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On the Reattribution of some Byblos Alexanders to Arados II

PLATES 1–15

LLOYD W. H. TAYLOR*

This study makes the case for the reattribution from Byblos to a second mint at Arados (Arados II) of the coinage of Alexander the Great bearing the \mathcal{R} mintmark. The majority of the early output from this mint was gold staters. Most probably the mint was established to accommodate the expansion of gold coinage production from ca. 328/7 BC, while silver Alexandrine coinage remained the priority of the first mint (Arados I), which had its origins in the old Achaemenid mint at Arados. After the initial striking of a substantial gold stater coinage, accompanied by a minor silver tetradrachm mintage, Arados II then issued a sizeable silver tetradrachm coinage. Both mints at Arados produced Macedonian imperial coinage until ca. 321/0 BC at which time Arados I ceased operation. Based on the hoard record, it is likely that Arados II continued to strike Alexander tetradrachms until around 301/0 BC when the city passed from Antigonid to Seleukid control following the Battle of Ipsos.

INTRODUCTION

In his discussion of the coinage attributed to Byblos, Price wrote “The coinage at this mint had certainly ended by 320 BC but attribution of 3422–3428 to Byblos is very doubtful.”¹ This applied to those coins bearing the \mathcal{R} monogram

* Independent scholar (lloyd_taylor@bigpond.com).

1. M. J. Price, *The Coinage in the Name of Alexander the Great and Philip Arrhidaeus* (London: British Museum/Swiss Numismatic Society, 1991), 430, with the quote corrected for the typographic error in Price’s text where types 2422–2428 are referenced rather than 3422–3428.

(a ligature of the Greek letters A and P), which he attributed to Byblos following the reasoning of Newell.² The latter associated these coins with a unique tetradrachm (Price 3421; ANS 1947.98.296; *Demanhur* 3586) of nominally similar style, bearing the Phoenician letters $\sim\circ$ (*ayin-yod*) that he read as an abbreviation of the name of Aynel (Enylos in Greek), the king of Byblos at the time of its surrender to Alexander the Great in 333/2 BC. Newell then deciphered the Greek \mathcal{A} monogram of Price types 3422–3428 as the abbreviation of the name Addirmilk (Adramelek in Greek) whom he inferred must have succeeded Aynel as the vassal king of Byblos under the rule of Alexander the Great.³

Recently, Newell's notion of the succession of these two kings under the suzerainty of Alexander has been discredited. Addirmilk preceded Aynel, prior to the Macedonian conquest.⁴ With the nexus of regnal succession proposed by Newell severed, the association of the coinage represented by Price 3422–3428 with that of Price 3421 is unsustainable. With this historical understanding, some in the numismatic trade have come to attribute Price 3422–3428 to Arados rather than Byblos.⁵ This reattribution is supported by the fact that the \mathcal{A} mintmark served to identify the autonomous coinage of Arados from the mid third century BC. It reverts to Newell's original interpretation of this coinage in his preliminary assessment of the Demanhur Hoard (*IGCH* 1664); an attribution that followed the reasoning of Müller almost sixty years earlier.⁶ Newell pondered the relationship between this coinage and that bearing the \mathcal{A} monogram, which like Müller before him, he also attributed to Arados. He suggested that the former may have been "local or city issues" while the latter "were regal or military issues struck by Alexander's generals or successors at Arados, but under separate management and in a separate mint. This might account, in degree, for the great divergence of

2. E. T. Newell, *Alexander Hoards II Demanhur*, 1905, ANS NNM 19 (New York: The American Numismatic Society, 1923), 52 and 122–125.

3. Newell, *Alexander*, 125 "Is it not at once apparent that, \mathcal{A} , the monogram on the subsequent tetradrachms is but the ligature of the letters $\mathcal{A}\Delta\mathcal{P}\mathcal{A}$, the first portion of Adramelek's name in Greek?"

4. J. Elayi, "An Updated Chronology of the Reigns of Phoenician Kings During the Persian Period (539–333 BC)," *Transeuphratene* 32 (2006), 11–44, 25–28, 37, table 3, and 41–42, table 5.

5. For example, Classical Numismatic Group Inc., www.cngcoins.com.

6. E. T. Newell, "Reattribution of Certain Tetradrachms of Alexander the Great," *AJN* 45/46 (1912), 5–62: "Coin types 126 [Price 3424] and 127 [Price 3426] have long been given to Arados—an attribution supported by the monogram (which is found on later undoubted Aradian Alexanders), and by the fact that the style on some is very similar to the above-mentioned coin published by Babelon as certainly struck at Arados." See also L. Müller, *Numismatique d'Alexandre le Grand, Suive d'un Appendice Contenant les Monnaies de Philippe II et III*. (Copenhagen: Imprimerie de Bianco Luno, 1855).

the two series in style, execution, monograms, and other details.”⁷ Eleven years later, in his final publication of the Demanhur Hoard, he abandoned this construct in favor of the Byblos attribution, based on the erroneous inference of the succession of Aynel by Addirmilk.⁸ In doing so, he overlooked the significance of the fact that both mintmarks \mathcal{A} and \mathcal{P} are but two variant ligatures of the same Greek letters, A and P, potentially signifying two different mints in the same city.

The relationship between the issues reattributed from Byblos (Price 3422–3428) to Arados and those previously attributed Arados (Price 3303–3335)⁹ remains uncertain, with the added confusion of dating now entering the picture as some in the numismatic trade seek to assign Price 3426 to Arados under Ptolemy I.¹⁰ The latter is improbable, for Ptolemaic forces only controlled the city for a matter of months in each of 319/18, 312 and perhaps 301 BC.¹¹ This paper seeks to address these uncertainties via a die study of the large denomination gold and silver coinage attributed to Byblos by Newell and Price. The study draws on the American Numismatic Society’s PELLA online database,¹² supplemented by coins in commerce. No attempt was made to assemble a corpus, a task well beyond the scope of this study. Rather, the catalogue provides a statistically meaningful database with which to analyze and estimate the volume and significance of the coinage. To further clarify the basis of the reattribution of this coinage, a review of the iconographic detail of the tetradrachm issue attributed to Byblos under Aynel and the basis of the reattribution precedes the catalogue of coins.

AYNEL (ENYLOS) TETRADRACHM

The only known example of the tetradrachm issue bearing the Phoenician letters $\mathcal{N}\mathcal{O}$ (Price 3421) came from the Demanhur Hoard (*IGCH* 1664). It is now housed in the American Numismatic Society collection, a component of the Newell bequest (Pl. 4, C). The letters $\mathcal{N}\mathcal{O}$ beneath the *diphros* upon which Zeus

7. Newell, *Reattribution*, 47.

8. Newell, *Alexander*, 52, 122–125.

9. See also F. Duyrat, *Arados hellénistique étude historique et monétaire* (Beirut: Institut Français du Proche-Orient, 2005).

10. For examples refer to Classical Numismatic Group Inc., www.cngcoins.com.

11. G. Le Rider, *Alexander the Great: Coinage, Finances and Policy*, trans. W. E. Higgins (Philadelphia: American Philosophical Society, 2007), 152, citing Diodorus 18.43.1–2 with respect to 319/8 BC; O. D. Hoover, “A Second Look at the Aradian Bronze Coinage Attributed to Seleucus I (SC 72–73),” *AJN* 18 (2006), 43–50, 48–49, citing Diodorus 19.58.1–5 and footnote 6, citing Diodorus 19.79.6–7 and 19.80.3 with respect of 312 BC, and E. T. Newell, *The Coinages of Demetrius Poliorcetes* (Chicago: Obol International, 1978), 54, with respect to 301 BC.

12. <http://numismatics.org/pella/>, accessed for this study prior to 8 October 2018.

is seated are clearly legible and beyond doubt. Whether these identify Aynel as the issuing authority is open to question, but it remains the best interpretation offered to date. The overall style of the coin is that of an early Alexander III issue, a derivative of Kilikian style as noted by Newell.¹³ Notwithstanding Newell's assertion,¹⁴ the obverse style of the coin diverges significantly in detail from that of Price 3424, represented in the catalogue of tetradrachms (Series 3; Pls. 4–7). In particular, the portrayal of the brow of Herakles with a heavy bulbous form on the Aynel coin is totally absent in the catalogue of dies of Price 3424. The orientation of the ear on the lion skin headdress is also atypical of the latter, being rotated 45 degrees clockwise from the disposition of the ear on the tetradrachms of Price 3424. The closest coins in overall style and detail are some of the early issues of Sidon, located 77 km south of Byblos. It may have been from this mint that a die engraver was deployed to Byblos for the “Aynel” issue. The absence of a close stylistic counterpart to Price 3421 in the catalogue of Series 3 (Price 3424) tetradrachms substantiates the conclusion from the historical record that these are unlikely to be associated issues from a single mint. Price 3421 remains the only Alexander issue of those under consideration that might be attributed to Byblos.¹⁵

REATTRIBUTION

The style and fabric of the coinage under study, plus the distribution of find locations detailed below, firmly place its origin in northern Phoenicia, or Syria commencing in the time of Alexander the Great. While the A mintmark is relatively common on later Hellenistic coinage, its appearance unaccompanied by other mintmarks, or controls, is exceptional. The attribution of Alexander's coinage to specific Phoenician and Syrian mints relies on the interpretation of the significance of mintmarks. Except for Tyre, these mints used a primary mintmark that identified the mint with Greek letters, or monograms, an abbreviation of the name of the city in which the mint was located.¹⁶ Usually this was accompanied

13. Newell, *Alexander*, 123 “modified ‘Cilician’ style very similar to the earliest issues of Sidon and Ake.”

14. Newell, *Alexander*, 122–123 “Its style and fabric is so close to the earliest issues of Nos. 3587–3623 [Price 3424 and 3426] that it must be considered as the immediate precursor of those pieces and struck in the same mint.”

15. In addition to this single issue we must consider the possible reattribution to Byblos of the coinage formerly attributed to Berytos by Newell and Price.

16. At Tyre (Ake of Price), the abbreviated name of the vassal king Ozmilk (Azemilkos) in Phoenician letters accompanied the regnal date. This served to distinguish the dating era of Tyre from that of Sidon, and to identify the mint.

by either a secondary letter mint control, or alternatively a regnal year date at each of Sidon and Tyre. In the coinage under study, the \mathcal{A} monogram is not accompanied by any other mint control. Therefore, the \mathcal{A} monogram can only be the identifying mark of the issuing mint. This mintmark is established to be abbreviation of the name of the city of Arados¹⁷ on the later autonomous coinage of the city from the mid-third century BC. Prior to 300 BC, there was no other major center of population in northern Phoenicia that could have hosted a major mint, let alone one that can be associated with the Greek letter abbreviation AP. Based on the mintmark, the attribution of Price 3422–3428 to a second mint located at Arados (Arados II) is most probable.

The attribution of the coinage bearing the \mathfrak{A} monogram (Price 3303–3335)¹⁸ to Arados is not impacted by this reattribution, for as initially postulated by Newell¹⁹ this coinage must have been struck in a separate facility (Arados I) in the same city. The presence of two separate mints is based on the clear demarcation between the two coinages, each defined by their own unique elements of iconographic style, mintmarks, fabric and other details. The first of these Alexander mints (Arados I) appears to have had its origins in the pre-existing Achaemenid mint in the city, evidenced by the continuity of the Phoenician letter mintmarks \mathfrak{A} (*mem-aleph*)²⁰ from the Achaemenid coinage of the city onto some of the Alexandrine coinage, one example of which (Price 3306) also carries the \mathfrak{A} monogram in addition to the \mathfrak{A} mint control.²¹ This suggests that the mint responsible for the coinage of Arados during the Achaemenid period also produced Alexander the Great's coinage following submission to the Macedonians. On this basis, the second mint, Arados II, must have been newly established following the Macedonian conquest in order to supplement the mintage from the continuing former Achaemenid facility. The practice of establishing two mints in the one city was not unusual. Newell described such at the opening of the mint at Tarsos.²² Later, the commissioning stage of the Alexander mint at Damaskos involved two apparently separate facilities that were consolidated into a single operation as production ramped up using six anvils within a process

17. The ancient Greek name for the island bearing the modern day Arabic name Arwad, or Ruad, derived from the old Phoenician name Arvad.

18. See also Duyrat, *Arados*, 9–30.

19. Newell, "Reattribution," 47.

20. Various interpreted to be the abbreviation of the phrase "of the king of Arwad," or "of the kingdom of Arwad" thus identifying in general terms the issuing authority and city of origin. Price, *Coinage*, 414 and Elayi, "Updated," 29–30.

21. Price, *Coinage*, 414 and Newell, *Alexander*, 119–120.

22. E. T. Newell, "Tarsos under Alexander," *AJN* 52 (1918), 69–115.

control environment that obviated the necessity to maintain separate facilities in order to achieve high output.²³ The earliest coinage of Babylon appears to have originated from two separate lines of production, if not separate facilities, that like those of Damaskos were consolidated into a single operation after about six months.²⁴ Later, two mints operated intermittently at Babylon between c. 320–316 BC and again in the period c. 308–304 BC.²⁵ The motivation for the establishment of two mints in one city appears to have been the need for a large volume of coinage in a short period of time and/or the necessity for different administrative structures. The latter applied in the case of Babylon following the death of Alexander the Great which saw the emergence of a clear division between the imperial and satrapal administration of two mints in Babylonia.²⁶

The dating and/or marking of issues with short lived secondary mint controls in addition to a primary mintmark was a long-standing practice at the Phoenician mints, one that carried over into the Macedonian era. Fourteen different mintmarks, or symbols, in multiple combinations are recognized on the Macedonian imperial coinage of Arados I (Price 3303–3335).²⁷ In contrast, the coinage of Arados II carries the solitary \mathcal{A} mintmark throughout. This may reflect the fact that the mint was newly established under Macedonian administration, with no prior Phoenician, or Achaemenid precedent to influence its operating conventions. Alternatively, it may reflect the fact that two different types of mint administration necessitated different process controls, checks and balances to ensure the integrity of each of their operations. Certainly, the absence of either a regnal year date, or a succession of mint controls at Arados II sets this mint apart from all of the other Phoenician mints of Alexander. It points to a different administrative construct for this mint, a point reinforced by the analysis and interpretation of the following catalogue of coins.

23. L. W. H. Taylor, “The Damaskos Mint of Alexander the Great,” *AJN* 29 (2017), 47–100.

24. L. W. H. Taylor, “The Earliest Alexander III Tetradrachm Coinage of Babylon: Iconographic Development and Chronology,” *AJN* 30 (2018), 1–43.

25. Houghton and Lorber, *Seleucid Coins*, 39–48, 481–483. For the downdating of the start of the second phase of operation of the Babylon II mint, see L. W. H. Taylor, “From Tripa-radeisos to Ipsos: Seleukos I Nikator’s Uncertain Mint 6A in Babylonia,” *AJN* 27 (2015), 41–97.

26. Houghton and Lorber, *Seleucid Coins*, 39–50.

27. Previously attributed to Arados I, the later issues of Price P138–P158 and Price 3336–3364 have been reattributed to the Babylon II mint: Houghton and Lorber, *Seleucid Coins*, 39–48 and 479–483.

CATALOGUE

Because the coinage carries a single primary mintmark, unaccompanied by secondary mint controls, it is not amenable to categorization into a sequence of issues based on a progression of mint controls. Rather, the catalogue sequence relies on the progression of evolving iconographic elements, plus a handful of die links. The catalogue is divided into four series. Series 1 and 2 are gold staters, each distinguished by the placement of the \mathcal{A} mintmark, either to the left of, or below Nike's right wing, respectively. Series 3 and 4 consist of tetradrachms. Both bear the \mathcal{A} mintmark in the reverse left field and are distinguished from each other by the depiction of Zeus with either parallel legs (Series 3) or crossed legs (Series 4). Within each of the series, minor types defined by variant iconographic or epigraphic elements are identified by a second digit in the sequence type number. For example, Series 2.2 is defined by the \mathcal{A} monogram below Nike's wing accompanied by an obverse on which Athena's helmet is decorated by a griffin, rather than the more usual serpent motif that characterizes Series 2.1. Dies are numbered sequentially in each denomination. Gold stater obverse dies are denoted by the prefix Av to distinguish them from the tetradrachm obverse dies prefixed with an A. Coin weights (column four) are in grams. The coins were struck with dies adjusted towards 12 o'clock. An asterisk adjacent to the catalogue number denotes a coin illustrated in the accompanying plates.

Gold Staters

Series 1

Proposed date: ca. 328/7–326/5 BC

Plates 2–3

Obv.: Head of Athena right, wearing crested helmet decorated with serpent (Series 1.1), or griffin (Series 1.2), or sphinx (Series 1.3).

Rev.: ΑΛΕΞΑΝΔΡΟΥ on r., Nike standing left, holding wreath and stylis; \mathcal{A} in left field, to left of Nike's right wing.

1.1 \mathcal{A} monogram in left field. Serpent on Athena's helmet. (Price 3423)

- | | | | | |
|-----|-----|----|------|--|
| 1. | Av1 | P1 | 8.49 | Oeconomides, 1999, no. 43, pl. 22, 43; Epidauros 1977 Hoard. |
| 2. | Av1 | P2 | 8.55 | Numismatik Naumann 40 (7 Feb. 2016), lot 66. |
| 3.* | Av1 | P3 | 8.53 | London, 1927,0504.12; Price 3423a. |

1.2 \mathcal{R} monogram in left field. Griffin on Athena's helmet. (Price -)

- 4.* Av2 P4 8.58 Peus 396 (5 Nov. 2008), lot 296. Av2 is a near identical die to Series 2 Av18 (Cat. No. 35).

