

A first attempt for a quantitative analysis of Etruscan coinage. 2nd part.

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Abstract: Following the scheme of the two Recueil quantitativ of Greek coinage by F.de Callataÿ, the author continues to study the dies of another series of coins of Populonia and also of Luca and Vulci, proposing an analytical typology for dies, functional to the creation of databases.

Keywords: Etruscan Coinage, Etruscan dies, quantitative analysis, analytical typology

In 2019 I published a catalogue with 16 cards relative to dies of Populonia's coins¹. Now the work continues, and in this second series of cards I have been analyzed the dies of 13 other coins with the corresponding codes of the alphanumeric "open" type; "open" because if it becomes necessary to insert a new die or to do a partial modification of those proposed, it can be carried out without having to remodel the database previously created.

Of course, only coins of which more than four are known have been taken into consideration.

Below is a brief guide to reading the cards.

5– didracma (X) Ar

Obv.: Head of Metus facing, hair bond with diadem; below XX
Rev.: Blank



Age of issue: seconda metà del V secolo a. C..

Weight gr (mode): 8,05-8,2

Books: PETRILLO SERAFIN P. 1976 – *Le serie monetarie di Populonia*, pp.105-140, Tavv. X ; VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, pp. 84-86 ; vol. 1.2, pl. 12-13 .

References to the type of dies : GIANNONI L. 2018 – *Ancora sui conii delle monete popoloniesi: le didracme con il volto di Metus e segno X e le monete con polpo da 1(?) unità*, PANORAMA NUMISMATICO, 340, p. 7- 14.

		d	%	n	%
1	XC, XE	2	18,2	2	6,10
2	XD, XF, XG, XH	4	36,4	8	24,20
3	XM	1	9,1	3	9,10
4	XB, XL, XY	3	27,3	12	36,40
...					
8	XA	1	9,1	8	24,20
Total		11	100,1	33	100,00

Dies Obv.: 11

Dies Rev.: (1)

Caracteroscopic index ($I_c = n/d$): 3,0

G. F. CARTER 1983

D = 14,0 ± 1,63

W. W. ESTY 1984

d = 93,9% di D

Notes: .

¹GIANNONI, 2019.

- The first line indicates that there are 2 dies (XC and XE) represented by a single coin;
- The second line indicates that there are 4 dies (XD, XF, XG and XH) represented by 2 coins;
- The third line indicates that there is only 1 die (XM) represented by 3 coins;
- The fourth line indicates that there are 3 dies (XB, XL and XY) represented by the 4 coins;
- The fifth line (...) indicates that there are not dies represented, respectively, by 5, 6 or 7 coins;
- The sixth line indicates that there is 1 die (XA) represented by 8 coins.
- The fourth and sixth columns (%) indicate the percentage of dies and coins respectively in relation to their total. The weights of the coins were taken into account using the statistical mode, rather than the more commonly used statistical average, because it gives a more realistic coin weight, based on the samples available.

d = number of known dies

n = number of known coins

D = theoretical number of total existing dies²

Ic = n/d = characteroscopic index³

For convenience of reading, in the Appendix 1 there is every type of identified dies not in scale.

CARDS

POPULONIA

17. one unit Ar⁴

Obv.: Wheel with long crossbar, central pin supported by two struts.

Rev.: Blank or I or wheel with long crossbar, supported by two struts.



Age of issue: IV century BC⁵.

Weight g (mode): 0,8

Books: VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, p. 97-99; vol. 1.2, pl. 15-16 .

References to the type of dies⁶:

		d	%	n	%
1	RT 2, RT 3	2	50,0	2	18,2
2	RT 4	1	25,0	2	18,2
...		-			
7	RT 1	1	25,0	7	63,6
	totale	4	100,0	11	100,0

Dies Obv.:

4

Dies Rev.:

(1)⁷

²According to the formulas of G. F. CARTER 1983 and W. W. ESTY 1984 (see “coverage”).

³It is recalled synthetically that the Ic serves to test if the studied sample is reliable: (Ic<2 poorly reliable sample, 2<Ic<4 reliable sample, Ic>4 the sample represents all dies).

⁴the numbering of the cards continues the one already published on OMNI 13.

