

Bernd Liesen

CARROT AMPHORAE PRODUCTION IN *GERMANIA INFERIOR*

With a contribution by Małgorzata Daszkiewicz and Gerwulf Schneider

During the late 1st and early 2nd centuries, imitations of levantine ‘carrot’ amphorae were produced in Germania inferior. These vessels were found predominantly in military sites along the Rhine frontier. Since the Eastern Mediterranean amphorae served as containers for dried fruit, the same function can be assumed for the reproductions.

Introduction

This paper gives general information about ‘carrot’ amphorae (Stuart type 24) produced in *Germania inferior*¹. These vessels were firstly described by P. Stuart and identified as reproductions of type Camulodunum 189², which served as small containers for dried fruit. Camulodunum 189 is of Levantine origin and predominantly distributed in the Western parts of the Roman Empire³.

Typology

Stuart 24 has a low, rounded to angular rim, a conical body and two small loop handles. The body is covered with grooves,

which run in most cases spirally all down the body (figs. 1–3). The only complete vessel (no. 46; fig. 1) is 49 cm high and has an exterior rim diameter of 8 cm. It has a weight of 1.9 kg and a capacity of 0.8 liters. Some damaged vessels such as nos. 13 and 14 seem to have had similar dimensions. In many cases the wall is quite thick.

Technical observations

Some details of the manufacturing process are worthy of mention: The shape indicates that the amphora was thrown upside down. It was observed that the grooves, which are sometimes angular, were made on the turning wheel, probably by a wooden instrument, from the rim up to the point. After drying, the rim and the upper part of the interior wall were finished with a sharp tool, as can be observed by fine grooves on the interior wall (fig. 4).

Fabric groups

The fabric of most Stuart 24 amphorae corresponds to the main fabric groups of the Rhenish Color Coated Ware⁴: The vast majority are made of fine white to light brown or yellowish clay with an orange, brown or reddish slip covering the body and continuing to the inside rim (fabric A according to H. Brunsting⁵) (figs. 1; 2, 1–6; 5, 1–2). Poorly represented are vessels of fabric B (nos. 7, 41, 51). It is made of the same clay as fabric A but with a very dark brown or black coating (figs. 2, 7; 5, 3). Fabric C does not correspond to any of the

¹ I am deeply indebted to J. van den Berg (Leuven), P. Bes (Amsterdam), A. Bours-Bergau (Xanten), L. Berger (Cologne), L. Döhning (Xanten), A. Hellmann (Düsseldorf), J. Hees (Utrecht), J. Hendriks (Nijmegen), C. Höpken (Ottweiler), S. Kleinbongartz (Düsseldorf), M. Mirschenz (Bonn), R. Niemeijer (Nijmegen), M. Polak (Nijmegen), D. Schmitz (Cologne) and S. Weiß-König (Nijmegen) for their valuable assistance.

² STUART 1977, 43 included carrot amphorae as type 24 in his typology of Color Coated Ware from Nijmegen: no. 17, furthermore Museum Kam inv. IV339, which does not belong to the group discussed here and therefore is not included in the catalogue. It is uncertain if Stuart was aware that these might be regional products. Anyway, he did not discuss their provenance in detail. Thereafter ‘type Stuart 24’ was mainly in use to describe the reproductions (cf. VAN DEN BERG ET AL. 2012, 64–65. – KLOOSTERMAN 2014, 125 named both imported and Rhenish vessels as Stuart 24).

