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A POSSIBLE UROSCOPY FLASK OF ROMAN AGE

Un posible recipiente uroscópico de época romana

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ABSTRACT: Research on human urine tests has resulted in a good knowledge of uroscopy flasks in the Middle Ages but has no parallels in Roman times. Although classical authors mention the existence of such tests in Antiquity, only few studies have focused on this theme. During the study of Roman necropolises in the Algarve (Portugal), a glass vessel probably picked from a medical doctor's grave has been identified. Its unprecedented shape, comparable to medieval uroscopy flasks, and its context can be related with that function. An identical object was documented at *Emerita*, the capital of *Lusitania*, also in a Roman doctor's grave. We have found statements of ancient authors that prove the existence of urine tests in Roman times.

The following study requires further back-up, but it strongly suggests that this glass flask was used for medical purposes. Even though this is a new piece, the two only specimens were found in possible medical practitioners' graves in Lusitanian cities. This is a preliminary study, but we hope that new findings can be documented and published.

Key words: Lusitania; Roman medicine; uroscopy recipients; glass flask; funerary context.

RESUMEN: La investigación sobre la evolución de los análisis de orina en humanos ha permitido conocer bien los frascos de uroscopia de la Edad Media, pero no tiene paralelo en la época romana. Aunque los autores clásicos mencionan la existencia de tales pruebas en la Antigüedad, pocos estudios se han centrado en este tema. Durante el estudio de las necrópolis romanas en el Algarve (Portugal), se identificó un contenedor de vidrio probablemente extraído de la tumba de un médico. Su forma inédita, comparable a la de los frascos de uroscopia medievales, y su contexto pueden relacionarse con esa función. Un objeto idéntico fue documentado en *Emerita*, la capital de *Lusitania*, también en la tumba de un médico romano. Encontramos declaraciones de antiguos autores que atestiguan la existencia de pruebas de orina en la época de los romanos.

A pesar de que nuestra propuesta necesita más argumentos, parece posible que este tipo de recipiente haya tenido un uso médico. Se trata de una forma nueva de la que los dos únicos ejemplares conocidos proceden de tumbas de médicos que ejercieron en ciudades lusitanas. Este estudio es tan solo preliminar, aunque esperamos que pueda ser el punto de partida para la documentación y la publicación de otros casos.

Palabras clave: Lusitania; medicina romana; recipiente uroscópico; vasija de vidrio; contexto funerario.

1. Introduction¹

Urine is possibly the human excretion that more keenly interested Medicine since very early historical

times, since it reflected the patient's health condition. The origins of uroscopy, i.e. the art of diagnosing disease by observing and analysing urine, cannot be easily established. There is however consensus that urine tests and Medicine appeared at the same time (Wellcome, 1911: 11).

This interest in the analysis of urine can also be explained by the fact that diseases were diagnosed

¹ Work carried out under the Research Project *NEC. ROM.AL-As necrópolis romanas do Algarve*, with the reference SFRH/BD/61005/2009, which resulted in the PhD thesis of the author.

by external symptoms until the eighteenth century AD. As a result, urine analysis has always been important in Ancient Medicine, albeit it only gained visibility in the Middle Ages onwards.

We have a good knowledge of this process since Hippocrates, but we cannot say the same about the flasks used for examining urine since Roman times. The established typology for these artefacts only concerns objects from the thirteenth century onwards. This can be explained by the multifunction use of glass containers until then; and the silence of classical sources about most medical instruments.

Even though researchers frequently encounter difficulties, we can draft a few preliminary lines to define and identify a few containers used for such purpose in Roman times, at least in the Western part of the Empire –i.e. Iberia–.

Funerary contexts provide important data for illustrating many topics of Roman daily life. The identification of professions of cremated or inhumed individuals, particularly medical doctors, is a subject that has significantly evolved in recent times. It is a well-known fact that glass flasks are frequently found in their graves, usually associated with relevant medical instruments –scalpels, probes, tweezers, suction cups and needles, among others–.

