

Zeitschrift: Schweizerische numismatische Rundschau = Revue suisse de numismatique = Rivista svizzera di numismatica
Herausgeber: Schweizerische Numismatische Gesellschaft
Band: 86 (2007)

Artikel: The serrated silver coinage of Carthage
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DOI: <https://doi.org/10.5169/seals-178709>

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PAOLO VISONÀ

THE SERRATED SILVER COINAGE OF CARTHAGE*

PLATES 5-7

1. INTRODUCTION

Serrated silver coins comprise a distinctive group of Carthaginian issues in precious metal, consisting of reduced shekels and double-shekels, that have not yet been fully studied.¹ Even after G.K. Jenkins and R.B. Lewis identified them as «the latest

*Frequently Cited Works*¹

| | |
|-----------------|---|
| ALEXANDROPOULOS | J. ALEXANDROPOULOS, <i>Les monnaies de l'Afrique Antique. 400 av. J.-C.-40 ap. J.-C.</i> (Toulouse 2000) |
| BALDUS 1988 | H.R. BALDUS, Eine 'hannibalische' Tanit (?), <i>Chiron</i> 18, 1988, pp. 1-14 |
| BALDUS 2003 | H.R. BALDUS, Ein 146 v. Chr. verbrannter Geldbörseninhalt aus Karthago, <i>Chiron</i> 33, 2003, pp. 195-199 |
| BALDUS 2004 | H.R. BALDUS, Karthagische Münzen, in <i>Hannibal ad portas. Macht und Reichtum Karthagos</i> , herausgegeben vom Badischen Landesmuseum Karlsruhe (Karlsruhe 2004) |
| BURNETT | A.M. BURNETT, Africa, in: A.M. BURNETT / M.H. CRAWFORD (eds.), <i>The Coinage of the Roman World in the Late Republic. BAR Int. Ser. 326</i> (Oxford 1987), pp. 175-185 |
| CRAWFORD 1985 | M.H. CRAWFORD, <i>Coinage and Money under the Roman Republic. Italy and the Mediterranean Economy</i> (Berkeley/Los Angeles 1985) |
| JENKINS/LEWIS | G.K. JENKINS / R.B. LEWIS, <i>Carthaginian Gold and Electrum Coins, RNS Spec. Publ. No. 2</i> (London 1963) |
| MÜLLER | L. MÜLLER, <i>Numismatique de l'ancienne Afrique</i> , vol. II (Copenhagen 1861) |
| VISONÀ 1998 | P. VISONÀ, Carthaginian Coinage in Perspective, <i>AJN</i> 10, 1998, pp. 1-27 |

* This essay is dedicated to Professor Theodore V. Buttrey, with much gratitude for decades of mentoring and friendship.

¹ Several friends and colleagues have provided data and feedback for this essay. I wish to thank, in particular, Richard Abdy, Richard Ashton, Hans Roland Baldus, Donal Bateson, Theodore V. Buttrey, Giles F. Carter, Michael H. Crawford, Günther Dembski, Wolfgang Fischer-Bossert, Dominique Gerin, Helle W. Horsnæs, Silvia Mani Hurter, Henry S. Kim, Rudolf Langer, Lorenza-Ilia Manfredi, Cecilia Meir, Torben Melander, Paloma Otero, Philip C. Schmitz, Peter G. van Alfen, Alain Weil, and Bernhard Weisser. I am also indebted to Suzanne Frey-Kupper for making casts and taking weights of the serrated double-shekels in the Musée de Carthage's collection in 2004, and to the

issue struck at Carthage» before the fall of the city in 146 BC,² thus upending L. Müller's classification,³ they have been largely ignored by numismatists and historians. Jenkins and Lewis's dating (c. 200-146 BC) was based on the contents of a hoard found in 1916 on one of the Cani Islands near Bizerta (Tunisia), including Carthaginian serrated double-shekels and Roman Republican denarii down to 146 BC (IGCH 2301; see *infra*). Jenkins and Lewis showed that these coins are closely linked by fabric, types, and style to the last Carthaginian gold issues (JENKINS/LEWIS' Group XVIII). They also pointed out that certain control marks on some of the silver coins correspond to those of the gold, and that both coinages were made with good metal.⁴ Their comments still need to be taken into consideration, particularly since very few data about the fineness of the Carthaginian serrated silver coins are known at present.⁵

In subsequent studies, both M.H. Crawford (who published a specimen similar to O1R54 said to be from the Cani hoard) and A.M. Burnett mentioned the purity of the «last silver issue of Carthage».⁶ Moreover, after an examination of 23 of these coins in the British Museum's collection, Burnett noted that «Despite the numerous variety of control symbols and letters which occur on the reverses, each denomination was struck from only a single obverse die, so that we can be fairly sure that the coinage was on a very small scale and minted for only a short period.»

Although Burnett did not identify the denomination(s) in silver he was referring to, he concluded that «... the good condition of the pieces in the British Museum from the Cani Island hoard, of 146 BC, makes it tempting to think that they were made just before or during the Third Punic War, and this would provide an obvious occasion for the gold as well.»⁷ Burnett's dating of the serrated silver, which is considerably later than one in the early 2nd century BC previously suggested

American Numismatic Society (New York), the American Numismatic Association (Colorado Springs), Cambridge University's Fitzwilliam Museum (U.K.), the Società Numismatica Italiana (Milan), and the Smithsonian Institution (Washington, D.C.), for allowing me to use their repositories of coin sale catalogues. G.K. Jenkins first described the Carthaginian serrated silver coins as reduced double-shekels and shekels in SNG Nummorum Graecorum Copenhagen, fasc. 42, North Africa: Syrtica-Mauretania (Copenhagen 1969), nos. 403-407, and he generously provided me with a copy of E.S.G. Robinson's handwritten notes on the Punic coins seen in Tunisian and Algerian collections in April and May, 1935.

² JENKINS/LEWIS, p. 53.

³ MÜLLER, p. 142.

⁴ JENKINS/LEWIS, pp. 53-54.

⁵ JENKINS/LEWIS, p. 136, nos. 13-14, cite a specific gravity value of 10.47 for two serrated double-shekels in the British Museum's collection (*infra*, Catalogue nos. 71, 93). The purity of the metal of the Carthaginian serrated silver coins was first recognized by MÜLLER, pp. 132-133, 142, n. 4.

⁶ CRAWFORD 1985, pp. 138-139, Fig. 50; BURNETT, pp. 175-176.

⁷ BURNETT, p. 175 and his footnote 12, p. 182.

by H.R. Baldus,⁸ was accepted by P. Visonà.⁹ According to J. Alexandropoulos, however, «La minceur des émissions d'or reste surprenante, et il faut donc admettre que la richesse de Carthage au moment de sa chute... se traduisait pour l'essentiel, du point de vue monétaire, par les frappes d'argent pour lesquelles le nombre des symboles accessoires utilisés laisse effectivement supposer des émissions abondantes». Alexandropoulos would date the last Carthaginian silver issues to c. 160-149 BC.¹⁰

Most recently, though, after three of these coins were found together in controlled excavations at Carthage, H.R. Baldus has thoroughly re-discussed their style and chronology.¹¹ In his view, historical considerations and an analysis of the coins themselves support dating the beginning of the serrated silver coinage to c. 150 BC. Since the Carthaginians had to use their silver bullion to pay a war indemnity to Rome between 201-151 BC, Baldus believes that they did not have a currency in precious metal for fifty years. Issues of heavy bronze coins similar to SNGCop 409-413, which were struck in massive quantity,¹² compensated for the basic lack of a silver coinage during this time. Moreover, while allowing the possibility that the double-shekels in the British Museum's collection may have been struck by more than one obverse die, and that the variety of control marks known for this denomination may indicate an extended period of issue, he has suggested that reduced shekels with a plain edge, bearing a horse stepping r. on the reverse (similar to SNGCop 408), and reduced shekels with a serrated edge, bearing a horse standing r. on the reverse (similar to SNG Cop 407) were minted before them.¹³

Baldus' insightful analysis shows that Carthaginian silver coinage continued to undergo significant changes in weight, fabric, and style, even in the 2nd century. A full assessment of the characteristics of the last Carthaginian silver issues (including both shekels and double-shekels) is essential for a reconstruction of the state of the Carthaginian economy on the eve of, and during the Third Punic War. Therefore, it has seemed necessary to conduct a systematic review of the coin finds and a die study of the specimens which have survived. The results of these investigations, which have been based on a combined search of museum collections and sale catalogues, aim to test the hypotheses that have been proposed and to define the historical importance of this coinage.

A key to the abbreviations used to describe each reverse variety is provided below before the Catalogue.

⁸ H.R. BALDUS, Naravas und seine Reiter. Numismatische Zeugnisse numidischer Kavallerie im karthagischen Heer, in: Deutscher Numismatikertag München 1981 Vorträge (Munich 1983), p. 15.

⁹ VISONÀ 1998, p. 22.

¹⁰ ALEXANDROPOULOS, p. 124 and p. 388. Alexandropoulos apparently was unaware of Burnett's 1987 essay.

¹¹ BALDUS 2003.

¹² See VISONÀ 1998, p. 20.

¹³ BALDUS 2003, pp. 198-199 and p. 199, n. 23.