³ Camulodunum 189 served as container for dates and figs. It was produced in Beirut and probably in the Gaza and Dead Sea region: REYNOLDS 2005, 571; REYNOLDS ET AL. 2008–2009. There it is rare, thus it may be made exclusively for export: REYNOLDS 2005, 571. For distribution of Camulodunum 189 see P. VIPARD, Les amphores carottes (forme Schöne-Mau XV). État de la question. SFEACG. Actes Congrès Rouen (Marseille 1995) 68–73; VILVORDER ET AL. 2000, 480–481; HOWELLS 2009, 72–75; VAN DEN BERG 2012, 229–231; R. R. DE ALMEIDA/J. M. JEREZ LINDE, Ânforas “Carrot” em *Avgusta Emerita* e La Vega. Evidência de um consumo exótico (mas não singular) na Lusitânia interior. Al Madan online 19/2, 2015, 21–24. – A late roman type of carrot amphora was produced in Dilesi (Greece): E. GEROUSI, A late Roman workshop at Dilesi in Boeotia. In: N. Poulou-Papadimitriou/E. Nodarou/V. Kilikoglou (eds.), LRCW4. Late Roman Coarse Wares, Cooking Wares and Amphorae in the Mediterranean: Archaeology and Archaeometry 4. The Mediterranean: a market without frontiers, BAR Internat. Ser. 2616 (Oxford 2014) 193–202. The content is unknown.

⁴ F. VILVORDER, La céramique engobée de Cologne. In: R. Brulet/F. Vilvorder/R. Delage, La céramique romaine en Gaule du Nord. Dictionnaire des céramiques. La vaisselle à large diffusion (Turnhout 2010) 330–336 (with further references); F. VILVORDER, La céramique engobée de Xanten. In: R. Brulet/F. Vilvorder/R. Delage, La céramique romaine en Gaule du Nord. Dictionnaire des céramiques. La vaisselle à large diffusion (Turnhout 2010) 336–338.

⁵ H. BRUNSTING, Het grafveld onder Hees bij Nijmegen. Een bijdrage tot de kennis van Ulpia Noviomagus. Arch.-Hist. Bijdragen 4 (Amsterdam 1937) 70–71.



Fig. 1. Carrot amphora (Stuart 24) from Moers-Asberg. – No scale.

fabrics of the Color Coated Wares, but may also have been produced in *Germania inferior*. Is is represented only by no. 45, which is made of fine orange clay with red inclusions and brownish color coating (figs. 2,8; 5,4)⁶.

Chemical composition

Małgorzata Daszkiewicz and Gerwulf Schneider

In order to determine the chemical composition and to attribute the amphorae to one or more workshops, ten samples (eight samples of fabric A, one sample of fabric B, and one sample of fabric C) were subjected to wavelength-dispersive X-ray-fluorescence analysis⁷. All ten amphorae analyzed were made from non-calcareous clay low in iron (table 1). Amphorae of fabrics A and B even have very low iron contents – below 2% Fe_2O_3 . Generally their chemical composition is very similar to each other, meaning that they could have been made in one workshop. The variation in composition of the five amphorae found in Nijmegen (e.g. in sodium, potassium, rubidium) is certainly due to absorption of phosphorus and more or less leaching of other elements due to special burial conditions in Nijmegen known from other analyses of pottery finds⁸. This alteration effect is largest in sample X434 with 4.8% P_2O_5 and it is connected with higher calcium and strontium and lowest potassium and rubidium contents. In spite of the general geochemical similarity, the amphora of fabric C differs significantly from the rest of the analyzed amphorae in many elements (e.g. in iron, silicon, aluminium, zirconium). It was very probably made in a different workshop from the other analyzed amphorae.

The composition of the analyzed carrot amphorae was compared to that of 328 analyzed samples of Roman pottery from Cologne, Xanten, and Nijmegen (fig. 6). It shows that carrot amphorae of fabrics A and B differ from all these samples in their iron and aluminium contents as opposed to the sample of fabric C which is placed in the middle of the large comparison group. According to multivariate analysis

⁶ According to KLOOSTERMAN 2014, 125 one specimen was made of 'Nijmeegs-Holdeurnse' clay, but this vessel could not be identified.

