The Numismatic Chronicle 176 Offprint

Silver Visigothic Coinage

by

MIQUEL DE CRUSAFONT, JAUME BENAGES
and JAUME NOGUERA

LONDON
THE ROYAL NUMISMATIC SOCIETY
2016

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[PLATES 28-29]

Abstract. It had always been thought that the Visigoths struck only gold coins. This article presents a group of Visigothic silver coins, very different from anything that has previously been described. They are not siliquae or their fractions, but tiny pieces around eight millimetres in diameter with an average weight of 0.068 grams. These coins, of a recognizable Visigothic style, were part of a small hoard of six silver coins and five gold tremisses imitating those of Justinian I (527–65) which were found in an archaeological excavation in the province of Tarragona. This provenance, together with their typology and their association with the Visigothic gold coins, helps to confirm they are Visigothic silver issues which were probably struck in Barcelona, then the Visigothic capital.

An unknown series

The purpose of this article is to publish a new series of Visigothic silver coins.[1] There are indications that silver coins were struck during the early period of Visigothic settlement in Aquitania and also during the migration towards the Iberian Peninsula. Toulouse, probably Bordeaux and finally Narbonne are thought to be the most likely mints.

In volume 10 of *Roman Imperial Coinage* John Kent identified a group of siliquae and their fractions, together with a group of gold coins, as Visigothic coins probably issued in Gaul. They were struck in the names of Roman emperors or usurpers ranging from Attalus (414–15) and Honorius (395–423) to Zeno (476–91).[2]

At that time few silver coins were known, information on hoards was scarce so, if the find spot was not known, both their Visigothic origin and their mint were very difficult to determine.

The group of silver coins presented here is, undoubtedly, Visigothic and can be dated to a much later period, namely the time of Justinian I (527–65). This chronology, together with the discovery of a similar silver coin in the name of Anastasius (491–518) and other published information, allows us to place the Visigothic silver series

[1] In 2015, we, together with the team of archaeologists, published a brief summary about the find: M. de Crusafont, J. Benages, J. Noguera, P. Valdés, E. Ble, T. Cartes, X. Sicart and J.E. Vila, 'La sèrie de plata de la monarquia visigoda', *Acta Numismàtica* 45 (2015), pp. 71–80. We did not then have all the data.

[2] J.P.C. Kent, *The Roman Imperial Coinage.* 10. *The Divided Empire and the Fall of the Western Parts 396–491* (London, 1994), pp. 450–62 (abbreviated *RIC* 10).

in a different context. It can be related to the Visigothic copper issues that were described several years ago.[3]

From the purely physical point of view these new silver pieces do not resemble any other known coins, either Visigothic or any pieces of Germanic origin. Their weights are extremely low, ranging from 0.04 to 0.1 grams, and their diameters range from 7.6 to 8 millimetres.

This group of coins was found in an archaeological survey using metal detectors and formed part of a small hoard which also contained gold coins. The use of metal detectors, quite uncommon in archaeological research, allowed the discovery of such tiny coins, which have probably remained undetected, and therefore lost, in other excavations where metal detectors were not used.

Unsigned and signed Visigothic coins. Problems of terminology

This coin series may be dated to the period when the Visigoths were striking imitations of Roman coins which cited only Roman emperors. They were first produced when the Romans allowed the Visigoths to settle in Aquitaine in 418,[4] in an area that started in the Pyrenees, occupied a strip of land to the north and had its capital in Toulouse. Later, the Visigoths spread north to the Loire and occupied the region of Provence.

These imitative Visigothic issues lasted until the reign of Leovigild (568–86) who began to issue coins in his own name around 580. From then on until the end of the Visigothic monarchy, in 714, Visigothic coinage always named the reigning king.

There has been argument as to how these pre-580 coins should be described. Felipe Mateu y Llopis was probably the first author to call them 'pre-Visigothic'.[5] Wilhelm Reinhart used the term in a 1941 article,[6] but by 1944 he was clearly unhappy with its implications: 'We believe that the term 'pre-Visigothic' with reference to the coins issued before Leovigild is wrong as it suggests that they were struck before the arrival of the Visigoths'.[7]

Obviously, 'before the Visigoths' is the exact meaning of the term 'pre-Visigothic', and the tendency developed to confine the term 'Visigothic' to the coins issued from Leovigild to Achila II (711–14). This is the case with more recent works by

[3] The Visigothic copper coinage was first identified and published by M. Crusafont, '¿Un numerario visigodo de cobre?', *GacNum* 74/75 (Barcelona, 1984), pp. 131–41, on the basis of 24 pieces found in Seville and its area. See also M. Crusafont, 'The copper coinage of the Visigoths of Spain', *Problems of Medieval Coinage in the Iberian Area,* 3 (Santarem, 1988), pp. 35–70, publishing 103 coins; and M. Crusafont, *El sistema monetario visigodo: cobre y oro* (Barcelona-Madrid, 1994) which published 234 specimens.

[4] For the historical side see M. Rouché, *L'Aquitanie des Wisigoths aux arabes* (Paris, 1979), pp. 19–27.

[5] F. Mateu y Llopis, *Las monedas visigodas del Museo Arqueológico Nacional* (Madrid, 1936), p. 7.

[6] W.M. Reinhart, 'Die Münzen des Westgotischen Reiches von Toledo', *Deutsches Jahrbuch für Numismatik* (1940/41), pp. 69–101. The very first reference to this expression (p. 69), describes them as 'so-called' pre-Visigothic.

[7] W.M. Reinhart, 'El arte monetario visigodo', *Boletín del seminario de Estudios de Arte y Arqueologia* (Valladolid, 1943/44), pp. 53–7.

George Miles, Jesus Vico and Maria and Gonzala Cores and Ruth Pliego.[8] Only Philip Grierson and Mark Blackburn analysed the Visigothic coinage as a whole.[9] Even the monograph by Wallace Tomasini, which is devoted to this imitative period, is limited to the issues which started in the time of Anastasius I (491–518),[10] when there is enough evidence to show that they began in the reign of Honorius. Therefore, we believe that the term 'pre-Visigothic' must be definitively abandoned, despite its unfortunate prevalence in Iberian numismatics.

Grierson and Blackburn made a distinction between the two different periods of Visigothic coinage dividing them into what they termed 'pseudo-imperial' and 'regal' coinage. We are unhappy with the term 'pseudo-imperial', as it suggests they were counterfeits. The coins were legitimate issues that imitated Roman typology to make them more easily acceptable as currency together with the prevailing Roman coins. That is why we believe that it is better to talk about 'Visigothic imitative' coinage and 'Visigothic named' coinage.

Visigothic imitative coinage

The identification of the imitative Visigothic coinage has long been a subject of discussion. For a long time the standard definitions were based on two major articles by Reinhart.[11] In 1973, in discussing a hoard found at Arçay (Cher) and other finds, Jean Lafaurie[12] suggested that some of the imitations previously considered to be Visigothic were issued by the *magister militum* Aetius (433–54) in areas of Gaul not controlled by the Visigoths. Other authors, such as E. Demougeot, agreed with the French numismatist's opinion but they did not produce any new evidence.[13] The idea was rejected by Grierson and Blackburn.[14] They followed Reinhardt's attribution but added significant refinements based on details of typology and legend. Grierson's vast experience had already enabled him to confirm the existence of a Byzantine mint in the Iberian Peninsula located in Cartagena, where gold[15] and, according to recent research, copper coinage was minted.[16]

[8] G.C. Miles, *The Coinage of the Visigoths of Spain: Leovigild to Achila II* (New York, 1952); J. Vico, M.C. Cores and G. Cores, *Corpus Numorum Visigothorum. Ca. 575–714. Leovigildus-Achila* (Madrid, 2006); R. Pliego, *La moneda visigoda I. Historia del Reino visigodo de Toledo (c.569–711)* and *II Corpus* (Seville, 2009).