A new object has been identified (Caldera de Castro, 1983; Rodríguez Martín, 1984) in necropolises of two Roman cities of the Roman province of *Lusitania*, i.e. *Balsa* –Tavira, Portugal–

and *Colonia Augusta Emerita* –Mérida, Spain–, which, until now, had exclusively been found in Roman graves of medical doctors. Its presence in these contexts proves that it was used in Medicine or Pharmacy, but it is more complicated to determine its specific function –the function we propose in this paper is just one possibility among many others–.

2. Uroscopy in Antiquity

Testing urine by observing its aspect, smell and texture, was a method used by Medicine since the Middle Ages. Uroscopy diagrams representing different colours and related symptoms are very well



FIG. 1. Uroscopy wheel from *Epiphanie Medicorum*, c. 1506.

known (Fig. 1). Such practice however dated from much earlier times, which is evidenced, for example, by Hippocrates, who used this type of test (Dimopoulos *et al.*, 1980; Kouba *et al.*, 2007). In fact, Greek medical knowledge already included urine observation, although as prognosis, not diagnosis.

It has also been stated that texts by this Greek author were the source of subsequent progresses in the field of uroscopy (Eknoyan, 2007: 866), always based on Hippocrates's criteria of urine observation, i.e. colour, texture, sediment, smell and volume. Galen improved such criteria and expanded them, simultaneously providing a justification for the use of these tests –i.e. that bodily secretions could evidence several types of internal imbalance (*On The Natural Faculties*, 1, 6; Brock, 1916: 18-25). He was the first to demonstrate that urine came from the kidneys (Silva, 2002: 25), even though misinterpreting the layout of the cardiovascular system (Eknoyan, 1989).

Uroscopy tests remained unchanged until Theophilus Protospatharius, a Byzantine medical doctor who wrote *De Urinis* (*Περὶ Οὔρων*), thus adding important methodological innovations to the macroscopic observation of urine (Magiorkinis and Diamantis, 2015: 1021). He possibly pioneered the drafting of the above mentioned uroscopy diagram (Fine, 1986), for the first time defining ten colour tones (Kouba *et al.*, 2007: 50-52), associated with different categories of urine thickness. He also developed new techniques for observing urine, namely by warming and cooling it, or observing it through glass flasks. Before that, however, the doctors already knew the different colours and possible diagnostics.

Once knowledge was acquired that urine could change as time passed by and due to air exposure, becoming clearer, more consistent or more turbid, the use of specific flasks in uroscopy became increasingly frequent. Theophilus quite clearly stated which kind of containers should indeed be used for macroscopically observing urine (*cf.* Kouba *et al.*, 2007: 51) and sought to standardize them, as he discovered that urine testing varied according to each expert's style and technique. His instructions,

besides specifying the type of uroscopy flask, also included precise indications on the rotation and movements that must be performed during examination (Wallis, 2000).

It seems obvious that Theophilus's well-succeeded attempt to standardize the type of container –usually manufactured in glass and known as *matulla*–, used at the service of uroscopy, shows that such use preceded his work. How long before, however, we do not know for sure.

Notwithstanding, uroscopy tests became constantly used from then on, as demonstrated by the reproduction of Hippocratic theories (Magiorkinis and Diamantis, 2015: 1021), more specifically by Constantine the African, and the amplified versions of the diagram invented by Theophilus (Fine, 1986). Our purpose is not to trace the evolution of the use of uroscopy flask, as this subject was more eloquently covered by other studies (Mattelaer, 1999; Kouba *et al.*, 2007; Moulinier-Brogi, 2012; Magiorkinis and Diamantis, 2015). It seems however relevant, in our view, to demonstrate that probably such practice preceded Theophilus's teachings.

The exclusive use of ceramic vessels for observing urine in Hellenistic and Roman times has been taken for granted (Mattelaer, 1999: 146; Eknoyan, 2007: 867). If this possibly made sense in the first millennium BC, at a time when most glass was opaque and manufactured by mould; the introduction of blowpipe in glass-making workshops revolutionized the manufacture of glass containers and its production evolved to a quite advanced stage in Roman times².

