi in età medio e tardo ellenistica (II-I sec. a.C.)”, in SALVINI 2014: 51-57.
- MAGGIANI A., 2022, “Un dono votivo da quindici assi. Nota su un nuovo bronsetto allungato dal territorio di Volterra”, in *StEtr* 83: 209-237.
- MAGGIANI A., *forthcoming*, “Le iscrizioni etrusche su votivi di bronzo. La divinità e i suoi devoti”, in MARIOTTI, SALVI, TABOLLI (*forthcoming*).
- MANCINI A., CAPEZZUOLI E., BROGI A., SWENNEN R., RICCI L., FRONDINI F., 2020, “Geogenic CO2 flux calculations from the Late Pleistocene Tivoli travertines (Acque Albule Basin, Tivoli, Central Italy)”, in *Italian Journal of Geosciences* 139, Issue 3: 374-382.
- MANNI V., 1617, *De Balneis Sancti Cassiani, Tractatus tres in partes distribuitus*, Siena.
- MANZELLA A., SERRA D. CESARI G. BARGIACCHI E., CEI M. CERUTTI P. CONTI P., GIUDETTI G. LUPI M., VACCARO M., 2019, “Geothermal Energy Use, Country Update for Italy”, in *European Geothermal Congress 2019*: 1-19.
- MARIENI L., 1870, *Geografia Medica dell’Italia – Acque Minerali*, Milan.
- MARIOTTI E., TABOLLI J. (eds.) 2021a, *Il Santuario Ritrovato: Nuovi Scavi e Ricerche al Bagno Grande di San Casciano dei Bagni*, Livorno.
- MARIOTTI E., TABOLLI J., 2021b, *Nella vasca delle meraviglie*, in *Archeo* 440: 13-23.
- MARIOTTI E., SALVI A., TABOLLI J., 2022, “Un palinsesto di fango: il potenziale della ricerca stratigrafica nella vasca sacra del Bagno Grande di San Casciano dei Bagni (SI)”, in *Bollettino di archeologia on-line*, 3: 5-12.
- MARIOTTI E., SALVI A., TABOLLI J., *forthcoming*, *Il Santuario Ritrovato 2: Dentro La Vasca Sacra. Rapporto Preliminare di Scavo al Bagno Grande di San Casciano dei Bagni*, Livorno.
- MARITAN M., GAUDIOSO B., MIOLA A., 2011, “Palaeoenvironment reconstruction using pollen and plant macrofossils: The archaeological site of via Neroniana (Montegrotto Terme - Padova)”, in *Alpine and Mediterranean Quaternary*, 24: 189-191.

- MARTINI F., SARTI L. (eds.) 1990, *La preistoria del Monte Cetona*, Florence: 58-59.
- MASSONI S., 1976, *Terme e termalismo in Toscana*, Florence.
- MATILLA SÉIQUER G., GONZÁLO SOUTELO S. (eds.) 2017, *Termalismo antiguo en Hispania: un análisis del tejido balneario en época romana y tardorromana en la península ibérica*, Madrid.
- MAZZESCHI E., 1976, *Cronache di archeologia senese*, Siena.
- MELE A. (ed.) 2008, *Il culto della dea Mefite e la valle d'Ansanto. Ricerche su un giacimento archeologico e culturale dei Samnites Hirpini, Atti del primo convegno di studi su cultura e tradizioni delle popolazioni sannitiche (Avellino-Villamaina-Rocca San Felice 2002)*, Avellino.
- MINETTI A., 2004, *L'Orientalizzante a Chiusi e nel suo territorio*, Rome.
- MOOK W.G., 2001, *Environmental isotopes in the hydrological cycle*, 4, New York.
