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METALLURGIC ANALYSIS OF COINS

Dating, series, variations and material of the coinage from Nemausus

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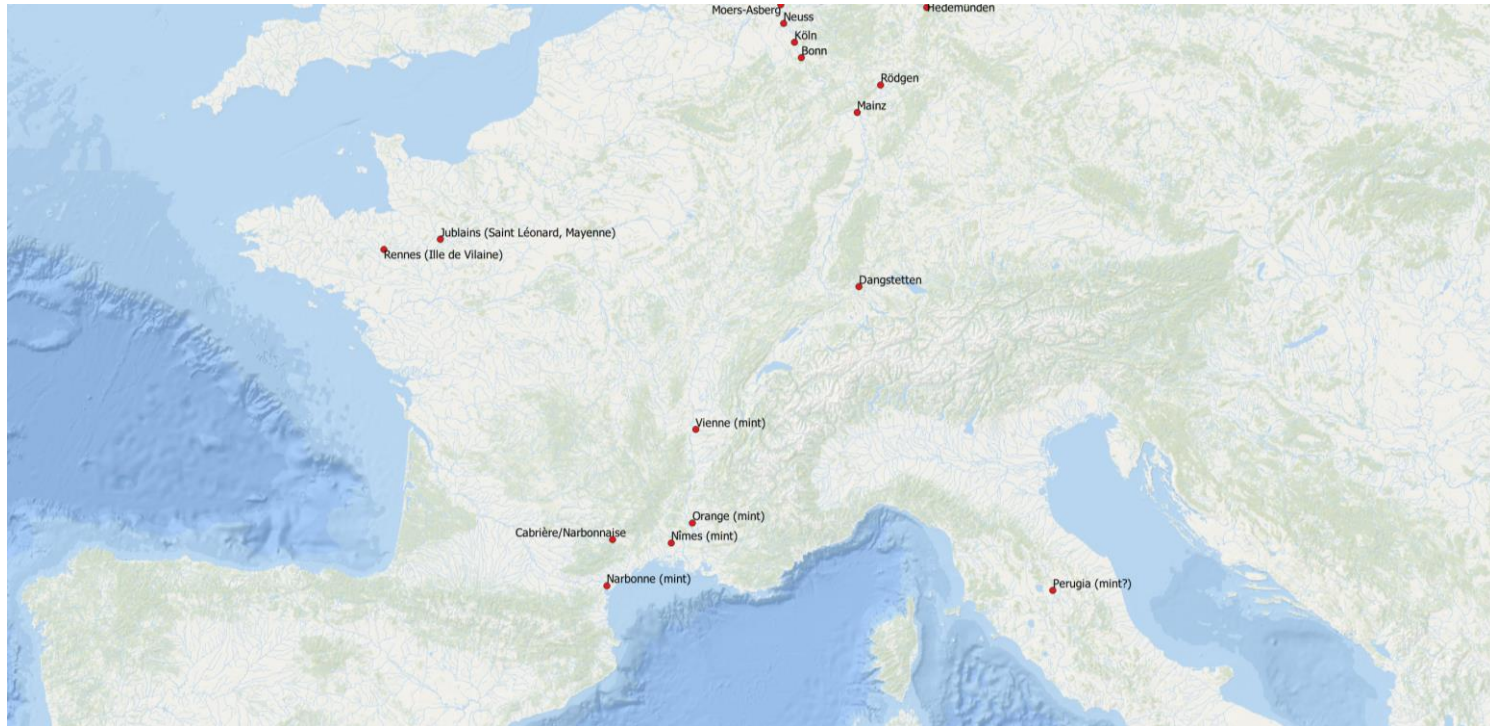
Base article

Paul-André Besombes, Jean-Noël Barrandon

- Les dupondii de Nîmes: datation, diffusion, et nature du métal utilisé
 - Revue numismatique, 6^e série, t. 157, 2001, p. 305-328.

- Target of article:
 - Information about the changes in regards to composition of alloy and material.
 - Separating series in new subgroups.
 - New dating of last series.