It has been recognized that, up to the turn of the Era, people could not observe urine through the available glass containers. As from the first century AD, however, most people had access to translucent glass flasks –certainly including medical doctors, who belonged to the upper classes–. Be that as it may, we should be cautious and remember that Theophilus Protospatharius, sought to standardize

² On glass and its evolution in Western Hispania, Cruz, M.: *O Vidro Romano no Noroeste Peninsular. Um olhar a partir de Bracara Augusta*. PhD thesis presented in 2009 in the Univ. of Minho, Portugal.

the use of such containers in the seventh century AD, giving instructions about the way urine should be stirred inside them. Nonetheless, we do not know if such testing was due to the existing variety of urine-testing containers, or to the different techniques used –and consequently to the different conclusions drawn from observation *per se*–.

Oddly enough recent research does not consider the possible use of uroscopy glass flasks before that period –so more so that glass-manufacturing activity evolved long before Theophilus's time–. We should remember, in this regard, Columela's advice, who explicitly states that glass containers are the most suitable for storing food (*De Re Rustica*, XII. IV; Forster, 1955), because they are easier to clean, transparent and hermetic.

The rare existing typologies of uroscopy containers date the oldest pieces from the thirteenth century AD³, without making the slightest reference to their use in previous times. We admit that, since the Middle Ages, the identification of such artefacts was simplified by their easy association with specific forms and functions (Fig. 2). Notwithstanding, especially if we consider the large number of glass artefacts available since the first century AD, some containers must have been used to perform that specific function in the Roman period.

One must also remember that the notion of *matul* existed since very old times. We must highlight that Plautus, a Roman playwright who lived during Rome's Republic, already used this concept (*Mostellaria*, 387, Riley, 1912), although, in this case, the word seemingly meant some container used as a urinal. In fact, Pliny the Elder describes the existence of public urinals in cities (Mattelaer, 1999: 145), housing containers that were regularly emptied. This author also states the urine was subsequently used in washing and bleaching fabrics (*Naturalis Historia*, XXVIII, 18; XXXV, 57), due to its ammoniacal properties.

Notwithstanding the above, the concept may have been used to describe glass vessels used for

³ Tyson, R.: *Medieval Glass Vessels in England AD 1200-1500: A Survey*. PhD thesis presented in 1996 in the Univ. of Durham, UK, pp. 161; 200.

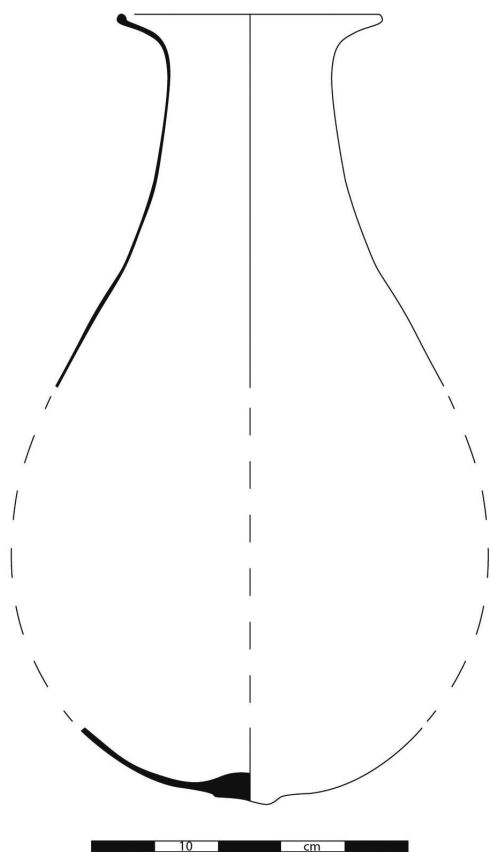


FIG. 2. Uroscopy flask made with glass, 14th century. Ludgershall Castle, Wiltshire. Tyson type F1 (1996: 161, fig. 27).

observing and testing urine. Unfortunately, neither Celsus (*De Medicina*), nor Galen (*On the Natural Faculties*) left us any clues as to their possible use as uroscopy flasks, their known cases referring to their use as urinals. Reference however should be made to the fact that Celsus widely adopted Hippocrates' methods, describing certain characteristics of urine in detail, and associating them with specific urological problems (*De Medicina*, 2, 7; Spencer, 1935). Thus, we can easily infer that some type of relatively transparent container must have been used.