2. FINDS

Except for a double-shekkel with R/ variety GA, which was unearthed at Boiano (ancient *Bovianum*, near Campobasso), in central Italy, before 1983,¹⁴ finds of Carthaginian serrated silver have been reported almost exclusively from North Africa. Unprovenanced specimens include a fragmented double-shekkel acquired by T. Shaw in the early 18th century, now in the Ashmolean Museum's collection,¹⁵ and at least 3 double-shekels in the Musée de Constantine (Algeria).¹⁶ A double-shekkel with R/ variety A2 and a reduced shekel with R/ Horse stepping r. and control letter B were recorded by E.S.G. Robinson in Algiers.¹⁷ The only provenanced example from Algeria is a double-shekkel with R/ variety A2 from Sûr al-Ghuzlân (Sour-El-Ghozlane, ancient *Auzia*), c. 90 km. SE of Algiers.¹⁸ Some double-shekels from Tunisia were illustrated by E. de Sainte-Marie¹⁹ and G.-G. Lapeyre and A. Pellegrin;²⁰ other examples are listed in old sale catalogues.²¹

¹⁴ VISONÀ 1998, p. 22, n. 67, where the ancient site is erroneously referred to as *Bovianum Vetus* (cf. IGCH 1986). I am grateful to Michael Crawford for calling attention to my error *per litteras* (2.2.2000). See also G. DE BENEDITTIS, *Bovianum ed il suo territorio. Primi appunti di topografia storica* (Salerno 1977), pp. 7-9, 22-23 (without reference to this find).

¹⁵ T. SHAW, *Travels, or observations relating to several parts of *Barbary* and the *Levant** (London 1757; 2nd ed.), p. 483, no. 5 and plate facing p. 483, 5. The same coin (which may have been broken in antiquity) was fully published by E.S.G. ROBINSON / C.M. KRAAY (eds.), SNG Vol. V Ashmolean Museum Oxford Part II, Italy Lucania (Thurium) – Bruttium Sicily Carthage (London 1969), no. 2184.

¹⁶ Although E.S.G. Robinson did not describe in his notes any serrated double-shekels among the Punic coins that he saw in the Constantine Museum on May 20, 1935, three specimens (one with R/ variety A3) were on display in 1983 in the museum's trays (*vidi*). A double-shekkel with R/ variety A2 was listed by M. ARGUEL, *Supplement au catalogue du Musée Archéologique de Constantine*, in: *Recueil des Notices et Mémoires de la Société archéologique, historique et géographique du Département de Constantine* 20 (1879-1880), p. 146, no. 2310.

¹⁷ Robinson sketched both coins in his notes for May 22, 1935, under «AR Carthage. dentellee» (*sic*), but he did not describe the edge profile of the shekel, which may be the same coin mentioned by JENKINS/LEWIS, p. 53 (with a plain edge). For a similar specimen, see Catalogue no. 2.

¹⁸ Anonymous, *Bulletin*, in: *Revue africaine* 41 (1897), pp. 387-388, no. 1.

¹⁹ E. DE SAINTE-MARIE, *Mission à Carthage* (Paris 1884), pp. 64-65, no. 8 (drawing of a double-shekkel apparently without control marks). This specimen is mentioned among the two types of Carthaginian coins which «on rencontre, fréquemment» in the environs of Carthage). However, no serrated silver coins are listed among the Carthaginian issues described by E. BABELON, *Numismatique*, in: *Recherche des Antiquités dans le Nord de l'Afrique. Conseils aux archéologues et aux voyageurs* (Paris 1890), pp. 177-179.

²⁰ G.-G. LAPEYRE / A. PELLEGRIN, *Carthage Punique* (814-146 avant J.-C.) (Paris 1942), Pl. VI facing p. 81 (photos of two double-shekels, including an example with R/ variety P1?).

²¹ Cf. A. DE LONGPÉRIER, *Catalogue des Médailles Grecques, Puniques, et Romaines, recueillies à Carthage par M. Joseph d'Egremont*, sale 21.8.1843 (Paris 1843), p. 44, no. 66 (serrated double-shekkel?); Schulman 19.12.1910 (coll. M.E. Couturier à Tunis *et*

Single specimens in the collection of Tunis' Musée National du Bardo featured in recent exhibition catalogues also probably represent Tunisian finds.²² Yet, even though most isolated finds and all hoards of these coins come from Tunisia, nearly all of them remain unpublished. This information can be summarized as follows:

i. Isolated Finds

1. Carthage, c. 1875-1884

A sondage on the Byrsa hill yielded a «belle monnaie punique d'étain à bords cannelés»: see A.-L. DELATTRE, *Inscriptions de Carthage 1875-1884. X – La colline de Byrsa*, in: *Bulletin Épigraphique de la Gaule* 5 no. 2 (March-April 1885), p. 91. Disposition: Unknown.

2. Carthage, before 1916

A double-shekkel with R/ variety Ca from Carthage in Tunis' Musée du Bardo is mentioned by A. Merlin.²³

Disposition: Tunis, Musée du Bardo.

3. Thala, environs (c. 70 km S of le Kef, western Tunisia); before 1916?

A double-shekkel with R/ variety PC3 (?) «qui a été récemment offert au Musée du Bardo par M. le Capitaine Moisy, du service des Affaires indigènes», is mentioned by Merlin, (p. ccv, n. 4).

Disposition: Tunis, Musée du Bardo.

²² *al.*, p. 24, no. 399 (with R/ variety Cr). See also Page-Ciani 7.4.1925, p. 5, lot 52 (32 undescribed Carthaginian silver coins ex coll. Couturier, presumably from Tunisia).

²³ See E. ACQUARO, Catalogue, in: S. MOSCATI (ed.), *The Phoenicians* (New York 1988), p. 639, no. 327 (inv. no. 274.4.84) with R/ variety P1?; K. BEN ROMDHANE, *25 siècles de monnaies tunisiennes* (Tunis 1996), (double-shekkel with R/ variety A3?); pp. 15, 17 (double-shekkel with Reverse variety GA; photos of O/ and R/ of the same coin?).

²³ A. MERLIN, *Séance de la Commission de l'Afrique du Nord*, 14 novembre 1916, BAC 1916, p. ccv, n. 2 (henceforth: MERLIN).

ii. Hoards

1. Aouina, 6 km WSW of Carthage, 1910; not in IGCH.

Four double-shekels with R/ varieties Ca (1), LP (1), TS (1), and one totally encrusted, from this location are described by Merlin, p. ccv, n. 2. Merlin provides no other information about this find.

Disposition: Tunis, Musée du Bardo.

2. The main Cani island, Cani Islands, 23 km NE of Bizerta, May 1916; IGCH 2301.

Eighteen double-shekels, including examples with R/ varieties A2 (2), Ca (2), Cr (3), GA (2), P2 (2), PC3 (1), and TS (1), and five encrusted or damaged specimens which may or may not have had control marks, were found by treasure-hunting soldiers inside a cave. Also found in the same spot were 132 Republican denarii (11 of which could not be identified), including 4 specimens of C. ANTESTI (a magistrate incorrectly identified as C. Antestius Labeo) minted in 146 BC, three fragmented silver bracelets, two small silver bars weighing 75 g and 153.5 g respectively,²⁴ and some bones. These items were recovered for the Musée du Bardo by the French authorities. According to Merlin, both the bones and the valuables lay «à une faible profondeur, au milieu d'un conglomerate de terre et de cailloux [...] qui avait probablement été explorée précédemment et qui a été complètement remuée et tamisée lors des fouilles récentes.»²⁵ While Merlin's report must be taken at face value, it remains unclear how the double-shekels were associated with the denarii and the other materials, since they were not found in controlled excavations. This point is especially worth noting, because no other similar assemblage of Carthaginian and Roman silver currency has hitherto been recorded. It could even be argued that separate deposits may have been disturbed and mingled by the finders.²⁶ Unfortunately, Merlin did not provide any significant data on the condition of the coins besides mentioning that five double-shekels were encrusted or

²⁴ According to MERLIN, p. ccviii, «Ces bracelets sont au nombre de trois, plus ou moins entiers, tous du même type. Ils se composent de huit fils d'argent disposés en cercle et tordus en spirale; le corps du bracelet va en s'effilant du milieu (diam. 0 m. 015) vers les extrémités qui chevauchent l'une sur l'autre, et où les fils se réunissent en un faisceau unique que termine une tête de serpent. L'un des bracelets est incomplet à ses deux extrémités; un autre, à une; du troisième, nous n'avons qu'environ la moitié. [...] A ces objets étaient joints deux lingots d'argent, aux contours irréguliers : le premier, mince et plat sur ses deux grandes faces, pèse 75 grammes; le second, qui a vaguement la forme d'un tronc de pyramide (haut. 0 m. 025), pèse 153,5 gr.»

²⁵ MERLIN, pp. cciv-ccv.

²⁶ Cf. a 'stipe votiva' at Bithia (Sardinia) which included two seemingly separate aggregates of Punic and Roman Republican bronze coins: G. PESCE, Sardegna Punica (Cagliari 1961), pp. 108-109 and Fig. 11.

damaged, that several denarii were stuck together in groups of two or three, and that some of them were fragmented. As a result, nothing is known about their relative wear or their patination.²⁷

There is also evidence that the number of Carthaginian silver coins found at Cani was larger than that reported by Merlin. When E.S.G. Robinson examined the «Ile Cani Find» in Tunis' Musée Alaoui in the Spring of 1935, the first coin he described and sketched in his notebook had a horse standing r. on the Reverse. He noted that it had «no letter, round edge» and was «rather worn, as Nos. 23-4». This may have been a reduced shekel similar to SNGCop 407 but with a plain edge, an example of which was found in the German excavations at Carthage in 1994 (see below). It is unclear what he meant by «Nos. 23-4». Robinson listed (in this order) «also» 3 double-shekels with R/ variety Ca, 4 examples with R/ variety Cr (alternatively, some of these may have been of R/ varieties A2-A3), 2 examples with R/ variety PC3, 2 examples with R/ variety GA, 2 examples with R/ variety LP, 1 example with R/ variety P1, 1 example with R/ variety P2, 2 examples with R/ variety TS, and 3 «uncertain» specimens.

There are obvious discrepancies between Robinson's and Merlin's accounts: not only are there more coins in Robinson's list (21 vs. 18), but they also comprise double-shekels with different reverse varieties (LP, P1), and they include one specimen of a different denomination (the presumed reduced shekel). Other than to assume that, prior to Robinson's visit, some extraneous coins had been added to the original nucleus from Cani (in particular, some of the specimens from Carthage, Aouina, and Thala mentioned by Merlin in his report), it seems conceivable that three more specimens had been recovered from the same findspot. Robinson subsequently visited the collector V. Chavanne in Tunis on May 15, 1935, and wrote that Chavanne «once: had about 10 dentelés (*sic*); very few other Carthaginian AR; had had dentelés (*sic*) in rouleaux all stuck together (Cani find?)».