1.3 \mathcal{R} monogram in left field. Serpent on Athena's helmet. (Price 3423)

- 5.* Av3 P5 8.54 CNG 94 (18 Sep. 2013), lot 242. Av3 is an obverse die link to Series 2 (Cat. No. 36). Av3 here in later, worn state.
- 6.* Av4 P6 8.56 Heritage 3041 (13 Aug. 2015), lot 32019. Vertical die break across left field transects hand and laurel wreath giving the impression of laurel branch.
7. Av4 P7 8.55 Paris, BNF41746217; Luynes 1613.
8. Av4 P8 8.54 London, 1994.0915.37.
- 9.* Av4 P9 8.68 London, 1928.0103.5; Price 2423b.
- 10.* AV5 P10 8.60 Triton XIII (4 Jan. 2010), lot 105. Av5 is an obverse die link to Series 2 (Cat. No. 37). Av5 here in unworn state.
11. AV5 P11 8.53 Triton IV (5 Dec. 2000), lot 168.
12. AV5 P12 8.60 Triton XIII (4 Jan. 2010), lot 1116.
- 13.* Av6 P13 8.61 CNG 860175. Av6 is a near identical die to Series 2 Av19 (Cat. No. 38).
14. Av6 P13 8.70 CNG eAuction 394 (19 Mar. 2017), lot 128.
- 15.* Av7 P14 8.61 ANS 1965.77.86.
- 16.* Av8 P15 8.61 ANS 1944.100.34975.
17. Av8 P15 8.61 Berlin, Münzkabinett 18253343; Larnaka Hoard, *IGCH* 1472.
- 18.* Av9 P16 8.56 Vienna, Münzkabinett Wien GR 28559.
19. Av9 P17 8.55 Spink 7023 (27 Sep. 2007), lot 34.
- 20.* Av10 P18 8.56 Künker 62 (13 Mar. 2001), lot 60.
21. Av11 P19 8.61 Gorny & Mosch 224 (13 Oct. 2014), lot 141.
- 22.* Av11 P19 8.64 CNG 731923.
- 23.* Av12 P19 8.44 Triton VI (14 Jan. 2003), lot 178. Av12 subsequently transferred to Miletos to strike examples of Price 2078.
24. Av13 P20 8.62 Hess Divo 326 (28 May 2014), lot 32; Hess Divo 325 (23 Oct. 2013), lot 187; Maison Palombo 11 (30 Nov. 2012), lot 13.
- 25.* Av13 P20 8.55 Stack's Bowers and Ponterio 2018 NYINC Auction (16 Jan. 2018), lot 2101; Roma Numismatics IX (22 Mar. 2015), lot 226; TimeLine Auctions (Aug. 2012).

26. Av13 P21 8.47 Forum Ancient Coins SH15299; Coin Galleries (20 Nov. 1975), lot 1098; Colosseum Coin Exchange. P21 first appearance of Nike's extended r. hand in profile. Av13 extensive die breaks.
- 27.* Av14 P22 8.58 CNG 99 (13 May 2015), lot 72.
28. Av15 P23 8.58 Berlin, Münzkabinett 18253344.
- 29.* Av15 P23 8.60 Heritage 3037 (4 Jan. 2015), lot 30901; Roma Numismatics VIII (28 Sep. 2014), lot 447.
30. Av15 P23 8.59 CNG eAuction 300 (10 Apr. 2013), lot 80.
- 1.3 \mathcal{A} monogram in left field. Sphinx on Athena's helmet. (Price -)
- 31.* Av16 P24 8.54 CNG 64 (24 Sep. 2003), lot 107.

Series 2

Proposed date: ca. 328/7–326/5 BC

Plates 3–4

Obv.: Head of Athena right, wearing crested helmet decorated with serpent (Series 2.1), or griffin (Series 2.2).

Rev.: $\Lambda\Lambda\Xi\text{AN}\Delta\text{POY}$ on r., Nike standing left, holding wreath and stylis; \mathcal{A} below Nike's right wing.

- 2.1 \mathcal{A} monogram below Nike's wing. Serpent on Athena's helmet. (Price 3422)
32. Av17 P25 8.37 ANS 1944.100.34977. The progression of die breaks on linking reverse die P25 sequences Series 2 obverse dies Av17 and Av18.
- 33.* Av17 P25 8.58 CNG 99 (13 May 2015), lot 71; CNG 96 (14 May 2014), lot 48.
34. Av17 P25 8.55 Berlin, Münzkabinett 18253345.
- 2.2 \mathcal{A} monogram below Nike's wing. Griffin on Athena's helmet. (Price -)
- 35.* Av18 P25 8.56 ANS 1944.100.34978. Av18 is a near identical die to Series 1 Av2 (Cat. No. 4).
- 2.1 \mathcal{A} monogram below Nike's wing. Serpent on Athena's helmet. (Price 3422)
- 36.* Av3 P26 8.54 ACR Auctions 6 (10 Dec. 2012), lot 375; CNG eAuction 54 (4 Dec. 2002), lot 22. Av3 is an obverse die link to Series 1 (Cat. No. 5). Av3 here in early, unworn state.
- 37.* Av5 P27 8.56 CNG eAuction 403 (9 Aug. 2017), lot 37. Av5 is an obverse die link to Series 1 (Cat. Nos. 10–12). Av5 here in a well-worn state.

38.*	Av19	P28	8.46	Peus 369 (31 Oct. 2001), lot 145. Av19 is a near identical die to Series 1 Av6 (Cat. Nos. 13–14).
39.*	Av20	P29	8.60	London, 1872,0713.26; Price 3422a.
40.*	Av21	P30	8.58	ANS 1944.100.34976; Naville I (4 Apr. 1921), lot 873.
41.*	Av22	P31	8.62	CNG 860686; Stack's Bowers 3483 (1 Jun. 2014), lot 22964; Stack's Bowers 3479 (5 May 2014), lot 21120; Stack's Bowers 3470 (2 Mar. 2014), lot 20639.
42.*	Av23	P32	8.52	London, 1866,1201.1053; Price 3422b.
43.	Av23	P32	8.58	CGB.fr Monnaies 25 (26 Jan. 2006), lot 56.

Silver Tetradrachms

Series 3

Proposed date: ca. 327/6–326/5 BC

Plates 4–7

Obv.: Head of Herakles r. in lion skin headdress, dotted border.

Rev.: ΑΛΞΑΝΔΡΟΥ on r., Zeus seated l. on *diphros*, holding eagle and scepter, Α to l., dotted border. Zeus's legs disposed side by side, in parallel.

3.1 Α (Price 3424)

44.	A1	P1	16.90	Museum Surplus 11594.
45.*	A1	P2	17.08	LWHT Coll.; Pars Coins PCW-G5970. Reverse die shift imprints the ligate AP as if the Phoenician letter Sade.
46.	A1	P2	16.78	Gorny & Mosch 170 (13 Oct. 2008), lot 1260.
47.	A1	P2	16.92	Goldberg 96 (14–15 Feb. 2017), lot 1587.
48.	A1	P3	17.13	CNG XXX (11 Jun. 1994), lot 66.
49.	A1	P3	16.84	Berlin, Münzkabinett 18253348.
50.	A1	P4	16.80	ANS 1944.100.34997.
51.	A1	P5	17.21	Berlin, Münzkabinett 18253347.
52.	A1	P6	17.19	Rauch 105 (16 Nov. 2017), lot 56; Rauch eAuction 18 (6 Nov. 2015), lot 34.
53.	A1	P7	17.15	ANS 1944.100.34998.
54.	A1	P7	17.17	Le Rider and Olçay, 1958, 74, pl. VII, 74; Akçakale Hoard, <i>CH</i> 8.201, <i>CH</i> 10.251.
55.	A1	P8	16.25	Numismatics 28 (22 Jan. 2017), lot 136.
56.*	A1	P9	17.12	ANS 1944.100.34999.
57.	A1	P10	17.19	CNG eAuction 265 (5 Oct. 2011), lot 217.

58.	A1	P10	17.18	Berlin, Münzkabinett 18253350; Abusir Hoard, <i>IGCH</i> 1672.
59.*	A2	P11	17.16	CNG 87 (18 May 2011), lot 344.
60.	A2	P12	17.06	ANS 1944.100.35000.
61.	A2	P12	16.73	Cambridge, <i>SNGuk_0601_0505</i> .
62.	A2	P13	17.12	Christoph Gärtner 32 (24 Oct. 2015), lot 34137.
63.	A3	P14	17.12	NAC Auction O (13 May 2004), lot 1545.
64.*	A3	P14	17.21	ANS 1944.100.34992; Demanhur Hoard <i>IGCH</i> 1664.
65.	A3	P14	17.10	ANS 1944.100.34993.
66.*	A4	P15	17.17	CNG 72 (14 Jun. 2006), lot 408; "Seleucus I" Hoard, <i>CH</i> 10.265.
67.	A4	P16	17.17	ANS 1944.100.34994.
68.	A4	P17	17.12	CNG 88 (14 Sep. 2011), lot 118.
69.*	A5	P17	17.16	CNG eAuction 350 (6 May 2015), lot 96.
70.	A5	P17	17.18	Le Rider and Olçay, 1958, 76, pl. VII, 76; Akçakale Hoard, <i>CH</i> 8.201, <i>CH</i> 10.251.
71.	A6	P18	17.15	Gorny & Mosch 196 (7 Mar 2011), lot 1403.
72.*	A6	P18	17.14	Heritage (3 Jan. 2012), lot 23050.
73.	A6	P19	17.24	Elsen 93 (15 Sep. 2007), lot 146.
74.	A6	P19	17.10	CNG eAuction 102 (24 Nov. 2004), lot 4.
75.	A6	P20	17.24	ANS 1944.100.34996.
76.	A6	P21	17.15	Heritage (12 Sep. 2011), lot 25864.
77.	A6	P21	17.13	CNG 78 (14 May 2008), lot 411.
78.*	A6	P21	17.15	ANS 1944.100.34995.
79.*	A7	P22	16.67	ANS 1944.100.35002.
80.*	A8	P22	17.02	Noble Numismatics 71 (22 Nov. 2002), lot 4564.
81.	A8	P23	16.05	Amandry and Callot, 1988, 9, pl. XIII, 9; Failaka Hoard, <i>CH</i> 8.256.
82.*	A9	P24	17.25	ANS 1944.100.84669.
83.*	A10	P25	17.21	Rauch 84 (13 May 2009), lot 97.
84.	A10	P26	17.19	Germania Inferior Numismatics HBR-1330; Heritage Europe 50 (24 May 2016), lot 204.
85.	A10	P26	17.04	ANS 1944.100.35009.
86.	A10	P27	16.99	Aureo & Calicó 258 (20 Mar. 2014), lot 3029.
87.	A10	P27	17.13	Naville Numismatics 19 (13 Dec. 2015), lot 37.
88.*	A11	P28	17.14	Künker 193 (26 Sep. 2011), lot 141.

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| 89. | A11 | P29 | 17.13 | Gorny & Mosch 196 (7 Mar. 2011), lot 1402. P29 depicts the last facing open palm for the right hand of Zeus. |
| 90.* | A11 | P30 | 17.20 | CNG 61 (25 Sep. 2002), lot 462. P30 depicts the first upward oriented hand in profile for the right hand of Zeus. A constant from here in the sequence. |
| 91. | A11 | P30 | 16.93 | Peus 401 (3 Nov. 2010), lot 233; Gorny & Mosch 186 (8 Mar. 2010), lot 1257. |
| 92. | A11 | P30 | 17.17 | Ars Time Company eAuction 2 (17 Dec. 2013), lot 119. |
| 93. | A11 | P30 | 17.15 | ANS 1944.100.35006. |
| 94.* | A12 | P31 | 17.17 | CNG eAuction 105 (10 May 2017), lot 73. |
| 95. | A12 | P31 | 17.20 | Gorny & Mosch 160 (9 Oct. 2007), lot 1321. |
| 96. | A12 | P31 | 17.15 | CNG eAuction 255 (4 May 2011), lot 48. |
| 97. | A12 | P32 | 16.90 | ANS 1944.100.35010; Abu Hommos Hoard, <i>IGCH</i> 1667. |
| 98. | A12 | P32 | 17.08 | ANS 1944.100.35011. |
| 99. | A13? | P33? | 17.17 | Wildwinds.com database entry Price 3424 A; www.wildwinds.com/coins/greece/macedonia/kings/alexander_III/t.html accessed on 1 May 2017. Die determination based on poor quality image of a worn coin. |
| 100.* | A14 | P34 | 17.27 | CNG eAuction 105 (10 May 2017), lot 72; Numismatica Ars Classica 92 (23 May 2016), lot 1440; Gorny & Mosch 156 (5 Mar. 2007), lot 1279. |
| 101. | A14 | P34 | 17.25 | Gorny & Mosch 233 (6 Oct. 2015), lot 1303. |
| 102. | A14 | P34 | 17.17 | ANS 1944.100.34981; Demanhur Hoard, <i>IGCH</i> 1664. |
| 103. | A14 | P34 | 17.12 | London, 2002,0101.782; Hersh Coll. |
| 104. | A14 | P34 | 17.14 | London, 1911,0409.47; Price 3424c. |
| 105. | A14 | P35 | 17.18 | ANS 1944.100.34991. |
| 106. | A14 | P35 | 16.97 | CNG eAuction 168 (11 Jul. 2007), lot 34. |
| 107. | A14 | P36 | 17.18 | ANS 1944.100.34990. |
| 108. | A14 | P36 | 17.22 | Oxford, Ashmolean HCR23653; SNGuk_0503_3006. |
| 109. | A15 | P37 | 17.24 | Heritage 3032 (10 Apr. 2014), lot 23118. |
| 110. | A15 | P37 | 17.19 | Heritage 3046 (14 Apr.2016), lot 31060. |
| 111. | A15 | P38 | 17.20 | ANS 1944.100.34982. |
| 112.* | A15 | P38 | 17.18 | ANS 1947.98.297. |
| 113. | A15 | P38 | 17.11 | ANS 1944.100.34983. |
| 114. | A15 | P39 | 17.20 | ANS 1944.100.34979. |

115.	A15	P40	16.91	London, 1913,0518.82; Price 3424a; Demanhur Hoard, <i>IGCH</i> 1664.
116.*	A16	P41	17.04	ANS 1944.100.34984.
117.	A16	P42	17.11	ANS 1944.100.34985.
118.	A16	P43	16.86	ANS 1944.100.34986.
119.	A16	P43	17.21	Gorny & Mosch 181 (13 Oct. 2009), lot 1307.
120.	A17	P44	17.23	The New York Sale XXX (9 Jan. 2013), lot 95; Künker 193 (26 Sep. 2011), lot 142.
121.	A17	P45	17.27	ANS 1944.100.34987.
122.*	A17	P45	17.19	ANS 1944.100.34988.
123.	A17	P46	17.10	ANS 1944.100.34989.
124.	A18	P47	17.16	CNG eAuction 350 (6 May 2015), lot 97.
125.	A18	P47	17.11	Maison Palombo 7 (13 Jun. 2009), lot 94.
126.*	A18	P47	17.16	Roma Numismatics VIII (28 Sep. 2014), lot 687.
127.	A19	P48	17.20	ANS 1944.100.35113.
128.	A19	P49	17.14	ANS 1944.100.35007.
129.	A19	P49	17.15	Teutoburger 110 (8–9 Sep. 2017), lot 653.
130.	A19	P50	17.14	Noble Numismatics 71 (20–22 Nov. 2002), lot 4563.
131.*	A19	P51	17.17	LWHT Coll; Naumann 55 (30 Jun. 2017), lot 111. Softly engraved letter X before head of Zeus?
132.*	A20	P52	17.17	Berlin, Münzkabinett 18253349.
133.*	A21	P53	17.18	ANS 1944.100.35008.
134.	A21	P53	16.92	Numismatik Naumann 54 (4 Jun. 2017), lot 106.
135.	A21	P53	17.09	Forum Ancient Coins SH68477; Künker eAuction 23 (30 Oct. 2013), lot 9.
136.*	A22	P54	17.21	ANS 1944.100.35013.
137.	A22	P55	17.00	ANS 1944.100.35012.
138.	A22	P55	14.17	London, 1847,0619.37; Price 3424b.
139.	A22	P56	17.15	Hess Divo 299 (27 Oct. 2004), lot 34.

Excluded from Series 3 is ANS 1944.100.35001 that is listed in the PELLA database as an issue of Byblos. It bears no control mark. Although of a closely similar style to Cat. Nos. 124–131 its association with the series remains uncertain in the absence either a control mark, or a direct die link.

Series 4

Proposed dates:

ca. 325/4–321/0 BC Dies A23–A47

ca. 320/19–311/0 BC Dies A48–A79

ca. 310/09–301/0 BC A80–A97

Plates 7–15

Obv.: Head of Herakles r. in lion skin headdress, dotted border.*Rev.*: ΑΛΞΑΝΔΡΟΥ on r., Zeus seated l. on *diphros* (or throne on last examples in sequence), holding eagle and scepter; Ἀ to l., dotted border. Zeus's legs disposed with right leg drawn back behind the left, in a crossed legs style.

4.1 Ἀ (Price 3426)

140.*	A23	P57	17.18	ANS 1944.100.35019.
141.	A23	P58	17.30	Davesne and Lemaire, 1996, no. 97, pl. VII, 97; Syria or Lebanon Hoard, <i>CH</i> 8.185.
142.	A23	P58	17.10	Hirsch 264 (25 Nov. 2009), lot 189.
143.*	A24	P59	17.18	Münzen & Medaillen 9 (4 Oct. 2001), lot 135.
144.	A24	P59	16.93	ANS 1944.100.35020.
145.*	A25	P60	16.96	ANS 1947.98.298.
146.	A25	P61	17.13	ANS 1944.100.35021.
147.	A25	P62	17.21	ANS 1944.100.35023.
148.	A25	P63	17.28	ANS 1944.100.35022.
149.	A25	P64	17.13	London, 1913,0518.83; Price 3426e.
150.*	A26	P65	16.91	CNG eAuction 374 (11 May 2016), lot 305.
151.*	A27	P66	17.15	ANS 1944.100.35024.
152.	A27	P67	17.12	Harald Möller 69 (8–9 Jun. 2017), lot 14; Münzen & Medaillen 44 (25 Nov. 2016), lot 147; Gärtner 32 (24 Oct. 2015), lot 34135.
153.	A27	P67	17.05	Oxford, Ashmolean HCR23658; SNGuk_0503_3011.
154.	A27	P67	17.14	Le Rider and Olçay, 1958, 78, pl. VII, 78; Akçakale Hoard, <i>CH</i> 8.201, <i>CH</i> 10.251.
155.	A27	P68	17.25	Hirsch 266 (11 Feb. 2010), lot 1636.
156.	A27	P69	17.94	ANS 1944.100.35025; Abu Hommos Hoard, <i>IGCH</i> 1667.
157.*	A28	P70	17.26	ANS 1944.100.35026.
158.	A29	P71	17.31	Le Rider and Olçay, 1958, 86, pl. VII, 86; Akçakale Hoard, <i>CH</i> 8.201, <i>CH</i> 10.251.