⁵The indications relating to the time of issue of this series as well as the subsequent minting are to be understood as hypotheses on which, however, there is not much agreement between scholars.

⁶When it is not indicated, the study of dies is from the Author.

⁷Here, as in the following cards, we indicate in brackets the minting of reverse when it is blank and therefore it is impossible to determine whether it was one or more hammer dies.

Characteroscopic index ($I_c = n/d$): 2,75
G. F. CARTER 1983 $D = 5,30 \pm 1,22$
W. W. ESTY 1984 $d = 81,8\% \text{ di } D$

18. one unit (?) Ar

Obv.: *Two dolphins.*

Rev.: *Blank.*



Age of issue: III century BC

Weight g (mode): 0,63-0,71

Books: VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, p. 283; vol. 1.2, pl. 93.

References to the type of dies:

		d	%	n	%
...		-			
3	DLF 1	1	50,0	3	42,9
...		-			
4	DLF 2	1	50,0	4	57,1
	totale	2	100,0	7	100,0

Dies Obv.: 2
Dies Rev.: (1)
Characteroscopic index ($I_c = n/d$): 3,50
G. F. CARTER 1983 $D = 2,42 \pm 0,63$
W. W. ESTY 1984 $d = 100,0\% \text{ di } D$

19. two and a half units (VII) Ar

Obv.: *Female head r. with waved hair caught with band; behind CII.*

Rev.: *Blank.*



Age of issue: III century BC

Weight g (mode): 0,82

Books: VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, p. 263; vol. 1.2, pl. 89.

References to the type of dies:

		d	%	n	%
1	MQTFD 1	1	100,0	8	100,0
...					
	totale	1	100,0	8	100,0

Dies Obv.: 1
Dies Rev.: (1)
Characteroscopic index ($I_c = n/d$): 8,00
G. F. CARTER 1983 $D = 1,04 \pm 0,15$
W. W. ESTY 1984 $d = 100,0\% \text{ di } D$

20. two and a half units(VII) Ar**Obv.:** *Male head r.;behind VII or UII or CII.***Rev.:** *Blank.***Age of issue:** III century BC**Weight g (mode):** 1,00**Books:** VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, p. 254-257; vol. 1.2, pl. 87-88.**References to the type of dies:**

		d	%	n	%
1		-	-	-	-
2	MQTMD 8	1	11,1	2	4,1
3	MQTMD 4, MQTMD 6, MQTMD 9	3	33,3	9	18,4
4	MQTMD 3	1	11,1	4	8,2
5	MQTMD 5	1	11,1	5	10,1
...					
8	MQTMD 1, MQTMD 7	2	22,2	16	32,7
...					
13	MQTMD 8	1	11,1	13	26,5
	totale	9	99,9	49	100,0

Dies Obv.:

9

Dies Rev.:

(1)

Characteroscopic index ($I_c = n/d$):

5,44

G. F. CARTER 1983

D= 9,85 ± 0,64

W. W. ESTY 1984

d =100,0% di D

21. five units (V) Ar**Obv.:** *Head of Turms r. wearing petasus; behind V.***Rev.:** *Blank*⁸.**Age of issue:** III century BC.**Weight g (mode):**1,85**Books:** VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, pp. 235-240; vol. 1.2, pl. 81-83 .**References to the type of dies:**⁸ The reverse has in one case [PVPL]VN[A].

		d	%	n	%
1	TRM 2	1	20,0	1	4,76
2	TRM 5	1	20,0	2	9,52
...	-	-	-	-	-
5	TRM 3	1	20,0	5	23,81
6	TRM 1	1	20,0	6	28,57
7	TRM 4	1	20,0	7	33,33
	totale	5	100,0	21	99,99

Dies Obv.: 5
Dies Rev.: (1)
Characteroscopic index ($I_c = n/d$): 4,20
G. F. CARTER 1983 $D = 5,76 \pm 0,69$
W. W. ESTY 1984 $d=95,2\%$ di D