Robinson's testimony suggests that more double-shekels were salvaged from Cani than the 18 specimens that were sent to the Bardo Museum. It also helps to explain the origin of the three double-shekels in the British Museum's collection with R/ varieties P1, LP, and Ca, that are said to come from the Cani find (inv. nos. 1936-7-6 9, 1936-7-6 10, 1936-7-6 11). According to notes in Robinson's handwriting in the inventory book, they were acquired from «Chavanne of Tunis.»²⁸ If Chavanne sent to London three double-shekels which had in fact been found at Cani (in addition to the eighteen specimens that were acquired by the Bardo), and if Robinson's record of the coins from Cani in the Musée Alaoui is reliable, this find

²⁷ In describing the denarii, Merlin wrote that «Ces 132 deniers, sauf 11, sont dans un état de conservation suffisant pour être identifiés avec certitude ou très grande vraisemblance» and that «Sur les onze qui n'ont pu être identifiés, deux portaient certainement au revers, avec les Dioscures, des noms de magistrats aujourd'hui indéchiffrables; les autres ont le revers tellement encroûté ou rongé, qu'on n'y distingue plus rien actuellement»: see MERLIN, p. ccvi and n. 3.

²⁸ I am grateful to Richard Ashton for checking both the number of coins from Cani in the British Museum's collection, and their provenance. For these specimens, see Catalogue nos. 24, 57, 79.

yielded at least 23 reduced double-shekels and 1 reduced shekel. In either case, the data listed in IGCH 2301 about the contents and disposition of this deposit need emending. The interment date proposed by Burnett also needs to be changed to «c. 146 BC» or «after 146 BC», since the presence of at least 4 denarii of a C. Antestius in the assemblage described by Merlin only provides a *terminus post quem*. G.K. Jenkins' mention of 4 rather than 3 double-shekels from Cani in the British Museum is based on M. Crawford's reconstruction in RRCH.²⁹ In view of the circumstances under which the assemblage was found, any inference about the significance of its contents for the dating of the double-shekels must therefore be made with great caution. The worn double-shekels with R/ variety PC3 illustrated in Crawford 1985 is not among those from Cani in the British Museum's collection. Even though Burnett correctly remarked upon the good condition of these coins, both Merlin and Robinson had pointed out that some specimens in the assemblage exhibited considerable damage or wear. This raises additional questions about the provenance of the three double-shekels sent by Chavanne, which could ultimately be settled by a full publication of the holdings of the Bardo Museum.

3. Carthage 1994.

Two double-shekels possibly with R/ varieties P2 and TS, and a reduced shekel similar to SNG Cop 407, but with plain edge, representing the contents of a purse or a portion of a larger hoard, were found together in excavations.³⁰ The coins were scorched from exposure to fire, most likely that of the conflagration which destroyed the city in 146 BC (Appian 8.19.128).

Disposition: Musée de Carthage?

4. La Goulette, 5 km S of ancient Carthage, 1920; IGCH 2302.

P. Bédé of Sfax (SE Tunisia) reported to E.S.G. Robinson the find of twelve double-shekels with unknown R/ varieties.

Disposition: Unknown.

²⁹ Although S.P. Noe listed this hoard under «Tunis, 1915?» without any mention of the coins in London in: A Bibliography of Greek Coin Hoards, NNM 25 (New York 1925), p. 223, «at least 4 tetroadrachms» (i.e., double-shekels) from Cani were said to be in the British Museum by M.H. CRAWFORD, RRCH, p. 76, no. 132. Chavanne was not the source of the coin no. 1936-7-6 8, which was accessioned before the three specimens from Cani and came from Sotheby's sale on 9.3.1936, 150. I owe this information to Richard Ashton and Richard Abdy; T.V. Buttrey has checked the Sotheby's catalogue on my behalf.

³⁰ BALDUS 2003, pp. 195-197. For color photos of these coins see *Id.*, 2004, p. 313, no. 89.

iii. Holdings of the Musée de Carthage

In 1935 Robinson saw «in the cases» of the Carthage Museum (then known as the Musée Lavigerie) and sketched in this order 2 serrated double-shekels with R/ variety GA and four specimens with R/ varieties PC4, PC3, TS, and PC1, respectively.³¹ Some of these coins presumably were among those poorly illustrated by Lapeyre and Pellegrin in 1942.³² In 1990 P. Visonà also recorded a double-shekkel with R/ variety LP, which has since been lost.³³ A thorough inspection of the Musée de Carthage's coin collection by Suzanne Frey-Kupper on May 18, 2004, has yielded a total of 5 double-shekels. None of them had inventory numbers, and three (2 with R/ variety P1, 1 with R/ variety TS) «were probably found together in a hoard (with other pieces, two or three according to the custos).»³⁴ Two other double-shekels have R/ varieties GA and TS, respectively.

3. CATALOGUE

The contents of the small assemblage excavated at Carthage in 1994 show that the last Carthaginian silver issues consisted of reduced shekels and double-shekels which circulated concurrently before the conquest of the city, as H.R. Baldus has pointed out.³⁵ Each denomination is described as follows:

Reduced shekels

Plain edge

| | | |
|---|----|--|
| 1 | O/ | Head of Kore l. wearing wreath of two ears of barley and leaf, single-drop earring, and single-strand necklace with both ends shown. Border of dots. |
| | R/ | Horse with halter stepping r. on exergue. Border of dots. |

³¹ Robinson also listed a serrated gold 2/5 shekel similar to Jenkins and Lewis 504.

³² See *supra*, n. 20.

³³ This coin was sketched and described in my notes as a «base tetradrachm»; it was not seen by S. Frey-Kupper in 2004. My examinations of the coin collection of the Musée de Carthage in 1984 and 1990 were made possible by the kindness of M.A. Ennabli, conservator of the site of Carthage, and M.M. Fantar, director of the Institut National d'Archéologie et d'Art, Tunis. When Philip C. Schmitz visited the Carthage Museum in July 1991, he was told by M.F. Chelbi that some gold and silver items had been recently stolen from the Museum's collection (E-mail communication by Ph.C. Schmitz on 3.18.2007).

³⁴ Notes by S. Frey-Kupper, who was unable to obtain any precise information about the findspot of the hoard «which is however Tunis». She was given access to the Punic coins in the collection of the Musée de Carthage by the Museum's director, M.F. Chelbi; M.A. Chkoundali provided further assistance. Frey-Kupper does not rule out the possibility that all five double-shekels may come from a single assemblage, since those with R/ variety TS are die-linked (personal communication of 2.6.2004).

³⁵ BALDUS 2003, p. 197.

2 O/ Similar to the preceding. Border uncertain.
R/ Horse without halter standing r. Border uncertain.

Serrated edge

2a O/ Similar to the preceding. Border uncertain.
R/ Similar to the preceding. Linear border.

Reduced double-shekels
(normally with serrated edge)

3 O/ Head of Kore l. wearing wreath of two ears of barley with prominent leaf and hook-shaped leaf in the hair, single-drop earring, and single-strand necklace generally without loose ends. Border of dots.
R/ Horse without halter stepping r. on exergue. Linear border.

The reverse types of these coins closely resemble those of previous issues in electrum and gold struck during and towards the end of the Second Punic War and are stylistically akin to those of the heavy bronzes minted at Carthage in the first quarter of the 2nd century.³⁶ However, the head of Kore on the obverse differs from the ‘Hannibalic’ head type that was retained for these bronzes, and is a simplified version of a pre-Barcid, traditional obverse type.³⁷ There are also stylistic differences between the shekels and the double-shekels. Even though the symmetrical arrangement of the hair on each side of the leaf on the head of Kore, the rendering of the ears of barley (which extend across the border of dots), and the position of the *omega*-shaped curls on the back are the same on both denominations,³⁸ the female head on the shekels is generally wider and flatter and has a broader face with heavy eyelids but no visible pupil. In contrast, the head of Kore on the double-shekels is taller and has a sharper look. The pupil is clearly shown in profile between thin eyelids. Furthermore, the position of the left foreleg of the horse on the reverse of the shekels with plain edges is identical to that on the bronzes similar to SNG Cop 409-413, whereas the same foreleg is bent horizontally or upward on the double-shekels.

These remarks indicate that the shekels with plain edge may have been minted some time before the double-shekels – as Baldus also has suggested – and possibly between 155-150 BC.³⁹ Serrated shekels are presumably later than those with plain edge, and the existence of specimens of the same reverse variety with a plain and

³⁶ Cf. JENKINS/LEWIS, pp. 47 and 118, nos. 464-467 (Group XIV), and pp. 48-50, p. 120, nos. 482-486 (Group XV); SNG Cop 399-400, 409-413.

³⁷ BALDUS 1988, pp. 4, 6-10.

³⁸ The head on the shekels has two fewer back curls than that on the double-shekels.

³⁹ See *supra*, n. 13. The presence of the halter on the reverse of the shekels with plain edge may not be chronologically significant, since this is also found on some of the Carthaginian serrated gold 2/5 shekels struck during the Third Punic War: cf. JENKINS/LEWIS, nos. 504-505 and, for an enlargement, M.R. VIOLA, Catalogo, in: E. ACQUARO

a serrated edge indicates that the serration coincided with a change of reverse type and was more than a decorative feature or an artistic fashion. However, the purpose of this practice remains uncertain.⁴⁰ The reduced double-shekels were generally struck with dies that were larger than the flans, and the serration seems to have been done by crimping the flans with a vise before striking them, since some specimens have a noticeable 'step' near the edge on the obverse or on the reverse, and sometimes on both sides. Only one double-shekkel with a plain edge has been recorded (see Catalogue, no. 120).