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| 159. | A29 | P71 | 17.08 | Le Rider and Olçay, 1958, 87, pl. VII, 87; Akçakale Hoard, <i>CH</i> 8.201, <i>CH</i> 10.251. |
| 160. | A29 | P72 | 17.19 | Oxford, Ashmolean HCR23655; SNGuk_0503_3008; Kuft Hoard, <i>IGCH</i> 1670. |
| 161.* | A29 | P72 | 17.20 | Noble Numismatics 113 (22–25 Nov. 2016), lot 4293. |
| 162. | A29 | P73 | 17.13 | CNG 37 (20 Mar 1996), lot 214. |
| 163. | A29 | P74 | 17.03 | CNG XXIII (13 Oct. 1992), lot 124. |
| 164. | A29 | P75 | 17.16 | ANS 1944.100.35027; Abu Hommos Hoard, <i>IGCH</i> 1667. |
| 165. | A29 | P76 | 16.97 | ANS 1944.100.35028. |
| 166. | A29 | P77 | 17.10 | Baldwin's 34 (13 Oct. 2003), lot 534. |
| 167. | A29 | P78 | 17.15 | Hirsch 293 (25 Sep. 2013), lot 2212; Hirsch 287 (7 Feb. 2013), lot 1834; Hirsch 271 (17 Feb. 2011), lot 1899. |
| 168. | A29 | P78 | 17.21 | Hirsch 293 (25 Sep 2013), lot 2211. |
| 169.* | A30 | P78 | 17.10 | Roma Numismatics E-Sale 38 (29 Jul. 2017), lot 287. |
| 170. | A30 | P79 | 17.15 | Hirsch 293 (25 Sep. 2013), lot 2213; Hirsch 287 (7 Feb. 2013), lot 1835; Hirsch 281 (2 May 2012), lot 281, Hirsch 271 (17 Feb. 2011), lot 1898; Hirsch 267 (5 May 2010), lot 181. |
| 171.* | A31 | P80 | 17.22 | ANS 1944.100.35031. |
| 172. | A31 | P80 | 17.06 | Munthandel G. Henzen 410902010. |
| 173. | A31 | P81 | 17.20 | ANS 1944.100.35029; Andritsaena, Elis, c. 1923 Hoard, <i>IGCH</i> 0083 |
| 174. | A31 | P81 | 17.05 | CNG eAuction 370 (9 Mar. 2016), lot 215. |
| 175. | A31 | P81 | 17.10 | ANS 1944.100.35034. |
| 176. | A31 | P82 | 17.12 | ACR eAuction 32 (11 Jan. 2016), lot 341. |
| 177. | A31 | P82 | 17.80 | ANS 1944.100.35050. |
| 178. | A31 | P83 | 17.11 | Ars Classica XVII (3 Oct. 1934), lot 375. |
| 179. | A31 | P83 | 17.22 | ANS 1944.100.35032. |
| 180. | A31 | P83 | 17.22 | Le Rider and Olçay, 1958, 81, pl. VII, 81; Akçakale Hoard, <i>CH</i> 8.201, <i>CH</i> 10.251. |
| 181. | A31 | P84 | 17.30 | ANS 1944.100.35030. |
| 182.* | A32 | P85 | 17.06 | Bertolami Fine Arts eAuction 44 (10 Sep. 2017), lot 314; ACR eAuction 4 (19 Mar. 2012), lot 52. |
| 183.* | A33 | P86 | 16.88 | London Coin Galleries 4 (1 Jun. 2017), lot 615. |
| 184.* | A34 | P87 | 17.17 | ANS 1944.100.35033. |

185.	A34	P88	17.22	ANS 1944.100.35035.
186.	A34	P89	17.15	ANS 1944.100.35036.
187.*	A35	P90	17.14	Stack's Coin Galleries (18 Dec. 2007), lot 95.
188.	A35	P90	17.22	CNG eAuction 398 (31 May 2017), lot 343.
189.	A35	P91	16.88	ANS 1944.100.35041.
190.	A35	P91	17.15	CNG 810147; Stack's Bowers 150 (8 Aug. 2009), lot 8365.
191.	A35	P92	17.20	Hirsch 275 (22 Sep. 2011), lot 3489.
192.	A35	P93	16.93	ANS 1944.100.35043; Abu Hommos Hoard, <i>IGCH</i> 1667.
193.	A35	P93	17.17	Stack's Bowers Baltimore Auction (15 Nov. 2012), lot 11585.
194.	A35	P94	17.30	ANS 1944.100.35042.
195.	A35	P94	17.14	London, 1958,0304.26; Price 3426a.
196.	A35	P95	17.20	ANS 1944.100.35044.
197.	A35	P96	17.17	Le Rider and Olçay, 1958, 79, pl. VII, 79; Akçakale Hoard, <i>CH</i> 8.201, <i>CH</i> 10.251.
198.	A35	P97	17.10	Le Rider and Olçay, 1958, 80, pl. VII, 80; Akçakale Hoard, <i>CH</i> 8.201, <i>CH</i> 10.251.
199.*	A36	P98	17.30	ANS 1944.100.35045.
200.	A36	P99	17.16	Eukratides Ancient Numismatics To42; CNG eAuction 341 (7 Dec. 2014), lot 249.
201.	A36	P100	17.21	Hirsch 266 (11 Feb. 2010), lot 1635
202.	A36	P101	17.20	ANS 1944.100.35046.
203.*	A37	P102	17.17	ANS 1944.100.35047.
204.	A37	P102	16.98	Roma Numismatics May 2013 Auction (21 May 2013), lot 351.
205.*	A38	P103	16.90	London Coin Galleries 4 (1 Jun. 2017), lot 614.
206.*	A39	P104	17.13	Roma Numismatics E-Sale 31 (26 Nov. 2016), lot 64.
207.	A39	P105	17.13	CNG 63 (21 May 2003), lot 186.
208.	A39	P105	17.07	CNG eAuction 283 (25 Jul. 2012), lot 134.
209.	A39	P105	17.16	Oxford, Ashmolean HCR23660; <i>SNGuk_0503_3013</i> ; Kuft Hoard, <i>IGCH</i> 1670
210.	A39	P105	14.89	Cox, 1953, 31, pl. III, 31; Gordion Hoard, <i>IGCH</i> 1406
211.	A40	P106	17.13	ANS 1944.100.35048.
212.*	A40	P106	17.02	ANS 1944.100.35049.

213.	A40	P107	17.08	Berlin, Münzkabinett 182533532.
214.	A40	P108	17.09	Paris, FRBNF41838003.
215.*	A41	P109	17.09	ANS 1944.100.35051; Andritsaena, Elis, c. 1923 Hoard, <i>IGCH</i> 0083
216.	A41	P109	17.00	Praefectus Coins GRA2328.
217.	A41	P109	17.13	ANS 1944.100.35052; Abu Hommos Hoard, <i>IGCH</i> 1667.
218.	A41	P110	17.11	ANS 1944.100.35053.
219.	A41	P110	17.15	Le Rider and Olçay, 1958, 89, pl. VII, 89; Akçakale Hoard, <i>CH</i> 8.201, <i>CH</i> 10.251.
220.	A41	P110	17.14	Le Rider and Olçay, 1958, 90, pl. VII, 90; Akçakale Hoard, <i>CH</i> 8.201, <i>CH</i> 10.251.
221.	A42	P110	17.25	CNG 63 (21 May 2003), lot 183.
222.*	A42	P110	16.63	ANS 1944.100.35054; Abu Hommos Hoard, <i>IGCH</i> 1667.
223.	A42	P110	16.98	Heritage 419, (15 Sep. 2016), lot 51013.
224.	A42	P111	17.05	Pegasi Numismatics 12120081; Pegasi XXXIV (24 May 2016), lot 94.
225.	A42	P112	16.90	ANS 1944.100.35055.
226.*	A43	P113	17.10	CNG eAuction 256 (25 May 2011), lot 149.
227.	A43	P114	17.28	Peus 418 (2 Nov. 2016), lot 949.
228.	A44	P115	17.27	Le Rider and Olçay, 1958, 85, pl. VII, 85; Akçakale Hoard, <i>CH</i> 8.201, <i>CH</i> 10.251.
229.	A45	P116	17.21	UBS Gold & Numismatics 52 (11 Sep. 2001), lot 40.
230.*	A45	P117	17.13	ANS 1944.100.35057.
231.	A45	P117	17.09	CNG 38 (6 Jun. 1996), lot 212.
232.	A45	P118	17.22	CNG eAuction 347 (25 Mar. 2015), lot 289.
233.	A45	P118	17.20	ANS 1944.100.35056; Abu Hommos Hoard, <i>IGCH</i> 1667
234.*	A46	P119	17.12	London, 2002,0101.783; Hersh Coll.
235.	A46	P120	16.91	ANS 1944.100.35061.
236.*	A47	P121	16.89	Chaponnière & Firmenich 6 (26 Nov. 2014), lot 13.
237.	A47	P122	17.18	Blackburn Museum; SNGuk 0800_0482.
238.	A47	P123	17.05	Hirsch 256 (5 May 2008), lot 55.
239.	A47	P123	17.12	Paris, FRBNF41838004.
240.	A47	P123	17.12	Oxford, Ashmolean HCR23654; SNGuk 0503_3007; Kuft Hoard, <i>IGCH</i> 1670.

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| 241. | A47 | P123 | 16.76 | CNG eAuction 354 (1 Jul. 2015), lot 257. |
| 242. | A47 | P123 | 17.07 | Zurqieh mk662. |
| 243. | A47 | P124 | 16.98 | Solidus Numismatik 6 (19 Jul. 2015), lot 63. |
| 244. | A47 | P125 | 17.17 | CGB.fr 47 (19 Mar. 2011), lot 59; Vinchon (14–15 Mar. 1989), lot 89. |
| 245. | A47 | P126 | 17.09 | The New York Sale XXXIV (6 Jan. 2015), lot 75. |
| 246. | A47 | P126 | 17.18 | Hirsch 296 (13 Feb 2014), lot 1696; Hirsch 303 (25 Sep. 2014), lot 2674. |
| 247. | A47 | P126 | 17.10 | Gorny & Mosch 200 (10 Oct. 2011), lot 1425. |
| 248. | A47 | P127 | 16.81 | Gorny & Mosch 118 (15 Oct. 2002), lot 1250. |
| 249. | A47 | P127 | 17.09 | Elsen 91 (24 Mar. 2007), lot 36. |
| 250. | A47 | P128 | 17.00 | ANS 1947.98.299. |
| 251. | A47 | P129 | 16.91 | CNG eAuction 391 (15 Feb. 2017), lot 315. |
| 252. | A47 | P129 | 17.14 | Peus 396 (5 Nov. 2008), lot 297. |
| 253. | A47 | P129 | 17.09 | VAuctions 249 (15 Jul. 2010), lot 2. |
| 254. | A47 | P129 | 16.90 | CNG eAuction 243 (27 Oct. 2010), lot 68; CNG eAuction 218 (9 Sep. 2009), lot 143. |
| 255. | A47 | P129 | 17.10 | CNG 54 (14 Jun. 2000), lot 480. |
| 256. | A47 | P130 | 17.10 | ANS 1944.100.35074. |
| 257. | A47 | P131 | 16.87 | Savoca Numismatik 15 (28 May 2017), lot 341. |
| 258. | A47 | P132 | 16.38 | VAuctions 257 (30 Dec. 2010), lot 8. |
| 259. | A47 | P133 | n.r. | Troxell, 1997, 132 no. 70, pl. 28, 70; Unknown Findspot (in Asia Minor) 1993 Hoard, <i>CH</i> 10.246. |
| 260. | A47 | P133 | 16.81 | Elsen 94 (15 Dec. 2007), lot 518. |
| 261. | A47 | P133 | 17.04 | CNG eAuction 325 (23 Apr. 2014), lot 277. |
| 262. | A47 | P133? | 16.15 | Cox, 1953, 32, pl. III, 32; Gordion Hoard, <i>IGCH</i> 1406. |
| 263. | A47 | P134 | 16.50 | Herbert Grün 54 (16 Nov. 2010), lot 34. |
| 264.* | A47 | P135 | 16.43 | ANS 1944.100.35076. |
| 265. | A47 | P136 | 16.67 | ANS 1944.100.35077. |
| 266. | A47 | P137 | 15.59 | CNG eAuction 272 (25 Jan. 2012), lot 164. |
| 267. | A47 | P138 | 16.44 | Münz Zentrum Rheinland 181 (17 May 2017), lot 59; Kölner Münzkabinett Tyll Kroha Nachfolger 104 (12 Feb. 2016), lot 38. |
| 268. | A48 | P139 | 17.13 | Elsen 93 (15 Sep. 2007), lot 147. |
| 269. | A48 | P140 | 17.01 | Forum Ancient Coins SH15299. |
| 270. | A48 | P140 | 16.92 | Stack's Bowers NYINC Auction (10 Jan. 2014), lot 33. |

271.	A48	P140	16.82	Gorny & Mosch 156 (5 Mar. 2007), lot 1280.
272.	A48	P141	16.97	Hess Divo 314 (4 May 2009), lot 1083.
273.	A48	P142	17.15	CNG eAuction 389 (18 Jan. 2017), lot 377; Peus 393 (31 Oct. 2007), lot 208.
274.	A48	P142	16.71	CNG 53 (15 Mar. 2000), lot 214.
275.	A48	P143	17.08	Künker 133 (11 Oct. 2007), lot 8024.
276.	A48	P144	16.95	Vienna, Münzkabinett Wien GR 10286.
277.*	A48	P145	16.98	Triton XVI (7 Jan. 2013), lot 584.
278.	A48	P145	16.94	CNG 64 (24 Sep. 2003), lot 106.
279.	A48	P145	17.03	Eukratides Ancient Numismatics vb32.
280.	A48	P145	16.85	V. Gadoury Auction 2016 (14 Dec. 2016), lot 6.
281.	A48	P146	16.90	Goldberg 80 (3 Jun. 2014), lot 3277.
282.	A48	P147	17.07	Hirsch 313 (23 Sep. 2015), lot 2026; Hess-Leu 45 (1970), lot 149.
283.	A48	P148	16.58	Stack's Bowers 2014 NYINC Auction (10 Jan. 2014), lot 34.
284.	A48	P149	16.97	Forum Ancient Coins SH71154.
285.	A48	P150	16.82	CNG 63 (21 May 2003), lot 185.
286.	A48	P151	16.68	Stack's Bowers 2015 ANA Auction (12 Aug. 2015), lot 33021.
287.	A48	P151	17.06	ANS 1944.100.35114.
288.	A49	P152	17.06	CNG eAuction 337 (22 Oct. 2014), lot 157.
289.	A49	P152	16.94	Numismatica Ars Classica 92 (23 May 2016), lot 1441.
290.	A49	P152	17.39	CNG eAuction 364 (2 Dec. 2015), lot 501.
291.*	A49	P153	17.13	LWHT Coll.; Roma Numismatics E-Sale 35 (3 May 2017), lot 178.
292.	A49	P154	16.64	Oxford, Ashmolean HCR23659 SNGuk_0503_3012.
293.	A49	P155	16.69	Rauch Summer Auction 2012 (20 Sep. 2012), lot 237.
294.	A50	P156	17.01	CNG eAuction 199 (19 Nov. 2008), lot 106.
295.*	A50	P156	17.16	Numismatik Lanz München 163 (7 Dec 2016), lot 50.
296.	A50	P156	16.92	CNG eAuction 216 (12 Aug. 2009), lot 78.
297.	A50	P156	17.07	Hirsch 313 (23 Sep. 2015), lot 2026.
298.	A50	P156	17.08	CNG eAuction 399 (14 Jun. 2017), lot 292.
299.	A50	P156	17.04	Naville Numismatics 21 (20 Mar. 2016), lot 55.
300.	A50	P157	16.84	CNG eAuction 307 (24 Jul. 2013), lot 113.

301.	A50	P158	17.11	CNG 72 (14 Jun. 2006), lot 411; "Seleucus I" Hoard <i>CH</i> 10.265.
302.	A50	P158	16.96	Stack's Coin Galleries September 2008 (10 Sep. 2008), lot 54.
303.	A50	P159	16.96	Heritage 3046 (14 Apr. 2016), lot 31062.
304.	A50	P160	17.12	VAuctions 266 (12 Mar. 2015), lot 2004.
305.	A50	P160	16.86	CNG 78 (14 May 2008), lot 412.
306.	A50	P160	16.97	CGB.fr 57 (20 Feb. 2013), lot 87; CGB.fr 53 (19 Apr 2012), lot 47.
307.	A50	P161	17.14	ANS 1944.100.35078.
308.	A51	P162	17.21	CNG 263539.
309.	A51	P163	17.01	Triton XIV (3 Jan 2011), lot 384.
310.	A51	P163	16.92	London, G.2494; Price 3426c.
311.	A51	P164	n.r.	Heritage 311 (11 Jan. 2003), lot 14128.
312.	A51	P164	17.11	Hess Divo 320 (26 Oct. 2011), lot 110.
313.	A51	P165	17.07	Aureo & Calicó 296 (21 Sep. 2017), lot 25.
314.*	A51	P166	17.18	Roma Numismatics XIII (23 March 2017), lot 186.
315.	A51	P167	16.96	CNG eAuction 225 (13 Jan. 2010), lot 54.
316.	A51	P168	16.96	CNG 41 (19 Mar. 1997), lot 302.
317.	A51	P169	17.03	Heritage 3045 (12 Jan. 2016), lot 32064.
318.	A51	P169	16.97	Berlin, Münzkabinett 18253356.
319.	A51	P170	17.15	CNG eAuction 400 (28 Jun. 2017), lot 349.
320.	A51	P170	17.08	Agora 68 (15 Aug. 2017), lot 20; CNG eAuction 388 (14 Dec. 2016), lot 183.
321.	A52	P171	17.20	Stacks Coin Galleries December 2007 (18 Dec. 2007), lot 96.
322.	A52	P172	17.15	Hirsch 238 (10 May 2017), lot 97.
323.	A52	P172	16.64	CNG eAuction 244 (10 Nov. 2010), lot 45.
324.	A52	P173	16.97	CNG 192006; CNG eAuction 218 (9 Sep. 2009), lot 141.
325.	A52	P174	17.10	C.J. Martin Coins EC280.
326.*	A52	P175	17.20	Roma Numismatics E-Sale 9 (28 Jun. 2014), lot 235.
327.	A52	P176	17.13	Berlin, Münzkabinett 18253355.
328.	A52	P177	17.17	CNG eAuction 398 (31 May 2017), lot 342.
329.	A52	P177	17.08	CNG eAuction 347 (25 Mar. 2015), lot 287.
330.	A52	P178	16.50	CNG eAuction 218 (9 Sep. 2009), lot 142.