[9] P. Grierson and M. Blackburn, *Medieval European Coinage* 1 *The Early Middle Ages (5th-10th centuries)* (abbreviated *MEC* 1) (Cambridge, 1986).

[10] W.J. Tomasini, *The Barbaric Tremissis in Spain and Southern France: Anastasius to Leovigild* ANS NNM 152 (New York, 1964).

[11] One has been mentioned in note 6 the second one is W. Reinhart, 'Die Münzen des Tolosanischen Reiches der Westgoten', *Deutsches Jahrbuch für Numismatik* (1938), pp. 107–35. We thank our friend A.R. Andreu i Ardèvol for his valuable and disinterested help.

[12] J. Lafaurie, 'Deux trouvailles de monnaies du Ve siècle à Châtelaillon, près la Rochelle', *BSFN* 35, 6 (June 1980), pp. 715–16.

[13] É. Demougeot, 'A propos des Solidi gallici du Ve siècle apr. J.C.', *L'Empire Romain et les barbares d'Occident (IV e-VII e siècles)* (Paris, 1988), pp. 343–70.

[14] *MEC* 1, p. 45.

[15] P. Grierson, 'Una ceca bizantina en España', *Numario Hispánico* (Madrid, 1955), vol. 4, pp. 305–14.

[16] M. Lechuga Galindo and R. Méndez, 'Numismática bizantina de Cartagena', *Historia de Cartagena* (1991), pp. 72–8. It was also included in Crusafont, *El sistema monetario visigodo*, p. 31.

Difficulties remain and these are discussed in recent study on the Sovana find (Tuscany).[17] The subject is also discussed by Pliego in her account of the Cuna street hoard in the present volume (*CH* 4).[18] In any case the gold coins in the hoard discussed here do not present any difficulty as this coinage issued in the name Justinian I has been unanimously accepted as Visigothic.

Did the Visigoths only strike gold coins?

It would seem that the partition of the Visigothic coinage into two areas and the focus on the period of the signed coins contributed to the axiom that the Visigoths only issued gold coins. As a consequence, Mateu y Llopis wrote in 1946: '*Visigoths confined their monetary system into a strict and exclusive monometallism; their national currency was the gold tremis, one third of the Roman or Byzantine solidus aureus*'.[19] More recently, García Moreno stated: '*... in the Visigothic kingdom no other coins but gold tremisses were struck*'.[20]

This meant that the first Visigothic period was being forgotten, whereas the existence of silver coinage had been remarked long before and there had been some speculations about copper issues under Amalaric, which were later attributed to the Burgundians.[21] It is therefore not surprising that Mateu y Llopis, when examining a find in Cullera (a town to the south of Valencia) in 1972, considered a group of coins as Vandalic which were later identified as Visigothic.[22]

The existence of a Visigothic copper coinage was confirmed when Crusafont published 228 specimens in 1994 and 43 more in 1998.[23] These figures may have doubled since then in the light of new finds, most of them in locations in the southern Iberian Peninsula from which they had not been recorded before.[24] The Visigothic

[17] R. Pliego, 'La amonedación visigoda del Reino de Tolosa (417–507); su representación en el conjunto de San Mamiliano de Sovana' in E.A. Arslan and M.A. Turcheti (eds), *Il ripostiglio di San Mamiliano a Sovana (Sorano.GR): 498 solidi da Onorio a Romolo Augusto* (Spoleto, 2013), pp. 123–36 at p. 123. On p. 132, she says: 'We must confess that it has been extremely complex having to lean towards one option rather than another when trying to decide about the coins attributed to Goths'.

[18] Other finds of the Visigothic imitation coinage in the peninsular area have been published: M.A. Paz Peralta, 'Nota sobre un tremissis acuñado al nombre de Severo III de Majaldares (Borja, Zaragoza)', *Cuadernos de Estudios Borjanos* 37–40 (1997/98), pp. 149–57. We believe that, in the past, many of these tremisses, solidi or even silver coins were probably found but identified as regular imperial coins.

[19] F. Mateu y Llopis, *La moneda española* (Barcelona, 1946), p. 82.

[20] L.A. García Moreno, 'Algunos aspectos fiscales de la Península Ibérica durante el siglo VI', *Hispania Antigua* I (1971), pp. 233–55 at p. 251.

[21] *MEC* 1, pp. 46–7.

[22] F. Mateu y Llopis, 'Bronces imperiales y vándalos en l'Illa de Cullera', *Archivo de Prehistoria Levantina* XIII (1972), pp. 241–56. Mateu y Llopis did not consider the possibility that some of these coins were Visigothic, despite a gold tremissis of Wamba being found in the same place (p. 252), and took this coin as a reference for the chronological closure of the site.

[23] The earlier ones in Crusafont, *El sistema monetario visigodo*, and the latter ones in M. Crusafont, 'Nuevos datos sobre los cobres visigodos', *Actas do IV Congresso Nacional de Numismática* (Lisbon, 1998), pp. 125–44.

[24] Many have been found in Málaga, Cádiz and other sites, although some of those found in Málaga were probably Byzantine and locally struck. B. Mora and C. Martínez, 'Un nuevo hallazgo de monedas bizantinas en Malaca (Málaga): El conjunto monetario de calle Cañón-Postigo de los Abades',

coppers were only struck in a few mints in the south of the Iberian Peninsula but they circulated throughout the area, either by themselves or complemented by Byzantine nummi and other copper coins. It is important to emphasise that many hoards have been found in archaeological excavations and, therefore, the association of the Visigothic copper coins with others of different origins is now clear considering the new, diverse and more certain find spots, in addition to the one of Cullera, which was the only one available for a long time.

It was hardly surprising that, after so many decades of a monometallic vision of the Visigothic coinage, the appearance of the copper coins initially generated a certain distrust. This gradually vanished as more material appeared. In fact, the specialists soon accepted the new attributions and others have now followed them in their publications.[25] A few authors remain reluctant to accept the attributions, but have no convincing arguments.[26]

The hoard we are describing suggests that, while the Visigoths coined mainly gold, they also struck silver and copper at certain times and places. These conclusions match with the idea of the 'permeability' of the Visigothic currency that is the kings' acceptance of any gold coinage comparable to their own, such as the Merovingian or Suevian tremissis, which were not re-struck,[27] as seen in the early findings studied by X. Barral[28] and in the dispersion of Byzantine copper coins and its linking to the Visigothic coinage explained in the works mentioned above. It is clear that the Visigoths were permanently short of gold as they tend to debase the gold content of the tremisses with increasing amounts of silver. This helps explain why the Visigoths were prepared to accept similar gold coins.

Saguntum 40 (2008), pp. 193–204. B. Mora, 'The circulation of bronze currency in Málaga during the sixth century AD. New findings', *NC* 2009, pp. 424–30. B. Mora, 'Arqueologia i moneda al sud-est hispà a l'antiguitat tardana. Els contactes entre la Regió Malacitana i l'interior bètic', *La moneda en temps de crisi,* Museu Nacional d'Art de Catalunya, 2012, pp. 119–34. C. González Cravioto, 'Monedas visigodas de bronce halladas en Churriana (Málaga)', *XIII Congreso Nacional de Numismática* (held in 2003) (Madrid, 2005), pp. 1187–94.

[25] E. Arslan, 'Ancora sulla questione della cosidetta "moneta in rame nell'Italia longobarda", una réplica e problemi di método', *RIN* 108 (2007), pp. 11–28 at p. 25. C. Martin, 'La géographie du pouvoir dans l'Espagne visigothique', *Presses Universitaires du Septentrion* (Paris, 2003), pp. 180–3.