- MORANDINI F., 2020, "Vieilles fouilles, nouvelles perspectives: le dépôt votif de Colle Arsiccio di Magione (Pérouse, Italie)", in H. WENDLING, M. AUGSTEIN, J. FRIES-KNOBLACH, S. GENTNER, M. KIRCHMAYR, M. KOHLE, K. LUDWIG, R. SCHUMANN, J. WIETHOLD (eds.), *Beiträge zur Ur- und Frühgeschichte Mitteleuropas 95, Sonderdruck aus: Objekt • Depot • Motiv Kontext und Deutung von Objektniederlegungen im eisenzeitlichen Mitteleuropa Beiträge zur Jahressitzung der AG Eisenzeit bei der gemeinsamen Tagung des WSWA sowie des MOVA vom 19.–22. März 2018 in Halle/Saale, Halle/Saale: 39-50.*
- MORELLI P., 2021, "Il Bagno Grande nella tradizione antiquaria e nei documenti d'archivio", in MARIOTTI, TABOLLI 2021a: 91-98.
- NAVA M.L., RUSSO A. (eds.) 1999, *Archeologia dell'acqua in Basilicata*, Catalogue of the Exhibition, Potenza.
- NEGRONI CATAACCHIO N. (ed.), 2002, *Paesaggi d'acque*, Atti del quinto incontro di studi *Preistoria e Protostoria in Etruria* (Sorano - Farnese 2000), Milan.
- NENCI G., 1763, "Methodus Utendi Aquis S. Cassiani", in *Atti dell'Accademia dei Fisiocritici*, 2: 100-106.
- NERUCCI O., 1763, "Analisi della Termale di S. Casciano", in *Atti dell'Accademia dei Fisiocritici*, 2: 79-99.
- NIELSEN I., 1983, *Thermae et Balnea: The Architecture and Cultural History of Roman Public Baths*, Aarhus.
- NIELSEN I., 1985, "Considerazione sulle prime fasi dell'evoluzione dell'edificio termale romano", in *Anal-Rom* 14: 81-112.
- NOGUERA CELDRÁN J.M., GARCÍA ENTERO V., PAVÍA PAGE M. (eds.) 2020, *Termas públicas de Hispania (Spal Monografías Arquelogía)*, Sevilla.
- ONORATO G.O., 1960, *La ricerca archeologica in Irpinia*, Avellino.
- ORTOLANI F., PAGLIUCA S., 2008, "Le manifestazioni idrotermali e il culto della dea Mefite (provincia di Avellino): quadro geoambientale e rapporto uomo-ambiente durante le ultime migliaia di anni", in MELE 2008: 23-53.
- PAOLUCCI G. (ed.) 2003, *L'acqua degli Dei. Immagini di fontane, vasellame, culti salutari e in grotta*, Catalogue of the Exhibition (Chianciano 2003), Montepulciano.
- PAOLUCCI G. 2021, "Le acque sacre nel sud della Toscana interna tra Etruschi e Romani" in MARIOTTI, TABOLLI 2021a: 57-70.
- PARDINI G. *forthcoming*, "Offerte di moneta nella vasca del santuario del Bagno Grande", in MARIOTTI E., SALVI A., TABOLLI J. (*forthcoming*).
- PENTECOST A., 2005, *Travertine*, Heidelberg.
- PERÉX AGORRETA M., ALAIX I MIRÓ C. (eds.), 2017, *Ubi aquae ibi salus. Agua mineromedicinales, termas curativas y culto a las aguas en la Península Ibérica, desde la Protohistoria a la Tardoantigüedad*, Madrid.
- PETRACCIA M. F., 2014, "Mefitis dea salutifera?", in *Gerión* 32: 181-198.
- PICCOLOMINI P., 1901, "Notizie di scavi nel territorio senese", in *Bullettino Senese di Storia Patria*, VIII: 126-140.
- PRO G., 1996-1997, *Rinvenimenti monetali da Sasso Pisano*, Unpublished Dissertation, scuola di specializzazione in archeologia, Sapienza University of Rome.
- PULCINELLI L., 2017, "Contributo per lo studio dei sistemi ponderali etruschi. Alcuni dati dal territorio vulcente", in *ArchCl* 68: 475-485.
- PURGOTTI S., 1857, *Idrologia Minerale di San Casciano dei Bagni*, Florence.
- RAININI I., 1980, "Una applique antropomorfa dal santuario di Mefite d'Ansanto", in *AION* 2: 113-122.
- RAININI I., 1985, *Il santuario di Mefite in Valle d'Ansanto*, Rome.