331. A52 P178 17.08 ANS 1944.100.35080.
332. A52 P178 17.10 VAuctions 259 (10 Feb. 2011), lot 7.
333. A53 P179 16.85 CNG eAuction 124 (12 Oct. 2005), lot 18.
334. A53 P179 17.00 CNG eAuction 347 (25 Mar. 2015), lot 288.
335. A53 P180 17.11 Roma Numismatics eSale 4 (28 Dec. 2013), lot 185.
- 336.* A53 P181 16.10 ANS 1977.158.152.
- 337.* A54 P182 16.66 Goldberg 96 (14 Feb. 2017), lot 1590.
338. A54 P183 16.50 CNG eAuction 271 (11 Jan. 2012), lot 23; Triton II (1 December 1998), lot 327.
339. A54 P183 17.11 CNG eAuction 390 (1 Feb. 2017), lot 226.
340. A54 P183 16.41 CNG eAuction 341 (7 Dec. 2014), lot 248.
341. A54 P184 17.02 CNG 57 (4 Apr. 2001), lot 227.
342. A54 P184 17.34 CNG 810148.
343. A54 P184 17.21 New Haven, Yale University Art Gallery 2001.87.10094.
344. A54 P185 17.32 Triton IX (9 Jan. 2006), lot 798.
345. A54 P185 16.86 CNA XX (25 Mar. 1992), lot 51.
346. A54 P186 17.09 CNG eAuction 383 (28 Sep. 2016), lot 240.
347. A54 P187 17.13 CNG 49 (17 Mar. 1999), lot 223.
348. A54 P188 17.12 Roma Numismatics (21 May 2013), lot 352.
349. A54 P189 17.13 Berlin, Münzkabinett 18253354.
350. A54 P190 15.70 Oxford, Ashmolean HCR23661, *SNGuk_0503_3013A*; Pasagarde Hoard, *IGCH* 1794.
351. A54 P191 16.93 Peus 395 (7 May 2008), lot 124.
352. A54 P191 16.76 CNG eAuction 403 (9 Aug. 2017), lot 288.
353. A54 P192 17.02 Sternberg 23 (29 Oct. 2000), lot 233.
354. A54 P193 17.15 Paul-Francis Jacquier 40 (16 Oct. 2015), lot 100.
355. A54 P194 17.13 ANS 1944.100.35082; Abu Hommos Hoard, *IGCH* 1667.
356. A54 P194 17.13 ANS 1944.100.35096.
357. A54 P195 17.24 CGB.fr (13 Jun. 2017), lot 13.
358. A54 P195 17.13 London, 1878,0301.155; Price 3426f.
359. A54 P195 16.87 Elsen 93 (15 Sep. 2007), lot 675.
360. A54 P196 16.60 CNG eAuction 198 (5 Nov. 2008), lot 55; CNG 41 (19 Mar. 1997), lot 303.

361.	A55	P197	14.50	ANS 1944.100.35083.
362.*	A55	P198	17.10	ANS 1944.100.45132; Armenak Hoard, <i>IGCH</i> 1423.
363.*	A56	P199	17.03	CNG eAuction 398 (31 May 2017), lot 341.
364.	A56	P200	16.96	ACR eAuction 32 (11 Jan. 2016), lot 340.
365.*	A57	P201	17.15	ANS 1944.100.35071.
366.	A57	P201	17.26	CNG eAuction 336 (8 Oct. 2014), lot 130.
367.	A57	P201	17.14	UBS Gold & Numismatics 59 (27 Jan. 2004), lot 5399.
368.	A57	P201	16.61	Heritage 3035 (3 Sep. 2014), lot 32039.
369.	A57	P202	16.59	Künker 295 (25 Sep. 2017), lot 249.
370.	A57	P203	17.13	Stack's Bowers NYINC (6 Jan. 2012), lot 162; CNG 72 (14 Jun. 2006), lot 409.; "Seleucus I" Hoard, <i>CH</i> 10.265
371.	A57	P203	17.31	CNG 61 (25 Sep. 2002), lot 465.
372.	A57	P204	17.24	CNG 49 (17 Mar. 1999), lot 222.
373.	A57	P204	16.94	Christoph Gärtner 32 (24 Oct. 2015), lot 34136.
374.	A57	P205	17.33	Aureo & Calicó, 293 (24 May 2017), lot 2025; Stack's Bowers Galleries (16 Nov. 2012), lot 11579.
375.	A57	P205	17.01	Münzen & Medaillen 27 (28 May 2008), lot 2046.
376.	A57	P206	16.79	Künker eAuction 42 (18 Oct. 2016), lot 40.
377.*	A58	P207	16.93	Künker 226 (11 Mar. 2013), lot 325; Hess Divo 317 (27 Oct 2010), lot 147.
378.	A58	P208	17.06	Heritage 3042 (17 Sep. 2015), lot 29040.
379.	A58	P209	17.12	ANS 1944.100.35079; Ankara Hoard, <i>IGCH</i> 1399.
380.	A58	P210	17.17	CNG 42 (29–30 May 1997), lot 260.
381.*	A59	P211	17.00	C.J. Martin Coins EC153.
382.*	A60	P212	17.12	CNG 79 (17 Sep. 2008), lot 173; Baldwin's 47 (25 Sep. 2006), lot 41.
383.	A60	P213	16.43	ANS 1944.100.35089; Abu Hommos Hoard, <i>IGCH</i> 1667.
384.	A60	P213	15.15	ANS 1953.150.22; Büyükçekmece Hoard, <i>IGCH</i> 0867.
385.	A60	P214	17.04	Peus eAuction 4 (14 Jan. 2017), lot 73.
386.	A60	P214	17.04	CNG 66 (19 May 2004), lot 246.
387.	A60	P214	17.10	ANS 1944.100.35085; Abu Hommos Hoard, <i>IGCH</i> 1667.
388.	A60	P214	16.82	ANS 1944.100.35086; Abu Hommos Hoard, <i>IGCH</i> 1667.

389.	A60	P215	15.87	Amandry and Callot, 1988, 11, pl. XIII, 11; Failaka Hoard, <i>CH</i> 8.256.
390.	A60	P215	17.20	Baldwin's 39 (11 Oct. 2004), lot 1217.
391.	A61	P216	16.94	London, 2002,0101.784; Hersh Coll.
392.*	A61	P216	17.10	ANS 1944.100.35084.
393.	A61	P217	17.00	Herbert Grün 65 (12 May 2015), lot 69.
394.	A61	P218	17.35	The New York Sale XXV (5 Jan. 2011), lot 36.
395.	A61	P218	17.15	CNG 61 (25 Sep. 2002), lot 464.
396.*	A62	P219	17.18	ACR 15 (27 Apr. 2016), lot 208; Triton XVIII (5 Jan. 2015), lot 776.
397.	A62	P220	17.04	Noble Numismatics 109 (28–30 Jul. 2015), lot 3597.
398.	A62	P220	17.16	Sedwick 21 (3–4 May 2017), lot 1274.
399.	A62	P221	16.67	ANS 1944.100.35097.
400.	A62	P221	16.18	ANS 1944.100.35098.
401.	A62	P222	17.00	ANS 1944.100.35099.
402.	A63	P223	17.18	Triton XVI (7 Jan 2013), lot 583.
403.*	A63	P223	17.07	CNG eAuction 224 (16 Dec. 2009), lot 95.
404.	A63	P223	17.00	Naumann 37 (1 Nov. 2015), lot 102.
405.	A63	P223	16.77	Adolph E. Cahn 84 (29 Nov. 1933), lot 251.
406.	A64	P224	16.63	CGB.fr 45 (14 Oct. 2010), lot 63.
407.	A64	P224	14.18	ANS 1944.100.35069; Abu Hommos Hoard, <i>IGCH</i> 1667.
408.	A64	P225	17.22	Heritage Europe 34 (23 May 2012), lot 90.
409.*	A64	P226	17.06	ANS 1944.100.35070.
410.	A64	P226	16.69	Berlin, Münzkabinett 182533531.
411.	A64	P227	17.14	CGB.fr 36 (23 Oct. 2006), lot 94.
412.	A64	P228	17.00	CNG 397 (17 May 2017), lot 223.
413.	A64	P228	16.78	Hirsch 281 (2 May 2012), lot 224; Hirsch 275 (22 Sep. 2011), lot 3490.
414.	A64	P229	17.27	CNG eAuction 336 (8 Oct. 2014), lot 131.
415.	A64	P229	17.07	Obolos eAuction 6 (28Nov. 2016), lot 318.
416.	A64	P229	16.68	CNG eAuction 375 (1 Jun. 2016), lot 450.
417.	A64	P230	17.18	Calgary Coin vcoin5350; VAuctions 218 (18 Dec. 2008), lot 10.
418.	A64	P230	17.16	Pegasi Numismatics XXII (20 Apr. 2010), lot 107.

419.*	A65	P231	17.37	VAuctions 242 (25 Feb. 2010), lot 2.
420.	A65	P231	17.17	UBS Gold & Numismatics 61 (14 Sep. 2004), lot 4267.
421.	A65	P231	17.17	Münzen & Medaillen 30 (28 May 2009), lot 219.
422.	A66	P232	17.07	Gorny & Mosch 118 (15 Oct. 2002), lot 1251.
423.*	A66	P232	16.68	ANS 1944.100.35104.
424.*	A67	P233	16.81	Kölner 105 (16 Sep. 2016), lot 91; Naumann 21 (7 Sep. 2014), lot 123.
425.	A67	P233	17.24	CGB.fr (15 Dec. 2015), lot 372084.
426.	A67	P233	16.94	CNG 61 (25 Sep. 2002), lot 463.
427.	A67	P234	17.18	Roma Numismatics XII (29 Sep. 2016), lot 207.
428.	A67	P235	17.07	Paris, BNF41848327.
429.	A67	P236	16.89	ANS 1944.100.45131; Armenak Hoard, <i>IGCH</i> 1423.
430.	A67	P236	17.15	Meister & Sonntag 10 (18 Nov. 2010), lot 10.
431.	A67	P236	17.01	CNG eAuction 322 (12 Mar. 2014), lot 396.
432.	A67	P237	16.77	Naumann 52 (2–3 April 2017), lot 226.
433.	A67	P237	16.96	Heritage 3046 (14 Apr. 2016), lot 31061.
434.	A68	P238	16.61	CNG eAuction 301 (24 Apr. 2013), lot 100.
435.*	A68	P238	16.97	Naumann 40 (7 Feb. 2016), lot 72.
436.	A68	P238	17.03	Vilmar Numismatics 10868.
437.	A68	P238	16.92	CNG eAuction 194 (20 Aug. 2008), lot 28.
438.	A68	P238	17.19	ANS 1974.26.573.
439.	A68	P239	17.14	Noble Numismatics 80 (22–24 Nov. 2008), lot 3173; Noble Numismatics 70 (9–11 Jul. 2002), lot 3139.
440.	A68	P240	17.26	ANS 1944.100.35095.
441.	A69	P241	16.83	CNG 88 (14 Sep. 2011), lot 535.
442.	A69	P241	16.91	ANS 1952.57.5.
443.	A69	P242	17.15	CGB. fr (May 2017), MA-ID 12020000898.
444.	A69	P243	16.91	Künker eAuction 23 (20 Oct. 2013), lot 10; Hirsch 256 (5 May 2008), lot 56
445.	A69	P243	17.26	iNumis 8 (20 Mar. 2009), lot 16.
446.*	A69	P243	16.96	ANS 1944.100.35090; Abu Hommos Hoard, <i>IGCH</i> 1667.
447.	A70	P244	17.05	CNG eAuction 69 (23 Jul. 2003), lot 17.
448.*	A70	P245	17.00	ANS 1944.100.35088.

449. A70 P246 16.97 Münz Zentrum Rheinland 168 (27 Dec. 2013), lot 102.
- 450.* A71 P247 17.05 Numismatik Lanz München 132 (27 Nov. 2006), lot 131.
451. A71 P248 16.92 Bolaffi 26 (10 Jun. 2015), lot 1053.
452. A71 P249 17.05 ANS 1944.100.35059; Egypt Hoard, 1912, *IGCH* 1668.
- 453.* A72 P250 16.94 CNG eAuction 310 (4 Sep. 2013), lot 143.
454. A72 P250 17.09 ANS 1944.100.35060; Andritsaena Hoard, *IGCH* 0083.

4.2 A rather than \mathcal{A} (Price B24)

455. A72 P251 16.21 CNG eAuction 310 (4 Sep. 2013), lot 144. Tooled coin.
- 456.* A72 P252 17.06 London, 1888,0614.26; Price B24.

4.3 Δ rather than \mathcal{A} (Price -)

- 457.* A73 P253 17.10 CGB.fr inventory no. bgr_374425; CGB.fr (29 Sep. 2015), lot 364766; Abdo Ayoub Coll. Coin image ©CGB Numismatique Paris.

4.1 \mathcal{A} (Price 3426)

- 458.* A74 P254 16.24 VAuctions 323 (17 Mar. 2017), lot 93.
- 459.* A75 P255 15.80 ANS 1944.100.35062.
- 460.* A76 P256 16.70 ANS 1944.100.35081.
- 461.* A77 P257 17.10 Bertolami Fine Arts 3 (31 May 2011), lot 85.
462. A77 P257 17.20 ANS 1944.100.35063; Abu Hommos Hoard, *IGCH* 1667.
463. A77 P258 16.88 Oxford, Ashmolean HCR23657; *SNGuk_0503_3010*.
464. A77 P258 17.02 Comptoir des Monnaies 31735; Rauch Summer Auction 2013 (18 Sep. 2013), lot 31.
- 465.* A78 P259 16.94 CNG eAuction 343 (28 Jan. 2015), lot 266.
466. A78 P259 16.43 ANS 1944.100.35058.
- 467.* A79 P260 17.15 Nomos 12 (22 May 2016), lot 39; Münzen & Medaillen 41 (11 Dec. 2014), lot 52; Münzen & Medaillen 35 (17 Nov. 2011), lot 36.
468. A79 P261 17.13 Münzen & Medaillen 8 (10 May 2001), lot 109.
469. A79 P262 17.17 Oxford, Ashmolean HCR23656; *SNGuk_0503_3009*; Kuft Hoard, *IGCH* 1670.
470. A79 P263 16.75 Noble Numismatics 66 (22–30 Mar. 2001), lot 3285.

471.	A79	P264	17.22	Hess Divo 314 (4 May 2009), lot 1082.
472.	A79	P264	16.94	Peus 286 (26 Apr. 2006), lot 187.
473.	A79	P265	17.20	Heritage 3032 (10 Apr. 2014), lot 23119; Forum Ancient Coins SH46941.
474.*	A80	P266	17.61	Freeman & Sear Mail Bid 15 (27 Jun. 2008), lot 53.
475.*	A81	P267	17.04	Roma Numismatics E-Sale 7 (26 Apr. 2014), lot 388.
476.*	A82	P268	16.56	ANS 1944.100.35102.
477.*	A83	P269	17.10	ANS 1944.100.35091.
478.*	A84	P270	16.96	Leu Numismatik Web Auction 1 (18 Jun. 2017), lot 321.
479.	A85	P271	17.14	iNumis 16 (16 Oct. 2011), lot 23.
480.*	A85	P272	16.27	ANS 1944.100.35103.
481.	A85	P272	16.56	ANS 1944.100.35101; Olympia Hoard, <i>IGCH</i> 176.
482.*	A86	P273	17.07	CNG eAuction 224 (16 Dec. 2009), lot 94.
483.	A86	P274	17.14	VAuctions 247 (3 Jun. 2010), lot 4; CNG 205 (25 Feb. 2009) lot 69.
484.*	A87	P275	16.89	CNG eAuction 255 (4 May 2011), lot 141.
485.	A88	P276	17.04	Pars Coins PCW-G4462.
486.*	A88	P276	17.01	CNG eAuction 285 (22 Aug. 2012), lot 149.
487.*	A89	P277	17.10	CNG eAuction 216 (12 Aug. 2009), lot 77.
488.	A89	P277	17.13	ANS 1944.100.35092; Ankara Hoard, <i>IGCH</i> 1399.
489.	A89	P277	16.57	Spink 14006 (22 Sep. 2014), Lot 653.
490.	A89	P278	17.10	ANS 1944.100.35093.; Zemun Hoard, <i>IGCH</i> 0458.
491.	A89	P279	16.57	CNG eAuction 193 (6 Aug. 2008), lot 42.
492.	A89	P279	16.59	Amandry and Callot, 1988, 10, pl. XIII, 10; Failaka Hoard, <i>CH</i> 8.256.
493.	A89	P279	17.0	ANS 1944.100.35094.
494.*	A90	P280	17.19	Nomos 15 (22 Oct. 2017), lot 67.
495.	A90	P280	17.10	Berlin, Münzkabinett 18253353.
496.*	A91	P281	n.r.	Peus 410 (31 Oct. 2013), lot 798 (one of 3 coins).
497.	A91	P282	17.06	Gorny & Mosch 118 (15 Oct. 2002), lot 1249.
498.	A92	P227	16.94	London, 1882,0803.3; Price 3426b.
499.	A92	P283	17.25	CNG 63 (21 May 2003), lot 184.
500.*	A92	P283	17.04	CNG eAuction 403 (9 Aug. 2017), lot 287.

501.	A92	P284	16.52	Miller 2010, 7, pl. 6, 7; East Arachosia (Quetta) Hoard, <i>CH</i> 10. 275.
502.*	A93	P285	17.12	Naumann 63 (4 Mar. 2018), Lot 593.
503.	A94	P286	16.80	Palmyra Heritage VCoins store 122133842599.
504.*	A94	P286	16.99	CNG 79 (17 Sep. 2008), lot 172.
505.	A94	P286	17.02	CNG eAuction 318 (15 Jan. 2014), lot 316.
506.*	A95	P287	16.73	Künker 295 (25 Sep. 2017), lot 248.
507.*	A96	P288	16.98	Triton IX (9 Jan. 2006), lot 799.
508.*	A97	P289	16.96	CNG eAuction 402 (26 Jul. 2017, lot 348.
509.	A97	P290	16.99	CNG 72 (14 Jun. 2006), lot 410; "Seleucus I" Hoard, <i>CH</i> 10.265.

Excluded from the catalogue of Series 4:

ANS 1989.114.1 too worn and corroded for definitive die identification.

ANS 1956.28.138 appears to be a silver plated fourrée.

ANS 1944.100.35100 bearing a AA mintmark; a Celtic (?) imitative of Series 4. Another example from the same obverse die, Hirsch 338 (9 May 2018), lot 4.