22. five units (V) Ar

Obv.: *Young male head r.; behind V.*
Rev.: *Blank.*⁹



Age of issue: III century BC.
Weight g (mode): 1,6-2,0
Books: VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, pp. 248-249; vol. 1.2, pl. 85.
References to the type of dies:

		d	%	n	%
1	QTMD 4	1	25,0	1	4,76
...	-	-	-	-	-
3	QTMD 2	1	25,0	3	14,29
...	-	-	-	-	-
7	QTMD 3	1	25,0	7	33,33
...	-	-	-	-	-
10	QTMD 1	1	25,0	10	47,62
	totale	4	100,0	21	100,00

Dies Obv.: 4
Dies Rev.: 2
Characteroscopic index ($I_c = n/d$): 5,25
G. F. CARTER 1983 $D = 4,4 \pm 0,46$
W. W. ESTY 1984 $d=95,2\%$ di D

⁹The reverse has in one case some intersecting lines (maybe a pentacle) and circles.

23. dracma (?) Ar**Obv.:** *Hare leaping r.***Rev.:** *Blank.***Age of issue:** III century BC.**Weight g (mode):** 3,9-4,1**Books:** VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, p. 277; vol. 1.2, pl. 92.**References to the type of dies:**

		d	%	n	%
1	LP 3	1	33,3	1	12,50
...		-		-	
3	LP 2	1	33,3	3	37,50
4	LP 1	1	33,3	4	50,00
	totale	3	99,9	8	100,00

Dies Obv.:

3

Dies Rev.:

(1)

Characteroscopic index ($I_c = n/d$):

2,67

G. F. CARTER 1983

D = 4,04 ± 1,16

W. W. ESTY 1984

d=87,5% di D

LUCA**24. five units(V) Ar****Obv.:** *Head of young male r. wearing laurel wreath; behind V.***Rev.:** *Blank.***Age of issue:** last quarter IV century BC**Weight g (mode):** 11,17**Books:** VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, p. 50; vol. 1.2, pl. 3-5.**References to the type of dies:**

		d	%	n	%
1		-		-	
...		-		-	
14	LTL 2	1	50,0	14	45,16
...		-		-	
17	LTL 1	1	50,0	17	54,84
	totale	2	99,9	31	100,00

Dies Obv.:	2
Dies Rev.:	(1)
Characteroscopic index ($I_c = n/d$):	15,50
G. F. CARTER 1983	$D = 1,97 \pm 0,09$
W. W. ESTY 1984	$d = 100,0\% \text{ di } D$

25. ten units (CC) Ar

Obv.: *Hippocamp r.; above dolphin r. and CC; below dolphin l.*

Rev.: *Blank.*



Age of issue: early III century BC

Weight g (mode): 4,8

Books: VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, p. 55; vol. 1.2, pl. 5-6.

References to the type of dies:

		d	%	n	%
1	IPCC 3, IPCC 4	2	50,0	2	9,52
...		-	-	-	-
7	IPCC 2	1	25,0	7	33,33
...		-	-	-	-
12	IPCC1	1	25,0	12	57,14
	totale	4	100,0	21	99,99

Dies Obv.:	4
Dies Rev.:	(1)
Characteroscopic index ($I_c = n/d$):	5,25
G. F. CARTER 1983	$D = 4,4 \pm 0,46$
W. W. ESTY 1984	$d = 90,5\% \text{ di } D$

26. five units (C) Ar

Obv.: *Hippocamp r.; above dolphin r. and four-pointed star; below C.*

Rev.: *Blank*



Age of issue: early III century BC

Weight g (mode): 2,05

Books: VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, p. 58-59; vol. 1.2, pl. 6.

References to the type of dies:

		d	%	n	%
1	IPC 1	1	100,0	18	100,00
	totale	1	100,0	18	100,00

Dies Obv.: 1
Dies Rev.: (1)
Characteroscopic index (I_c = n/d): 18,00
G. F. CARTER 1983 D = 1,0 ± 0,06
W. W. ESTY 1984 d = 100,0% di D

Notes: In Münzkabinett der Staatliche Museen zu Berlin there is an exemplar (n. 814819-18219885) whose style is totally different from the rest of the exemplars. so much so as to suggest one of the many fantasy coinage made at the end of the nineteenth century; the date of acquisition of the coin, 1903, seems to confirm this hypothesis.