[26] For instance, Vico, Cores and Cores, *Corpus Numorum Visigothorum*, pp. 111–16, argue that the letters **SP** seen on one coin series of Hispalis (Seville) stand for SPania (Hispania) instead of SPali, without taking into account that other coins have the three letters **SPL** which contradict his hypothesis. T. Marot tries to deny the attribution to the time of Wamba of one of the copper coins of Toledo contained in the study mentioned above by referring to the Cullera hoard and explaining that the coin was lost before Wamba. In order to defend her argument, she avoids mentioning the tremissis of Wamba's times found in Cullera itself. M. Crusafont, 'Nuevos datos sobre los cobres visigodos'. D.M. Metcalf, in his 'Visigothic monetary history: The facts, what facts?' in *The Visigoths. Studies in Culture and Society* (Leiden, Boston, Köln, 1999), pp. 201–17, qualifies the finding of the Visigothic copper coins as a 'bombshell' and accepts the Visigothic origin of the copper coins from Emerita, but does not seem to agree with the interpretation nor provide any alternative.

[27] The word 'permeability' and its meaning are explained in Crusafont, *El sistema monetario visigodo*, pp. 96–101.

[28] X. Barral, *La circulation des monnaies suèves et visigothiques* (Munich, 1976). With regard to the Visigothic circulation, see Crusafont, *El sistema monetario visigodo*, pp. 96–101.

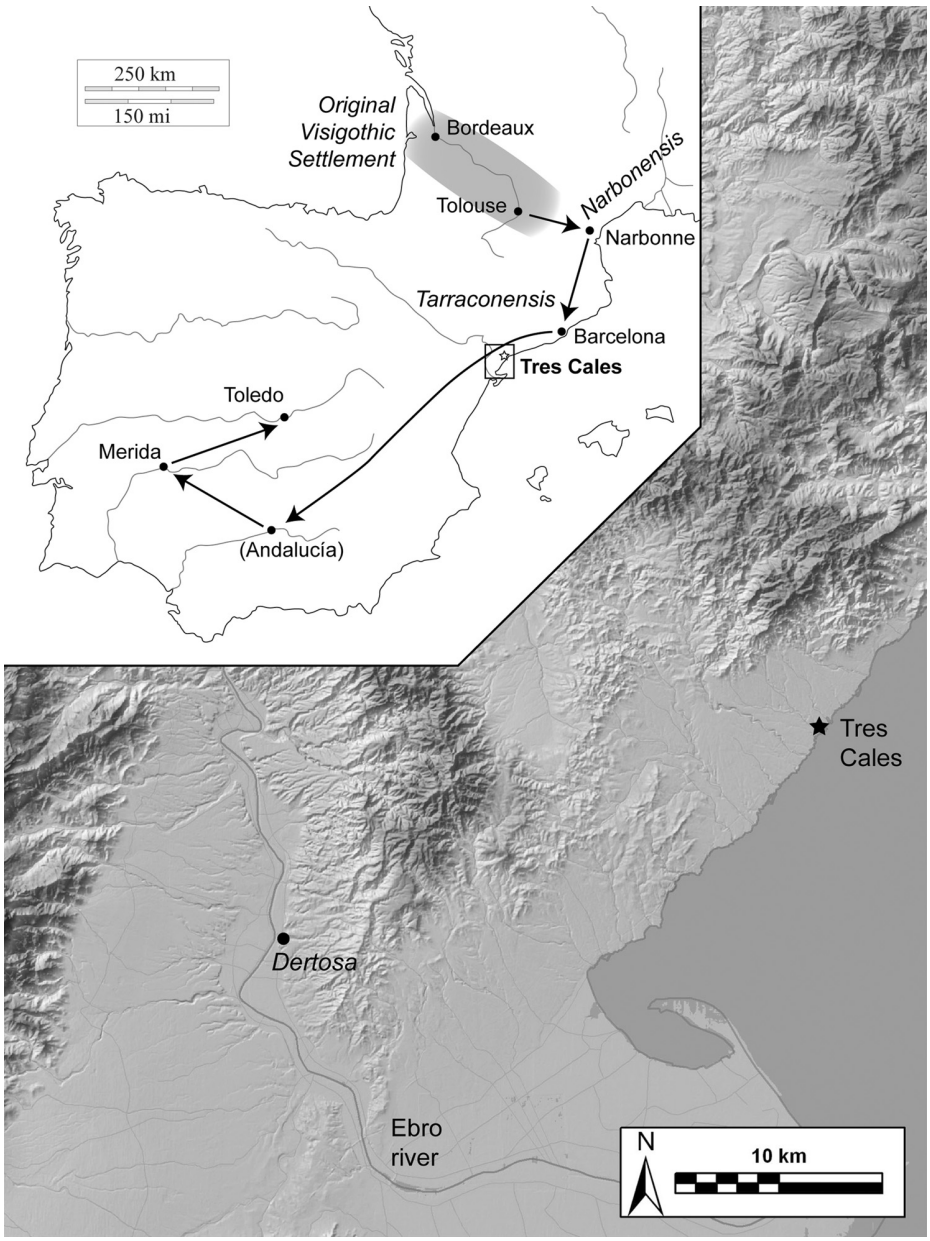


Fig. 1. Location of Les Tres Cales site (l'Ametlla de Mar, Tarragona), and the evolution of the Visigothic capital during the fifth and sixth centuries AD

The possibility that many Roman copper coins were still in circulation might in theory have made Visigothic copper unnecessary. This model was convincingly rejected by Pierre Le Gentilhomme. He argued that the earlier Roman coinage was no longer in circulation in the Lower Empire which is why the nummus coinage was widely counterfeited. When ancient Roman coinage is found mixed with later coinage this is likely to be merely the consequence of accidental finds of old finds of Roman coins which were reintroduced into circulation.[29]

Context and circumstances of the find

This hoard of the early Visigothic period was found on 19 September 2014, in the site named Les Tres Cales (Ametlla de Mar, Tarragona, **fig. 1**), during a research project named 'War and conflict in the northeast of the Iberian Peninsula during the Roman Republican period', led by the University of Barcelona.

Methodology used during both the 2014 and 2015 campaigns was based on the systematic archaeological surveys (visual searching, metal detecting, GPS, geophysical searching, air photography, etc.), which are normally used in so-called 'conflict archaeology'.[30]

The location was of strategic importance and archaeological data have proved that the area was occupied for a long time. There are three reasons for this. First, it is located half way between Tarraco and the mouth of the Ebro River, on the south side of the Coll de Balaguer, a difficult path in ancient times. Second, there is a flow of drinkable water in the Sant Jordi ravine. This is a very scarce resource in an area which is otherwise dry and desert-like (it has been called the 'desert of Alfama', an Arabic word meaning baths or mineral waters).[31] Third, it has one of the few natural harbours or mooring places in the region, sheltered from the fearsome east winds by a rocky hill that protects the beach in the south and the southwest (**fig. 2 over**).

Les Tres Cales, an area that has traditionally had a military and defensive use, is now the name of an eight hectare residential area by the sea, set on a maritime terrace 10 to 15 meters above the sea level and at the bottom of the Sant Jordi ravine. It is an arid and rocky area, deeply eroded not only by the sea and the strong wind, but also by human activity (**fig. 3 over**).

The Visigothic coin hoard was found exactly 280 meters west of the Sant Jordi castle by an archaeological survey team equipped with ten metal detectors, georeferenced with a GPS. The gold coin (no. 4) was the first to be found (G20 Waypoint 289). Four meters to the south the largest group, six silver coins (nos 6 to 11), was then found; then three more gold coins (nos 1 to 3) and the fragment of a folded gold coin (no. 5) were found at G20 Waypoint 290. Six meters to the east a second piece of gold coin

[29] P. Le Gentilhome, 'Le monnayage et la circulation monétaire dans les royaumes barbares en Occident (V–VIII siècles)', *RN*[5] 7 (1943), pp. 46–112; 8 (1944/5), pp. 13–64. See also Crusafont, *El sistema monetario visigodo*, p. 95.