COMMENTARY

Series 1 and 2 (Gold Staters)

Series 1 and 2 consist of gold staters distinguished by the placement of the \mathcal{A} mintmark. It is located to the left of Nike's right wing on Series 1 (Cat. Nos. 1–31), while positioned beneath the wing on Series 2 (Cat. Nos. 32–43). The two series were struck contemporaneously, as evidenced by two obverse die links and a parallel progression of iconographic development summarized in Table 1 (below). Sixteen obverse and 24 reverse dies are represented in Series 1, which includes two previously unrecorded varieties with distinguishing decorative elements on Athena's helmet; 1.2 bearing a griffin and 1.3 with a sphinx. Nine obverse and eight reverse dies are represented in Series 2, which includes a previously unrecorded variety (2.2) struck from an obverse die with a griffin rather than a serpent on Athena's helmet. In Series 2, the progression of small die breaks on the \mathcal{A} monogram and behind Nike's trailing leg on a linking reverse die (P25) serve to sequence varieties 2.1 and 2.2. The latter from obverse die Av18 mirrors the same iconographic development on Series 1 die Av2, to the extent that both dies are nearly identical, evidently from the same engraver's hand. This is the first of four occurrences in the catalogue linking the two types

by the presence of a shared die engraver, or shared die. Series 1 and 2 are linked by two obverse dies, Av3 and Av5. Die Av3 was in its earliest unworn state when used to strike Series 2, while the reverse applied with die Av5, which was initially put into use for Series 1. This indicates that shared dies were commissioned during the striking of both series, excluding the possibility that one series was struck after the other using old dies from the former. Two almost identical pairs of obverse dies, each pair from the hand of a single engraver, serve to reinforce the association of the two types; the previously noted example of Av2 and Av18, plus Av6 and Av19. Within Series 1, one reverse die link serves to sequence dies Av11 and Av12.

Table 1. Series 1 and 2: dies, links and relative chronology

Series 1 Dies	Links and Iconography	Series 2 Dies
Av1	Paired to reverse dies depicting Nike's right hand with an open facing palm. Series 2: Av17 and Av18 reverse die linked.	Av17
Av2	Griffin on helmet—near identical dies.	Av18
Av3	Obverse die link between Series 1 & 2.	Av3
Av4		-
Av5	Obverse die link between Series 1 & 2.	Av5
Av6	Near identical obverse dies.	Av19
Av7–Av15	Nike's right hand depicted in profile on the last of the reverse dies in each series. Series 1: Av11 and Av12 reverse die linked. Av12 die link to Miletos (Price 2078)	Av20–23
Av16	Sphinx on helmet.	

The sequence is defined in the broadest sense by a progression of the detail in the depiction of the extended right hand of Nike. It evolves from the initial depiction of a crudely defined facing open palm with splayed fingers (Pl. 4, A), eventually to that of a well-defined hand in profile oriented upward (Pl. 4, B) on the last reverse dies of Series 1 and 2. Clumsily engraved intermediate forms of representation are present, indicating that the die engravers struggled to develop the depiction of the hand in profile. This change finds a parallel in the altered depiction of the extended right hand of Zeus that occurs midway through the tetradrachm sequence of Series 3. This parallel suggests that the gold emission finished around the time this change took effect early in the tetradrachm sequence.

The die analysis demonstrates that Series 1 and 2 were struck in parallel (Table 1) so that the differing placement of the \mathcal{R} mintmark does not define separate issues. Rather, the placement of the \mathcal{R} monogram, either below the wing of Nike, or in the left field, is likely to have been of some significance in the mint's internal control process. Most plausibly, it may have served to identify the output from each of two anvils during parallel striking. If so, the reverse dies were purpose cut for use on each anvil, the latter uniquely identified by the placement of the \mathcal{R} monogram. On a daily basis, the struck product from each anvil, identifiable to the specific coin level, could be reconciled precisely by weight to the amount of gold, or gold blanks, apportioned to each anvil at the start of the day. This would have reduced the risk of fraud, malfeasance, or debasement via the ability to match a coin with those responsible for its production, notwithstanding the fact that two production teams operated side by side in the same facility.

Transfers between mints

The diversity of engraving styles of the head of Athena (Pls. 1–4) across the gold emission is notable. The work of up to thirteen engravers is identified in the catalogue of staters. Most notably, as demonstrated on Pl. 1, the work of at least five of these engravers is also recognized in the output of other mints. Common to both Series 1 and 2, obverse die Av5 is of a uniquely distinctive style and detail, also found on an example of the first dated stater issue of Sidon (Price 3482). Dated regnal year 7 (RY 7), equivalent to 327/6 BC, it is the first stater from the mint to depict a serpent, rather than a griffin,²⁸ on Athena's helmet (Pl. 1, 1). The Sidon die used to strike this example of RY 7 was not recorded by Newell,²⁹ but was identified from coins in commerce.³⁰ The use of this die was limited to the RY 7 emission; an important chronological marker. Whether the engraving of Av5 preceded, or post-dated, the engraving of the Sidon RY 7 die is not immediately apparent. However, the first presence at Sidon of the serpent rather than the griffin motif on Athena's helmet argues for the introduction of a new die engraver to Sidon at this time. Based on this, plus the consideration of the movement of other die engravers and an obverse die from Arados II to other mints, it is likely that the engraver of Av5 was transferred from Arados II to Sidon.

28. Le Rider, *Coinage*, 134–139. The earliest staters formerly attributed to Sidon (Price 3456–3466) are reattributed to Tarsos so that Price 3482 is the first issue in the Sidon series to bear the serpent motif.

29. E. T. Newell, *The Dated Alexander Coinage of Sidon and Ake* (Oxford: Oxford University Press, 1916), 12, no. 21 and pl. II, 5.

30. CNG 87 (18 May 2011), lot 347 (illustrated in Pl. 1, 1) and CNG 100 (7 Oct. 2015), lot 45.

Series 1 die Av6 and its Series 2 counterpart Av19 find a very close match with four of the Sidon dies used for stater issues dated regnal years 13 (321/0 BC; Price 3500; Newell *Sidon* 38, dies Y and Z), 14 (320/19 BC; Price P170–P171; Newell *Sidon* 42, die CC), 16 (318/7 BC; Price P176; Newell *Sidon* 46, die CC) and 18 (316/5 BC; Price 3503; Newell *Sidon* 49, dies CC and DD). Pl. 1, 2 compares Av 6 (Cat. No. 13) with a Sidon year 13 example³¹ from Newell's obverse die Z. The detailing of the helmet plumes and structure, Athena's hair, and the three locks of hair protruding from beneath the helmet rim obscuring Athena's ear are so distinctive that it is most likely that these dies all originated from one engraver's hand. The congruity of these elements, plus the outline and form of Athena's head, with those of dies Av6 (Series 1) and Av19 (Series 2) is inescapable, pointing to the transfer of the engraver responsible for these dies to Sidon in advance of the issues commencing in 321/0 BC.

Obverse die Av11 finds an extremely close match with the obverse die of Thompson's, Miletos Series III, 129³² that was used to strike examples of Price 2096, dated to 323–322 BC (Pl. 1, 3). The match is so close that it is concluded that the die engraver responsible for Arados die Av11 was transferred to Miletos. It may have been by this means that obverse die Av12, reverse die linked to Av11, was transported to Miletos, where it was used to strike one of the Miletos Series I staters dated to the period 325–323 BC. Obverse die Av12 is an unequivocal die-link to an example of Price 2078 from Miletos (Pl. 1, 4).³³ The style and detail of this die, and others from the hand of the same engraver, is so distinctive that it stands well apart from others. This occurs in the treatment and fine detailing of the crossed form of the proximal and medial plumes of Athena's helmet, plus the relatively unstructured, falling locks of Athena's hair. Die Av12 was in its unworn state when the Arados II coin (Cat. No. 23) was struck, whereas die wear is present on the Miletos coin, unequivocally identifying the direction of die transfer. Miletos Series I, including Price 2078, was dated by Thompson to the period 325–323 BC. The Arados stater sequence must either precede, or partially overlap this date range. No other comparably styled dies have been identified in the Miletos sequence, from which it might be concluded that the engraver of Av12 did not accompany the die transfer to Miletos.

31. Triton XVI (8 Jan. 2013), lot 295.

32. M. Thompson, *Alexander's Drachm Mints I: Sardes and Miletus* (New York: American Numismatic Society, 1983), pl. 24, 129. British Museum coin 1878,0301.57.

33. This coin is from a die unrecorded by Thompson, *Drachm Mints*. Illustrated coin is Dimitry Markov 11 (3 Sep. 2003), lot 26; the same coin as Gorny & Mosch 122 (10 Mar. 2003), lot 1230. It is reverse die linked to another example of Price 2078.

However, the work of the same engraver is later recognized at Tyre (Ake of Newell and Price), where an almost identical obverse die was used to strike some of the staters dated year 33 (317/6 BC;³⁴ Price 3284 and 3285; Newell *Dated Ake* 36, die O), illustrated on Pl. 1, 4.³⁵ This die marks the sole introduction into the Tyre series of the serpent motif in place of the griffin on Athena's helmet, suggesting that it may have been the result of the engagement of a new die engraver at the mint. A progression in the iconography involving a slight refinement of the falling locks of Athena's hair, in particular the leading edge of the hair style, plus the addition of a necklace suggest that the Tyre die post-dates the Arados II/Miletos example from the same engraver's hand. It appears that sometime after the transfer of die Av12 to Miletos, the engraver of this die must have transferred to Tyre where he engraved a near identical obverse die for the gold emission of 317/6 BC.

Series 2 obverse die Av17 is of the same portrait model, style and detail, from the same hand as an engraver engaged in cutting of some of the dies for the earliest Alexander III gold issues (Price 164 and 179) of Macedonia (Pl. 1, 5).³⁶ This distinctive portrait model is limited to Arados II and Macedonia, with the execution at the former apparently in its earliest incarnation, as evidenced by embellishments of minor details on the Macedonian series. It is possible that what we are seeing is the transfer of a portrait model, but when weighed with the evidence of other transfers from Arados, it is likely that the transfer was accommodated by means of an engraver transfer. The start date of the Macedonian gold issuance is uncertain, although a *terminus ante quem* of 323/2 BC is established by the presence of the staters in the Saida Hoard (IGCH 1508). Price concluded that it is likely that the Macedonian production of Alexander III gold staters commenced in the later part of the period 330–323 BC,³⁷ while Le Rider deduced a start date in early 323 BC,³⁸ post-dating the first gold issue of Arados II. It appears that the engraver responsible for Av17 was transferred from Arados to Macedonia at the start of the Macedonian mintage of gold staters in the name of Alexander III.

34. Based on the dating era of Ozmilk, the vassal king of Tyre: J. Elayi and A. G. Elayi, *The Coinage of the Phoenician City of Tyre in the Persian Period (5th–4th cent. BCE)* (Leuven: Peeters, 2009), 371–395. Also, Elayi, "Updated," Table 5.

35. Illustrated example is BM 1908,0110.1214; Price, *Coinage*, pl. XI, 3284.

36. Illustrated on Pl. 1, 5 is CNG 87 (18 May 2011), lot 354.

37. Price, *Coinage*, 106.

38. Le Rider, *Coinage*, 54–56.

The identification of various die engraver and die transfers to other mints serves to constrain the chronology of the Arados II gold emission. Based on the probable transfer of the engraver of die Av5 to Sidon for the RY 7 (327/6 BC) issue, the gold mintage at Arados II is likely to have commenced around 328 BC, while the transfer of die Av12 to Miletos to strike Price 2078 dates at least the first 75 percent of the gold emission to earlier than ca. 325–323 BC. The transfers also shed some light on the *modus operandi* of Alexander's mints. They are the first documented cases involving the mintage of gold staters.³⁹ Newell noted the transfer of two tetradrachm dies, plus the die engraver responsible for one of these, from Sidon to Tyre (Ake of Newell).⁴⁰ This occurred during the commissioning of the Alexander mint at Tyre, immediately following the protracted siege of the city in 332 BC. Subsequently, this engraver was transferred to Tarsos in 329 BC where his distinctive style is recognizable on a number of tetradrachm obverse dies.⁴¹ The additional examples identified in this study expand on this underappreciated movement of skilled workers and confirm the suspicion of Le Rider when discussing Newell's example of the Sidon to Tyre transfers, "This is probably not an isolated example. Not only iconographic models, in all likelihood, passed from mint to mint: the artisans did too."⁴²

39. The transfer of a die from Arados II to Miletos may not have been a unique circumstance at the latter mint. Thompson Drachm Mints: 46 and 50 (Series I.28–I.32) identified a possible obverse die link between an Alexander III "eagle on fulmen" drachm (Price 153) and an "enthroned Zeus" drachm of Miletos (Price 2088). Price (*Coinage*, 88, 103–105, 276) disagreed with Thompson's attribution of a small mintage of Alexander "eagle" drachms to Miletos, and assigned these coins to Macedonia, noting that "The general similarity of style of the early silver of this mint [Miletos] to that of lifetime Macedonia issues makes it very likely that there was some contact between the mints of the two areas, and the possibility that an engraver, perhaps with a die, transferred between the two cannot be discounted." He stated that "It is preferable to view this isolated link between Macedonia and Miletos as the result of a member of the mint personnel travelling to Asia Minor to prepare the imperial coinage of the newly opened Alexander mint" and concluded that "It seems much more probable that skilled mint personnel were moved from Macedonia to Miletos at a time when an exceptionally large coinage was required in a city which did not previously contain an Alexander mint."

40. Newell, *Dated*, 53, and Price, *Coinage*, 436.

41. Newell, "Tarsos," 81.

42. Le Rider, *Coinage*, 138.

Series 3 and 4 (Tetradrachms)

The catalogue of tetradrachms separates into two series distinguished by the portrayal of Zeus on the reverse. Series 3 depicts Zeus seated on a *diphros* with legs disposed side by side, in a parallel fashion (Cat. Nos. 44–139). This portrayal of Zeus is consistent with that found on the earliest output of the other Phoenician mints. Series 4 (Cat. Nos. 140–509) portrays the right leg of Zeus drawn back behind the left leg in a crossed legs style that spread widely throughout the eastern mints, commencing around 324 BC. The sequence of Series 3 and 4 is poorly constrained by four reverse die links between obverse dies A4–A5, A7–A8, A29–A30 and A41–A42. As a result, groupings of obverse of style were used to define the sequence in its broadest sense.⁴³

No obverse die link was identified between Series 3 and 4. However, as sequenced the change between the two occurs with reverse dies paired to the second of two distinctively engraved obverse dies (A22: Pl. 7, 136 and A23: Pl. 7, 140), both the work of the same engraver. Although a significant time break between Series 3 and 4 cannot be completely excluded there is no evidence in the die study to suggest such might have occurred. The large number of engravers represented in the mint's output implies frequent turnover, so that the continuity of an engraver across the end of Series 3 and the start of Series 4 suggests that there was not a major time break (i.e., multiple years or more) between the two series, despite the change in style of depiction of Zeus. This is consistent with that observed at the mints of Sidon, Tyre, Babylon and Susa where the transition from the older, parallel legs depiction, to the later crossed legs portrayal is not associated with a chronological break.⁴⁴

Two previously unrecorded varieties are identified in Series 4. The letter A rather than the *Α* monogram defines series 4.2 (Cat. No. 455–456) struck from two different reverse dies. Price considered one of these coins (Cat. No. 456) to be a “barbarous” imitation, Price B24.⁴⁵ However, 4.2 is from the same obverse die (A72) as two other coins in the catalogue (Cat. Nos. 453–454) bearing the

43. Each style group is defined by the form, configuration and composition of the component elements of the iconography, particularly the definition of the brow of Herakles, the form of the locks of his hair on the forehead, and the detail of the ear, snout, and mane of the lion skin headdress. Within style groups the work of more than one die engraver can often be recognised.

44. Of the eastern mints, Susa is a notable exception to the pattern of displacement of the archaizing style of parallel legs by the later crossed legs style. Here the two styles alternated on coinage from c. 320, well into the Seleukid era.

45. Price, *Coinage*, 507.

complete \mathcal{A} monogram, while the obverse style is consistent with that of other dies in this part of the sequence. On series 4.3 (Cat. No. 457) the \mathcal{A} monogram is rendered as Δ . This variant is associated with the mint by virtue of the affinity of style of the obverse die (A73) to that of the immediately preceding coins in the sequence and the consistency of the reverse style with that of series 4.1. The Δ monogram may simply be the result of careless engraving of the A component of the monogram.

Iconographic Progression

Series 3 resembles the earliest issues of Myriandros (Price 3217–3230), Arados (Price 3303; Duyrat Groups I and II)⁴⁶ and Karne (Price 3429). All are based on the same portrait model for Herakles, derivative of that initiated at Tarsos in 333/2 BC. Although within the framework of a common portrait model, the brow of Herakles, lightly delineated by a single curved line defining an eyebrow, is a distinctive characteristic of Series 3 that sets this type apart from the coinage of contemporary mints, although some specimens of Myriandros come close. This contrasts with the heavier, sometimes bulging, brow depiction on a number of the succeeding Series 4 dies. The obverse dies of Series 3 are of a consistent style, although the influence of three engravers can be detected in the detail of the interpretation of that style. The associated reverse dies variably depict the feet of Zeus either free-floating or resting on a footstool. Beyond this variable, they are of a notably consistent style, but for the change in the depiction of the extended right hand of Zeus from that of a facing open palm to that of an upward oriented hand in profile. This occurred mid-way through the emission of Series 3. Only one obverse die (A11) was paired to reverse dies with a mix of the two differing depictions of the right hand of Zeus. All other Series 3 obverse dies were paired to reverse dies that exclusively depicted one, or the other style of hand, without any commingling of the styles. This suggests that the change in the depiction of the right hand of Zeus occurred at a point of time within the working life of a single obverse die. This observation is consistent with that seen at the other Phoenician, Syrian and Babylon mints. It suggests that the change in the portrayal of the right hand of Zeus was a conscious decision taken at each mint, albeit at varying times down to 325 BC, from which time the depiction of the profile hand was the norm throughout the region. This defines a *terminus ante quem* of 326/5 BC for the first half of the Series 3 emission.⁴⁷

46. Duyrat, *Arados*, 9–14, pl. 1, 4–28.

47. See Taylor, “Earliest,” for a detailed discussion of the chronological significance in the eastern mints of the changed portrayal of the right hand of Zeus.