As stated above, we can associate certain functions with specific forms of glass-made artefacts in the Middle Ages (Fig. 3), but this does not apply to Roman times. This task is extremely difficult due to the wide variety of forms, some imitating containers in ceramic and metal, and the absence of written



FIG. 3. *Cosmas and Damian, Christian patrons of medicine, one of them holding a uroscopy flask in Grandes Heures of Anne of Brittany* (<http://gallica.bnf.fr/ark:/12148/btv1b52500984v/f355.item>).

references. In addition, we must remember that anatomical knowledge was still scarce, especially if we bear in mind that human dissection was forbidden.

Even so, we can affirm that the key innovation of Roman surgery was, indeed, its logical therapeutic

method –although of Greek origin–, and the use of highly operational medical instruments, some still unsurpassed –at least in what concerns most utensils (Monteagudo, 2000: 86)–.

But for certain experts who currently do research in the field of Medicine this major innovation in surgical instruments and palliative techniques sharply contrasts with the mediocre anatomical knowledge –heightened, as aforementioned, by the medical doctors’ impunity and the impossibility of dissection (Monteagudo, 2000: 86; Cybulska *et al.*, 2012)–. Anatomical knowledge could not progress due to the cult of ancestors or *Manes*, along with their deification. In addition, anyone who had contact with death and corpses was considered heretic, since dissecting a corpse meant desecrating the memory of the deceased.

Galen mentions the prohibition of human dissection in Rome, a city where he developed his activity, but recognizes having practiced it on exceptional cases, and mostly the technic of vivisection (*cf. On The Natural Faculties*, III, VIII; Brock, 1916: xxxvii).

In Roman times, people envisaged death in a completely different way, depending on whether the deceased was influential in society, a mere criminal or a destitute person. The poor could even be subject to inhuman burial (Pereira, 2018: 32-34), their corpses dumped into common graves, and merely covered with sediments when the graves were full (Varro, *De Lingua Latina*, v, 4; Kent, 1938).

Consequently, medical doctors would have enough test subjects to practice *post mortem* surgery outside the law and learn about human anatomy, at least in major coastal cities or province capitals, where population density was higher and the existence of destitute people more likely.

Considering the large collections of medical artefacts discovered in the graves of Roman surgeons (Tabanelli, 1960; Maiuri, 1973; Ayerbe, 2001; Ramírez Sábada, 2002), frequently associated with glass containers, we find it strange that medical instruments could evolve so rapidly in contrast with the knowledge of their users. It is not plausible that medical doctors produced their own instruments, at least not all of them. Thus, doctors possibly instructed manufacturers to make practical functional utensils, adapted to the specific tasks they performed. This situation appears to demonstrate an in-depth knowledge of human anatomy—at least cutaneous and sub-cutaneous—, contradicting the apparent ignorance of which Roman doctors are sometimes accused.

As from the reign of August, Roman medicine was marked by rapid technical progress, only halted by an ideology that revered the ancestors. Even so, this society was always eager to recover the sick and the wounded, particularly at times of war; this is clear in the investments made in buildings capable of housing a considerable number of patients, more specifically *valetudinaria*, which abounded for example in the *limes germanicus* (Koenen, 1904: 180-182; Schultze, 1934: 54-63; Johnson, 1983: fig. 117 and 160).

According to Columela's reports, such buildings also probably existed in other places and contexts, namely in *villae* (*De Re Rustica*, XII, 18). Other urban public buildings, aimed for boxers and gladiators, were also equipped with such facilities. Their remaining archaeological evidence, however, may be virtually imperceptible, since they were part of buildings with other functions—for example amphitheatres, where medical instruments are often found⁴.