[30] J. Noguera, E. Ble and P. Valdés, 'Metal detecting for surveying marching camps? Some thoughts regarding methodology in light of the lower Ebro Roman camps, project's results', *Proceedings of the 22nd International Congress of Roman Frontier Studies* (= Bulletin of the National Archaeological Institute) 42 (Sofia, 2015), pp. 853–60.

[31] X. Figueres, *Notes històriques de l'Ametlla de Mar* (Ajuntament de l'Ametlla de Mar, 1991).

no. 5, smaller than the first one, was recovered (G20 Waypoint 372). The discovery of the coins led to the stratigraphic excavation of the area, but no remains of any sort were discovered. As is the case on most of the site the soil depth is ten centimetres above the rock. It is only in the ravine area, where the soil is deeper that there are there are some remains of buildings.

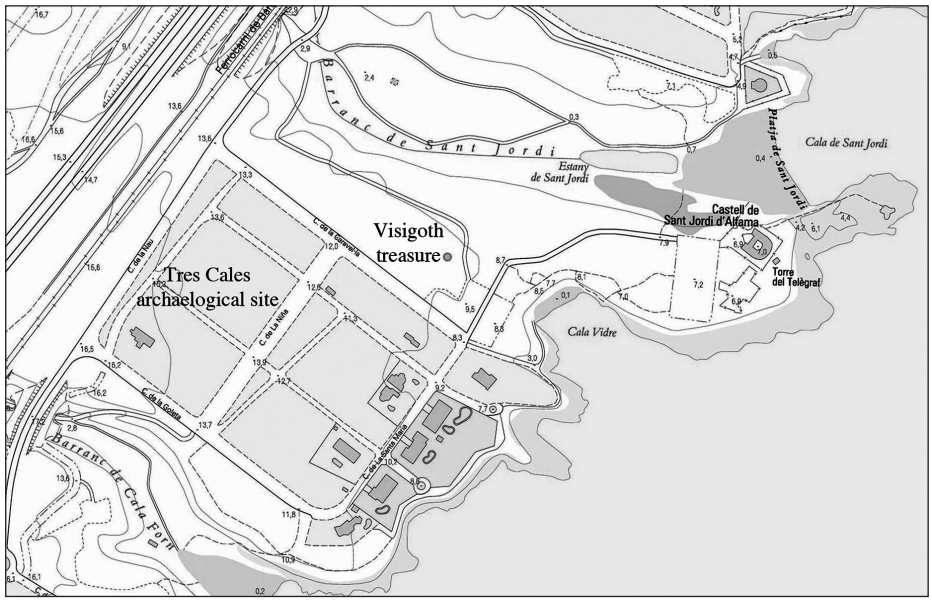


Fig. 2. Topographic map of Les Tres Cales site, including the location of the Visigothic hoard. Source: Institut Cartogràfic de Catalunya

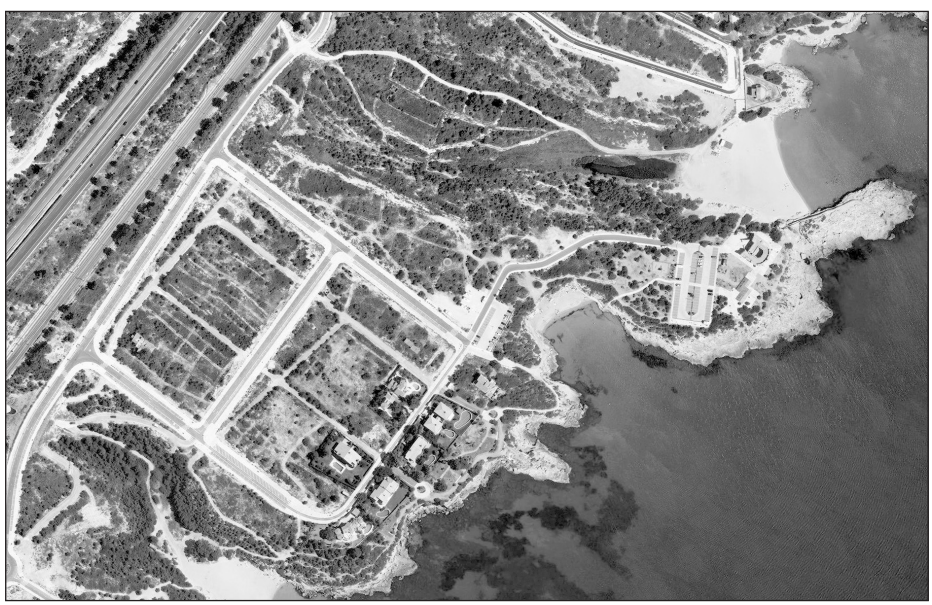


Fig. 3. Orthophotomap of Les Tres Cales area, showing the coastal configuration and the dryness of the ground. Source: Institut Cartogràfic de Catalunya

The context and the circumstances of the find deserve comment. First, metal detectors were used without discrimination in order to find all kinds of metal items, such as small nails from Roman legionaries' footwear (*clavii caligari*), not easily found by other methods. Furthermore, it was possible to conclude that the tiny silver coins, which weigh less than 0.1 grams, would not have been located had they not been next to the gold coins: the detector signal is too weak when detecting them alone. This may explain why they have not previously been found as their size makes them almost invisible when using conventional archaeological techniques and even a metal detector.

Second, during the search some pottery fragments were recovered and georeferenced. Three of these pottery fragments were found next to the coins: a rim (TC'14-G20-373), a body sherd (TC'14-G20-366) and a base (TC'14-G20-378). Although they do not fit together, they are made from the same kind of clay and by the same technique: a white, oxidation fired limestone clay with abundance of temper, resulting in an ochre pottery, made on a slow potter's wheel. The resulting vessel is small and globular, with a flat bottom which has a small central depression, and an out-curving rim (**fig. 4**). It is a locally produced ceramic item of uncertain date sometime in late antiquity which was extensively used along the Mediterranean coast between the fifth and eighth centuries.[32] Other fragments of the same type of pottery have been found during two archaeological survey campaigns in other spots on the site, leading to the conclusion that Les Tres Cales was occupied when the Visigothic hoard was buried.

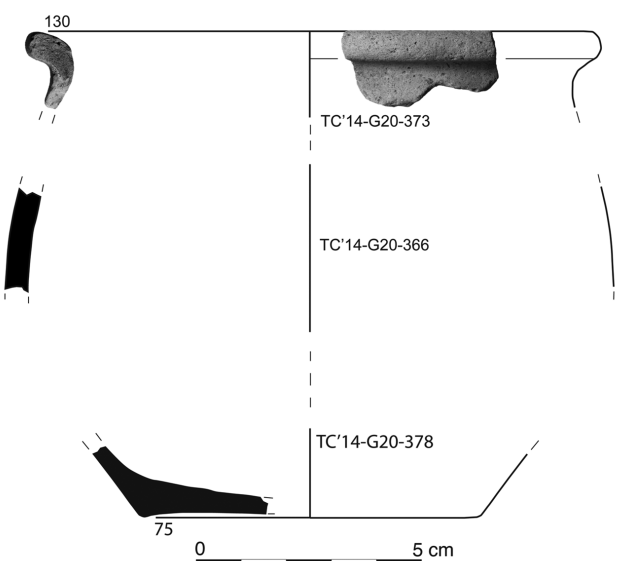


Fig. 4. Pottery fragments belonging to the vessel that contained the Visigothic gold and silver coins.