⁷ Samples were prepared by pulverising fragments weighing ca. 2g, having first removed their surfaces and cleaned the remaining fragments with distilled water in an ultrasonic device. The resulting powders were ignited at 900°C (heating rate 200°C/h, soaking time 1 h), melted with a lithium-borate mixture (Merck Spectromelt A12) and cast into small discs for measurement. This data is, therefore, valid for ignited samples but, with the ignition losses given, may be recalculated to a dry basis. For easier comparison the major elements are normalised to a constant sum of 100%. Major elements are calculated as oxides. Total iron is calculated as Fe_2O_3 . The precision for major elements is better than 1%; for trace elements this rises to a maximum of 20% for low concentrations. Accuracy was tested by analysing international reference samples and by exchange of samples with other laboratories. For major elements and the most important trace elements it is between 5 and 10%. Preparation of samples for analysis was carried out by M. Daszkiewicz ARCHEA, measurement using a PANalytical AXIOS XRF-spectrometer are made by G. Schneider and A. Schleicher in GFZ Potsdam (GFZ = Helmholtz-Zentrum Potsdam, Deutsches Geo-ForschungsZentrum GFZ, Sektion 4.2, Anorganische und Isotopengeochemie).

⁸ G. SCHNEIDER, Mineralogical and chemical alteration. In: A. Hunt (ed.) *The Oxford Handbook of Archaeological Ceramic Analysis* (Oxford in press).



Fig. 2. Carrot amphorae (Stuart 24) from Bunnik-Vechten (1), Nijmegen (2–4, 7), Xanten (5, 8), and Cologne (6). Fabric A (1–6); fabric B (7); fabric C (8). – Scale 1:2.