The catalogue is organized according to the list of reverse varieties beginning with the smaller denomination, and must be regarded as highly provisional. Double-shekels with R/ variety N have been placed at the end of the catalogue because they comprise a group of poorly legible coins whose control marks are uncertain, or which may have been struck without any control marks. The weights of worn specimens have not been factored into weight averages. Nearly all specimens have the vertical die axis characteristic of the Carthage mint since the last 4th century BC; the modules of their flans range between c. 24 and 27 mm.

Coins marked with an asterisk are illustrated in *Plates 5-7*.

KEY TO REVERSE VARIETIES

1s/p *Reduced shekels with plain edge*

- A Letter *alef* below the horse
- BP Letter *bet* below the horse; pellet below l. foreleg
- N No control marks
- US Uncertain symbol on r.

1s/s *Reduced shekels with serrated edge*

- US Uncertain symbol on r.
- USP Uncertain symbol on r.; pellet below the horse

Reduced double-shekels

| | | | |
|----|-----------------------------------|----|-------------------------------------|
| A1 | Letter 'ayin above the horse | N | No certain or visible control marks |
| A2 | Letter 'ayin below the horse | P1 | Pellet above l. foreleg |
| A3 | Open letter 'ayin below the horse | P2 | Pellet below l. foreleg |

(ed.), *Monete Puniche nelle Collezioni Italiane Parte III* Napoli, Museo Archeologico Nazionale [BullNum 6.3] (Roma 2002), no. 521 and Pl. 30.

⁴⁰ Cf. the remarks by CRAWFORD, RRC, p. 581; BALDUS 1988, p. 8; Ph. GRIERSON / U. WESTERMARK (eds.), O. MØRKHOLM, *Early Hellenistic Coinage from the Accession of Alexander to the Peace of Apamea (336-188 B.C.)* (Frome and London 1991), p. 13.

| | | | |
|-----|--|-----|-------------------------------------|
| Ca | Short caduceus on base above the horse | P3 | Pellet below the horse |
| Cr. | Crescent below the horse | P4 | Pellet between hindlegs |
| GA | Letters <i>gimel 'ayin</i> below the horse | PC1 | Pellet in crescent above l. foreleg |
| LP | Large pellet above the horse | PC2 | Pellet in crescent below l. foreleg |
| LR | Large rosette above the horse | PC3 | Pellet in crescent below the horse |
| | | PC4 | Pellet in crescent above the horse |
| | | R | Rosette pattern above the horse |
| | | TS | Tanit sign above the horse |

Note J. Alexandropoulos lists a specimen bearing the Punic letter *mem* before the horse in Tunis' Musée du Bardo (Bardo 387), whose existence needs to be verified. He also lists a variety with «une tête d'Hermès» known only to Müller (no. 123a).⁴¹

Reduced Shekels

1s/p

Variety A

| | | | | |
|----|------|-------|------|---|
| 1* | O1R1 | 19 mm | 6.44 | London 1874-7-15 456; ALEXANDROPOULOS, p. 388 and Pl. 4, no. 101; BALDUS 1983 (<i>supra</i> , note 8), Pl. 2, no. 16 |
|----|------|-------|------|---|

Variety BP

| | | | | |
|----|------|-------|------|------------------------------------|
| 2* | O1R2 | 20 mm | 6.32 | Argenor, 23.4.1999, 55 (some wear) |
|----|------|-------|------|------------------------------------|

Variety N (average weight of 4 coins: 6.312 g)

| | | | | |
|----|-------|-------|------|---|
| 3* | O1R3 | | 6.58 | Bourgey, 10.3.1980, 42 = Bourgey, 21.6.1979, 23 |
| 4 | O1R? | | 6.23 | Copenhagen; SNGCop 408 |
| 5* | O1R4 | 20 mm | 6.38 | London, RBL 1987-6-49 349 |
| 6 | O1?R? | 20 mm | 6.06 | London 1937-6-15 1 |
| 7 | O?R5? | 20 mm | 5.23 | London 1938-5-10 18 (worn) |

⁴¹ ALEXANDROPOULOS, p. 388. Two double-shekels in the Tunis Museum's collection (Bardo 375 and 390) listed by Alexandropoulos have not been included in the Catalogue for lack of sufficient data.

Variety US

| | | | | |
|---|-------|-------|------|--|
| 8 | O?R6? | 20 mm | 6.67 | Carthage? = BALDUS 2004, p. 313, no. 89 (encrusted) = BALDUS 2003, pp. 197 and 201, Fig. 6. |
|---|-------|-------|------|--|

1s/s

Variety US

| | | | | |
|---|------|---------|------|--|
| 9 | O2R6 | 19.5 mm | 6.42 | London 1938-5-10 17; ALEXANDROPOULOS, p. 388 and Pl. 4, no. 102 |
|---|------|---------|------|--|

Variety USP

| | | | | |
|----|------|-------|------|---|
| 10 | O?R7 | 19 mm | 6.27 | Copenhagen; SNGCop 407; Baldus 2003, p. 201, Fig. 7 |
|----|------|-------|------|---|

Reduced Double-Shekels

Variety A1 (average weight of 2 coins: 13.06 g)

| | | | | |
|------|-------|--|-------|---|
| 11 | O1R1 | | 13.01 | Bonhams, 21.5.1980, 243 (12.99 g) = Peus 298, 1979, 149 = Aes Rude 3,1978, 192 |
| 11a* | O1aR2 | | 13.06 | Künker 133, 2007, 8291 |
| 12 | O2R3 | | 13.11 | London 1938-5-10 12 |
| 13 | O?R4 | | 9.85 | Oxford; SNG Ashmolean 2184 (broken) |
| 14 | O?R2? | | 11.97 | Paris 184 (worn) |

Variety A2 (average weight of 3 coins: 12.93 g)

| | | | | |
|-----|-------|----------|-------|--|
| 15* | O1R5 | | 12.96 | Albuquerque, 6.25.1994, 112 = Bourgey, 26.6.1989, 21 = Bourgey, 7.11.1983, 25 = Baudey-Pesce, 17.10.1982, 276 |
| 16 | O1R6 | | 12.98 | Copenhagen; SNGCop 406 |
| 17 | O1?R? | | 12.51 | Paris 211 (worn) |
| 18 | O1?R? | | 12.64 | Tarkis 88, 1995, 91 (oxidized surface; worn) |
| 19 | O1R6 | 25-26 mm | 12.85 | Thorvaldsen 2430; cf. Müller p. 90, no. 120 and n. 10 |
| 20 | O?R7 | | | Kress 151, 1970, 288 |
| 21 | O?R? | | | Constantine; Arguel (<i>supra</i> , n. 16) |

Variety A3

| | | | | |
|-----|-------|--|-------|--|
| 22* | O1?R8 | | 13.20 | Bourgey 21.3.1972, 18 |
| 23 | O?R8? | | | Tunis; BEN ROMDHANE, p. 7 (at top of figure) |

Variety Ca (average weight of 5 coins: 12.20 g)

| | | | |
|-----|--------|-------|---|
| 24* | O1R9 | 10.08 | London 1936-7-6 11; from Cani |
| 25 | O1?R9 | 12.75 | Parma; BUFFI NERI/LANZONI, p. 105, no. 19 |
| 26* | O1?R9 | 12.37 | Poinsignon-Pesce 30.6.1987, 712 (flaked obv. surface) |
| 27 | O1R10 | 13.09 | London, RBL 1987-6-49 350 |
| 28 | O1?R10 | | Superior 30.5.1995, 7843 ('porous') |
| 29 | O1?R11 | 12.74 | London 1938-5-10 13 |

Variety Cr (average weight of 4 coins: 12.72 g)

| | | | | |
|-----|--------|-------|-------|---|
| 30 | O?R12 | 24 mm | 12.31 | Glasgow; MACDONALD, p. 591, no. 60 (worn) |
| 31 | O1?R13 | 24 mm | 13.20 | Auctiones 23, 1993, 158 = A. Hess, 18.3.1918, 761 (ex coll. Vierordt) = Helbing, 9.4.1913, 797 |
| 32* | O1R14 | | 12.65 | Graupner & Winter 7, 7.12.1978, 70 = KPM 2, 1971, 189 |
| 33 | O1?R15 | | 12.59 | Pegasi 105, 1998, 134 (but 12.55 g; 'minor bend in planchet') = Pegasi 100, 1997, 190 = NCirc 91/6, July 1983, 4543 = NCirc 87/12, Dec. 1979, 11174 |
| 34 | O?R16 | | 12.47 | London 1929-10-11 2 = Naville – Ars Classica 12, 1926, 1094 (obv. die recut?) |

Variety GA (average weight of 11 coins: 12.73 g; nos. 35, 37, 39, 47, 50 not included)

| | | | | |
|-----|---------|---------|-------|---|
| 35 | O1R17 | | 12.60 | Asta Titano 56, 1994, 90 (worn) |
| 36 | O1?R17 | | 12.23 | London 1938-5-11 9 |
| 37* | O1R18 | 25 mm | 11.84 | Berlin (Löbbecke; fragmented) |
| 38 | O1R? | 24.6 mm | 12.55 | Carthage (rev. double-struck?) |
| 39 | O1?R18? | | 11.87 | London 1936-2-15 9 (rev. worn) |
| 40 | O?R19? | 26 mm | 12 | Boiano (ancient <i>Bovianum</i>); found before 1983 |
| 41 | O1R19 | | 12.51 | Bourgey 17.6.1985, 14 |
| 42 | O1?R19 | | 13.08 | London 1938-10-7 5 |
| 43 | O1R19? | | 13.07 | London, RBL 1987-6-49 353 |
| 44 | O1?R20 | | 12.82 | Coin Galleries 29.4.1976, 967 ('light corrosion') |
| 45 | O1R20 | 24 mm | 12.78 | Munich; BALDUS 2004, p. 309, no. 59 |
| 46 | O1R21 | 26 mm | 13.25 | Glasgow; MACDONALD, p. 591, no. 62 |
| 47 | O?R? | 26.5 mm | 12.54 | Milan; SNG Milano 49 (worn) |
| 48 | O1R? | | 12.55 | G. Hirsch 218, 2001, 649 = MünzZentrum 73, 1992, 1403 (12.57 g) |
| 49* | O1?R21 | | 13.27 | Münzen u. Medaillen FPL 326, Aug. 1971, 8 |
| 50 | O?R21? | | 12.20 | Oxford; SNG Ashmolean 2185 (worn) |
| 51 | O1?R21 | | | Tunis; BEN ROMDHANE, pp. 15 and 17 (same coin?) |