⁴ Rodríguez Martín, F.: *Estudio del instrumental médico romano existente en Mérida*. Bachelor thesis presented in

Examples of places in which medicine was permanently practiced, though not a *valetudinaria*, are the “surgeon’s house” at Pompeii (Maiuri, 1973), where approximately 140 surgical instruments were found, or at Rimini (Ortalli, 1997). There was therefore a civilian medical doctor who practiced *medicatrina* in an annex of his own home. Nevertheless, as said above, such contexts are rare and difficult to identify. A more common finding is the identification of graves of famous medical doctors, scattered a bit all over the Roman Empire.

Graves of Roman medical doctors are more easily identifiable, either because of their tombstones, giving way their existence, or the finding of abundant instruments related with medicine. Some of the best examples exist in the capital city of the Roman province of *Lusitania*—Mérida, Spain—, confirmed by both epigraphy and medical instruments (Blanco and Peral, 2005: 46-49), even allowing for a discussion on whether medicine was also practiced by women, a fact evidenced by the tombstone of Iulia Saturnina (Blanco and Peral, 2005: 50-51).

It was in such contexts, dated from high-empire, that we identified a specific type of glass container that may have been used for uroscopy tests. We must nonetheless insist that classical sources do not refer to glass containers used for performing such function at that time. We can however propose this interpretation, since such pieces had never been recognized in other contexts, and they appeared exclusively in funerary contexts easily attributable to medical doctors.

3. A uroscopy flask of Roman date?

One such piece was found at the Roman necropolis of the Roman city of *Balsa*, located on the Torre d’Ares estate, in Tavira (Portugal). *Balsa* is, together with *Ossonoba*—Faro, Portugal—, the most famous Roman site in the Algarve (Fig. 4). André de Resende (1593) was the first author to mention it, when he studied the places referred to in classical sources, but it was Estácio da Veiga who intensely

1979 in the Univ. of Extremadura, p. 40.



FIG. 4. Map of Hispania with the location of the two mentioned sites (adapted from Global Multi-Resolution Topography-GMRT).

“explored” this important archaeological site in the late 19th century, excavating many graves of the necropolis located north of the Roman city.

It was precisely at this necropolis that Estácio da Veiga collected a significant set of medical-surgical metal instruments which have already been studied (Pereira, 2018)⁵. Since this is an old archaeological intervention, there are no records that enable us to identify which instruments appeared in clear association with the glass flask. Even so, 35 artefacts were identified and distributed into 14 functional categories, namely probing and unction, simple surgery, surface hygiene or pharmacy material.

Such data is valid enough to prove that these instruments are associated with a medical doctor who probably practiced general medicine, as we cannot be sure that he had an expertise in any field. Obviously, the instruments which accompanied him

⁵ And also Gomes, J.: *Os materiais médico-cirúrgicos de época romana do Museu Nacional de Arqueologia*. Master thesis presented in 2010 in the Univ. of Lisbon, Portugal.

after his death may not represent all the instruments he used when he was alive. Nevertheless, even though *Balsa* was an important city in Antiquity, renowned medical doctors possibly preferred to live in cities with higher demographics, or cities that were the capital of a *conventus*, where they could practice their expertise. Conversely, in smaller cities, in which only one, perhaps two, individuals practiced medicine, professional practice should be more flexible, as consequence of the lack of “competition”. Thus, they possibly took care of all kinds of emergencies, diseases or sim-

ple consultations. This set of medical instruments may reflect such reality.

Three scalpels, certainly manufactured at the same workshop, in view of their form, and possibly used by the same individual, prove that this doctor from *Balsa* practiced surgery. All three pieces consist of a round-section handle decorated with incisions, one of which helix-shaped, with four lines of silver inlaid on top of the circular incisions. Their extremely elaborate craftsmanship, with silver inlays, evidences a high-level toreutic expertise (Fig. 5).