This change was followed by the evolution of the *diphros* beneath Zeus from a single cross-bracing strut to that of a distinctly double-strut depiction. In this process, the topmost beaded horizontal element, initially part of the seat platform structure, migrated down the legs of the *diphros* to form a clear and distinct second bracing strut. This development is evident in the latter part of Series 3. With few exceptions it is the norm on Series 4. In its earliest development, the depiction of the double-strut *diphros* occurred with the commissioning of the Alexander mints at Babylon and Damaskos in 326/5 BC.⁴⁸ This is a chronological reference point for the transition from Series 3 to Series 4. However, the defining characteristic of Series 4 is the changed depiction of Zeus, seated with his right leg (that furthest from the viewer) drawn back behind the left in the fashion of crossing legs. This change was abrupt, with no commingling of the old (parallel legs) and new styles (crossed legs). At Arados I, an apparently contemporaneous change in the style of the depiction of Zeus's legs was made in a different manner. Here the depiction of Zeus changed to that of his left leg (that closest the viewer) rather than his right drawn back, so that the overall disposition of the legs defines an L-shape below the knees (Price 3316; Duyrat Group IV, Series 4). The differing approach to the new treatment of Zeus's legs at the two Arados mints is a notable point of differentiation. It suggests that the change in the style of Zeus's legs may have originated at Arados with two competing styles. The earliest firmly dated examples of the crossed-legs style are found at Sidon on tetradrachms (Price 3487) dated regnal year 9 (325/4 BC). At Tyre (Ake of Price) the same occurs on coinage (Price 3265 and 3267) dated regnal year 26 (ca. 324/3 BC). However, within the uncertainties attached to the definition of the start of the Tyrian year and the approach taken at Sidon, versus Tyre, to counting, or otherwise the accession year,⁴⁹ this timing may be synchronous. At these two mints, reverse dies in both the old and new style are identified during the year in which the new style emerged, indicating that the change was implemented in the course of a year rather than at its outset, and that no time break accompanied the change. The latter supports the inference from the die study that at Arados II the transition from Series 3 (parallel legs) to Series 4 (crossed legs) did not

48. Taylor, "Damaskos."

49. Elayi and Elayi, *Coinage*, 373: "The Phoenician lunar calendar is not well-known and it is uncertain whether the year began in the Spring (March/April) or in the Autumn (September/October)." The Macedonian year, by which the coinage of Sidon is dated most certainly commenced in the Autumn (September/October). Sidon followed the accession-year system in which the remaining part of the year in which the royal accession occurred counted as year 1, rather than the first full calendar year following the accession. The system followed at Tyre is less certain and may have varied from ruler to ruler.

involve a substantial time break. It is notable that the L-legs style of Arados I is not found on the coinage of either Sidon or Tyre. The regional uptake of this style was limited to the last of the Babylon Group II coinage (Price 3642–3670), preceding the adoption of the crossed legs style on Babylon Group III coinage around 324/3 BC. These observations combined with the die count at Arados II (discussed below), suggest that the start of Series 4 was no later than 324/3 BC and may have been up to two years earlier.

Series 4 shows little evolution in the reverse style and detail of the iconography until close to the end of the sequence, where the last 16 obverse dies are paired to reverse dies of variable detail and style. On the last 23 reverse dies of the sequence a high-backed throne makes an appearance, commingled with the depiction of the *diphros*. At the same time, a ground line is placed beneath the throne. In a further progression, the footstool beneath the feet of Zeus, is dropped so that his feet rest directly on the ground line. The introduction of new and variable elements into the reverse iconography sets the last fifth of the Series 4 emission apart from the preceding component, possibly the result of the mintage of the last of the coinage at a time when the iconographic conventions of the mint were either relaxed, or not enforced. It suggests the possibility that these coins may date to a much later period than the main body of the emission.

STATISTICS

The utility of statistical methodology to estimate the size of a coin emission is a contentious subject.⁵⁰ However, for the following reasons, there is both validity and utility in the statistical estimation of the original population of dies from which a sample of surviving coinage was derived, albeit couched within a widely varying degree of uncertainty dependent on both the size and randomness of a sample of the coinage under study. Uncertainty,⁵¹ properly quantified, does not negate the utility of an estimate of the original population of dies from which a coinage was struck, provided it is considered together with the estimate in making comparisons from one coinage sample to the next. Moving a step beyond the estimation of the original number of dies to make an estimate of the struck vol-

50. T. V. Buttrey, "Calculating ancient coin production: Facts and fantasies," *Numismatic Chronicle* 153 (1993), 335–351; T. V. Buttrey, "Calculating ancient coin production II: Why it cannot be done," *Numismatic Chronicle* 154 (1994), 341–352. In response, F. de Callataj, "Calculating ancient coin production: seeking a balance," *Numismatic Chronicle* 155 (1995), 289–311.

51. The most appropriate measure of uncertainty is the 95% Confidence Interval that is attached to an estimate: W. W. Esty, "How to estimate the original number of dies and coverage of a sample," *Numismatic Chronicle* 166 (2006), 360, formula 4.

ume of coinage represented by a sample is more problematic, relying as it does on an assumption of average die productivity. Nevertheless, with a full understanding of the assumptions and inherent uncertainties attached to a statistically determined estimate, the result provides an “order of magnitude” estimate of the total volume coined. This can constrain interpretations and facilitate comparison across different coinages and mints. In the absence of such statistical estimation within a framework of a quantified uncertainty, comparison across different coinage emissions, or mints, is limited to observed die counts. The latter are prone to a potentially greater unquantified error and uncertainty, one that arises from variable sample sizes and survival rates.

Table 2. Estimated coinage: gold staters

	Series 1 and 2	
	Av dies	P dies
Sample size (n)	43	43
Observed Dies (d)	23	32
Singletons (d_1)	11	26
Characteristic Index (n/d)	1.87	1.34
Coverage (C_{est})	0.74	0.40
Estimated Dies (D_{est})	49.5	125.1
95% Confidence Interval	31.9–77.6	66.9–251.0
Observed P/A	1.39	
Estimated P/A	2.53	
Estimated coinage	500,000	
Attic talents of gold	165.38	
Attic talents silver equivalent	1,653.8	

Table 3. Statistics: tetradrachm emission

	Series 3				Series 4				Total
	A dies	P dies	A dies	P dies	A dies	P dies	A dies	P dies	
Sample size (n)	96	96	370	370	466	466	466	466	
Observed Dies (d)	22	56	75	234	97	290	97	290	
Singletons (d_i)	4	29	20	151	24	180	24	180	
Characteristic Index (n/d)	4.36	1.71	4.93	1.58	4.80	1.61	4.80	1.61	
Coverage (C_{est})	0.96	0.70	0.95	0.59	0.95	0.61	0.95	0.61	
Estimated Dies (D_{est})	28.5	134.4	94.1	636.6	122.5	767.8	122.5	767.8	
95% Confidence Interval	24.4–33.4	96.3–188.2	87.4–101.3	525.7–771.3	114.6–131.0	649.6–907.8	114.6–131.0	649.6–907.8	
Observed P/A		2.5		3.1		3.0		3.0	
Estimated P/A		4.7		6.8		6.3		6.3	
Estimated coinage*		c. 580,000		c. 1,880,000		c. 2,460,000		c. 2,460,000	
Attic talents*		c. 383.7		c. 1,236.5		c. 1,620.2		c. 1,620.2	

*Estimated original dies have been rounded to the nearest whole die for the calculation of the volume coinage struck

Tables 2 and 3 summarize the statistics of the gold and silver emissions using the approach of Esty to estimate the original population of dies used at the mint,⁵² combined with Callataÿ's estimates of die productivity⁵³ to approximate the volume of coinage produced. An estimated 50 ± 18 original stater obverse dies, plus 123 ± 8 tetradrachm obverse dies were employed at Arados II. Based on this, the coinage is estimated to have totaled $3,274 \pm 700$ Attic talents of silver equivalent, of which approximately 50% was gold staters; the latter determined assuming a 1:10 gold to silver weight equivalent value.⁵⁴ Over its life, Arados II produced a significant volume of coinage, which unusually for the time was equally proportioned between gold and silver on a value equivalent basis. Moreover, as will be shown, the gold coinage was struck in the first two to three years of the mint's 28 year life, after which no further gold coinage was issued.

The estimated number of original dies employed in each series also provides a basis for the determination of a potential minimum duration of the coinage. An estimated original population of 50 obverse stater dies, split two-thirds Series 1 and one-third Series 2, were put to use in a parallel striking process. The latter argues strongly for near continuous operation to achieve a requisite volume of coinage in a comparatively short time, otherwise serial striking over a more protracted period would have been a more efficient and less demanding process. With an assumed average daily striking rate of 1,000 staters per anvil, and an average stater die productivity of 10,000 coins, then the gold coinage might have been struck in as little as one year. An estimated original population of 123 obverse tetradrachm dies were commissioned, split one-quarter Series 3 and three-quarters Series 4. All indications are that the tetradrachm coinage was struck serially. Based on an assumed average tetradrachm die productivity of 20,000 coins, combined with a conservatively estimated striking rate of 1,000 coins per day, the entire tetradrachm coinage could have been struck in less than 7 years of continuous striking, with Series 3 accounting for as little as 20 months of striking.⁵⁵ Despite the large estimated volume of the coinage, the totality of

52. W. W. Esty, "The Geometric Model for Estimating the Number of Dies," in *Quantifying Monetary Supplies in Greco-Roman Times*, ed. F. de Callataÿ (Bari: Edipuglia, 2011), 43–58.

53. An average stater obverse die productivity of 10,000 coins and an average tetradrachm obverse die productivity of 20,000 coins per F. de Callataÿ, "Quantifying monetary production in Greco-Roman times: a general frame," in *Quantifying Monetary Supplies in Greco-Roman Times*, ed. F. de Callataÿ (Bari: Edipuglia, 2011), 23.

54. Le Rider, *Coinage*, 149 "We do not know if the relative value of the two metals, which was theoretically 1:13.33 under the Persians remained the same under Alexander or if it went to 1 to 10, as in Greece."

55. By way of comparison to the conservative assumption of a daily striking rate of 1,000 coins, Callataÿ has determined from a die study of the dated tetradrachm issues of Mithradates

Series 1–4 might have been struck in less than seven years based on a continuous striking operation with a daily mintage of no more than 1,000 coins per anvil. This indicates that Price's dating of the coinage to the period 330–320 BC is a plausible possibility, although, as will be shown, the hoard evidence suggests a more extended, downdated period of mintage.

Another noteworthy aspect to emerge from the statistical analysis of the Arados II coinage is the divergence in the estimated average die pairing ratio (P/A) for gold and silver dies; the former is estimated to have been 2.5 (Table 2), while the latter is calculated to have been 6.3 (Table 3). A peripheral observation from the stater die analysis is that almost all the gold coins show evidence of die rust, indicative of striking from ferrous dies. This contrasts with the complete absence of the effects die rust on the tetradrachms, indicating that the latter were struck from dies of bronze composition. The significantly lower die-pairing ratio in the sample of stater dies may well result from the use of harder and stronger ferrous dies for the gold coinage, versus that of bronze dies for the silver coinage. This is the earliest recorded use of ferrous dies in the Alexander series. The transfer of die engravers and ferrous dies to other mints, as noted to have occurred with obverse die Av12, may have been instrumental in the transfer of this technology throughout the Macedonian Empire, for the effects of die rust becomes more widespread on the staters produced elsewhere after the transfers from Arados II to other mints.

METROLOGY

Table 4 summarizes the weight distribution of the coins in the catalogue. The gold staters were struck to the Attic weight standard of 8.6 g per stater, with no difference between the two series. The weight distribution (Fig. 1) of the staters is tightly constrained indicating precise al pezzo weight adjustment. The tetradrachms of Series 3 appear to have been struck on the Attic standard of 17.2 g per tetradrachm, within a tightly constrained weight distribution (Fig. 2). Series 4 shows a discernible weight reduction over its duration with mean median and modal weights all around 0.8 g less than Series 3. The weight

VI Eupator that up to 5 obverse tetradrachm dies were used per month, suggesting an average striking rate of up to ca. 3,000 coins per day: F. de Callatay, *L'histoire des guerres mithridatiques vue par les monnaies* (Louvain-la-Neuve: Association de numismatique professeur M. Hoc, 1997), 407; F. de Callatay, "The Late Hellenistic Didrachms of Leukas: Another Greek Coinage for the Roman Army," in *Fides: Contributions to Numismatics in Honor of Richard B. Witschonke*, ed. P. G. van Alfen, G. Bransbourg and M. Amandry (New York: American Numismatic Society, 2015), 256.

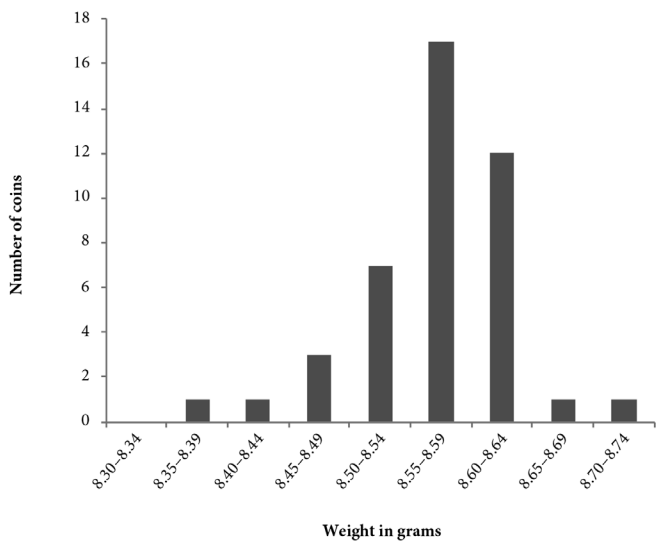


Figure 1. Metrology of AV staters (Price 3422-3423).

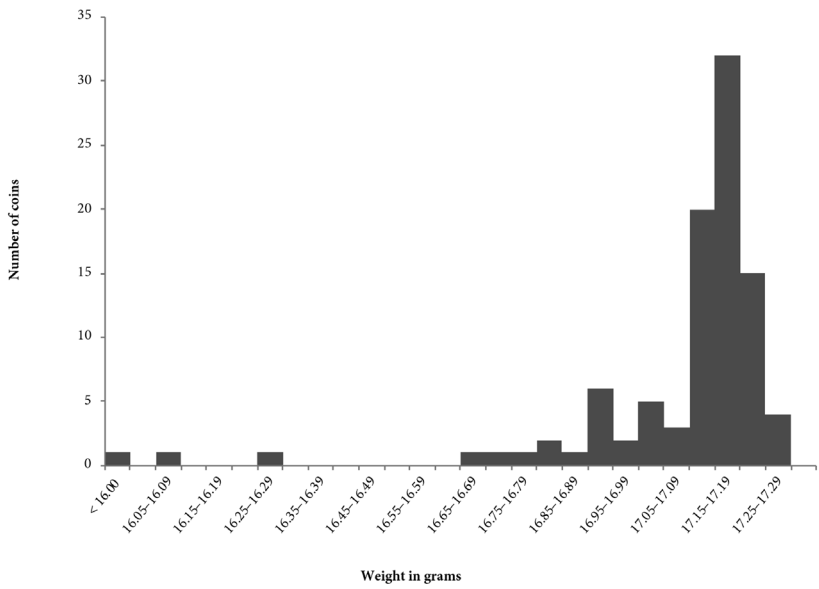


Figure 2. Metrology of Series 3 AR tetradrachms (Price 3424).

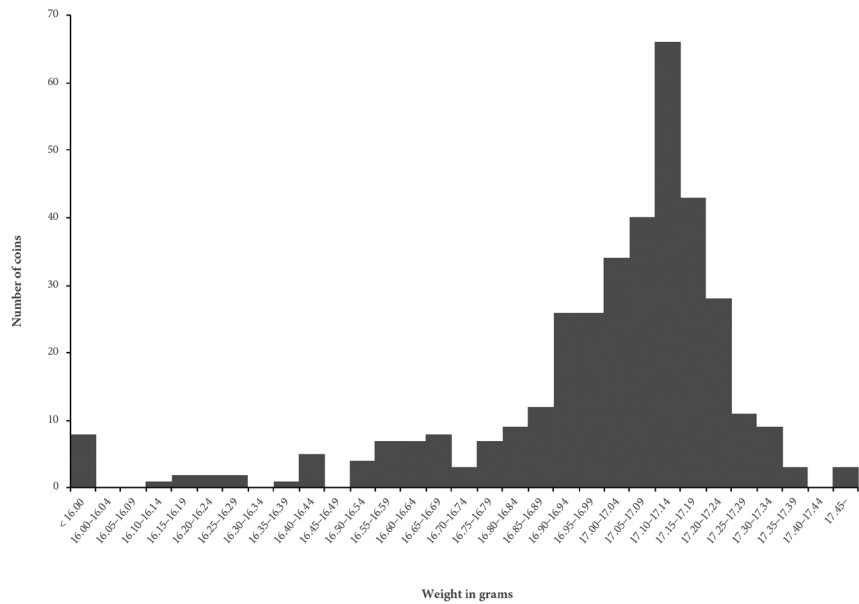


Figure 3. Metrology of Series 4 AR tetradrachms (Price 3426).

distribution suggests a reduced Attic weight standard of about 17.1 g per tetradrachm (Fig. 3). However, most of the weight reduction in Series 4 occurred in the second half of the emission, in which the mean and median weight of the sample are each reduced by 0.1 g relative to that of the first half. The weight reduction suggests that much of Series 4 was struck after the death of Alexander III.

Table 4. Metrological Summary

Series	Number of Coins (<i>n</i>)	Mean (g)	Median (g)	Mode (g)	Standard Deviation (σ)
1	31	8.57	8.58	8.61	0.05
2	12	8.54	8.56	8.58	0.07
3	96	17.06	17.15	17.17	0.35
4	367	16.98	17.07	17.10	0.36

HOARDS

Documented hoards containing examples of the Arados II coinage are listed in Table 5. Recorded finds of gold staters are few, limited to Greece and regions north, plus Cyprus, the earliest of which fall in the period 315–300 BC. The finds of tetradrachms are more geographically and chronologically spread, extending from the eastern region of Arachosia, through the Middle East and Egypt into Asia Minor and Europe, as far west as Greece. These finds date from the last quarter of the fourth century to the closing years of the 3rd century BC. With the exception of three very large Egyptian hoards, the number of Series 3 and 4 coins in hoards decreases rapidly with distance from the region of northern Phoenicia and Syria. In terms of the percentage of content, the Arados II component in the large Egyptian hoards falls at, or below that (less than one percent) of the much smaller hoards found throughout the Middle East and Asia Minor. The highest percentage of Arados II content, up to nineteen percent, occurs in Syrian and Phoenician hoards; the largest percentage occurring in the Sfire 1932 hoard (*IGCH* 1511) found 25 km southeast of Aleppo, around 200 km northeast of Arados. The recorded find locations of Arados II coinage, overlap closely with those of the Arados I series (Table 5). The geographic distribution and content of documented hoards supports the attribution of the coinage to a mint in Northern Phoenicia, or adjacent Syria.