Variety LP (average weight of 6 coins: 12.955 g; nos. 53 and 58 not included)

| | | | | |
|-----|--------|---------|-------|--|
| 52 | O1?R22 | | 12.84 | Argenor, 9.5.2007, 18 |
| 53 | O1?R22 | | 12.88 | Aureo, 27.4.1999, 4019 (worn) |
| 54* | O3?R22 | | 13.18 | Burgan, 18.6.1991, 421 = Bourgey 26.10.1981, 22 = Gadoury, 13.10.1980, 514 |
| 55 | O3?R22 | 25.3 mm | 13.11 | Cambridge; GROSE p. 455, no. 9981 |
| 56 | O1?R22 | 26 mm | 12.90 | Florange-Ciani 17.2.1925, 1725; ex coll. Allotte de la Fuÿe (cuts on obv.) |
| 57* | O4?R22 | | 13.16 | London 1936-7-6 10; from Cani |
| 58 | O?R22 | | c. 13 | Malloy 18, 1.12.1980, 660 = Malloy, FPL 38, Sept. 1975, 288 |
| 59 | O?R22 | | | Spagni, c. 1990, 70 ('in argento basso') |
| 60 | O?R23 | | 12.54 | Emporium Hamburg 45, 2001, 257 |
| 61 | O?R? | | | Carthage; missing in 2004 (see <i>supra</i> , n. 33) |

Variety LR

| | | | | |
|-----|--------|--|-------|--------------------------------|
| 62* | O1?R24 | | 12.49 | Vecchi 6, 1997, 354 ('pitted') |
|-----|--------|--|-------|--------------------------------|

Variety P1 (average weight of 16 coins: 12.90 g)

| | | | | |
|-----|---------|---------|-------|---|
| 63 | O1R25 | | 12.94 | Astarte 1, 1998, 113 |
| 64 | O1?R25 | | 12.80 | Blaser-Frey 10, 1962, 20 |
| 65 | O1?R26 | 26 mm | 11.70 | Carthage |
| 66 | O1?R? | 25.7 mm | 11.78 | Carthage (worn) |
| 67 | O1?R26? | | | Blom, FPL 55, Oct.-Dec. 1970, 86 |
| 68 | O1?R26 | | 13.24 | Aureo, 1.3.2000, 1005 |
| 69 | O1R26 | 25 mm | 12.08 | Cederlind 5, 2002, 78 = Cederlind 121, 2001, 92 |
| 70 | O1R26 | | 13.10 | CNG 40, 1996, 1165 ('light porosity') |
| 71 | O1R26a | | 13.22 | London, RBL, 1987-6-49 352 |
| 72 | O1R26 | 25 mm | 13.22 | Magnaguti no. 477 = Sambon-Canessa 28.6.1927, 1163 (13.30 g) |
| 73 | O1R26a | 25 mm | 13.28 | Naville 10, 1925, 375 |
| 74 | O1R? | 26.2 mm | 12.96 | de Hirsch 1867 |
| 75 | O?R? | 26 mm | 12.38 | Oslo (worn) |
| 76 | O?R27? | | 12.79 | Pegasi 102, 1997, 165 (worn) = Pegasi 97, 29.4.1996, 165 = Pegasi 71, 1992, 146 = Pegasi FPL 80 (undated), 61 = Pegasi FPL 42 (undated), 71 |
| 77 | O?R27 | | 13.16 | Tunis 274.4.84; ACQUARO 1988, p. 639, no. 327 |
| 78* | O1R28 | | 12.65 | SKA 5, 1986, 230a |
| 79* | O1R29 | | 13.06 | London 1936-7-6 9; from Cani (eroded control mark) |
| 80 | O5R26 | | 13.05 | CNG 38, 1996, 585 (die flaw across obv.) = Sotheby's 24.10.1985, 67; ex coll. Virgil M. Brand |

| | | | |
|----|-------|---------|---|
| 81 | O5R26 | 13 | Vienna 26326 (die flaw across obv.) |
| 82 | O5R27 | 12.95 | London 1929.6-4 5 (die flaw across obv.); ex R. Ratto, 4.4.1927, 2933; H.R. BALDUS, <i>Die Münzprägung der Numidischen Königreiche</i> , in: H.G. HORN / CH.B. RÜGER (eds.), <i>Die Numider</i> (Bonn 1979), p. 189, no. 3 (obv.) |
| 83 | O?R? | 25.8 mm | 10.92 Tel Aviv, K-62701 (worn) |
| 84 | O?R? | 26 mm | 12.65 coll. Prosper-Valton; DE FOVILLE, p. 125, no. 607 |

Variety P2 (average weight of 11 coins: 12.99 g; no. 101 not included)

| | | | |
|-----|---------|---------|---|
| 85 | O?R30 | 24.5 mm | 12.69 ANS 1944.100.79688 (E.T. Newell; pitted) |
| 86 | O1R30 | | Bergé, 3.4.2003, 65 |
| 87* | O1?R31 | 26 mm | 12.91 Berlin, axis 30° (Löbbecke) |
| 88 | O1R31 | | 13.01 Aureo, 3.3.2004, 1012 (13.10 g) = Bourgey 29.6.1976, 105 (ex coll. R. Castaing) |
| 89 | O?R32 | | 13.17 de Nanteuil 428 |
| 90 | O1R32 | | 13.19 Künker 94, 2004, 1616B = Hess-Leu 31, 1966, 184 (13.22 g) |
| 91 | O1?R32? | | 12.94 Elsen 63, 2000, 200 = Peus FPL 35, June 1973, 42 |
| 92 | O1R33 | | 12.45 London 1929-6-46; ALEXANDROPOULOS, Pl. 4, no. 100; BALDUS 1983 (<i>supra</i> , note 8), Pl. 5, no. 36; <i>Id.</i> 1988, p. 13, Fig. 10; <i>Id.</i> 2003, p. 200, Fig. 2; |
| 93 | O1R34 | | 13.15 London, RBL, 1987-6-49 354 |
| 94 | O1R? | | 11.81 Madrid (worn; rev. cuts) |
| 95 | O1R35 | | 12.50 Oxford; SNG Ashmolean 2183 (worn) |
| 96 | O1?R36 | 25 mm | 13.07 Sotheby's, 4.4.1973, 764 (ex coll. J. Ward 922, ex Montagu 460 [part]) |
| 97* | O1R36? | | Weil, 16.10.1989 |
| 98 | O1R37 | | Sotheby's, 28.5.1987, 82 |
| 99 | O1R38 | | 13.23 Stack's 6.6.1970, 611 (ex F.S. Knobloch); same coin as Malloy, 28.3.1973, 271? |
| 100 | O1R? | | 13.10 Vedrines 4.11.1992, 85 |
| 101 | O?R? | | 13.59 Carthage? BALDUS 2004, p. 313, no. 89 (encrusted); <i>Id.</i> 2003, p. 196 and p. 200, Fig. 1 |

Variety P3

| | | | |
|------|-------|-------|---|
| 102* | O?R39 | 12.43 | Münzen und Medaillen Deutschland 11, 2002, 845 (worn) |
|------|-------|-------|---|

Variety P4 (average weight of 5 coins: 12.688 g)

| | | | |
|-----|--------|-------|--|
| 103 | O1?R40 | 12.09 | Albuquerque 110, 2000, 6 ('flan éclaté') |
| 104 | O1?R40 | 12.45 | Copenhagen; SNGCop 403 |

| | | | |
|------|--------|-------|--|
| 105 | O?R40? | 13.14 | Lanz 125, 2005, 532 (small corrosion traces) = Berk 86, 1995, 164 = JSD Coins FPL Oct. 1975, 35 = SNG Lockett 1072 = Glendining, 25.10.1955, 977 |
| 106 | O?R? | | Henzen FPL 116, Dec. 2000, 276 = Henzen FPL 113, July 2000, 274 = Henzen FPL 110, Dec. 1999, 252 |
| 107* | O1?R41 | 12.66 | London 1930-2-3 1 (flaked surface) |
| 108 | O6R42 | 13.10 | Paris, de Luynes 3778 (die flaw on rev.) |

Variety PC1

| | | | |
|------|--------|-------|-------------------|
| 109* | O1?R43 | 13.18 | London 1936-7-6 8 |
|------|--------|-------|-------------------|

