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

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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 CIVILLO 1552; BACCI 1571; SCHIAVETTI 1585; TINELLI 1605; GHEZZI 1617; MANNI 1617; BOTTARELLI 1688; GIULI 1722; BASTIANI 1733; NERUCCI 1763; NENCI 1763; BASTIANI 1770; SANTI 1795; GIULI 1833; PURLOTTI 1857; MARIENI 1870; MASSONI 1976; STOPANI 1995; ROSETTI, VALENTI 1997; CHELLINI 2002; BOISSEUL 2002; FERRETTI 2005; DE GREGORIO 2020; GUARDUCCI 2021; MARIOTTI, TABOLLI 2021a.
3 CUDA, MODESTI 2021.
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, CAtACCIO 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).

Fig. 3. The major building phases in the sanctuary of Bagno Grande in Roman times (photo by E. Mariotti).
number of vegetal offerings: intact pinecones (in a region where pine trees have an unknown biogeographical history\(^8\)), 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 terracotta\(^10\)) 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 Havens\textsuperscript{11}, while contemporary inscriptions in Latin referred to the ‘corresponding’ Fons\textsuperscript{12}. 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 sanctuary\textsuperscript{13}. 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 2\textsuperscript{nd} and 3\textsuperscript{rd} century CE of Apollo, Fortuna Primigenia and Isis, while a marble statuette of Hygeia was found inside the pool\textsuperscript{14}. At the beginning of the 5\textsuperscript{th} 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 place\textsuperscript{15}. 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 Roman\textsuperscript{16}, 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

\textsuperscript{11} MAGGIANI forthcoming.
\textsuperscript{12} GREGORI forthcoming.
\textsuperscript{13} PARDINI forthcoming.
\textsuperscript{14} MARIOTTI, TABOLLI 2021a.
\textsuperscript{15} MORELLI 2021, with the description of the archival sources.
\textsuperscript{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 properties\textsuperscript{17} (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 warm\textsuperscript{18}), 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 phenomenon\textsuperscript{19}. 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 water\textsuperscript{20}; 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 understudied\textsuperscript{21}. Even when important publications attempt to address the characteristic longue durée of thermo-mineral sites\textsuperscript{22}, the starting point of their use is almost always considered to occur in the Roman period\textsuperscript{23}. 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 city\textsuperscript{24}. 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 Romanisation\textsuperscript{25} 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 tradition\textsuperscript{26}.

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 perspective\textsuperscript{27}. Issues of continuity have been stressed

\textsuperscript{17} CASTELLANA 1980; most recently TABOLLI, MARIOTTI 2021.
\textsuperscript{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.
\textsuperscript{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.
\textsuperscript{21} ECLUND-BERRY 2010.
\textsuperscript{22} See for example COSTA et al. 2011; BOISSEUL 2002; GUARDUCCI 2021.
\textsuperscript{23} MATILLA SEÍQUE, GONZÁLO SOUTELO 2017; NOGUERA CELDRÁN et al. 2020.
\textsuperscript{24} The vast majority have a fluvial origin attributable to calcium bicarbonate equilibrium in surface waters; see CORAZZA, LOMBARDI 1995.
\textsuperscript{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 (GINOUVÉS 1962: 349–361; BOUDON 1994).
for the key role of Southern Etruria sites such as the *Aqua Caeretanae* at Pian della Carlotta in Cerveteri28 or the sanctuary of *Aqua 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 Raplo- lano Terme in the complex of Campo Mun32. In the area of Siena, at the votive deposit of Acqua Bor- ra/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 Arsicchio (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 deposit 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, funerary, or 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.

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28 See most recently Chellini 2002: 87-87, with previous bibliography.
30 For the site of Bagno della Regina at Veii, with a possible early votive deposit (8th-6th centuries BCE) associated to the thermo-mineral water and iron-rich carbonated water, see most recently Fusco 2019, 26-27, with previous bibliography.
35 For the 1954 discovery of the site by Umberto Calzoni see Trippetti 2014; most recently see Morandi 2020, with previous bibliography.
36 The number has been counted based on IDAI.bibiliography/Zenon. For the exhibitions see for example Nava, Russo 1999; Paoloucci 2003.
37 Giontella 2012.
39 Hughes 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 perspective 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 Casciano – 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 literature. 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 narratives. 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 studies. 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 productivity. 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 contributions. 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 survey, based on available geological maps and previous studies. Prof. Marco Pettita, 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 analyses. Over the next months, specific isotopic analytical studies will be carried out, 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 Carbon and for CaCO3 deposits (including travertines and karst concretionary rocks). 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.
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.
Medicine beyond Religion

While there are many generic references to sacred hot waters and their connection to the concept of “healing”, 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 practices. Despite the fact that the Etruscans have been widely known for their knowledge of medicine, and notwithstanding comprehensive studies on Etruscan medicine, 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 medicine. 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 Jallet 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.
to create merely a narrative, often filled by clichés. 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 today. 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 medicine.

The circumstance that in the votive deposit of the sacred pool of Bagno Grande a bronze surgical gouge (fig. 7) has been identified together with bronze anatomical ex votos – among which two polivisceral plates 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

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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.
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 altars\textsuperscript{61}.

\textit{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"\textsuperscript{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 religion\textsuperscript{63}. 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 offerings\textsuperscript{64}). 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.

\textsuperscript{61}\textsuperscript{62} See for instance EIDINOW 2011 with relevant bibliography.\textsuperscript{63}\textsuperscript{64} SCHEID 2008; BUONOPANE, PETRACCIA 2014.\textsuperscript{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 approaches and the concept of “Lived Ancient Religion” (LAR). 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 agglutinating groups subject to continuous negotiation 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). 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).](image)

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65 STEK 2009.
66 RUPKE et al. 2018; GRAHAM 2021.
68 MAGGIANI forthcoming; GREGORI forthcoming.
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 BCE\textsuperscript{69}, often within the context of landscape archaeology; however, thermo-mineral water is

\textsuperscript{69} Especially after AMPOLO 1990.
rarely addressed as a significant economic resource in pre-Roman Italy\textsuperscript{70}. 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 place\textsuperscript{71}. 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 economy\textsuperscript{72}, 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 view\textsuperscript{73} 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)\textsuperscript{74}.

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

\textsuperscript{70} GRIFONI CREMONESI 2005; GROPPI 2006.
\textsuperscript{71} GUERMANDI, ROSENBACK 2013.
\textsuperscript{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.
\textsuperscript{73} BENTZ, HEINZELMAN 2021.
\textsuperscript{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 systems. 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 toreutic process.

**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.

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