Overview: mints, hoards, deposits



Coinage from Nemausus (Nîmes/FR)

Among others there are bronze coins with a crocodile on the revers. They were struck in three series. In common:

Avers:

Agrippa left with rostral crown combined with laurel wreath and Augustus right

IMP/DIVI F (Imperator Divi Filius)

Revers:

Crocodile is chained; above palm, wreath with long ties

COL-NEM (Colonia Nemausus/Nimes)



Coinage from Nemausus (Nîmes/FR)

Nemausus coins are divided in 3 series:

- Series I: Augustus, bare-headed
 - Ia (*sestertius*) Dating: 27 BC
 - Ib (*as*) Dating: 20-10 BC (RIC), [16/15-10 BC (RPC)]
- Series II: Augustus with oak wreath
 - Dating: 9/8-3 BC
- Series III: Augustus with laurel wreath, P P (**Pater Patriae**)
 - Dating: 10-14 AD



Metall analysis I

Composition of alloy and nature of copper used

- Analyse of the coins using the activation with fast neutrons of a cyclotron.
- Example table for Nîmes Ia-1:

		Cu	Sn	Pb	Sb	Ag	As	Fe	Ni	Au
Nîmes Ia-1	Or. 175 (V)	90	9,11	0,3	0,3	0,15	0,001	0,08	0,06	0,0003
RPC I, 522	Or. 176 (V)	90,1	8,52	0,57	0,4	0,15	0,017	0,1	0,055	0,0002
	Or. 177 (V)	91,2	7,89	0,27	0,34	0,16	0,014	0,06	0,072	0,0002
	FG 2800a	89,3	9,86	0,22	0,3	0,16	0,012	0,065	0,062	0,0001
	FG 2747	91,7	7,32	0,26	0,42	0,15	0,048	0,1	0,048	0,0001
	FG 2750	90,8	8,3	0,26	0,36	0,17	0,014	0,053	0,061	0,0001
	FG 2874	89,7	9,85	0,1	0,031	0,0088	0,0013	0,049	0,24	<0,0007
	FG 2799	93,3	5,66	0,39	0,41	0,16	0,014	0,037	0,058	0,0001
	FG 2816	93	6	0,31	0,41	0,17	0,02	0,039	0,063	0,0002
	FG 2800	91,2	7,85	0,24	0,31	0,16	0,009	0,12	0,067	0,0001

Metall analysis

Two interpretations

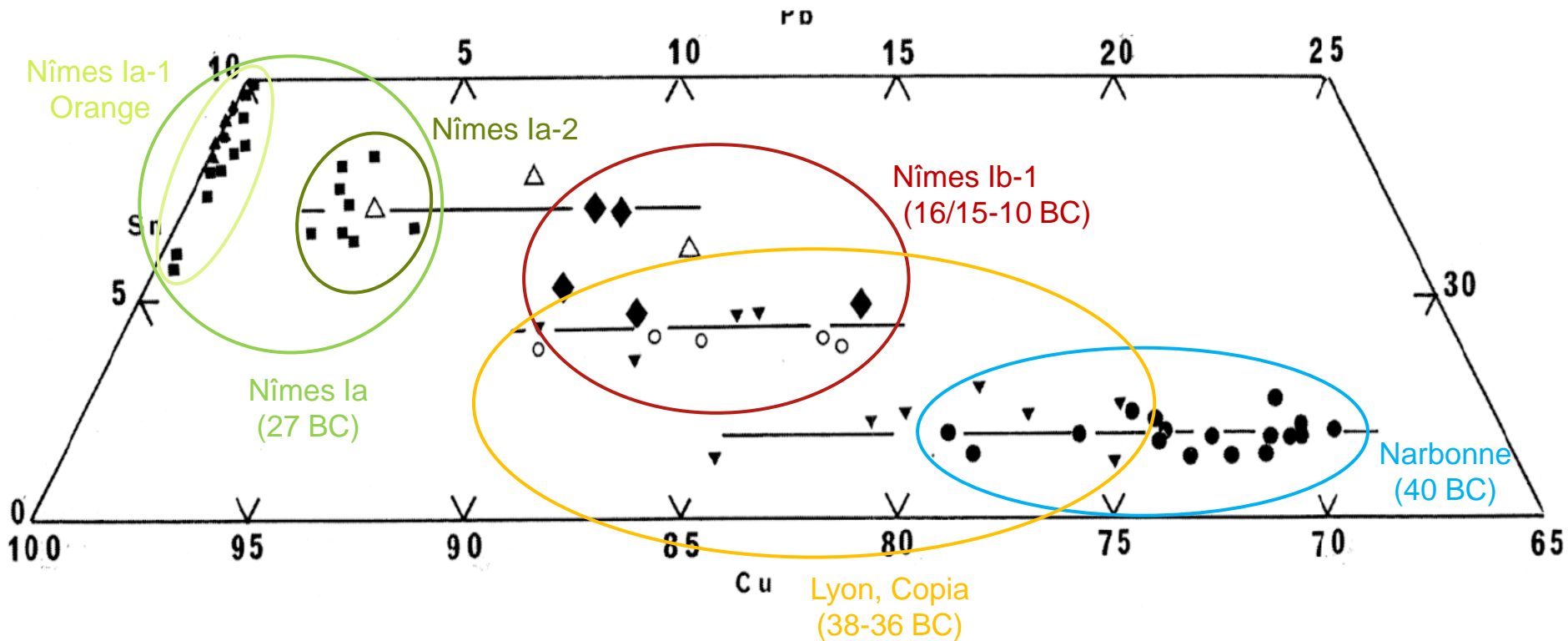
- metallurgic
- geochemical (nature of copper used)