27. five units(?) Ar

Obv.: *Head of lion.*
Rev.: *Blank.*



Age of issue: III century BC
Weight g (mode): 1,12
Books: VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, p. 274; vol. 1.2, pl. 91. VECCHI I. (2018) *Una rivalutazione della monetazione di Luca e Populonia e dell’Italia centrale, Atti del Convegno Le monete degli Etruschi: a 42 anni dal convegno di Napoli, Populonia 6-7.10.2017, Rassegna di Archeologia*, 26, pp. 61-66.
References to the type of dies:

		d	%	n	%
1		-		-	
2	LFA3	1	33,3	2	15,38
...					
4	LFA2	1	33,3	4	30,77
...					
7	LFA1	1	33,3	7	53,85
	totale	3	99,9	13	100,00

Dies Obv.: 3
Dies Rev.: (1)
Characteroscopic index (I_c = n/d): 4,00
G. F. CARTER 1983 D = 3,5 ± 0,59
W. W. ESTY 1984 d = 100,0% di D

VULCI**28. dracma Ar**

Obv.: *Sphinx with moustached male-head and teats, seated r. on double external line.*

Rev.: *Young male head three-quarterfacing, wearing headband; above and below, serpents. Around Θ ezi.*



Age of issue: V-IV century BC

Weight g (mode): 5,32-5,40

Books: VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, p. 374-375; vol. 1.2, pl. 131.

References to the type of dies:

		d	%	n	%
1	VSF 2	1	50,00	1	12,50
...		-		-	
7	VSF 1	1	50,00	7	87,50
totale		2	100,00	8	100,00

Dies Obv.:

2

Dies Rev.:

3

Characteroscopic index ($I_c = n/d$):

4,00

G. F. CARTER 1983

$D = 2,33 \pm 0,51$

W. W. ESTY 1984

$d = 87,5\% \text{ di } D$

29. didracma Ar

Obv.: *Winged Metus running l., holding serpent in each hand.*

Rev.: *Wheel with long crossbar, supported by two struts. Around: Θ ezi / without Θ ezi.*



Age of issue: V-IV century BC

Weight g (mode): 11,1-11,6

Books: VECCHI I. 2002 – *Etruscan coinage*, vol. 1.1, p. 371-372; vol. 1.2, pl. 130.

References to the type of dies:

		d	%	n	%
1	VMT3	1	33,33	1	9,09
...		-		-	
3	VMT2	1	33,33	3	27,28
...		-		-	
7	VMT1	1	33,33	7	63,63
totale		3	99,99	11	100,00

Dies Obv.:	3
Dies Rev.:	6
Characteroscopic index ($I_c = n/d$):	3,67
G. F. CARTER 1983	$D = 3,58 \pm 0,68$
W. W. ESTY 1984	$d = 90,9\% \text{ di } D$

APPENDIX 1

1. Obverse

Dies of card 17



RT 1



RT 2



RT 3



RT 4

Dies of card 18



DLF 1



DLF 2

Dies of card 19



MQTFD 1

Dies of card 20



MQTMD 1



MQTMD 2



MQTMD 3



MQTMD 4



MQTMD 5



MQTMD 6



MQTMD 7



MQTMD 8



MQTMD 9

Dies of card 21



Dies of card 22



Dies of card 23



Dies of card 24



Dies of card 25



Dies of card 26



IPC 1

Dies of card 27



LFA 1



LFA 2



LFA 3

Dies of card 28



VSF 1



VSF 2

Dies of card 29



VMT 1



VMT 2



VMT 3

2. Reverse

Dies of card 17



rtr 1

Dies of card 22



pcl 1

Dies of card 28



vtS 1



vtS 2



vtS 3

Dies of card 29



vtR 1



vtR 2



vtR 3



vtR 4



vtR 5

APPENDIX 2

n° card	issue	metal	n° dies obv.	n° coins (5.000) x dies obv.	mode g	kg
POPULONIA						
17	Wheel	AG	4	20000	0,80	16,00
18	Dolphin	AG	2	10000	0,67	6,70
19	Female head CII	AG	1	5000	0,82	4,10
20	Male head VII	AG	9	45000	1,00	45,00
21	Turms V	AG	5	25000	1,85	46,25
22	Young male head V	AG	4	20000	1,80	36,00
23	Hare	AG	3	15000	4,00	60,00
						214,05
LUCA						
24	Young male head V	AG	2	10000	11,17	111,70
25	Hippocamp CC	AG	4	20000	4,80	96,00
26	Hippocamp C	AG	1	5000	2,05	10,25
27	Head of lion	AG	3	15000	1,12	16,80
						234,75
VULCI						
28	Sphinx / Young male head	AG	2	10000	5,36	53,60
29	Metus / Wheel	AG	3	15000	11,35	170,25
						223,85