Variety PC2 (average weight of 8 coins: 13.08 g)

| | | | |
|------|---------|---------|--|
| 110 | O1R44 | 13.20 | Button 111, 27.9.1965, 398 |
| 111 | O?R45 | 12.70 | Superior 10.2.1975, 2041 (worn) = Sotheby's 16.2.1972, 325 = Coins & Antiquities FPL 1, 1970, G498 |
| 112 | O1R46 | 25 mm | 13.03 Hamburger, 12.6.1930, 654 |
| 113 | O1?R46? | 25 mm | 13.30 Naville 12, 1926, 1093 |
| 114* | O1?R46 | | 13.12 Peus 340, 2.11.1994, 622 (13.15 g) = Knobloch 27.5.1965, 393 = Coin Galleries I/2 March-April 1960, A137 |
| 115 | O1R46? | | 12.99 Copenhagen; SNGCop 404 (worn) |
| 116 | O1R47 | 25 mm | 12.86 Glasgow; MACDONALD, p. 591, no. 61 |
| 117 | O1R48 | 25 mm | 13.15 Helbing, 24.10.1927, 3177 |
| 118 | O1R49 | | 12.90 Stack's 29.11.1990, 306 (12.915 g; 'light surface corrosion') = Münzen u. Medaillen 37, 1968, 298 = Kricheldorf 7, 1959, 138 |
| 119 | O1R49? | 12.39 | London EH p179.7 (worn) |
| 120 | O1R49? | | Madrid (with plain edge; cut on obv.; cuts and circular punch mark or beginning of perforation hole on rev.; worn) |
| 121 | O1R49? | | Münzen u. Medaillen FPL 351, Nov.-Dec. 1973, 19 |
| 122 | O1?R49? | 12.14 | Noble 64 Part A, 2000, 2387 = Argenor, 29.10.1999 with ticket; 'porous surface and test mark on edge', worn) |
| 123 | O1R49? | 12.82 | Poinsignon-Pesce, 30.6.1987, 711 (pitted, worn) |
| 124 | O1R49? | 12.89 | UBS 59, 2004, 6024 (scratches on rev.; worn) |
| 125 | O?R49? | 12.44 | Vecchi 5, 1997, 152 (worn) |
| 126 | O1R50 | 25.5 mm | 13.15 Schulman, 16.12.1926, 215 = same coin as Gans 16, 1960, 226? |

Variety PC3 (average weight of 6 coins: 12.976 g; no. 130 not included)

| | | | | |
|------|--------|---------|-------|---|
| 127 | O1?R51 | 26.4 mm | 13.25 | ANS 1944.100.79689 (E.T. Newell) |
| 128 | O1?R52 | | 13.17 | Copenhagen; SNGCop 405 (scratches on obv. and rev.) |
| 139 | O?R53 | | | Delorme-Fraysse, 7.11.2000, 71 |
| 130 | O1?R53 | | 12.20 | G. Hirsch, 21.2.1963, 1340 (cuts on rev.; worn) |
| 131* | O1R54 | | 13.19 | London 1934-5-22 1 = Page, 19.6.1933, 462 = Platt, 27.3.1922, 942 (coll. V. Luneau) |
| 132 | O1R54 | | 12.62 | London 1935-6-14 1 (with fragmented edge) |
| 133 | O1R54 | | 13.05 | Paris 210 |
| 134* | O1R55 | | 12.33 | London, RBL 1987-6-49 351 |
| 135 | O1R56 | | 12.87 | NAC "Q", 2006, 1288 |

Variety PC4

| | | | | |
|------|---------|-------|-------|--|
| 136 | O1?R57 | 26 mm | 12.95 | Berlin; BALDUS 2004, p. 304, no. 18 (worn) |
| 137* | O1?R57? | | 13.15 | Peus 355, 1998, 163 |

Variety R (average weight of 5 coins: 13.04 g)

| | | | | |
|------|--------|--|-------|---|
| 138* | O1?R58 | | 13.16 | London EH p179.8 |
| 139 | O1R59 | | 13.21 | London, RBL 1987-6-49 355; VISONÀ 1998, p. 27 and Pl. 4, no. 64 |
| 140 | O1R60 | | 12.95 | Parma; BUFFI NERI/LANZONI, p. 105, no. 18 |
| 141 | O1R61 | | 13.06 | Triton I, 1997, 642 (13.06 g; 'rev. lightly double struck') = Vinchon, 20.5.1959, 429 (12.95 g) = M. Ratto 4, 1933, 111 (12.90 g) |
| 142 | O1R62 | | 12.85 | UBS 59, 2004, 6023 |
| 143 | O?R63 | | 12.50 | Coins & Antiquities FPL 53, 1976, G165 (worn) |

Variety TS (average weight of 6 coins: 12.775 g; no. 152 not included)

| | | | | |
|------|--------|---------|-------|--|
| 144* | O1R64 | 24 mm | 12.99 | Glasgow; MACDONALD, p. 591, no. 63 |
| 145 | O1?R? | | 12.62 | Albuquerque, 25.6.1994, 33 (worn) |
| 146 | O1?R65 | | 13.06 | London 1931-4-7 1; BALDUS 2003, p. 201, Fig. 5; B.L. TRELL, Phoenician Greek Imperial Coins, INJ 6/7, 1982/83, Pl. 25, no. 34 (rev.); BALDUS 1988, p. 193, no. 13 (rev.) = same coin as Spink, 3.12.1929, 1192 (ex coll. E. Nordheim); edge partly serrated? |
| 147* | O7R66 | | 12.80 | Bourgey, 25.3.1977, 24 (rev. die cracked) |
| 148 | O7R66 | 25.4 mm | 12.89 | Carthage |
| 149 | O7R66 | 24.7 mm | 11.76 | Carthage |

| | | | | |
|------|-------|-------|-------|--|
| 150* | O7R66 | 26 mm | 13.15 | Paris; de Luynes 3779 (scratches on obv.) |
| 151 | O?R? | | 13.03 | Carthage? BALDUS 2004, p. 313, no. 89 (encrusted); <i>Id.</i> , 2003, p. 196 and p. 200, Fig. 4 |

Variety N

| | | | | |
|-----|------|-------|--|---|
| 152 | O1R? | | | Berk, FPL 25.10.1983, 123 |
| 153 | O1R? | 12.64 | | Bologna; E. ACQUARO / E. BUFFI NERI, p. 21, no. 28 |
| 154 | O?R? | 12.75 | | G. Hirsch 55, 1967, 2276 = G. Hirsch 53, 1967, 3295 |
| 155 | O1R? | 12.38 | | G. Hirsch 157, 1988, 233 (worn) |
| 156 | O1R? | | | H. Schulman, 10.10.1972, 310 (ex coll. Harding; badly pitted; worn) |
| 157 | O1R? | 13.27 | | London 1938-1-2 3 |

4. ANALYSIS

The present database makes no claim to be complete, since it does not include the bulk of the material in Tunis' Musée du Bardo (which is assumed to be, along with the British Museum, one of the largest repositories of Carthaginian serrated silver issues), and any specimens published online. The fact that it consists mainly of specimens from museums and the coin trade, rather than from site finds or controlled excavations, should also not be underestimated. In particular, the double-shekels in this catalogue are not listed in a chronological sequence of issue. No die linkage, discernible pattern of wear, decreasing weight, and/or stylistic change have been observed that would support a sequential reconstruction of the 19 reverse varieties on record. Three varieties (LR, P3, PC1) are represented by single specimens, and two varieties (A3, PC4) by two coins each. Even though the Caduceus variety appears to be the lightest, the weights of the double-shekels seem to have been less than regular within each variety. Conversely, despite the fact that several coins are underweight, each variety contains examples approaching or exceeding 13 g. The combined average weights of the varieties with Pellet and Pellet in crescent, which bear the same number of control marks (4) and are represented by the largest number of specimens within the database (46 coins or 31.08 % and 29 coins or 19.59 %) reach 12.75 and 13.09 g respectively.

Since the same obverse die seems to have been used in combination with each reverse variety, and die links are known only between coins of the reverse variety P1 (nos. 80-82), it is still unclear how this coinage was deployed. H.R. Baldus has pointed out that the serrated gold units, which are equivalent in weight to 2/5 shekels, and silver double-shekels with similar control marks (pellets) must be later than the gold issues with plain edge bearing alphabetical letters as control marks.⁴² This may suggest that the double-shekels with R/ varieties A1-A3 and GA come early in the sequence. Although a letter sequence may have been followed for the

⁴² BALDUS 2003, p. 199.

reduced shekels and for the gold 2/5 shekels with plain edge, there is no conclusive evidence that one was also used for the reduced double-shekels.

Moreover, the placement and size of the pellets on the serrated gold units do not correspond exactly to those on the double-shekels. Even if the system of pellets used for the gold units matched that of the double-shekels with R/ varieties P1-P4, it would not help to date the latter more precisely, *e.g.*, at the beginning or the end of the minting sequence. In fact, the coarse style of the obverse type of these gold 2/5 shekels is derived from that of the silver double shekels.⁴³ The weight of the gold coins also presupposes that reduced silver shekels and double-shekels were already in circulation, since it would have allowed a 2/5 shekel of c. 3 g to be exchanged for six silver shekels of c. 6.5 g or three double shekels of c. 13 g at a gold-silver ratio of 1:13, as Jenkins and Lewis surmised. Such a high ratio would be quite conceivable under the circumstances.⁴⁴

While the issue of gold can thus be explained as an emergency measure at the start of, or during the Third Punic War, as was suggested by Baldus and Burnett,⁴⁵ there is reason to believe that the minting of double-shekels was a more complex operation, and on a larger scale. Gold may have been used intermittently to pay with *moneta sonante* any merchant willing to run the Roman blockade to bring in desperately needed supplies,⁴⁶ but it was «an extremely small issue», as Jenkins and Lewis concluded. In contrast to the 9 reverse varieties and 10 reverse dies recorded by Jenkins and Lewis for the gold units, which were struck with one or two obverse dies,⁴⁷ as many as 19 reverse varieties and 67 reverse dies are known at present for the silver double-shekels, which were struck with at least 8 obverse dies. In addition, at least 2 obverse and 7 reverse dies are known for the silver shekels, although relatively few of them have survived. It should also be pointed out that 33 obverse and 24 reverse dies (representing 20.94 % and 16.21 % of the number of double-shekels in the database) which may include some new dies, could not be identified. Clearly this was not an insignificant output of coinage.

The unprecedented stylization of the obverse type and the variety of control marks on the double-shekels are especially noteworthy.⁴⁸ In particular, the eight reverse varieties with Pellet and Pellet in crescent (P1-4, PC1-4), which were struck

⁴³ See the enlargement in VIOLA (*supra*, n. 39), Pl. 29 opposite p. 106, of what may be a new obverse die (this coin was not known to Jenkins and Lewis).