- RAININI I., 2003, “*Mephitis aedes o locus consaeptus*. Alcune osservazioni sul santuario della dea Mefite nella valle d’Ansanto”, in *Sanctuaires et sources dans l’antiquité. Les sources documentaires et leurs limites dans la description des lieux de culte. Actes de la table ronde organisée par le Collège de France, l’UMR 8585 Centre Gustave-Glotz, l’École Française de Rome et le Centre Jean Bérard* (Naples 2001), Naples: 137-143.
- RASTRELLI A., 1993a, “La decorazione fittile dell’edificio sacro in loc. I Fucoli presso Chianciano Terme”, in *Ostraka*, II, 2: 351-367.
- RASTRELLI A., 1993b, “Scavi e scoperte nel territorio di Chianciano Terme: l’edificio sacro dei Fucoli”, in G. MAETZKE (ed.), *La Civiltà di Chiusi e del suo territorio, Atti del XVII Convegno di Studi Etruschi e Italici (Chianciano Terme 1989)*, Florence: 463-476.
- ROSETTI E., VALENTI L., 1997, *Terme e sorgenti di Toscana*, Florence.
- ROUTH H.B., BHOWMIK K.R., PARISH L.C., WITKOWSKI J.A., 1996, “Balneology, mineral water, and spas in historical perspective”, in *Clinics in Dermatology*, 14, 6: 551-554.
- RÜPKE J., ALBRECHT J., DEGELMANN C., GASPARINI V., GORDON R., PATZELT M., PETRIDOU G., RAJA R., RIEGER A-K., SIPPEL B., RUBENS URCIUOLI E., WEISS L., 2018, “Religion in the making: the Lived Ancient Religion approach”, in *Religion*, 48, 4, 568-593, DOI: 10.1080/0048721X.2018.1450305.
- SALVI A., TABOLLI J., 2022, “L’economia del sacro e le sorgenti termali di Campo Muri (Rapolano Terme, SI). Nuove indagini sul deposito votivo di Buca delle Fate”, in *ScAnt* 28.2: 513-523.
- SALVINI M. (ed.) 2014, *Etruschi e Romani a San Casciano dei Bagni. Le stanze cassianensi*, Rome.
- SANTI G., 1795, *Viaggio al Montamiata*, Siena.
- SARRACINO D., 2021, *Depositi votivi del Lazio meridionale. Pratiche religiose e identità culturale tra il IX e il V secolo a.C.*, Rome.
- SAVONAROLA M., 1485, *De balneis et thermis naturalibus omnibus Italiae*, Venice.
- SCHEID J., 1991, “Sanctuaires et thermes sous l’Empire romain”, in Y. THÉBERT (ed.), *Le thermes romains. Actes de la table ronde de Rome*, Rome: 205-216.
- SCHEID J., 2008, “Le culte des eaux et des sources dans le monde romain”, in *Annuaire du Collège de France*, 108: 621-627.
- SCHEID J., NICOU D., BOISSEUIL D., COSTE J. (eds.) 2015, *Le thermalisme. Approches historiques et archéologiques d’un phénomène culturel et médical*, Paris.
- SCHIAVETTI A., 1585, *Breve ragionamento sopra l’acqua et bagni di San Casciano*, Siena.
- SISANI S., 2007, *Fenomenologia della conquista. La romanizzazione dell’Umbria tra il IV sec. a.C. e la guerra sociale*, Rome.
- STEK T., 2009, *Cult places and cultural changes in Republican Italy. A contextual approach to religious aspects of rural society after the Roman conquest*, Amsterdam.
- STEK T.D., 2013, “Material Culture, Italic Identities and the Romanization of Italy”, in J.D. EVANS (ed.), *A Companion to the Archaeology of the Roman Republican Period*, Chichester: 337-353.
- STOPANI R., 1995, *I tepidi lavacri. Il termalismo nella Toscana del medioevo*, Florence.
- TABANELLI M., 1963, *La medicina nel mondo degli Etruschi*, Florence.