Metallurgic analysis of bronze coins

Metallurgic analysis of ~ 60 coins from Narbonne, Lyon, Vienne, Orange and Italy

Date	Mint	Tin (%)	Lead (%)
40-38 BC	Narbonne, Lyon	2	18-30
38-36 BC	Italy, Lyon	4	10-17
36-26 BC	Lyon, Vienne, Nîmes	7	3-12
31-27 BC	Orange, Nîmes	9	-

- high bandwidth of alloys
- increase of tin, decrease of lead



Légende du graphique numéro 5 :

● = Narbonne / ▼ = Lyon / ◆ = Nîmes Ib-1 / ○ = Pérouse / △ = Vienne / ■ = Nîmes Ia / ▲ = Orange

Analysing Nîmes Series Ia

Observations of coins with less than 8% lead

Series Ia can be separated into two groups:

- Ia-1: without lead (less than 1%)
- Ia-2: with lead (3-4%)

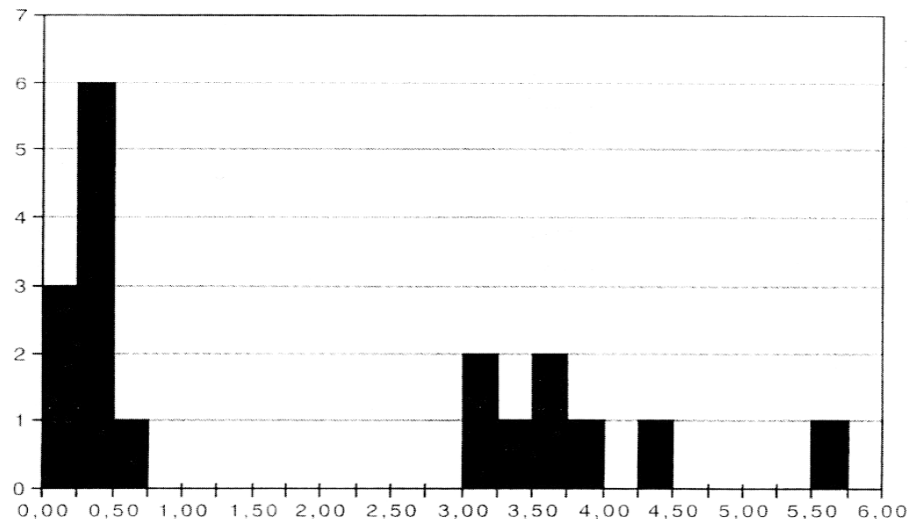


Fig. 3

Analysing Nîmes Series Ia

Taking this into account, it can be observed, that the style of the subgroups differs.

- Ia-1: larger images on avers, good proportioned crocodile on revers, bended palm, small COL NEM letters, chain drawn with rings.
- Ia-2: small body of crocodile, big jaw (Kiefer), straight palm, large COL NEM letters, chain drawn with small strokes.



Analysing Nîmes Series Ib

Observations of coins with less than 8% lead

- Two subgroups in Nîmes Ib
 - Ib-1: > 8% lead – usually, and > 4.5% tin
 - Ib-2: < 6.5% lead – usually, and < 4.5% tin
- Ib lead/tin changes probably introduced for massive minting.
- Group Ib which is dated 16/15-10 BC. This corresponds to the higher amount of coinage along with the introduction of the monetary reform of Augustus (Neuordnung 19 v. Chr, Gorecki 1981, 20).
- Ib-1 probably older than Ib-2.

Analysing Nîmes Series Ib II

Taking this into account, it can be observed, that the style of the subgroups differs:

- Ib-2: finer portrait of Agrippa and Augustus than on Ib-1 (the quality of the images is not that high to proof this here).