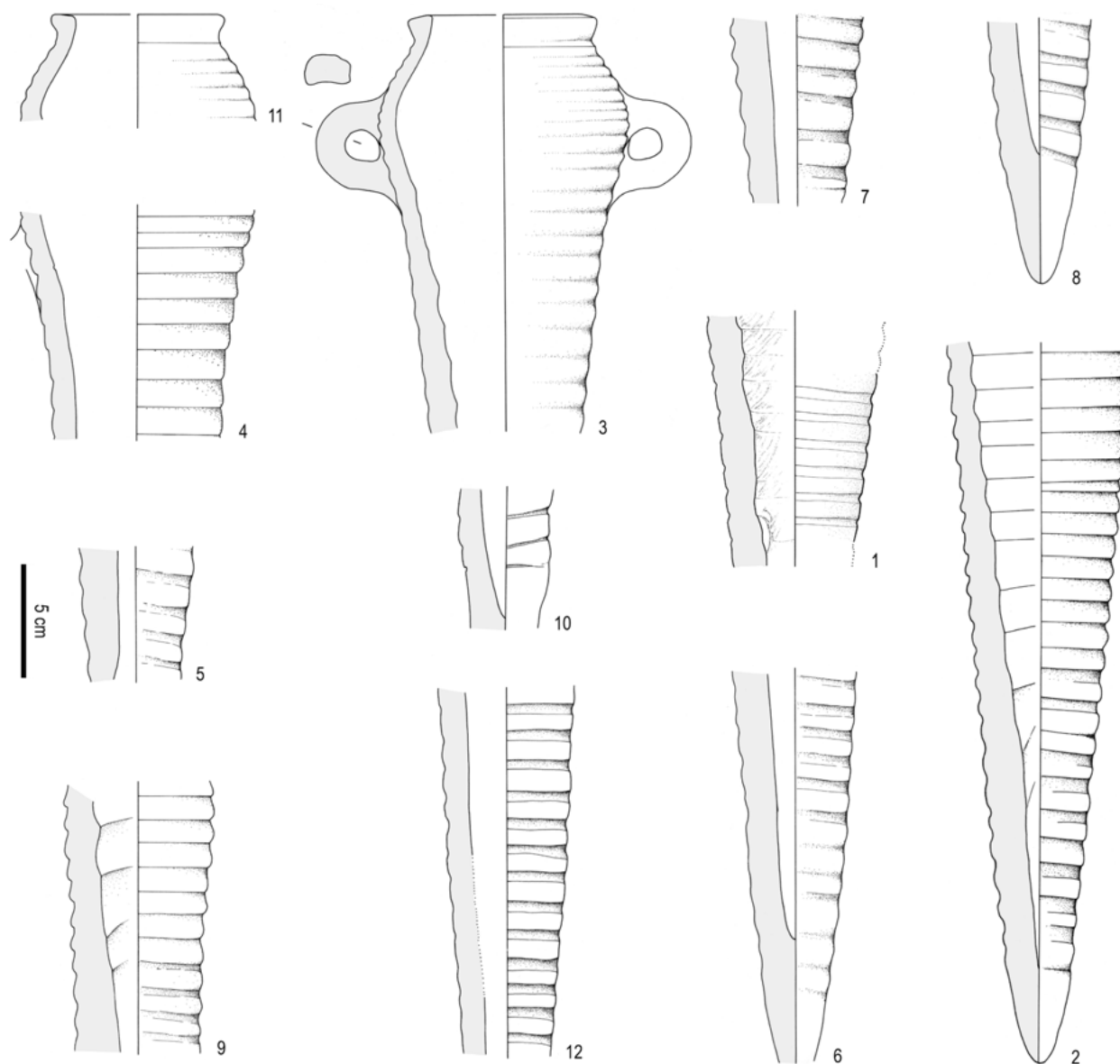


Fig. 3. Carrot amphorae (Stuart 24) from Alphen aan den Rijn (1), Bunnik-Vechten (2), and Nijmegen (3–12). – Scale 1:3.

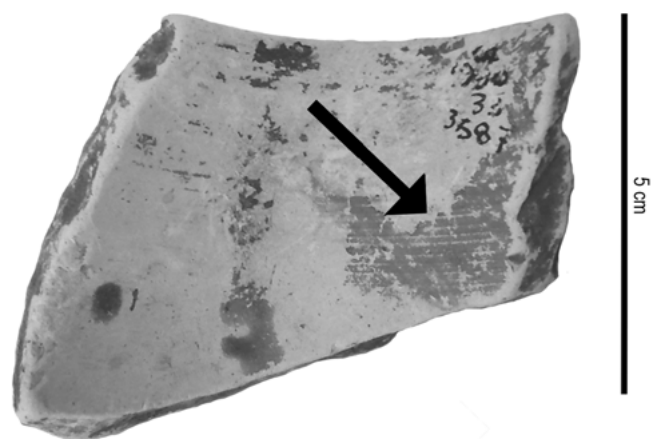


Fig. 4. Traces of tooling on the interior wall of no. 41.



Fig. 5. Fresh break of fabric A: no. 44 (1), no. 50 (2); fabric B: no. 51 (3); fabric C: no. 45 (4).

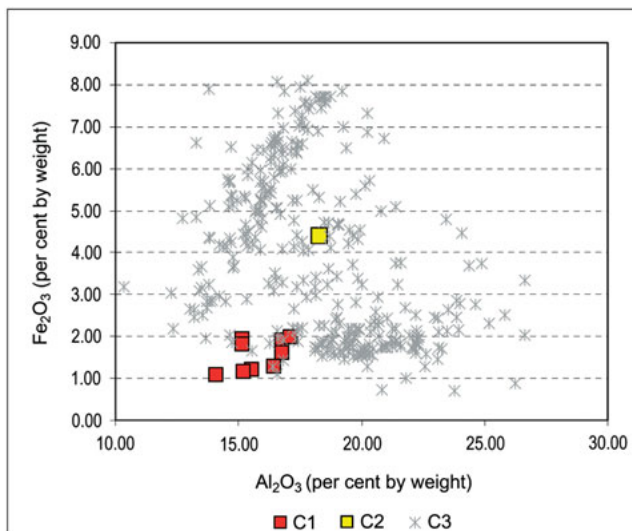


Fig. 6. Contents of Al_2O_3 (wt.%) vs. Fe_2O_3 (wt.%). C1 = carrot amphorae of fabrics A and B found in Nijmegen and Cologne, C2 = carrot amphorae of fabric C found in Xanten. C3 = pottery samples from Cologne, Xanten, and Nijmegen.