We found three other instruments, also from the Roman High Empire, which, together with the scalpels, apparently belong to the same set. They have the same decorative technique and metalwork and, in addition to silver inlays, they also show inlaid gold. All three have the handle decorated with a helix-shaped groove. In the light of the above criteria, these instruments –i.e. two needles and a difficult to define item– were possibly made by the same

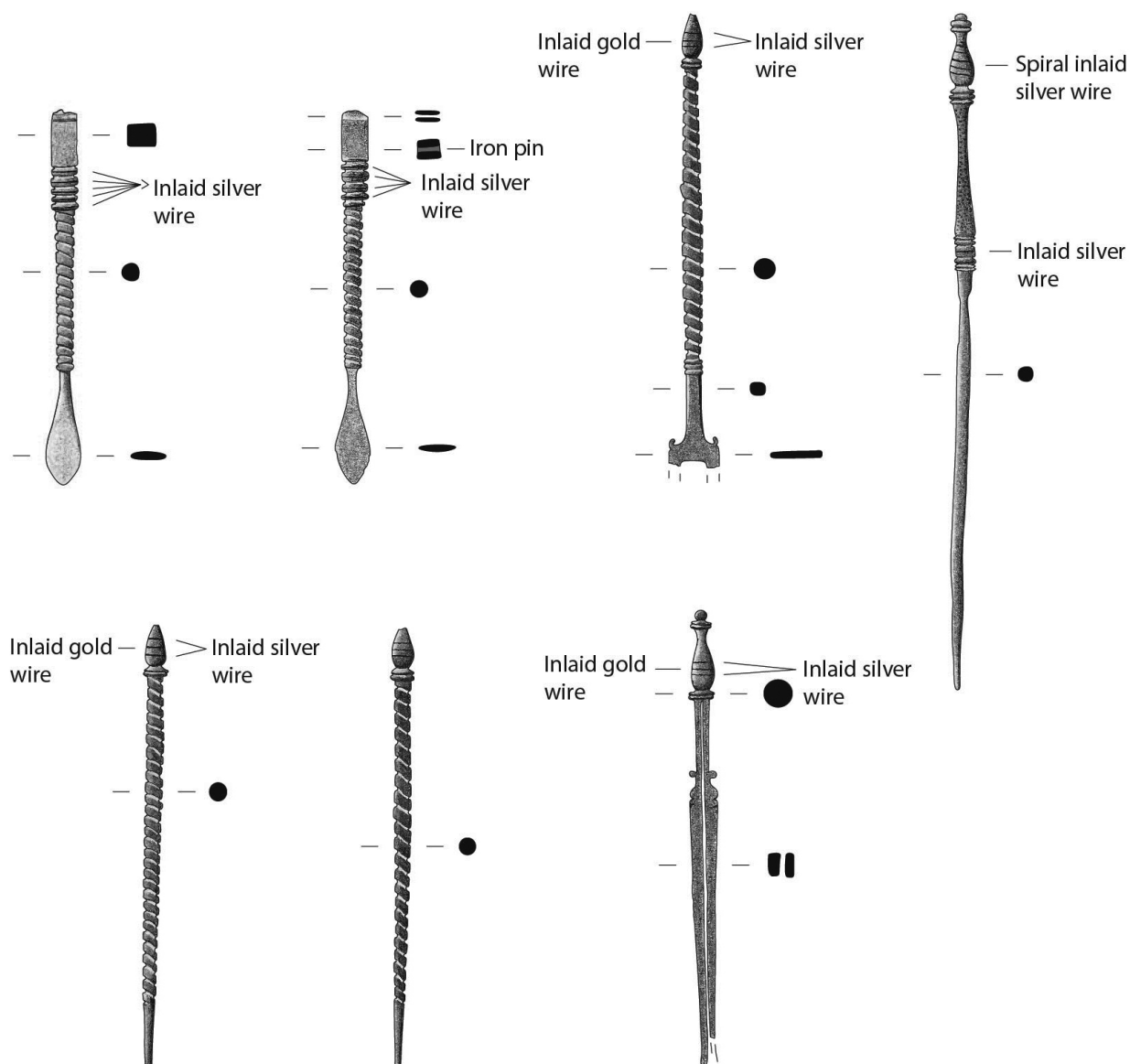


Fig. 5. *Medical instruments from Balsa, Torre d'Ares, Tavira (Portugal).*

craftsman. Surely this one was a two-tipped artefact, possibly with folded tips and, depending on whether it had them or not, it can be considered a forked probe (Walters, 1899: 314, n.º 2323; Milne, 1907: 83-84, pl. xxii, n.º 3) or a dull hook (Jackson, 1990: 15, fig. 2, n.º 5; Baker, 2009). Regardless the shape of this instrument's beaks, which could be permanently folded or straightened by their users according to their needs, recent studies have shown