FG 2771 Nîmes 2b-1

FG 2770 Nîmes 1b-2

Analysing Nîmes Series II and III

- Groups Nîmes II and Nîmes III have similar alloys
 - Nîmes II has stable weight and lead of 1 – 2.5%
 - but Nîmes III can be separated in two subgroups

Series III, group a

- unpersonal portrait of Augustus
- high and fine letters of COL NEM like for series II
- slightly higher rate of Pb

Series III, group b

- right portrait „Stubsnase“ (Tiberius) , rectangle like face
- thick, small letters of COL NEM
- slightly lower rate of Pb



St-Léonard - Nîmes IIIa

FG 2759E Nîmes IIIb

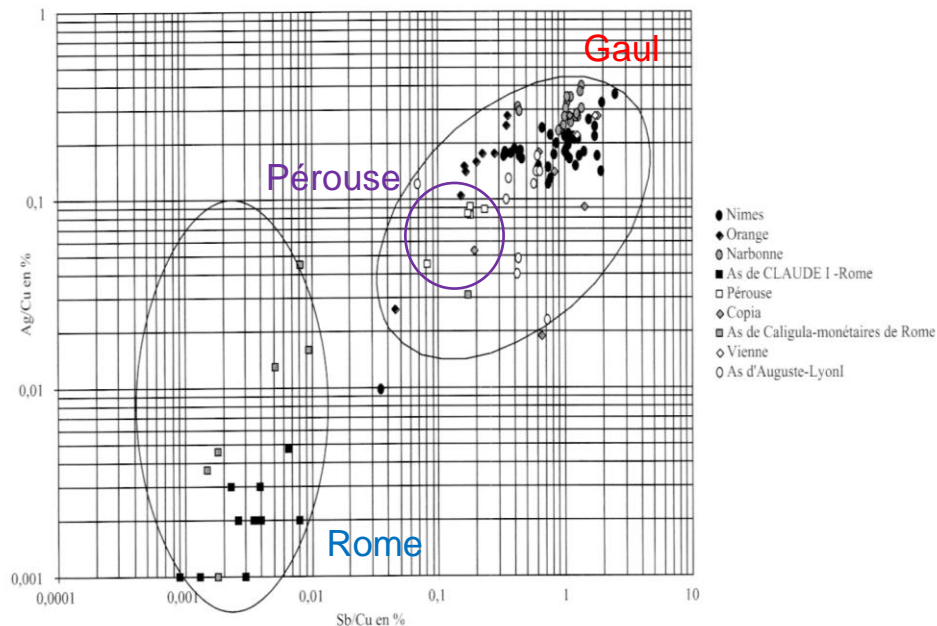
Analyse of trace elements I

- Antimony (Sb)
- Silver (Ag)
- Arsenic (As)

All in Gaul struck coins have high values of antimony and silver compared to the once struck in Rome. The values are about 100 times higher. The high amount of antimony and silver is typical for the copper deposits in south France like Cabrière.

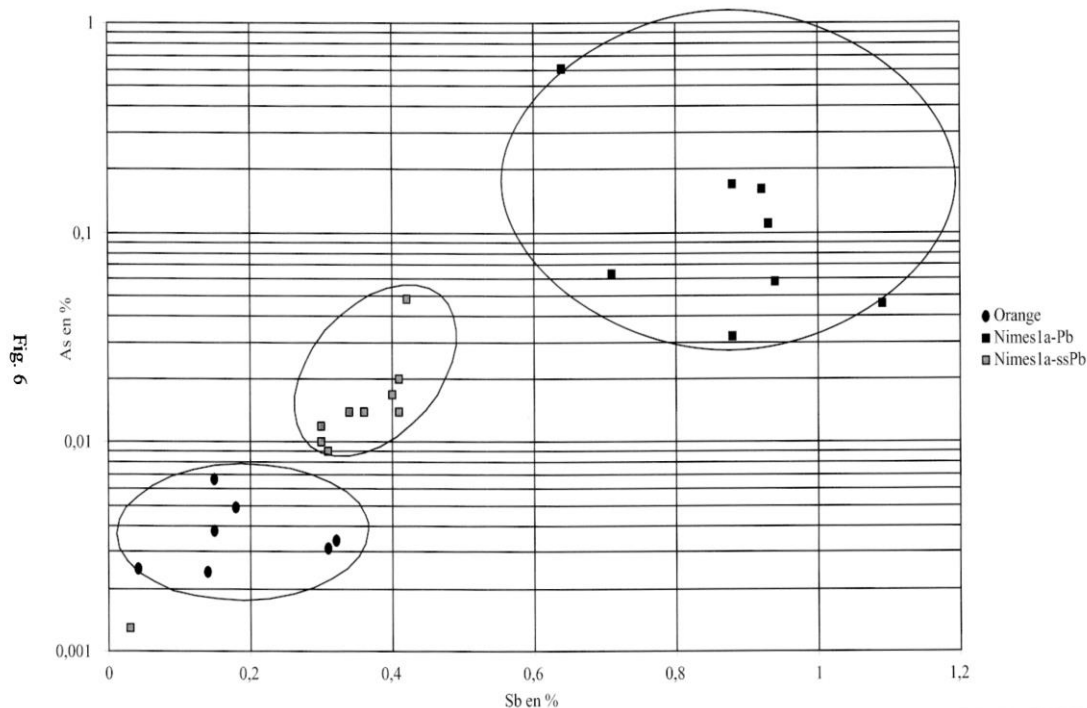
Info: the mint of coin RPC I, 620 is unknown. There are suggestions for Nimes, Lyon and Pérouse = Perugia in Italy.