⁴⁴ JENKINS/LEWIS, p. 54; cf. MØRKHOLM (*supra*, n. 40), pp. 4-5, 66-67.

⁴⁵ See *supra*, nn. 6, 8, 13. Baldus has convincingly linked the issue of gold to a fragment of Diod. Sic. (32.9), according to whom «the Carthaginian women contributed their gold jewelry» after the Romans began the siege of Carthage in the summer of 149.

⁴⁶ See the vivid account by Appian 8.18.120.

⁴⁷ JENKINS/LEWIS, pp. 122-123; but see *supra*, n. 43.

⁴⁸ Comparanda for symbols such as the caduceus, the pellet in crescent, the rosette, and the Tanit sign, are found on several monuments of the late 3rd to mid-2nd centuries BC at Carthage: cf. *e.g.* C. PICARD, Thèmes hellénistiques sur les stèles de Carthage, in: Antiquités africaines 1, 1967, espec. pp. 10-18; *Ead.*, Les représentations de sacrifice molk sur les ex-voto de Carthage, Karthago 17, 1976, pp. 79-83, 92-95, 111; *ibid.* 18, 1978, pp. 5-6, 20-24, 34-41, 86-89, 91-111; *Ead.*, Tanit courrotrophe, in: J. BIBAUW (ed.), Hommages à Marcel Renard vol. III. Coll. Latomus 103 (Brussels 1969), p. 177 and Pl. 171, Fig. 4; ACQUARO 1988, pp. 616-617, nos. 189, 193, 196.

with at least 19 and 15 reverse dies, respectively – attest to a high degree of standardization in minting practices. This would account for the remarkably consistent style of the obverse and reverse types combined with the sometimes perfunctory depiction of control marks such as the Pellet in crescent and the Rosette symbols. The Pellet in crescent is often represented by two intersecting semicircular strokes and tends to resemble an inverted comma,⁴⁹ especially in varieties PC2-PC3, whereas the Rosette can be reduced to a cluster of pellets (cf. nos. 141-143).

Yet, the die linkage of the double shekels is highly unusual. The identification of the obverse die O1 is especially difficult, and remains tentative in several instances, partly because of the condition of the coins and the uneven quality of the photographic record. Additional obverse dies may yet be found. Furthermore, while the number of obverse dies is uncertain, too many reverse dies are represented by only one coin. It is baffling how the same obverse could be paired with so many reverses without showing evident signs of fatigue.⁵⁰ This anomaly may reflect a pattern of episodic bursts of minting rather than a sustained production of coin that would have quickly exhausted the die. It seems less likely that the same die was used «in einer mobilen Abteilung der Münzstatte Karthago» to strike coins under certain circumstances, as Baldus has suggested with regard to the gold 2/5 shekels with plain edge.⁵¹ Obvious die flaws in dies O5 and O7 (see nos. 80-82, cf. 147-150) on the other hand, may be indicative of the need to extend a die's life as long as possible in situations of particular stress. The fact that the reverse dies «in general were not used until they failed,» raises the possibility that these coins were minted «for different events», or to make *ad hoc* payments (e.g. to specific groups of people, or army units).⁵²

If the production of double-shekels was related to extraordinary military expenditure, as seems to have been the case for earlier issues struck during the First Punic War,⁵³ the serrated double-shekels are perhaps to be regarded as a form of *moneta castrensis* whose circulation was limited *de facto* to the besieged city of

⁴⁹ The linear form of this symbol (which can also be described as a 'sundisk below crescent', a 'sun-crescent-moon', or a 'horseshoe curve surrounding a small circle') shows «the central line running through the strokes of the actual existing form», to borrow a definition by A. YARDENI, *The Book of Hebrew Script* (Jerusalem 1997), p. 133. For the mirror-inversion of writing see J. ELAYI, *Remarques méthodologiques sur l'étude paléographique des légendes monétaires phéniciennes d'époque perse*, in: C. BAUAIN *et al.* (eds.), *Phonikeia Grammata. Lire et écrire en Méditerranée* (Namur 1991), p. 188. I am grateful to Philip Schmitz for these remarks, and for all the references in this footnote.

⁵⁰ These remarks are by Giles F. Carter (E-mail message of 27.3.2007). Theodore V. Buttrey has suggested that this weird die linkage may have resulted from difficulties with the alloy of the dies, or with the hardening of the dies. Buttrey also surmised that maybe the reverse dies were really being used to destruction «and the destruction happened totally and all at once» (E-mail message of 31.3.2007). - For the possibility of hubbing, cf. MØRKHOLM (*supra*, n. 40), p. 14. For a hub used for making reverse dies of victoriati, cf. M.P. GARCIA-BELLIDO, *A Hub from Ancient Spain*, NC 146, 1986, pp. 76-84.

⁵¹ BALDUS 2003, p. 199. It is not known whether all minting activity at Carthage was centralized, particularly in wartime.

⁵² The quotes are by Giles F. Carter (E-mail message of 27.3.2007).

⁵³ P. VISONÀ, *A New Wrinkle in the Mid-Carthaginian Silver Series*, NC 166, 2006, pp. 18-19.

Carthage and its immediate environs. Lingering doubts about the quality of the metal used for some of these issues – exemplified by the presence of ancient cuts, scratches, and test marks on numerous coins, by the gritty appearance and pitted and flaked surface of some of the flans,⁵⁴ and by the persistent descriptions of some specimens as «base silver» in several catalogues (cf. nos. 59, 70, 90, 100, 111, 141) – also lead one to suspect that the Carthaginian minting authorities may have followed tradition in debasing the coinage, perhaps occasionally, or beginning with a specific reverse variety. The existence of any debased specimens would have significant implications for a reconstruction of the internal sequence of issue of the double-shekels, which may need to be re-configured. Nonetheless there is no question that A. Burnett was fundamentally right to assert that the last silver coinage of Carthage was struck, on the whole, «on a very small scale». The Romans did not find much silver upon their conquest of the city in 146: if the total weight of 4,370 pounds of captured silver (presumably including coins) reported by the Elder Pliny can be accepted as an official tally,⁵⁵ it would corroborate this interpretation of the evidence. Carthage apparently did not have large reserves of bullion before or during the Third Punic War. Except for the coins that were hidden from the Romans, most of the Carthaginian serrated silver was probably quickly melted down, which would explain its overall rarity in the numismatic record.

Zusammenfassung

Die spätesten Emissionen des punischen Karthagos bestehen aus reduzierten Schekeln und Doppelschekeln, die einen auffälligen gezackten Rand aufweisen; sie wurden in den Jahren 150-146 v.Chr. geprägt. Die Studie von 10 Schekeln und 158 Doppelschekeln zeigt, dass für diese Prägung nur ganz wenige Vorderseitenstempel verwendet wurden. Die Münzen dienten ausschliesslich dem lokalen Umlauf und das Silber war möglicherweise etwas verschlechtert.

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⁵⁴ This has been confirmed by independent visual inspections of nos. 83 and 85, for which I am especially grateful to Cecilia Meir and Peter G. van Alfen.

⁵⁵ Pliny, N.H. 33.50.141: *Libras XXXII argenti Africanus sequens heredi reliquit idemque, cum de Poenis triumpharet, IIIICCLXX pondo transtulit. Hoc argenti tota Carthago habuit illa terrarum aemula, quot mensarum postea apparatu victa!* Carthaginian tombs of the 2nd century BC have yielded little jewelry, and of mediocre quality, according to B. QUILLARD, *Bijoux Carthaginois II. Publications d'Histoire de l'Art et d'Archéologie de l'Université Catholique de Louvain XXXII, Aurifex 3* (Louvain-La-Neuve 1987), p. 240.

REPORT ON THE MEASUREMENT OF THE SPECIFIC GRAVITIES OF SEVENTEEN
2nd CENTURY BC CARTHAGINIAN SERRATED SILVER COINS

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Abstract

The specific gravities (SGs) of eighteen 2nd century BC Carthaginian serrated silver coins were measured following the methods described in Hughes and Oddy (1970), prior to their publication in SNR by Paolo Visonà. The following results were obtained:

| Visonà no. | Registration no. | Weight/g | Weight-liq/g | Temp/°C | SG |
|------------|------------------|----------|--------------|---------|-------|
| 1 | 1874,7-15,456 | 6.4400 | 5.2251 | 22.3 | 10.41 |
| 5 | 1987,6-49,349 | 6.3810 | 5.1796 | 21.9 | 10.44 |
| 9 | 1938,5-10,17 | 6.4209 | 5.2130 | 22.0 | 10.45 |
| 12 | 1938,5-10,12 | 13.0994 | 10.6349 | 22.0 | 10.45 |
| 24 | 1936,7-6,11 | 12.7166 | 10.2907 | 21.7 | 10.30 |
| 34 | 1929,10-11,2 | 12.4639 | 10.0964 | 22.0 | 10.35 |
| 42 | 1938,10-7,5 | 13.0857 | 10.6256 | 22.0 | 10.45 |
| 57 | 1936,7-6,10 | 13.1534 | 10.6483 | 21.5 | 10.32 |
| 79 | 1936,7-6,9 | 13.0363 | 10.5874 | 21.5 | 10.47 |
| 82 | 1929,6-4,5 | 12.9464 | 10.5062 | 22.2 | 10.42 |
| 93 | 1987,6-49,354 | 13.1482 | 10.6822 | 22.0 | 10.48 |
| 107 | 1930,2-3,1 | 12.6501 | 10.1709 | 22.2 | 10.03 |
| 109 | 1936,7-6,8 | 13.1597 | 10.6898 | 22.0 | 10.47 |
| 119 | EH p179.7 | 12.3809 | 10.0454 | 22.5 | 10.41 |
| 138 | EH p179.8 | 13.1250 | 10.6171 | 22.0 | 10.28 |
| 146 | 1931,4-7,1 | 13.0644 | 10.5985 | 21.7 | 10.41 |
| 157 | 1938,1-2,3 | 13.2550 | 10.7704 | 22.2 | 10.48 |

The error of the SG measurement is *c.* ±0.02, assuming that the coins do not suffer from porosity or have soil and/or corrosion products adhering to their surfaces. The SGs of the coins fall into a range between 10.28 and 10.48, with the exception of one coin (1930,2-3,1) which is lower, at 10.03. The SG of pure silver is *c.* 10.49.