- TABOLLI J., 2019, “Il crollo dei modelli. Domande in cerca d’autore su Siena etrusca”, in M. FIRMATI (ed.), *Gli Etruschi tra Chianti e Monte Maggio*, Siena: 23-29.
- TABOLLI J., 2021, *From Coins to Landscape: Contextualizing Archaeological Perspectives around Roman Siena*, in HOLLAND GOLDTHWAITE L., *Treasure of Chianti: Silver Coinage of the Roman Republic from Cetamura del Chianti*, Livorno: 29-42.
- TABOLLI J., forthcoming, “Tra divinazione e medicina termale al Bagno Grande”, in MARIOTTI, SALVI, TABOLLI (forthcoming).
- TABOLLI J., MARIOTTI E., 2021, “Il Bagno Grande tra il 1970 e il 1980: un’inedita collezione, un’inedita ricognizione e un’inedita carta geologica”, in MARIOTTI, TABOLLI 2021a: 99-120.
- TARGIONI TOZZETTI G., 1774, *Relazioni di alcuni viaggi fatti in diverse parti della Toscana, per osservare le produzioni naturali e gli antichi monumenti di essa*, 12 voll. Florence.

- TERRENATO N., 2019, *The Early Roman Expansion into Italy: Elite Negotiation and Family Agendas*. Cambridge, New York.
- TINELLI Z., 1605, *Medicarum consultationum juxta magni Hyppocratis doctrinam*, Siena.
- TONDI S., 1334, “Visita nello Stato delle Repubblica di Siena, commessa a Simone di messer Jacomo Tondi dal governo dei Nove, per costruire ponti, fonti e strade per lo sviluppo dei commerci e delle industrie della stessa Repubblica, dicembre 1334”, in A. LISINI, “Notizie delle miniere della Maremma Toscana e leggi per l'estrazione dei metalli nel medioevo”, in *Bullettino Senese di Storia Patria* 42, 1935: 215-221.
- TRAINA G., 2006, “Romanizzazione, ‘métissage’, ibridità. Alcune riflessioni”, in *MEFRA* 118/1: 151-158.
- TRIPPETTI S., 2014, “Sito di Colle Arsiccio: cronaca inedita dello scavo ufficiale condotto da Umberto Calzoni nel 1935”, in G. CHIODINI (ed.), *Gli ultimi nati in casa: riti, credenze e saperi millenari*, Perugia: 149-158.
- TURFA J.M., 2012, *Divining the Etruscan World: The Brontoscopic Calendar and Religious Practice*, Cambridge.
- TURFA J.M., 2016, “The *Obesus Etruscus*: can the trope be true?”, in S. BELL, A. CARPINO (ed.), *A Companion to the Etruscans*, Oxford: 321-335.
- TURFA J.M., BECKER M.J., 2013, “Health and medicine in Etruria”, in J.M. TURFA (ed), *The Etruscan World*, London-New York: 855-881.
- VALENTI M., 1995, *Carta Archeologica della Provincia di Siena. 1. Il Chianti Senese*, Siena.
- VERSLUYS M.J., 2014, “Understanding objects in motion. An archaeological dialogue in Romanization”, in *Archaeological Dialogues*, 21.1: 1-20.
- VILUCCHI S., 2009, *Campo Muri, Il Complesso Archeologico*, Poggibonsi.
- VILUCCHI S., 2011, “L'edificio termale di campo Muri a Rapolano Terme”, in S. RAFANELLI, P. SPAZIANI (eds.), *Etruschi. Il privilegio della bellezza*, Sansepolcro: 118-121.
- VIOTTI A CLIVOLO B., 1552, *De balneorum naturalium viribus*, Lyon.
- WOOLF G., 1998, *Becoming Roman: The Origin of Provincial Civilization in Gaul*, Cambridge.
- WOOLF G., 2014, “Romanization 2.0 and its alternatives”, in *Archaeological Dialogues*, 21: 45-50.
- YEGÜL K. F., 1992, *Baths and Bathing in Classical Antiquity*, Cambridge.
- ZANETTI C., 2017, *Il termalismo nelle province romane centrali*, Università degli Studi di Padova, PhD. Dissertation.