that this artefact could be used as retractor, or even as "tonsil lifter" (Monteagudo, 2000: 115-116). An identical piece, of much simpler manufacture, was found in Turkey (Monteagudo, 2000: fig. 43, n.º 16).

This exceptional set, proving the existence of a medical doctor with a surgery practice, has been given a too large timeframe –centuries I-III AD–. This chronology is the same previously attributed by J. Milne to the scalpels in general.

According to the manuscripts left by Estácio da Veiga, a glass flask was associated with this set (Fig. 6). This container has an outward-folded and inward-refolded tubular rim, with a long neck (gradually narrowing as it approaches the rim) and an inverted blunt-cone body with a concave base. Glass is translucent and greenish. Due to the presumable context of the finding, alongside a few medical-surgical instruments, we must consider this artefact was used to perform some function in the field of Medicine or Therapeutics, especially if we considered the long neck suitable for grabbing.

Finding glass vessels in the graves of medical doctors is nothing new. In Mérida (Spain), a sizeable set of glass artefacts was found; they were possibly used in Medicine and especially Pharmacy (Bejarano, 2015: 103-108). They are the only parallel available for the *Balsa* piece, also found in the grave of a doctor, who practiced medicine in the capital of *Lusitania*. Its context, and the rarity of its shape, have already helped establish that it was used for medical purposes (Rodríguez Martín, 1984: 126)⁶.

Despite the above reflections, the set of medical instruments found in funerary contexts in Mérida has been recently reviewed. Glass flasks were grouped into the pharmaceutical category, i.e. as containers for ointments and medicines. Some seem to have contained olive oil and wine (Jouanna, 1996: 422-430; Mazzini, 2000: 112-120), substances frequently employed in the preparation of drugs and for therapeutic use, as demonstrated by lab tests of glass bottles found at the grave of Saint-Médard-des-Près, in Vendée (Santrot and Corson, 2012: 208-209; Robin, 2012).

Glass flasks are constantly found in graves of Roman medical doctors, proving their use in these activities. However, one would expect this specific form to be common in the Roman glass stock. It is however a new form, which is not represented in any typology of Roman glass. We therefore must

⁶ Cf. also Rodríguez Martín, *op. cit.* n. 4, pp. 92-94, fig. 28.



FIG. 6. Glass recipient from Balsa, Torre d'Ares, Tavira (Portugal), discovered in a Roman grave associated to medical instruments.

consider that they could be containers of Hispanic make, perhaps ordered by the medical doctors who used them.

In addition, both the existence of two identical glass artefacts and the presence of medical instruments in these two Roman cities, i.e. *Balsa* (Tavira, Portugal) and *Colonia Augusta Emerita* (Mérida, Spain) force us to consider a possible contact between the medical professionals of this cities.

We do not mean to adamantly say, without having clearer evidence or irrefutable arguments, that such flasks were used for uroscopy tests. But their similarity with uroscopy containers from the Middle Ages seems obvious. Unfortunately, because it was an old collection and the samples were contaminated, it was not possible to carry out content analyses.

4. Summing up

State-of-the-art knowledge on Roman Medicine is no enigma for today's scientific community.

According to Pliny, one Archagatus, born in the Peloponnesus, was the first medical doctor established in Rome, around 210 BC (*Naturalis Historia*, xxix, 6; Bostock and Riley, 1856: 375), after a period in which medical practice was based on *auspicium* and *haruspicium*. This Greek doctor is considered the first to practice a method-based technical medicine and was the first to be granted Roman citizenship and the title of *vulnerarius*. Even so, he was eventually expelled from the city of Rome, with the epithet of *carnifex*, due to his bold surgeries and the cruelty evidenced when amputating limbs from his patients. Nonetheless, he paved the way for others, and to the practice of a scientific medicine by his followers, such as Asclepiades of Bithynia, who supposed saved a patient who was virtually dead (Pliny, *Naturalis Historia*, vii, 37; Bostock and Riley, 1890: 183).