D.R. Hook
31 May 2007

A.P. Simpson

Reference

M.J. HUGHES / W.A. ODDY, 'A reappraisal of the specific gravity method for the analysis of gold alloys', *Archaeometry* 12,1, 1970, pp. 1-11.

APPENDIX

I. Museum and University Collections

| | |
|------------------|--|
| ANS | The American Numismatic Society, New York |
| Berlin | Staatliche Museen zu Berlin; select specimens published by Baldus 2004 |
| Bologna | E. ACQUARO / E. BUFFI NERI, Le monete puniche e neopuniche del Museo Civico di Bologna, Riv. di Studi Fenici 8 (1980), pp. 195-223 |
| Cambridge | Fitzwilliam Museum, Cambridge; S.W. GROSE, Catalogue of the McClean Collection of Greek Coins, vol. III (Cambridge 1929) |
| Carthage | Musée de Carthage, Carthage |
| Constantine | Musée de Constantine, Constantine |
| Copenhagen | G.K. JENKINS (ed.), SNG Cop (<i>supra</i> , n.1) |
| Glasgow | Hunterian Museum, Glasgow; G. MACDONALD, Catalogue of Greek Coins in the Hunterian Collection, University of Glasgow, vol. III (Glasgow 1905) |
| London | The British Museum, London |
| London, RBL | The British Museum, London; R.B. Lewis collection |
| Madrid | Museo Arqueológico Nacional, Madrid |
| Milan | R. MARTINI (ed.), SNG Italia Milano Civiche Raccolte Numismatiche Vol. XIV, Cyrenaica-Mauretania (Milano 1989) |
| Munich | Staatliche Münzsammlung, Munich |
| Oslo | Universitetets Kulturhistoriske Museer, Oslo |
| Oxford | Ashmolean Museum, Oxford; SNG Ashmolean (<i>supra</i> , n. 15) |
| Paris | Cabinet des Médailles, Paris |
| Paris, de Luynes | Cabinet des Médailles, Paris; J. BABELON, Catalogue de la collection de Luynes, vol. IV (Paris 1936) |
| Parma | Museo Archeologico Nazionale di Parma; E. BUFFI NERI / C. LANZONI, Le monete puniche del Museo Archeologico Nazionale di Parma, Riv. di Studi Fenici 9 (1981) Suppl., pp. 99-120 |
| Tel Aviv | Kadman Numismatic Pavillion, Eretz Israel Museum, Tel Aviv |
| Thorvaldsen | Thorvaldsen Museum, Copenhagen |
| Tunis | Musée National du Bardo, Tunis |
| Vienna | Kunsthistorisches Museum, Vienna |

II. Coin Catalogues and Periodicals

| | |
|--------------------------------------|--|
| Coin Galleries de Hirsch de Nanteuil | Coin Galleries Numismatic Review and FPL, New York (NY, USA) P. NASTER, La collection Lucien de Hirsch (Brussels 1959) J. BABELON, Collection H. de Nanteuil de monnaies grecques (Paris 1925) |
| MAGNAGUTI NCirc | A. MAGNAGUTI, Ex Nummis Historia, vol. I (Roma 1949) Numismatic Circular, Spink & Son, London |

| | |
|----------------|--|
| Prosper-Valton | J. DE FOVILLE, Bibliothèque Nationale. Collections Armand- Valton léguées au Département des Médailles et Antiques, Première Partie, Les Monnaies Grecques et Romaines de la Collection Prosper-Valton, Catalogue (Paris 1912) |
| SNG Lockett | Sylloge Nummorum Graecorum, vol. III, Part II, Sicily / Thrace (London 1957) |

III. Sale Catalogues

| | |
|---------------------|---|
| Aes Rude | Aes Rude S.A., Chiasso |
| Albuquerque | Cabinet Numismatique Albuquerque, Rouen |
| Ars Classica | see Naville |
| Argenor | Argenor Numismatique S.A., Paris |
| Astarte | Astarte S.A., Lugano |
| Auctioes | Auctioes S.A., Basel |
| Aureo | Aureo Subastas Numismaticas S.a., Barcelona |
| Asta Titano | Asta Internazionale del Titano, San Marino |
| Baudey-Pesce | J.-C. Baudey jointly with M. Pesce, Lyon |
| Bergé | P. Bergé & Ass., Paris |
| Berk | Harlan J. Berk, Ltd., Chicago (IL, U.S.A.) |
| Blaser-Frey | H.P.R. Blaser-Frey, Freiburg im Breisgau |
| Blom | Chr. Blom, Hawthorne (NY, U.S.A.) |
| Bonhams-Vecchi | Bonhams and V.C. Vecchi and Sons, London |
| Bourgey | É. Bourgey, Paris |
| Burgan | C. Burgan Numismatique, Paris |
| Button | Frankfurter Münzhandlung E. Button, Frankfurt a.M. |
| Cederlind | Tom Cederlind, Portland (OR, U.S.A.) |
| CNG | Classical Numismatic Group, Inc., Lancaster (PA, U.S.A.) / London |
| Coins & Antiquities | Coins and Antiquities Ltd., London |
| Coin Galleries | Coin Galleries, New York (NY, U.S.A.) |
| Delorme-Fraysse | J. Delorme and V. Fraysse, Paris |
| Elsen | J. Elsen, Brussels |
| Emporium Hamburg | Emporium Hamburg, Hamburg |
| Florange-Ciani | J. Florange jointly with L. Ciani, Paris |
| Gadoury | V. Gadoury, Baden-Baden, later Monte Carlo |
| Gans | Numismatic Fine Arts Edward Gans, Berkeley (CA, U.S.A.) |
| Glendining | Glendining & Co., London |
| Graupner & Winter | Berliner Münz-Cabinet Graupner & Winter GmbH, Berlin |
| L. Hamburger | L. Hamburger, Frankfurt a.M. |
| Helbing | O. Helbing Nachf., Munich |
| Henzen | Munthandel G. Henzen, Amerongen (Netherlands) |
| A. Hess | A. Hess, Frankfurt a.M., from 1931 Lucerne |
| Hess-Leu | A. Hess jointly with Bank Leu, Zurich |
| G. Hirsch | G. Hirsch Nachf., Munich |
| JSD Coins | JSD Coins, Santa Ana (CA, U.S.A.) |
| Knobloch | E.S. Knobloch, New York (NY, U.S.A.) |

| | |
|---------------------------------|---|
| KPM | Kurpfälzische Münzhandlung, Mannheim |
| Kress | Münchener Münzhandlung K. Kress, Munich |
| Kricheldorf | H.H. Kricheldorf, Stuttgart, later Freiburg i.Br. |
| Künker | F.-R. Künker, Osnabrück |
| Lanz Munich | Numismatik Lanz, Munich |
| Malloy | A.G. Malloy, South Salem (NY, U.S.A.) |
| Münzen u. Medaillen | Münzen und Medaillen AG, Basel |
| Münzen u. Medaillen Deutschland | Münzen und Medaillen GmbH, Deutschland, Weil am Rhein |
| Münz Zentrum | Heinz-W. Müller (formerly A. Pilartz), Köln |
| Naville | L. Naville, Geneva; Ars Classica from catalogue 13 on |
| Noble | Noble Numismatics Pty Ltd., Sydney and Melbourne |
| NAC | Numismatica Ars Classica AG, London / Zurich |
| Page | A. Page, Paris |
| Page-Ciani | A. Page jointly with L. Ciani, Paris |
| Pegasi | Pegasi Numismatics, formerly Pegasi Coins, Ann Arbor (MI, U.S.A.) / Holicong (PA, U.S.A.) |
| Peus | Dr. B. Peus Nachf. Frankfurt a.M. |
| Platt | C. Platt, Paris |
| Poinsignon-Pesce | A. Poinsignon, Strasbourg, jointly with M. Pesce, Lyon |
| M. Ratto | M. Ratto, Milan and Paris |
| R. Ratto | R. Ratto, Lugano |
| Sambon-Canessa | A. Sambon jointly with A. Canessa, Paris |
| H. Schulman | H.M.F. Schulman, New York (NY, U.S.A.) |
| J. Schulman | J. Schulman B.V., Amsterdam |
| SKA | Schweizerische Kreditanstalt, Bern |
| Sotheby's | Sotheby's, London |
| Spagni | L. Spagni, Valeggio sul Mincio (Verona, Italy) |
| Spink London | Spink & Son, London |
| Stack's | Stack's, New York (NY, U.S.A.) |
| Superior | Superior Stamp & Coin Galleries, Inc., Los Angeles (CA, U.S.A.) |
| Tarkis | Tarkis S.A., Madrid |
| Triton | see CNG |
| UBS | Union de Banques Suisses, Basel |
| Vecchi | I. Vecchi, Ltd., London |
| Vedrines | J. Vedrines, Paris |
| Vinchon | J. Vinchon, Paris |
| Weil | A. Weil Numismatique, Paris |



1



2



3



5



11a



15



22



24



26



32



Paolo Visonà
The Serrated Silver Coinage of Carthage (1)



37



49



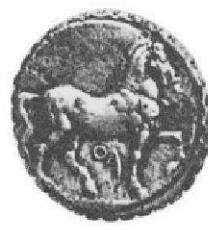
54



57



62



78



79



87



97



102

Paolo Visonà
The Serrated Silver Coinage of Carthage (2)



107



109



114



131



134



137



138



144



147



150



Paolo Visonà
The Serrated Silver Coinage of Carthage (3)