[32] J.M. Macias, *La ceràmica comuna tardoantiga a Tàrraco. Anàlisi tipològica i històrica (segles V-VII)* (Tulcis, Monografies Tarraconenses 1) (Tarragona, 1999).

Finally, we can confirm that it is a deliberately buried hoard for three reasons. First, there is the concentration of 11 gold and silver coins in a small area of about ten square meters. Second, we believe we have identified the pottery container where they were hidden: its fragments were spread over a four square meter area and not mixed with pieces of any other container. Finally, two pieces of a gold coin, separated by six meters, were part of the same coin. In short, it seems likely that at an unknown date, maybe during the recent works to build the street network of the residential area, the vessel containing the coins was broken and its contents dispersed.

The gold coins (**Pl. 28, 1–5**).

The hoard contains four gold coins, two pieces of another gold coin and six silver coins. One of the two pieces of a gold coin was twisted. When untwisted and flattened it was possible to make the two pieces fit together but even so the coin was not complete (**Pl. 28, 5**).

1. Gold tremissis at the name of Justinian (ref. TC14G20290_12).

Obv. ·TVAN· – ·IT∧NV Diademed bust right, cross on chest. Border of short lines.
Rev. VICT – IVNAIV in exergue ONO. Victory walking right, holding wreath and palm. Border of short lines.
1.44 g, 19.4 mm, 6 h
Tomasini group JAN 2[33]

2. Gold tremissis at the name of Justinian (ref. C14G20290_11).

Obv. DNIVSTINI – ∧NVSPP∧VG Diademed bust right, cross on chest. Border of short lines.
Rev. VICTORI – ∧∧VCVO in exergue CONOB. Victory right, holding wreath and palm. Border of short lines.
1.39 g, 19.2 mm, 6 h
Tomasini group JAN 5(?)

3. Gold tremissis at the name of Justinian (ref. TC14G20290_1).

Obv. DNVSTN – ∧NVSP∧C Diademed bust right, cross on chest. Border of short lines.
Rev. VICTOR – ∧∧VƧTOI in exergue ONO. Victory right, holding wreath and palm. Border of short lines.
1.43 g, 19 mm, 6 h
Tomasini group JAN 5(?)

4. Gold tremissis at the name of Justinian (ref. TC14G20289).

Obv. DNIVSTINI – ∧NVSPACDiademed bust right, cross on chest. Border of short lines.
Rev. VICTORI – ∧∧ […] in exergue CONC. Victory right, holding wreath and palm. Border of short lines.
1.31 g, 19 mm, 6 h
Tomasini group JAN 5(?)

[33] Tomasini, *Barbaric Tremissis*.

5. Incomplete gold tremissis, broken into two pieces, in the name of Justinian or perhaps Justin (ref. TC14G290-1 and TC14G20372).

Obv. DNVSTN(I)… (PVI?) Bust not visible
Rev. VICTO (star) AA [.,.] Victory not visible
Wnr, diameter = ?
Similar to Tomasini 462/464

No. 1 is crude and stylised, the head seems to be split open while the hair lines are in the wrong position, the diadem is crude and the ribbon is hardly visible. The dress, usually drawn with two lines, has three lines on the left hand side. The reverse is generally more irregular than that of the other three coins and shows fewer letters.

No. 2 is less stylised (obverse and reverse) than nos 1 and 3, though still crude and with the hair lines in the wrong position. The ribbons are knotted. On the reverse the exergue is well defined.

No. 3 has a cruder obverse, especially the diadem, the ribbons and the depiction of the hair. The reverse is generally irregular and shows fewer letters than nos 2 and 4.

No. 4 is in relatively good style. The diadem and the ribbons are finely drawn and the hair is regular. Like no. 2 the reverse is less stylised and the exergue is well defined.

It is difficult to find exact matches to coins in Tomasini as every die was engraved with different features. References are therefore to groups of similar but not identical coins. For instance, no. 1 is similar to no. 266 and to Vidal-Quadras-5005,[34] while no. 3 is quite close to nos 342, 343, 344 and 346. All of them are imitations of Justinian's coins (527–65) but the legends are generally shorter.[35] No. 5 may be an imitation of Justin II (565–78), but this cannot be confirmed because so much of the coin is missing.

Tomasini considers that his group 2 coins (no. 1 above were struck under Amalaric (527–31) in Narbonne or Barcelona, and those in his group 5 (nos 2, 3 and 4 above) were struck under Theudis and Theudegisel (540–9) in Seville and Córdoba.[36] The assignment of our coins to these groups is somewhat dubious so such identifications are very uncertain.

As we can see, the gold coins form a coherent group, containing mostly imitations of Justinian's coinage, but none of his predecessors' between Honorius (393–423) and Justin I (518–27), whose coinage the Visigoths had also imitated. This may help us to date the whole hoard to the end of the transition period dating from the Visigothic kingdom of Aquitania to one settled in the Iberian Peninsula. After they lost Toulouse, their capital moved to Narbonne, then Barcelona, then somewhere in Andalusia, then Mérida and, finally, Toledo (see **fig. 1**). Meanwhile Justinian had taken advantage of the power vacuum in the southeast of the peninsula and gained vast territories.

[34] *Catálogo de la colección de monedas y medallas de Manuel Vidal-Quadras y Ramon* 1 (Barcelona, 1892).

[35] See also *MEC* 1 nos 190–202.

[36] An issue in Córdoba does not seem possible as it was in a permanent revolt and Achila was not in control of the town.

The new silver coins (**Pls 28-29, 6–11**).

6. Silver fraction (ref. TC14G20290_3).

Obv. (lines imitating letters) Bust right. Drapery indicated by chevrons.
Rev. (lines imitating letters) Standing figure holding spear and staff ending in a shield depicted as a ring.
0.10 g, 8 mm

7. Silver fraction (ref. TC14G20290_6).

Obv. (lines imitating letters) Bust probably facing right. Drapery indicated by inverted chevrons.
Rev. (lines imitating letters) Standing figure, similar to no. 6.
0.08 g, 8.5 mm

8. Silver fraction (ref. TC14G20290_8).

Obv. (lines imitating letters) Bust seems to be facing front. Drapery indicated by crude chevrons.
Rev. (lines imitating letters) Standing figure, similar to no. 7.
0.05 g, 8 mm

9. Silver fraction (ref. TC14G20290_4).

Obv. (lines imitating letters) Facing bust(?). Drapery indicated by inverted chevrons.
Rev. (lines imitating letters) Facing standing figure.
0.07 g, 8 mm; part broken off

10. Silver fraction (ref. TC14G20190_7).

Obv. (letters barely visible) Bust probably facing right. Drapery indicated by double line, and possibly a cross.
Rev. (lines imitating letters) Figure apparently advancing to the left, holding a spear and an open ring.
0.04 g, 7.6 mm

11. Silver fraction (ref. TC14G20190_5).

Obv. (barely visible) Bust facing right(?). Drapery indicated by inverted chevrons.
Rev. (row of lines imitating letters) Standing figure similar to no. 10.
0.07 g, 8 mm

The obverse busts show a wide variety of styles. No. 6 for example is reasonably well engraved in comparison with the typical schematic styles of the Visigothic coinage. The busts on the other coins are so crude that it is difficult to determine if they are facing right, left or front; also they may be more or less regular, as with nos 6 and 7, or badly drawn, like in no. 8. This style of bust with a chevron or inverted chevron seems to imitate the draped imperial busts and it is also found on gold imitative coins (see Tomasini-9 triens), and on Visigothic coins, represented by the bust of Miles type 5l/5p.[37]

[37] Miles, *Visigoths of Spain*, pp. 59–60.