Asclepiades's adopted therapeutic is considered identical to that practiced by today's traditionalist therapists—therefore naturalistic, but active—and he implemented the early diagnostic. In opposition to this medical school, the other practiced therapeutic—i.e. Hippocrates' passive naturalistic therapy—trusted the healing power of nature (Monteagudo, 2000: 92).

Medical practitioners' reputation improved significantly in the first century BC, although they were frequently scorned in literature—especially by Pliny—, because their techniques were increasingly successful. In this regard, hydrotherapy deserved special preference, proved by abundant references in classical sources to healing water springs (Horace, *Epistulae* I, 15, 1-11; Pliny, *Naturalis Historia*, mentions more than 80 water springs; Vitruvius, *De Architectura*, viii, 2.1; Morgan, 1914). A work by Suetonius proves the good reputation of Roman doctors, stating that, during a water shortage, Augustus expelled all foreigners from the city of Rome except doctors (*De Vita Caesarum, Divus Augustus*, 42, 3; Rolfe, 1914: 191).

As from the turn of the Era, medical doctors had a strong reputation as professionals and possessed a quite advanced anatomical knowledge, albeit the restrictions imposed by society, as proved by the work

of *Aulus Cornelius Celsus*, the most complete ancient medical book extant today. Its author practiced medicine around the first half of the first century.

In his textbooks, *Celsus* clearly states that he possessed a considerable knowledge on uroscopy, and that he also practiced it. Although our knowledge of Medicine in Antiquity is considerable, many questions still lack a satisfactory answer. In this regard, we need to identify which containers were used for performing this kind of tests, something that is very difficult because the multiuse of the glass vessels.

Glass flasks have been found in most Roman graves related to doctors, but we ignore their specific function. Most containers were used for keeping substances used in the preparation of drugs or in therapeutics, while the use of others remains unknown—as is the case of those studied in this paper—. Considering the form of these artefacts, new but comparable to medieval uroscopy flasks, it is not improbable that they were also used for urine testing.

As mentioned above, this is an unparalleled form that can be included in the types manufactured in local workshops, which began to operate at the time of Tiberius only at a regional or provincial level (Corbacho, 2005: 505-506; Bejarano, 2015: 131-132). The only two cases known, both from cities of the Lusitanian province, were collected in clear association with medical-surgical instruments—mainly scalpels—.

The existence of merely two pieces in the entire Roman province forces us, however, to be rather careful before assigning them any specific function. This is, we must insist, just a proposal lacking confirmation—either by the finding of more specimens, or by way of further lab tests—. We should bear in mind that the systematization Theophilus sought to implement in urological testing may be a symptom that, up until then, urological tests were made in a variety of vessels—which included other forms, namely ointment jars (*unguentaria*)—.

Having said this, it is interesting that these pieces were solely found in funerary contexts. It is therefore unarguable that they were used by medical doctors of the Roman Lusitanian province. The

same can be said about the recipients used in this analysis. Naked eye examination of urine for diagnostic purposes surely demanded the use of transparent bulbous flasks.

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Articles en revue:
MALUQUER DE MOTES, J. (1951): "De la Salamanca primitiva", *Zephyrus*, II, pp. 61-72.
Collaboration dans une œuvre collective:
BOAST, R. (1995): "Fine pots, pure pots, Beaker pots". En KINNES, I. et VARDELL, G. (eds.): *Unbaked Urns of Rudely Shape*. Oxford: Oxbow, pp. 69-80.
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Colaboración en obra colectiva, congreso, etc.:
BOAST, R. (1995): "Fine pots, pure pots, Beaker pots". En KINNES, I. y VARDELL, G. (eds.): *Unbaked Urns of Rudely Shape*. Oxford: Oxbow, pp. 69-80.
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