Table 6 identifies the catalogue coins and associated dies with recorded hoard occurrences. Critical to the dating of the Arados II sequence are three hoards, *IGCH* 1672 (Abusir, 1901) with a burial date ca. 325–300 BC,⁵⁶ *CH* 8.185 (Syria or Lebanon, 1990) with a closure date of ca. 320 BC⁵⁷ and *CH* 10.246 (Unknown Findspot in Asia Minor, 1993) with a reported closure date of c. 323/2 BC.⁵⁸ *IGCH* 1672 contained a specimen of Series 3 (Cat. No. 58) from obverse die A1. *CH* 8.185 contained an example of Series 4 (Cat. No. 141) struck from obverse die A23. Another example of Series 4 (Cat. No. 259) from die A47 was found in *CH* 10.246. These examples indicate that the mintage of Series 4 coinage started well in advance of 320 BC and that at least half of the Series 4 sequence was struck before this date. Both Series 3 and 4 are well represented in the Demanhur

56. Online Inventory of Greek Coin Hoards (*IGCH*) <http://coinhoards.org/id/IGCH1672> accessed 18 October 2018. The burial dates of all other *IGCH* designated hoards noted in the text and tables are from the same source.

57. A. Davesne and A. Lemaire, “Trésors hellénistiques du Proche-Orient I–IV,” *RN* 151 (1996), 51–76.

58. Hoover, O., A. Meadows and U. Wartenberg (eds.) *Coin Hoards X: Greek Hoards*. (Royal Numismatic Society/American Numismatic Society, 2010), 31.

Hoard (*IGCH* 1664) that closed in 318 BC and the Akçakale Hoard (CH 8.201) buried in 318/7 BC. The latter contained coins struck from a range of dies from A1 (Cat. No. 54) to A44 (Cat. No. 228). Dies after A47, down to A79 are represented by catalogue coins in documented hoards that closed from c. 315 BC to around 310 BC, while coins from dies later than this in the sequence are represented only in hoards that were buried early decades of the third century BC or later (Table 6).

The pattern in the hoard record of coins in the catalogue is consistent with the dating of all of Series 3 and the first half of Series 4 to the period down to 320 BC. Based on the catalogue coins, the second half of Series 4 is associated with progressively younger hoard occurrences of coins from later dies after this date. Finds of coins from dies A48 to A79 suggest that these were minted in the decade c. 319–310 BC, while the earliest identified hoard occurrences of coins in the catalogue from dies A80 to A97 are consistent with mintage in the last decade of the fourth century BC.

Table 5. Hoards

Hoard	Reference	Closure (BCE)	Content	Arados II Series 1-5	Arados I Price 3303-3332
<i>AV Staters</i>					
Europe					
Malko Topolovo, Bulgaria, 1940	<i>IGCH</i> 0853	ca. 285-275	96+ AV	1+	1+
Anadol, Ukraine, 1895	<i>IGCH</i> 0866	ca. 228-220	1,200 AV	1	3
Lergutsa, Leovo raion, Moldavia, 1956	<i>IGCH</i> 0800	ca. 315-300	21+ AV	1	-
Northern(?) Greece, before 1966	<i>IGCH</i> 0801	ca. 310-300	c. 350 AV	1	1
Epidauros, 1977	Oeconomides 1999	ca. 295-290	92 AV	1	-
Cyprus					
Larnaka, 1870	<i>IGCH</i> 1472	ca. 300-295	1,000+ AV	3	3
<i>AR Tetradrachms</i>					
Europe					
Camarina	<i>CH</i> 7.58	ca. 300		1	1
Zemun, Yugoslavia, 1924	<i>IGCH</i> 0458	ca. 220	195+ AR	1	-
Prilepec, Yugoslavia, 1950	<i>IGCH</i> 0448	ca. 280	208+ AR	1	-
Pontoleibade-Kilkis, Macedonia, 1961	<i>IGCH</i> 0445	ca. 280	114+ AR	1	3
Myriophyton, Macedonia, 1932-3	<i>IGCH</i> 0432	ca. 320	53+ AR	1	1

Turnu Severin (Hinova), Rumania, 1923	<i>IGCH</i> 0452	ca. 275–250	62+ AR	1	-
Büyükçekmece, Thrace, 1952	<i>IGCH</i> 0867	ca. 220	184 AR	1	-
Boeotia, 1935	<i>IGCH</i> 0163	ca. 250	49 AR	1	-
Messene, 1922	<i>IGCH</i> 0095	ca. 305–300	31 AR	1	1
Andritsaena, Elis, 1923	<i>IGCH</i> 0083	ca. 315	150+ AR	4	5
Olympia, Elis, 1922	<i>IGCH</i> 0176	ca. 235–225	82 AR	1	-
Asia Minor					
Kizakli, Pontos 1939	<i>IGCH</i> 1369	ca. 235	13 AV, 803 AR	-	-
Ankara, c. 1913	<i>IGCH</i> 1399	ca. 290–285	179+ AR	9	9
Aksaray, Cappadokia, 1968	<i>IGCH</i> 1400	ca. 281	19 AR	1	5
Gordion, 1951	<i>IGCH</i> 1406	ca. 205–200	114 AR	2	-
Asia Minor, c 1966	<i>IGCH</i> 1436	ca. 323	52 AR	2	3
Asia Minor, 1964	<i>IGCH</i> 1438	ca. 320	70+ AR	1	6
Asia Minor, 1968	<i>IGCH</i> 1439	ca. 320	80+ AR	2	17
Asia Minor, 1968	<i>IGCH</i> 1440	ca. 320	90+ AR	2	16
Asia Minor, 1965	<i>IGCH</i> 1443	ca. 310	29+ AR	1	2
Manissa, Lydia, 1971	<i>IGCH</i> 1293	ca. 280	24 AR	2	-
Karaman, Lycaonia, 1969	<i>IGCH</i> 1398	ca. 300	49 AR	1	1
Armenak, Kilikia, 1927	<i>IGCH</i> 1423	ca. 280	1957+ AR	2	5
Mersin, Kilikia, 1963	<i>IGCH</i> 1424	ca. 280	150+ AR	7	4

Alcakale, Osrhoene, Turkey, 1958	<i>CH</i> 8.201, <i>CH</i> 10.251	318/7	190 AR	19	10
Unknown Asia Minor, 1993	<i>CH</i> 10.246	ca. 323–322	73 AR	1	1
‘Seleucus I’ Hoard, 2005	<i>CH</i> 10.265	ca. 280–279	5,000+ AR	28	5
Cyprus					
Kannaviou, 1936	<i>IGCH</i> 1468	ca. 310	90 AR	1	1
Phoenicia, Syria and Judaea					
Sfire, 25 km SE of Aleppo, 1932	<i>IGCH</i> 1511	ca. 318	84 AR	16	11
Aleppo, 1893	<i>IGCH</i> 1516	ca. 305	3000+ AR	43	24
Byblos, 1931	<i>IGCH</i> 1515	ca. 309–308	141 AR	7	4
Baalbek, 1885	<i>IGCH</i> 1512	ca. 305	22 + AR	2	2
Tel Tsippor, Judaea, 1960	<i>IGCH</i> 1514	ca. 311	63 AR	3	2
Syria or Lebanon, 1990	<i>CH</i> 8.185	ca. 323	175+ AR	1	20
Ashkelon, 1990	<i>CH</i> 8.220	ca. 305–290	18 AR	3	1
Mesopotamia and East					
Chorsabad 1934?	<i>IGCH</i> 1754	ca. 31–305	9 AR	1	-
Tell Halaf, Northern Mesopotamia, 1913	<i>IGCH</i> 1763, <i>CH</i> 8.302	ca. 246–240	353 AR	1	2
Mosul, 1862–3?	<i>IGCH</i> 1756	ca. 305	88+ AR	1	2
Babylonia, c. 1900	<i>IGCH</i> 1761	ca. 280	108+ AR	3	13

Mesopotamia or Babylonia, 1954	<i>IGCH</i> 1751	ca. 315	20 AR	1	3
Failaka, Kuwait, 1964	CH 8.256	ca. 290–270	27+ AR	3	-
Pasargadae, 1963	<i>IGCH</i> 1794	ca. 280	34 AR	3	5
East Arachosia, Quetta, Pakistan, 2001	CH 10.275	206–200	230+ AR	1	-
Egypt					
Phacous, 1956	<i>IGCH</i> 1678	ca. 283	2,400 AR	14	13
Demanhur, 1905	<i>IGCH</i> 1664	ca. 318	8,000+ AR	66	317
Abu Hommos, 1919	<i>IGCH</i> 1667	ca. 311–310	1,000 AR	14	20
Egypt, 1912	<i>IGCH</i> 1668	ca. 310	20 AR	1	2
Kuft, 1875–80	<i>IGCH</i> 1670	ca. 310–305	330+ AR	3	12
Abusir, 1901	<i>IGCH</i> 1672	ca. 325–300	44 AR	1	-

Table 6. Catalogue coins: recorded hoard occurrences

Hoard	Reference	Burial	Cat. no.	Obverse dies*
Abusir, 1901	<i>IGCH</i> 1672	ca. 325–320	58	A1
Unknown Findspot, 1993	<i>CH</i> 10.246	ca. 323–322	259	A47
Syria or Lebanon, 1990	<i>CH</i> 8.185	ca. 320	141	A23
Demanhur, 1905	<i>IGCH</i> 1664	ca. 318	64, 102, 115	A3, A14, A15
Akçakale, 1958	<i>CH</i> 8.201	318/7	54, 70, 154, 158, 159, 180, 197, 198, 219, 220, 228	A1, A5, A27, A29, A29, A31, A35, A35, A41, A41, A44
Andritsaena, 1923	<i>IGCH</i> 0083	ca. 315	173, 215, 454	A31, A41, A72
Abu Hommos, 1919	<i>IGCH</i> 1667	ca. 311–310	97, 156, 164, 192, 217, 222, 233, 355, 383, 387, 388, 407, 446, 462	A12, A27, A29, A35, A41, A42, A45, A54, A60, A60, A60, A64, A69, A77
Egypt, 1912	<i>IGCH</i> 1668	ca. 310	452	A71
Kuft, 1875–80	<i>IGCH</i> 1670	ca. 310–305	160, 209, 240, 469	A29, A39, A47, A79
Ankara, c. 1913	<i>IGCH</i> 1399	ca. 290–285	379, 488	A58, A89
Failaka, 1964	<i>CH</i> 8.256	ca. 290–270	81, 389, 492	A8, A60, A89
Armenak, 1927	<i>IGCH</i> 1423	ca. 280	362, 429	A55, A67
Pasagarde, 1963	<i>IGCH</i> 1794	ca. 280	350	A54
“Seleucus I,” 2005	<i>CH</i> 10.265	ca. 280–279	66, 301, 379, 509	A4, A50, A57, A97
Olympia, 1992	<i>IGCH</i> 0176	ca. 235–225	481	A85
Büyükçekmece, 1952	<i>IGCH</i> 0867	ca. 220	384	A60
Zemun, 1924	<i>IGCH</i> 0458	ca. 220	490	A89
East Arachosia (Quetta)	<i>CH</i> 10.275	ca. 206–200	501	A92
Gordion, 1951	<i>IGCH</i> 1406	ca. 205–200	210, 262	A39, A47

* Dies in bold text: earliest occurrences of progressively later sequence dies.

CHRONOLOGY

The hoard record is imprecise as to the start date of the coinage, other than to suggest that it commenced prior to 325 BC. Refinement relies on the interpretation of the die analysis. The gold staters of Series 1 and 2 were struck in parallel, an argument for near continuous striking, otherwise serial striking would have been more efficient and administratively less demanding. Seven stater dies, five commissioned for Series 1 and two for Series 2, are observed to have preceded the transfer of the engraver of Av5 to Sidon for the year 7 (327/6 BC) issue from that city, making it is unlikely that the gold emission commenced before 328/7 BC. Certainly, the transfer of a stater die and five die engravers to other mints suggest that the gold coinage of Series 1 and 2 commenced no later than 327/6 BC and ended around 326/5 BC. The latter date is consistent with the observation that the final component of the gold emission was coincident with the changed depiction of the extended right hand of Nike from an open facing palm to that of a hand in profile, analogous to the change observed in the portrayal of right hand of Zeus midway through the Series 3 tetradrachms. Based on the evidence from the other Phoenician, Syrian and Babylonian mints this iconographic change occurred no later than 326/5 BC.⁵⁹

The last half of Series 3 and all of Series 4 post-date this iconographic development. The transition from Series 3 to Series 4 is defined by the changed disposition of the legs of Zeus from parallel to crossed. At Sidon and Tyre this is dated to issues in the years 325/4 and ca. 324/3 BC respectively. By analogy with its other Phoenician counterparts, it is probable that the Series 4 emission commenced around 324 BC. This date would allow ample time for the utilization of the last 11 dies of Series 3. The hoard record is consistent with mintage of Series 3 and the first half of Series 4 in the period down to 321/0 BC. Based on the earliest hoard occurrences of coins from dies of the second half of Series 4, it appears most likely that this component of the emission was struck in two phases; the first struck from dies A48–A79 in the period ca. 320/19–311/0 BC, with the second from dies A80–A97 dating to the interval ca. 310/09–301/0 BC.⁶⁰

59. Taylor, "Babylon," 31–35.

60. This division into age ranges by obverse dies is approximate due to the partial and incomplete sampling of the hoard process and the limitations of the catalogue sample with respect to the hoard record. For most hoards, the identification of the Arados II content to the specific die level is not possible due to the limitations of documentation.

In summary, the evidence from the die analysis combined with that from early Alexander hoards, points to the mintage of Alexander the Great's gold coinage at Arados II commencing around 328/7 BC. The emission of Series 1 and 2 gold coinage finished in 326/5 BC, overlapping with the first half of the Series 3 tetradrachm emission. Series 3 continued for up to a year after this date, and was then followed by the Series 4 coinage from ca. 325/4 BC. Based on the hoard evidence, the first half of Series 4 was certainly struck by 321/0 BC. However, the hoard data suggests that the mint continued to operate after this date, perhaps intermittently down to ca. 301/0 BC. Within the uncertainty that is attached to the documentation of hoard data to the die specific level, an approximate division of the second half of the Series 4 tetradrachms into two phases is possible; ca. 320/19–311/0 BC for that component from dies A48–A79, and ca. 310/09–301/0 BC for that portion struck from dies A80–A97.

INTERPRETATION

Based on this chronology, the estimated breakdown of the tetradrachm coinage of Series 3 and 4 into the components pre- and post-321/0 BC is summarized in Table 7 (below). Within the uncertainty attached to the statistics, the tetradrachm die count and thus issuance in the period ca. 328–320 BC is the same as that which occurred in the subsequent twenty years. Taking this a step further, Table 8 (below) summarizes the observed and estimated original number of stater and tetradrachm dies at each of the eastern mints of Alexander the Great down to ca. 320 BC based on a sample of 3,328 coins originating from 598 obverse dies, comprising 80 stater dies and 518 tetradrachm dies.⁶¹ Figures 4 and 5 (below) present this data in graphic form, including the 95% confidence interval (high and low) that is attached to each estimate of the original number of dies commissioned at each mint.⁶² Figure 6 presents the approximate volume of gold and silver coinage, expressed in Attic talents of silver equivalent, calcu-

61. The observed die counts underpinning this analysis are sourced from Newell, *Dated Sidon and Ake*; Newell, *Myriandros*; Duyrat, *Arados*; Taylor, "Damaskos"; Taylor, "Earliest"; Waggoner, *Alexander Mint*; L. W. H. Taylor, "The Karne Alexanders," *Journal of the Numismatic Association of Australia* 29 (2018–2019), 1–23; L. W. H. Taylor "The Macedonian Mint at Susa (319/8–312/1 BC)," *Koinon II* (2019), 28–62; and L. W. H. Taylor, "Reattribution of the Berytos Alexanders to Byblos," forthcoming. The data takes account of the reattribution to Tarsos of the staters formerly attributed to Sidon (Price 3456–3466), as proposed by Le Rider (*Coinage*, 134–139), plus the downdating of the start of the Macedonian mint at Susa to 319/8 BC, detailed in Taylor, "Macedonian Mint at Susa."

62. Statistically, any estimate derived from another random sample of the original coinage will yield a result that will fall within the identified high-low range in 95% of cases.

lated from the statistically estimated original population of dies at each mint.⁶³ A number of insights as to the origin, nature and function of Arados II arise from the consideration of this analysis.

Table 7. Tetradrachm statistics: pre- and post-320 BC

	ca. 327–320 BC	ca. 319–300 BC
Sample size (<i>n</i>)	224	242
Observed Dies (<i>d</i>)	47	50
Singletons (<i>d</i> ₁)	10	14
Characteristic Index (<i>n/d</i>)	4.77	4.84
Coverage (<i>C</i> _{est})	0.96	0.94
Estimated Dies (<i>D</i> _{est})	59.5	63.0
95% Confidence Interval	54.0–65.6	57.4–69.1

Table 8. Obverse die counts: eastern mints to c. 320 BC.

Mint	Sample (<i>n</i>)	Stater Dies		Tetradrachm Dies		
		Observed	Estimated	Sample (<i>n</i>)	Observed	Estimated
Myriandros	1	1	1	97	25	34
Karne	-	-	-	21	5	7
Arados I	51	12	16	750	196	265
Arados II	43	23	50	224	47	60
Byblos	-	-	-	93	8	9
Sidon	62	16	21	109	19	22
Tyre	30	12	20	194	25	29
Damaskos	-	-	-	456	54	61
Babylon	62	16	22	1,135	139	158
Totals	249	80	130	3,079	518	645

Firstly, the disparity in the quantum and composition of the output of Arados II compared to that of Arados I is starkly expressed in Figures 4–6. This is evident whether the basis of comparison is the observed die count, the estimated original number of dies, or the value of the coinage struck in each precious metal. Arados II was first and foremost an issuer of gold staters in the period down to 320 BC while Arados I was minting tetradrachms in large quantity. Sixty-

63. Assuming an average obverse stater die productivity of 10,000 coins and an average tetradrachm obverse die productivity of 20,000 coins per Callataÿ, “Quantifying,” plus a 1:10 gold to silver value weight equivalency per Le Rider, *Coinage*, 149.