The plot shows that the used copper shows the same trace elements as in Gaul.



Analyse of trace elements II

- Nimes Ia-1 can be separated from coins from Orange (compare with the metallurgic diagram [Cu, Pb, Sn] where they were not seen as separate groups).
- Nimes Ia-2 is clearly separated as well.



Summary

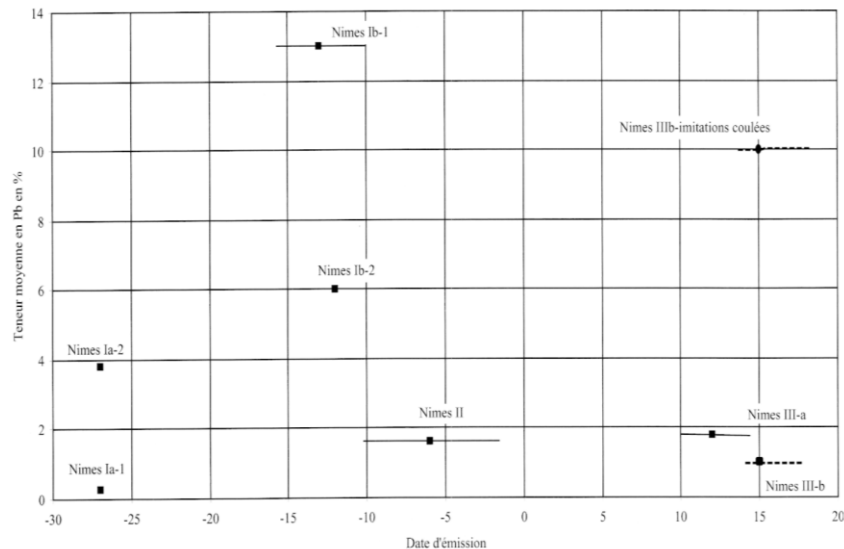
Nîmes Ia can be divided into Ia-1 and Ia-2 (27 BC)

Nîmes Ib can be divided into Ib-1 and Ib-2
(16/15-10 BC)

Nîmes II 9/8-3 BC

Nîmes III can be divided into III-1 (10-14 AD) and III-b
(Beginning reign of Tiberius)

- Usage of copper from Narbonnaise/FR (maybe Cabrière) for the coins from Narbonne, Orange, Nîmes and the first series of Lyon (RIC I, 230).
- Probably in Pérouse/Italy as well.
- The alloy of a coin might help to identify the mint.



Picture Credits

- Titel: H. de la Tour, Atlas de Monnaies de Gauloises (Paris 1892), Taf. VII. ff.
- Overview: Entwurf J. Hunke, basierend auf Basiskarte World_Ocean_Base. Das Kartenbild ist geistiges Eigentum von Esri und wird mit Genehmigung von Esri verwendet. Copyright © 2020 Esri und dessen Lizenzgeber. Alle Rechte vorbehalten. Quellen: Esri, GEBCO, DeLorme, NaturalVue | Esri, HERE, Garmin, FAO, NOAA, USGS
- Coinage from Nemausus I: RIC 154-161
- Analysing Nîmes Series Ia: RIC 154
- all others: Besombes, P.-A., 2001

Online sources

RIC (Roman Imperial Coinage) <http://numismatics.org/ocre>

RPC (Roman Provincial Coinage) <https://rpc.ashmus.ox.ac.uk/>

Literature

Besombes, P.-A., 2001. Les dupondii de Nîmes : datation, diffusion et nature du métal utilisé. numi 6, 305–328. <https://doi.org/10.3406/numi.2001.2331>

Willers, V.H., 1902. Die Münzen der römischen Colonien Lugudunum, Vienna, Cabellio und Nemausus. Numismatische Zeitschrift 89–138, Taf. V-VII.

Kraft, K., 2021. Das Enddatum des Legionslagers Haltern. Bonner Jahrbücher Bd. 155/156, 95-111 Seiten. <https://doi.org/10.11588/BJB.1955.1.75923>

End of presentation

questions/discussion