Theoretical calculation of the metal used for minting¹⁰

¹⁰ In the calculation I assumed a prudential production for minting of obverse equal to 5.000 coins (see CAMPANA, 1987). As far as the weight unit, I have used the value of the mode that comes closest to the theoretical weight.

APPENDIX 3

n° card	issue	nt	N 5000	N 15000	D	TS 5	TS 15
POPULONIA							
17	Wheel	11	26500	79500	5,30	2409	7227
18	Dolphin	7	12100	36300	2,42	1729	5186
19	Female head CII	8	5200	15600	1,04	650	1950
20	Male head VII	49	45000	135000	9,00	918	2755
21	Turms V	21	28800	86400	5,76	1371	4114
22	Young male head V	21	22000	66000	4,40	1048	3143
23	Hare	8	20200	60600	4,04	2525	7575
LUCA							
24	Young male head V	31	9850	29550	1,97	318	953
25	Hippocamp CC	21	22000	66000	4,40	1048	3143
26	Hippocamp C	18	5000	15000	1,00	278	833
27	Head of lion	13	17500	52500	3,50	1346	4038
VULCI							
28	Sphinx / Young male head	8	11650	34950	2,33	1456	4369
29	Metus / Wheel	11	17900	53700	3,58	1627	4882

Survival rate¹¹

Nt = total number of coins currently known

N 5000 – N15000 = estimated productivity per die

1/TS 5 – 1/ TS 15 = survival rate

Using part of the data in Appendix 2, the “survival index” of the Populonia’s coinage has been calculated, making two hypotheses of productivity of the straight mints: 5,000 and 15,000 coins per die; for example, a survival rate of 144 (or 431 depending on the productivity per die chosen) indicates that one *Metus XX* has come to us every 144 (or 431) initially minted.

It is interesting to note that the survival rate of coins dating back to the V-early IV century B.C. is significantly lower than that of more recent coins. This would suggest perhaps a reuse of silver, if not a recast for new minting that may possibly have been required due to monetary reform, as per the changes from the system of the didrachma of value X (mode = gr 8.12 about) to that of value XX (mode = gr 8.4).

¹¹ DE CALLATAÿ 2000.

APPENDIX 4

<i>n° card</i>	<i>issue</i>	<i>metal</i>	<i>n</i>	<i>d</i>	<i>D</i>	<i>n/d</i>	<i>D/d</i>
POPULONIA							
17	Wheel	AG	11	4	5,30	2,75	1,33
18	Dolphin	AG	7	2	2,42	3,50	1,21
19	Female head CII	AG	8	1	1,04	8,00	1,04
20	Male head VII	AG	49	9	9,85	5,44	1,09
21	Turms V	AG	21	5	5,76	4,20	1,15
22	Young male head V	AG	21	4	4,40	5,25	1,10
23	Hare	AG	8	3	4,04	2,67	1,35
LUCA							
24	Young male head V	AG	31	2	1,97	15,50	0,99
25	Hippocamp CC	AG	21	4	4,40	5,25	1,10
26	Hippocamp C	AG	18	1	1,00	18,00	1,00
27	Head of lion	AG	13	3	3,50	4,33	1,17
VULCI							
28	Sphinx / Young male head	AG	8	2	2,33	4,00	1,17
29	Metus / Wheel	AG	11	3	3,58	3,67	1,19

Issues¹²

ERRATA CORRIGE

The previous text, published on OMNI 13, should be corrected on page 17, card 5 as follows:
weight g (mode): 7,76-8,14

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¹²The index **D/d** points out the ratio among the number of theoretical dies and the number of knowndies; if the ratio is ≤ 1 , it means a perfect identity, if >1 , we can reasonably think that shall be more dies.

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Article received: 26/12/2019

Article accepted: 30/03/2020