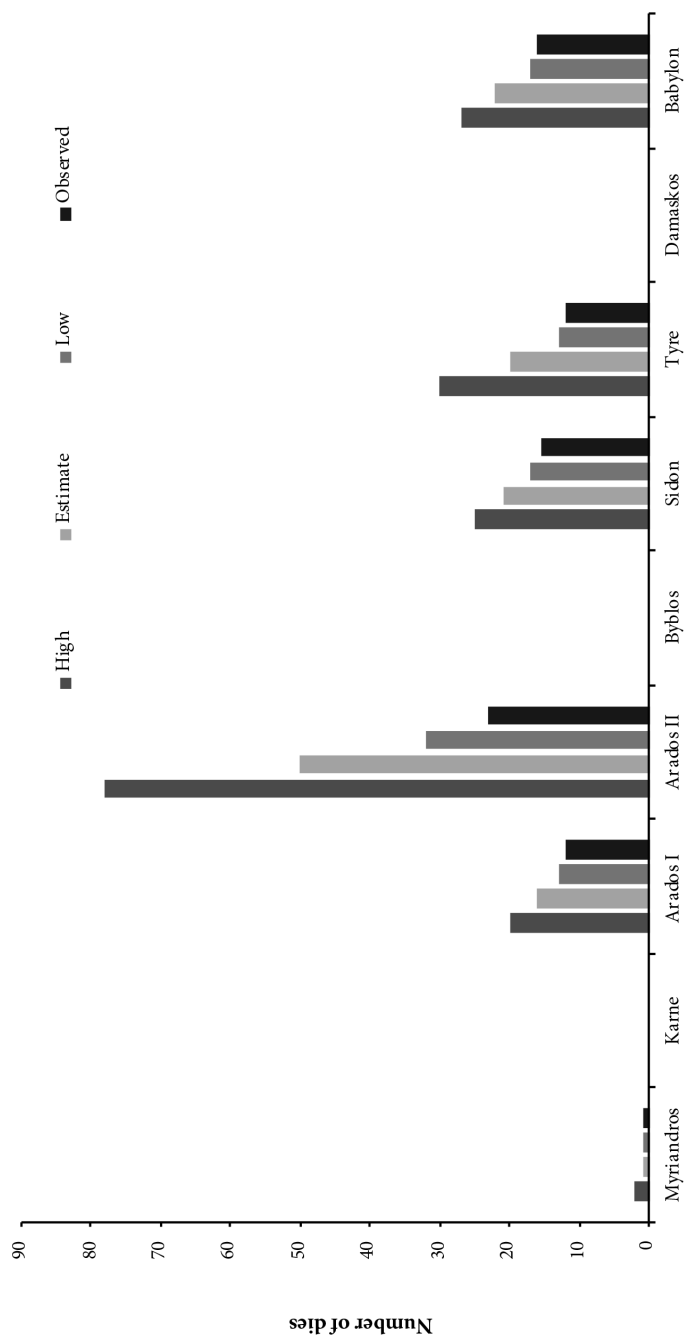


Figure 4. Gold stater obverse die count by mint to ca. 320 BC.

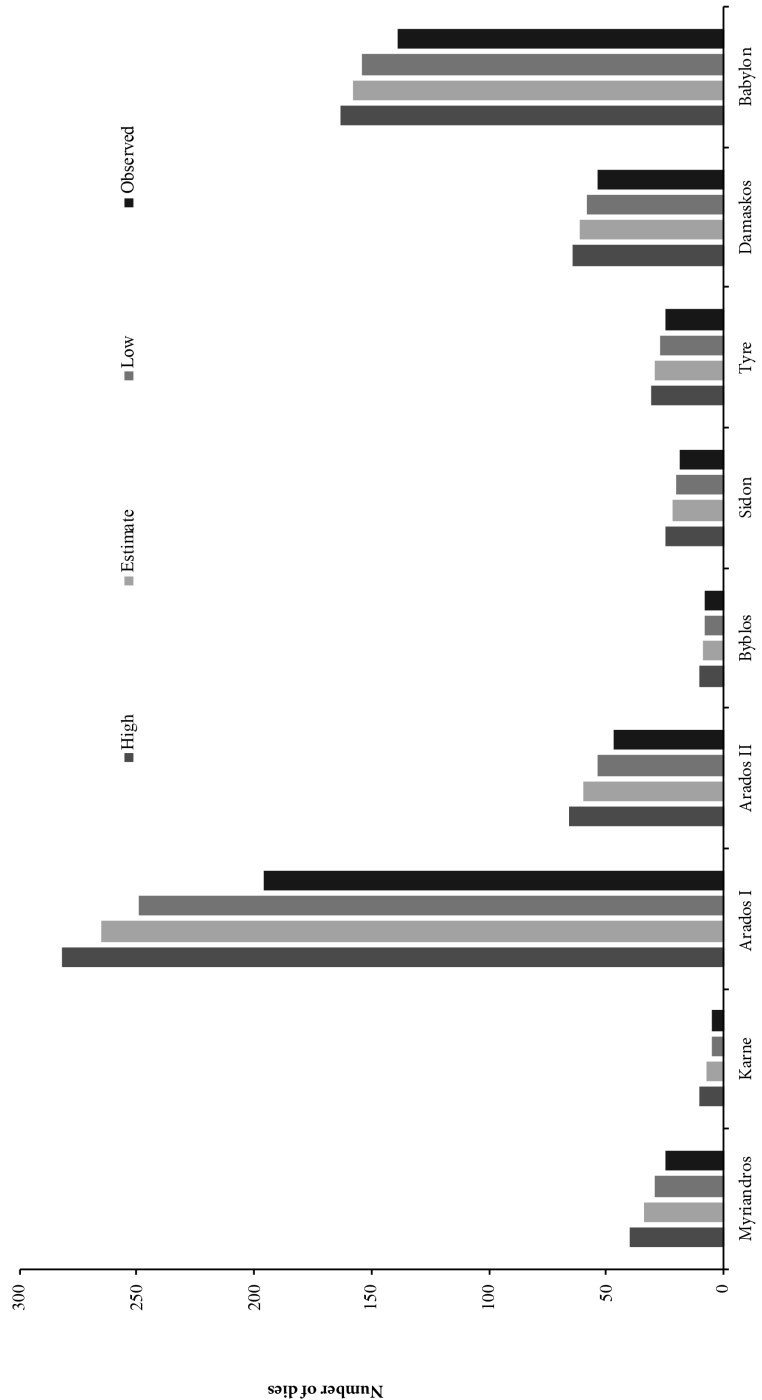


Figure 5. Tetradrachm obverse die count by mint to ca. 320 BC.

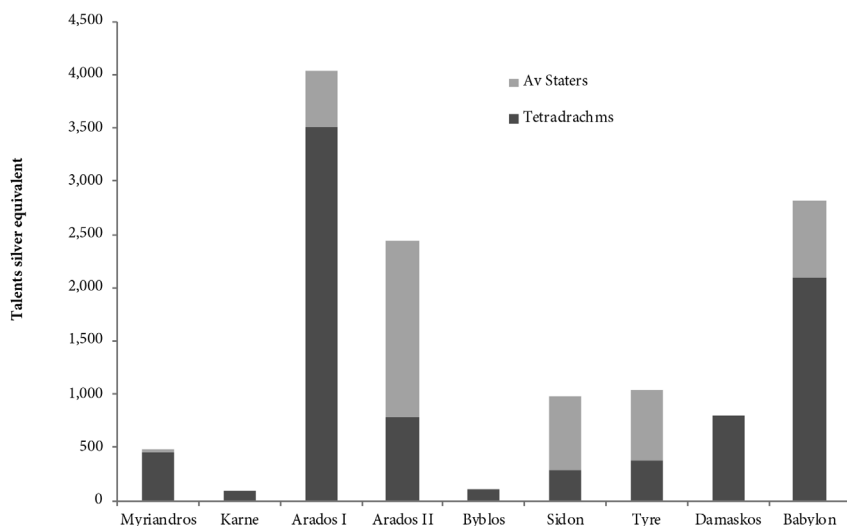


Figure 6. Estimated output by mint to c. 320 BC.

eight percent of the value of the coinage produced at Arados II is estimated to have been gold staters, while only thirteen percent of the value of the Arados I mintage consisted of gold. Notably, with the exception of one issue (Price 3306) from a single obverse die, all of the gold issuance from Arados I is dated to ca. 323–320 BC,⁶⁴ after the death of Alexander the Great, and thus postdates the Series 1 and 2 emissions from Arados II. This provides a plausible rationale for the establishment of a second Alexander mint at Arados in 328/7 BC to supplement the continuing operation of the former Achaemenid mint (Arados I) that was striking Alexandrine tetradrachms; the need for a large amount of gold staters in a relatively short time.

Examined in a regional context, the two mints at Arados account for an estimated 51 percent of the gold stater dies and 50 percent of the tetradrachm dies employed across the mints of Phoenicia, Syria and Babylon in the period 333/2–321/0 BC. Arados II alone accounted for an estimated 40 percent of the gold stater dies used in the east. The regional predominance of Arados II gold stater dies (and implicitly the volume of gold coinage struck) remains even at the lower bound of the 95 percent confidence interval attached to the estimate of the original number of dies. Even ignoring the statistically estimated original number of dies and using the observed die counts as an alternative, Arados II

64. Duyrat, *Arados*, 9–30. Most tellingly, all the Arados I stater issues dated to the period ca. 323–320 BC bear the royal title.

used almost 50 percent more stater dies than any other eastern mint. The conclusion is inescapable; Arados II was a significant, if not the most significant center of gold mintage in the easternmost Mediterranean during Alexander the Great's lifetime (Fig. 6).

Another notable aspect that comes from the regional comparison of the number of dies used in each mint is the comparatively minor issuance from each of the mints located in the other Phoenician vassal kingdoms, Byblos, Sidon and Tyre (Figs. 4–6). If the purpose of one of the mints at Arados was to produce coinage for “local or city” purposes as suggested by Newell,⁶⁵ then it is difficult to explain why the city of Arados would require so much more coinage for civic purposes than Tyre, which suffered appreciable destruction in the culmination of Alexander the Great's seven-month siege of the city in 332 BC. Logically, the reconstruction of Tyre in the years following the siege would have required the opposite to that which we see in the comparative die counts, if one of the Arados mints was a “local or city” mint. Based on the regional analysis of mint productivity in the period 333/2–321/0 BC, the output of either mint at Arados exceeds what could be construed as a reasonable volume for any local, or city requirement. Therefore, the classification of one of either Arados I or II as a “local or city” mint receives no support from the regional die analysis. The large volume of coinage (manifest in large die counts) from each, struck in a complimentary manner (gold versus silver), accompanied by wide and overlapping circulation patterns (manifest in the hoard record) speak to a common purpose. The establishment and maintenance of two mints at Arados during Alexander's lifetime has one possible explanation, the requirement of a large volume of coinage, beyond the capacity of a single facility. The initial impetus for the establishment of Arados II appears to have been the need for a large volume of gold coinage in a short period.⁶⁶ A separate mint, with its own dedicated administration and resources, focused primarily on gold coinage, would have been better positioned to address many of the integrity and security issues associated with a large gold mintage. Two to three years later, with the requisite gold mintage fulfilled, the priority turned to silver tetradrachm mintage, at a scale that was sufficient to justify the maintenance of two mints.

65. Newell, *Reattribution*, 47.

66. This explanation is simply an extension of the previously recognized fact that Alexander's mints often had different production priorities. For example, the drachm mints of Asia Minor documented by M. Thompson and A. R. Bellinger, “Greek Coins in the Yale Collection, IV: A Hoard of Alexander Drachms,” *Yale Classical Studies* 14 (1955), 3–45, which identified mints established for the primary purpose of minting drachms, while others struck tetradrachms.

Different administrative structures

Based on the Achaemenid precedents, and analogy with the other Phoenician vassal kingdoms under Macedonian suzerainty, the Arados I mint at its inception was most probably under the supervision and management, but not the absolute control, of the vassal king Gerastart (Gerostratos in Greek), whose son voluntarily surrendered the island city and its mainland territory to Alexander the Great as he advanced down the Phoenician coast in late 333 BC.⁶⁷ Indeed the earliest issue from the mint (Price 3303) bears a Γ mintmark has been interpreted to be the first letter abbreviation of the name of Gerostratos the king of Arados, the latter being identified by the letter A beneath the *diphros*.⁶⁸ This would be a tacit acknowledgement that Gerostratos was subservient to Alexander whose name figured most prominently on the coins. In contrast, Arados II, established some years later, with its different conventions, notably a single invariable mintmark, must have fallen within a different administrative construct, one more directly responsible to Alexander the Great who retained the absolute authority for the coining of imperial money.⁶⁹ The Phoenician and Cypriot mints managed by vassal kings operated on a different basis to those of other cities, astutely and succinctly summarized by Otto Mørkholm,

It is therefore hardly proper to make a distinction between “imperial” mints and “allied” mints, as Newell was inclined to do. The explanation is rather that, while the other mints were government agencies, the Phoenician and Cypriot city-states under their local kings retained the management of their mints, although they naturally had to operate within the general regulations laid down by the central administration.⁷⁰

67. Arrian, *Alexander*, 2.13.7–8, from J. Romm, ed. *The Landmark Arrian* (New York: Pantheon Books, 2010), 79.

68. Elayi, “Updated,” 30–31.

69. A. R. Bellinger, *Essays on the Coinage of Alexander the Great* (New York: The American Numismatic Society, 1963), 39–42. In the four years following Alexander the Great’s death the exclusive power over the issuance of imperial coinage in the east fell successively to Perdikkas under the Partition Agreement of Babylon (323 BC), then to Antipater via the Treaty of Triparadeisos (320 BC) who delegated this responsibility to Antigonos, as *strategos* of Asia. In following the two decades the empire fragmented in almost continuous conflict. All pretence of a unified empire quickly dissipated and Macedonian imperial type coinage came to be issued by each of the successors, the first step toward establishment of their own royal domains.

70. O. Mørkholm, *Early Hellenistic Coinage from the Accession of Alexander to the Peace of Apamea (336–186 B.C.)*, eds. P. Grierson and U. Westermark (Cambridge: Cambridge University Press, 1991), 47.

In this context, the Arados II mint, established some years after Arados I, was a “government agency” mint directly controlled under instruction from Alexander the Great, without the intercession of an intermediary vassal king. This was the most efficient arrangement for the striking of a substantial gold coinage on the instruction of and for the purposes of Alexander the Great. It afforded the direct control of and accountability for a large gold coinage struck on the direct instruction of the king. It also explains the divergence in the control processes between the two mints, manifest by the multiplicity of mint controls with regular variations at Arados I, versus that of the single \mathcal{A} mintmark at Arados II. Multiple, regularly changing mint controls would have facilitated the process of checking, or auditing in modern parlance, that a mint under intermediary supervision was operated “within the general regulations laid down by the central administration,” including an agreed annual framework of issuance, or a budget. This requirement was simplified, if not reduced, in the case of a “government agency” mint, directly accountable to Alexander the Great; one that drew bullion for striking from a royal treasury only in pre-approved quantities, as and when required by Alexander. Under the latter circumstance, the invariable \mathcal{A} mintmark, unaccompanied by any form of secondary mint controls throughout the life of Arados II would suffice.

This differentiated administrative construct explains the continued operation of Arados II in the two decades following the Treaty of Triparadeisos. The latter saw Arados fall under the authority of Antigonos, the *strategos* of Asia in 321/0 BC. He was a Macedonian traditionalist, rigidly adhering to Macedonian policy, practice, and controls.⁷¹ By 320 BC, when the justification for the maintenance of two mints at Arados was no longer present, the closure of Arados I,⁷² still under non-Macedonian intermediary supervision, would have been the logical option for Antigonos.⁷³ Two decades later, the Battle of Ipsos in 301 BC saw the death and defeat of Antigonos. Syria and northern Phoenicia fell under the control of Seleukos who moved rapidly to eliminate vestiges of Antigonid control and infrastructure in Syria and northern Phoenicia. Within less than a year he

71. R. A. Billows, *Antigonos the One-Eyed and the Creation of the Hellenistic State* (Berkeley: University of California Press, 1990).

72. Previously attributed to Arados I, the issues of Price P138–P158 and Price 3336–3364, dated to c. 320–300 BC have been reattributed to the Babylon II mint: Houghton and Lorber, *Seleucid Coins*, 39–48, 479–483.

73. Contemporaneously, at the direction of Antigonos, a similar rationalization of mint operations occurred on Cyprus where most of the mints formerly under the management of vassal kings ceased operation, Salamis being the sole exception. Price, *Coinage*, 482–496. Elsewhere in Phoenicia, the mints at Byblos/Berytos and Karne struck no more imperial coinage after 320 BC.

had established four new foundations in the region.⁷⁴ Accompanying this were new mints at Antioch on the Orontes, Seleukeia in Pieria, Laodikeia by the Sea, and Apamea on the Orontes. These fringed, or were within the territory formerly administered by the Aradian vassal kings. The establishment of this Seleukid infrastructure eliminated any justification for the maintenance of a legacy mint at Arados. Thus, the closure of Arados II. Fifty-five years later when Arados was granted autonomy, the city commenced striking a civic coinage (Price 3365–3403) that resurrected \mathcal{A} mintmark of Arados II.

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74. Houghton and Lorber, *Seleucid Coins*, 18–26.

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Plates

Arados II



1. Av5. Cat. No. 10



2. Av6. Cat. No. 13



3. Av11. Cat. No. 22



4. Av12. Cat. No. 23



5. Av17. Cat. No. 33

Other Mints



Sidon, Year 7. Price 3482



Sidon, Year 13. Price 3500



Miletos. Price 2096



Miletos. Price 2078



Tyre, Year 33. Price 3284



Macedonia. Price 164

On the Reattribution of some Byblos Alexanders to Arados II

Plate 2



3



4



5



6



9



10



13



15



16



18



20



22



On the Reattribution of some Byblos Alexanders to Arados II



23



25



27



29



31



33



35



36



37



38



39



40



Plate 4



41



42



A



B



Aynel Tetradrachm



C



45



56



59



64



On the Reattribution of some Byblos Alexanders to Arados II



On the Reattribution of some Byblos Alexanders to Arados II



On the Reattribution of some Byblos Alexanders to Arados II



133



136



140



143



145



150



151



157



161



Plate 8



169



171



182



183



184



187



199



203



205



On the Reattribution of some Byblos Alexanders to Arados II



206



212



215



222



226



230



234



236



264





On the Reattribution of some Byblos Alexanders to Arados II



On the Reattribution of some Byblos Alexanders to Arados II



On the Reattribution of some Byblos Alexanders to Arados II



On the Reattribution of some Byblos Alexanders to Arados II



On the Reattribution of some Byblos Alexanders to Arados II



500



502



504



506



507



508