On the reverse, a standing figure is shown by a simple vertical line topped by a globe or a thicker line for the head, with the legs indicated by two lines. One of the arms holds a spear, which on nos 6 and 7 ends in an arrow point, while the other holds a staff pointing down and ending in an open or closed ring (a misunderstood arm, depicted exaggeratedly long, holding a round shield).

The pseudo-letters do not allow a true reading of the legend. They are mostly vertical lines (I) or angles (Λ or V). On no. 6, there seem to be the letters Ɔ and C on the obverse and, on the reverse, the letters TI; on the obverse of no. 9, there is a И. It has been suggested that these letters could be an attempt at CIVITAS,[38] as is seen on later copper coinage from Emerita, but it must be taken into account that there are legends on both sides and that they are formed by at least eight characters on the obverse of the best-preserved coin.

These coins are of extremely low weight. The Barbaric imitation siliquae struck by the Ostrogoths weigh an average of 2.7 grams and it is possible to find quarter siliquae weighing between 0.6 and 0.8 grams, almost ten times more than the coins described above. Only the Lombards had a monetary series with comparable weights with the anonymous coins measuring 12 to 13 millimetres and weighing between 0.13 and 0.26 grams.[39] This suggests that these new coins are silver Visigothic issues as they do not match any other known coinage.

Kent described some rare siliqua-type coins and their fractions as Visigothic, probably struck at the Narbonne mint. This coinage, including gold coins, is in the names of emperors and usurpers dating from 414 to 491.[40] There are also other later silver imitative coins, such as the coin at the name of Anastasius (491–518) which do not have any relationship with the hoard under discussion.

Silver one-eighth of siliqua? (**Pl. 29, 12**).

Obv. D.N.ANAS [...] SIVS PP N C Bust right.
Rev. VICTO – RIΛΛS Standing figure holding a spear and a shield. Star on right.
0.28 g, 11 mm; Áureo and Calicó (Barcelona) auction 264 (17 December 2014), lot 161.

This coin is much cruder than all the siliquae and half siliquae described by Kent,[41] and so light that it should be regarded as a one-eighth siliqua. The reverse shows the same design (figure holding spear and shield) as the small silver coins described above. Its origin is unknown, but it is probably from the Iberian Peninsula.[42]

[38] We are grateful to the anonymous referee for this suggestion.

[39] E.A. Arslan, *Le monete di Ostrogoti, Lobgobardi e Vandali, Catalog delle Civiche Raccolte Numismatiche di Milano* (Milan, 1978), pp. 58–9, nos 23–30.

[40] *RIC* 10, pp. 450–62, the coins are in the names of Attalus (414–15), Honorius (395/418–23), Theodosius II (423–5), Valentinian III (425–55), Avitus (455–6), Majorian (459–61), Severus (451–70), Anthemius (467–72), Nepos (474–5) and Zeno (476–91).

[41] *RIC* 10.

[42] It must be stated that Cayon considers a specimen weighing 0.3 g as a regular Anastasius coin of a 'third of siliqua' denomination which, taking into account its irregularities might be a Visigothic imitation. It may also belong to a peninsular collection. J.R. Cayón, *Compendio de las monedas del Imperio Romano* vol. IV (Madrid, 1985), p. 3010, no. 19.

Other unusual silver coins have been described recently. Lafaurie published a small silver fragment in the name of Justinian, which copied the gold tremissis models. The authors consider that the complete coin would weigh about 0.18 grams. It was found in Valentine (Haute Garonne) and Lafaurie considered it to be Gaulish.[43] A very similar specimen weighing 0.23 grams appeared in Barcelona in 1999,[44] suggesting the coins is Visigothic. All finds should be re-considered periodically so that more precise attributions can be made and a better understanding of the evolution of the coinage can be gained.

Metrology: the gold coins

The average weight of the gold coins found in the hoard is around 1.4 grams. This is similar to that of the R-A series (R-A in the exergue) considered by Depeyrot to be undoubtedly Visigothic, and whose weights ranged from 1.21 grams under Basiliscus to 1.39 / 1.42 grams under Valentinian III to Zeno.[45] These weights match those provided by Grierson for the Visigothic tremissis struck under Justinian and, according to Arslan, those found in a Barbarian context for the same period.[46]

The tables included in the Appendix, below, show the gold content ranging from 88.80% to 91.9%, with an average of 90.62% (taking into account all 11 readings). Values provided by Grierson when the mints were located at Narbonne or Barcelona under Justinian are the closest ones to our results: they range from 90% to 96% gold, with an average of 92.8% for the six coins he analysed. This small difference in relation to the lower result of our hoard may be the consequence of the imperfections of the analytical method itself. For instance, if the iron detected comes from the earth that remained attached to the coins, then gold proportion is 1% lower, so we can consider a rise to 91.62%. However, it must be taken into account that the average of our hoard is strongly influenced by the analysis of the fragmented coin, probably as irregular as others studied by Grierson, which contains only 87% or even 74% gold. If we do not consider these values and add 0.3% of iron (the three higher figures for iron, above 1%, also belong to the broken coin), our average increases almost to the same level as Grierson's: 92.01 + 0.3 = 92.3%.

Metrology: the silver coins

The metrology of the silver coins is far more unusual. These six coins are worn, and in some cases broken, so the following comments are very provisional and we cannot assign a concrete denomination to the coins. The average weight of the six coins is 0.068 grams. They are more worn than the gold though nos 6 and 7, which are in the best condition, have an average weight of 0.09. Even so they do not match

[43] J. Lafaurie, 'Monnaie en argent du VIe siècle trouvée à Valentine (Haute-Garonne)', *Revue de Comminges* 93 (1980), pp. 533–4.

[44] T. Marot, 'La ciudad de Barcino durante los siglos V i VI: Nuevas aportaciones sobre el circulante', *Anejos de A EspA* 20 (1999), pp. 415–22 at p. 420.

[45] G. Depeyrot, 'Les émissions wisigothiques de Toulouse (V e siècle)', *Acta Numismàtica* 16 (Barcelona, 1986), pp. 79–104, especially p. 82 (95 coins were weighed).

[46] *MEC* 1, pp. 442 ff, and Arslan, *Le monete,* pp. 35 ff.

the usual weights of the period. Siliquae usually ranged from 1 to 1.4 grams. Half siliquae should therefore range from 0.5 to 0.7 grams, quarters from 0.25 to 0.35 grams and eighths from 0.12 to 0.175 grams. The heaviest of our silver coins do not reach the lowest weight of an eighth siliqua, which was an extremely rare coin in its time. Therefore, as the weights of our coins are lower than that of the eighth siliqua, we can conclude that they are a special issue whose low weights are at odds with the traditional ones.

The metallurgical analyses for the silver are far less reliable than for the gold coins but even so their finenesses show some anomalous features. Their fineness ranges from eight to 11 diners (.666 to .916 silver). Even 11 diners is low, so this group would have been anomalous in the circulating medium.

Chronology and the most likely mint

The silver coins can be roughly dated by their association with the gold coins, which were mostly struck under Justinian I. Nos 1 and 5, apparently in the name of 'Justin', cannot be dated precisely because we do not know whether they refer to Justin I or Justin II. No. 1 is probably copying Justinian I. Although no. 5 is similar to a coin listed by Tomasini under Justin II, because there is a star in the legend, Tomasini also describes coins of Justin I with a cross in the legend, so their distinction becomes very difficult. As a consequence, we believe that the best option is to take the attribution to Justinian I as the best one.

Justinian I's rule (527–65) was very close to the period in which the Visigoths had their court in Barcelona, that is, during the rule of the Visigothic kings Theudis (531–48) and Theudegisel (548–9). As the find spot is near Barcelona, the workshop where these silver coins were struck was probably located in that city. It is worth noting that the Barcelona mint had been active under Maximus Tyrannus (409–11) striking siliquae and copper coins of a quality similar to that of the Roman coinage. Barcelona had also been the capital in Ataulufus' time (414–15). Given that the gold coins from the hoard were found in the Tarragona area, they were probably struck in Barcelona. Recently gold coins of Justinian have been unearthed not far from Barcelona, such as a tremissis found at Conca de Tremp (Lleida) or four tremisses at Alcàsser (València).[47]

Sequence of the Visigothic silver and copper coinage

Coins in the name of Anastasius (which, according to the weight of the coin described above, 0.28 grams (**Pl. 28, 7**), should be one eighth of a siliqua) can now be added to the silver siliquae and their fractions attributable to the Visigothic rule from Honorius to Zeno. Two coins in the name of Justinian described by Lafaurie and Marot, weighing 0.18 and 0.23 grams, are even lighter.[48] These two silver coins in the name of Justinian are probably some of the earliest struck in his reign as they

[47] A.M. Balaguer, 'Troballa de la Conca de Tremp', *Acta Numismàtica* 24 (Barcelona, 1994), pp. 198–200; A. Ribera i Lacomba, 'El contexto histórico y arqueológico de las emisiones monetarias en el País Valenciano', *GacNum* 157 (Barcelona, 2005), pp. 41–62.

[48] Lafaurie, 'Monnaie en argent', pp. 533–4; Marot, 'La ciudad de Barcino', p. 420.

are much heavier than those in the new find. Their reverse typology is quite different from Justinian's silver coins as they imitate his gold coins. They would thus be a first step towards a weight reduction. They may have been minted at Narbonne which would explain their being found in both Haute Garonne and Barcelona. The coins found south of Tarragona were probably minted in Barcelona.

As the Visigoths gradually moved from the solidus to the tremissis, a denomination which was probably was more suitable for their lower level transactions, they probably also introduced a denomination lower than the siliqua. The first step was the Anastasius' eighths, then the weaker Justinian eighths and finally the coins in the new find. It probably soon became obvious that such tiny coins were not practical and it was decided to replace them with copper coins. Logically, this new copper coinage followed the Byzantine models for the nummus and its multiples in the same way that the Visigothic gold followed the metrological and even physical models of the Byzantine coinage.

The earliest copper coins were struck in Emerita / Mérida. The location of the Visigothic capital evolved as follows (see also **fig. 1**):

Until Alaric II (484–507) ..... Tolouse
Under Amalaric (507–31) ..... Narbona
Under Theudis and Theudegisel (531–49) ..... Barcelona
Under Achila (549–54) ..... maybe Andalucia, surely Mérida
Under Atanagild (554–67) ..... Toledo
Under Liuva I (567–72) ..... (Narbonne, around one year)
Under Leovigild (568–86) onwards ..... Toledo[49]

Some of the copper coins attributed to Mérida have the legend CIVITA, more appropriate for a city coinage such as that produced in Carthage under the Vandals, but they also depict a king's bust, so they should be part of a coin issue accepted or at least tolerated by the king. In some of these depictions, the king is shown in profile with a quadrangular bust, as seen in the late Visigothic imitations, such as Leovigild's early issues. Copper coins probably replaced the small fractional silver coins after the capital had been established in Mérida and probably continued to be struck afterwards. The attribution of these coins to Mérida is based on the monogram shown on the reverse, which, we believe, represents the city name. Many monograms stand for the king's name, but in other instances they stand for the mint location, such as in the Lombard coinage of Lucca.[50]

Crusafont has previously suggested that the first Visigothic copper issues were produced under Leovigild because of their similarity to this sovereign's first gold

[49] This very schematic list shows the estimated itinerary of the Visigothic court during a little known period. It must be pointed out that these relocations were seldom decided for geopolitical reasons and were often due to escapes or military defeats at a time when assassinations of kings were frequent. See E.A. Thomson, *The Goths in Spain* (Oxford, 1969).

[50] E. Bernareggi, *Il sistema economico e la monetazione dei longobardi nella Italia superiore* (Milan, 1978), p. 187, no. 200. For another specimen see Numismatica Ars Classica (Zürich) auction 93 (26 May 2016), lot 1293.

issues, on which a quadrangular bust is depicted.[51] It is now possible to refine this date. If the copper coins are considered an immediate replacement of the small silver coins, the copper should be dated to the time of Achila (549–54). A quadrangular bust is also depicted on the gold tremissis of the imitative period, so the copper coins may have been introduced under Achila, but were probably struck for a considerable time as many varieties exist. There are pieces with and without the legend CIVITA, the bust may be quadrangular or arched (that is the bust has the shape of a square in some pieces and an arch in others) and there may even be two metrological standards.[52] As coins with the legend CIVITA seem to be heavier, and therefore presumably older, Achila may have tolerated this city coinage. Leovigild, who was probably more authoritarian, allowed the issue to continue but removed the reference to the city. It is also possible that the light silver coinage described here lasted some time and that it started in Emerita under Leovigild, as the current theory explains. Future finds might shed more light on these questions.

The copper coins of Seville were probably minted well into Leovigild's reign when the second gold type was adopted depicting a cross on steps. This typological element on the oldest copper coins of Hispalis copies of the new type introduced by the Byzantine emperor Tiberius II (578–82) on his gold solidus and would later be used on a very few of Heraclius' (610–41) copper coins, whose designs are even similar to Seville copper coins.[53] The chronology of remaining Visigothic copper coins is based on their similarity to the gold models, so there is no need to change their attributions.

Conclusions

1. The newly discovered silver coins, different from the imitation fractional silver coinage in the name of Justinian I (527–65), are shown to be Visigothic by their typology and their association with gold tremisses in the name of Justinian, and form a new and previously unknown series in the Visigothic coinage. Given they were found in a site near Barcelona, this new fractional silver coinage, which does not depict a readable sovereign's name, was probably struck in Barcelona during a second period of Justinian I's rule, when this town became temporarily the Visigothic capital.
2. The new silver coins seem to belong to a late stage in the issue of imitation siliquae by the Visigoths as their weight is so low. Earlier silver coins had higher weights and are listed in *RIC* 10 under Attalus (3701–3702), Honorius (3703 and 3708–3709) and Valentinian III (3723–3726), and nowadays are known in the name of Anastasius and Justinian. Both the latter were minted in Narbonne and show a slow decrease in weight.
3. These tiny silver pieces have probably been missed by archaeologists in other excavations as, even using a metal detector, they are hard to find, so it is very

[51] Crusafont, *El sistema monetario,* pp. 50–1.
[52] For the different busts, see Crusafont, *El sistema monetario visigodo*, p. 143.
[53] *MIB* 3, pl. 13, no. 181 (Nicomedia mint), and especially pl. 16, no. 210 (Alexandria mint).

difficult to determine for how long they were minted. Also they were probably not very convenient because of their size and weight. This may have been the reason the Visigoths started issuing copper coins which followed the metrology of the nummus and its multiples.

4. As the oldest Visigothic copper coins have been attributed to Emerita, where the capital was established after Barcelona (leaving aside a short period when it may have been somewhere in Andalucia), the change from a low denomination small silver coinage to a copper coinage possibly took place in Emerita under Achila (549–54), who moved the capital to this city. This would lead us to conclude that these copper coins started being minted earlier than supposed so far, that is, under Achila instead of Leovigild; the wide range of different varieties and metrologies suggests that they were minted for a long time. Of course, this would be a valid theory had the small silver coins been replaced immediately and not issued until Leovigild's times. Neither of these hypotheses changes the chronology of the other Visigothic copper coins, which is based on typological similarities with the Visigothic tremissis: cross on steps (Ispali 1), head facing (Ispali 2), profile bust with a cross (Toleto), etc.

5. The latest archaeological finds of copper coins confirm the relationship of the Visigothic copper with Byzantine and Vandalic issues.[54] They therefore support Crusafont's approach regarding the circulating currency of the Visigoths, who were ready to admit into circulation Suevian or Merovingian gold tremisses and copper coins from other places, to be used with their own currency. The mints striking Visigothic copper were apparently located in the centre and south of the Iberian Peninsula, in Mérida, Seville, Toledo, probably Córdoba and maybe in some other so far unidentified mints. This did not prevent Visigothic copper coins from circulating everywhere.

6. The old axiom that the Visigothic coinage was monometallic has now been overcome. It will now be possible to refer to silver coinage at least during the period from 418 to 549, and to the use of local or foreign copper coinage at least from 570/80 until Wamba's issues of Toledo (672–80). In order to narrow down the chronological and geographical minting and use of the silver and copper coinage in the Visigothic period, more detailed research on finds of gold, silver and copper coins is necessary. By doing so it one could decide whether each find is formed of imperial coins or Visigothic imitations. This would not have been possible years ago. One cannot rule out the possibility that a tri-metallic coinage, composed of local and foreign issues, circulated throughout the Visigothic realm.

[54] Bartolomé Mora Serrano, 'Old and new coins in southern *Hispania* in the 6th century AD', in J. Chameroy and P.-M. Guihard (eds), *RGZM – TAGUNGEN* 29 *Produktion und Recyceln von Münzen in der Spätantike* (Mainz, 2016), pp. 139–53.

APPENDIX

Metallographic analysis[55]

Both silver and gold coins have been analysed following the X-ray fluorescence method. We are aware that this analysis gives data of the coin surface and not of the core.[56] On the other hand, these pieces had never been cleaned before, so the analyst himself warned, for instance, that presence of iron could be the result of small traces of earth attached to the coin. In any case, gold being a very stable metal, the results obtained with this method seem quite acceptable. Regarding the silver coinage, there is no problem as long as the alloy contains a high proportion of silver, but the reliability decreases as the content of other metals increase because they are me and may thus alter the outer layer in some degree. Besides, silver is far more liable to oxidise than gold, so the reliability of the results is lower. In fact, differences between both sides of the same coin introduce these problems. The results are expressed in percentages on tables 1 and 2.

Table 1. Metal analyses of the gold tremisses

Cat. no.	*Obv. / rev.*	*AU*	*AG*	*CU*	*ZN*	*PB*	*SN*	*FE*	*Others*
1.	Obv.	91.0	7.86	0.88	-	-	0.11	0.17	-
1.	Rev.	91.2	7.46	0.93	-	-	0.16	0.20	-
2.	Obv.	91.7	7.10	0.87	-	-	0.11	0.13	-
2.	Rev.	91.9	7.16	0.81	-	-	-	0.12	-
3.	Obv.	91.5	7.57	0.60	-	-	0.16	0.15	-
3.	Rev.	91.7	7.24	0.61	-	0.06	0.12	0.17	-
4.	Obv.	90.4	8.53	0.66	-	0.08	0.10	0.27	-
4.	Rev.	90.7	8.41	0.60	-	-	-	0.29	-
5. fragment 1	?	89.0	8.29	0.78	-	-	-	1.36	-
5. fragment 2	Obv.	89.0	8.69	0.92	-	-	-	1.43	-
5. fragment 2	Rev.	88.8	8.81	0.94	-	0.09	-	1.37	-

[55] X-Ray Fluorescence analysis (ED-XRF) and micrographs were done by Ignacio Montero, of the Centro de Ciencias Humanas y Sociales (CSIC, Madrid).

[56] In the silver alloy coins, especially those containing less than 50% of this metal, the surface oxidation may penetrate up to 25% of the coin's thickness on both sides. See M. Crusafont, 'Primers resultats d'algunes anàlisis per via química sobre monedes catalanes', *I Simposi Numismàtic de Barcelona* (Barcelona, 1979), vol. 2, pp. 348–52. Comparison of both analysis procedures, chemical and destructive on one hand, and X-Ray on fragments of the same coins on the other, has proved there is a deviation in the latter one. This was the reason why W.A. Oddy, of the British Museum, developed a technique that involved a minimal destruction of the coin. It consisted of filing the edge of the coin, making sure that the unaltered core of the coin was reached, so the X-ray could be directed to that spot. Furthermore, N. Barrandon, of the Centre Ernest-Babelon, proved the efficiency of the analysis using nuclear methods. There is an abundant literature on the question. For instance, see E.T. Hall and D.M. Metcalf (eds), *Methods of Chemical and Metallurgical Investigation of Ancient Coinage* RNS SP 8 (London, 1972); D.M. Metcalf and W.A. Oddy (eds), *Metallurgy in Numismatics* 1 RNS SP 13 (London, 1980); W.A. Oddy (ed.), *Metallurgy in Numismatics* 2 RNS SP 19 (London, 1988); N. Barrandon, 'Méthodes nucléaires d'analyse et numismatiques', *Actes IX Congres International de Numismatique* (Bern, 1979), pp. 3–15.

Table 2. Metal analyses of the fractional silver

Cat. no.	*Obv. / rev.*	*AU*	*AG*	*CU*	*ZN*	*PB*	*SN*	*FE*	*Others*
6.	Obv.	0.80	89.3	8.29	0.29	0.54	-	0.48	0.11
6.	Rev.	0.76	89.3	7.68	0.35	0.58	-	1.18	0.16
7.	Obv.	0.99	91.0	5.24	1.18	0.73	-	0.46	0.41
7.	Rev.	0.81	79.1	17.30	1.23	0.53	-	0.74	0.15
8.	Obv.	0.63	62.7	31.7	3.62	0.44	0.32	0.50	-
8.	Rev.	0.63	66.4	25.6	3.38	0.47	0.34	1.94	0.16
9.	Obv.	0.47	66.2	26.1	3.20	0.21	0.49	2.31	0.28
9.	Rev.	0.56	76.6	18.3	2.69	0.24	0.65	1.02	-
10.	Obv.	0.42	63.7	30.6	3.86	0.25	0.43	0.65	-
10.	Rev.	0.48	68.0	23.3	4.69	0.33	0.50	2.65	-
11.	Obv.	0.36	57.0	37.3	3.91	0.26	0.46	0.74	-
11.	Rev.	0.33	51.0	41.6	5.71	0.23	0.41	0.57	-

Micrographs have revealed some edge wear, which proves that these coins circulated, and some mould canal traces, which suggests their planchets were made by casting despite their very small size. When using this technique, planchets were removed from the resulting tree after cooling down and solidifying. The irregular section produced on the planchet edge after splitting it from the tree reveals this technique.

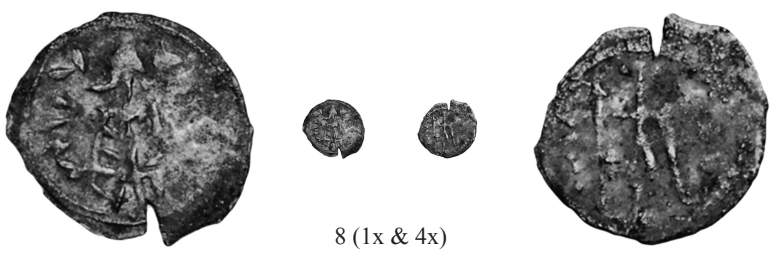
PLATE 28

1 2 3 4

5 (1x & 2x)

6 (1x & 4x)

7 (1x & 4x)



8 (1x & 4x)

DE CRUSAFONT, BENAGES and NOGUERA, SILVER VISIGOTHIC COINAGE (1)

9 (1x & 4x)

10 (1x & 4x)

11 (1x & 4x)

12 (1x & 4x)

DE CRUSAFONT, BENAGES and NOGUERA, SILVER VISIGOTHIC COINAGE (2)