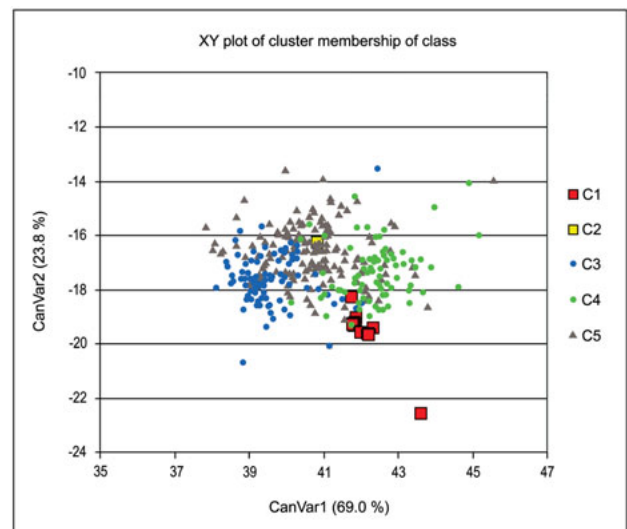


Fig. 7. Discriminant analysis, plot of the first two canonical variables. C1 = carrot amphorae of fabrics A and B found in Nijmegen and Cologne, C2 = carrot amphorae of fabric C found in Xanten. C3 = pottery samples from Cologne, C4 = pottery samples from Nijmegen, C5 = pottery samples from Xanten.

Cat.	Findspot	Lab.	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	V	Cr	Ni	Zn	Rb	Sr	Y	Zr	Nb	Ba	(La	Ce	Pb)	I.o.i.	TOTAL
		No.	per cent by weight											ppm										%	%		
Fabric A																											
49	Cologne	X385	76.01	1.22	17.11	1.99	0.013	0.89	0.35	0.051	2.29	0.07	126	144	37	80	142	99	33	348	25	328	49	116	31	0.77	98.46
50	Cologne	X543	78.39	1.12	15.16	1.81	0.014	0.74	0.36	0.143	2.19	0.07	125	142	40	66	124	96	40	334	27	315	50	88	34	0.81	99.68
29	Nijmegen	X430	79.17	1.16	15.55	1.20	0.006	0.39	0.33	0.019	1.41	0.76	99	148	29	58	83	105	32	388	30	415	51	104	36	1.38	99.21
32	Nijmegen	X431	78.25	1.12	15.14	1.94	0.015	0.73	0.32	0.105	2.04	0.35	105	135	39	69	115	91	40	335	26	329	65	96	30	0.87	99.18
30	Nijmegen	X433	79.71	1.14	15.22	1.16	0.005	0.42	0.38	0.038	1.43	0.50	105	149	29	36	88	119	32	374	29	288	49	84	32	1.10	99.37
33	Nijmegen	X434	75.78	1.11	14.11	1.08	0.009	0.20	1.51	0.057	1.33	4.80	89	133	16	40	65	406	26	362	28	209	35	65	24	4.54	100.47
34	Nijmegen	X435	75.76	1.24	16.77	1.90	0.009	0.68	0.52	0.038	1.90	1.19	100	151	37	108	113	134	44	365	29	386	50	100	32	1.65	100.20
44	Xanten	X429	77.69	1.16	16.77	1.60	0.016	0.58	0.28	0.049	1.77	0.09	106	145	42	45	101	104	32	341	27	287	58	117	36	0.57	97.83
Fabric B																											
51	Cologne	X438	78.67	1.14	16.43	1.28	0.008	0.50	0.24	0.067	1.58	0.07	114	152	31	13	93	98	29	357	26	277	51	100	36	0.63	99.09
Fabric C																											
45	Xanten	X542	71.71	1.22	18.27	4.42	0.069	0.95	0.72	0.449	2.08	0.10	110	140	57	88	125	111	43	297	32	385	69	108	32	0.92	99.55

Table 1. Chemical composition analyzed by WD-XRF of samples ignited at 900°C (l.o.i. = loss on ignition).

(fig. 7) the carrot amphorae are most similar to pottery from Nijmegen. However, no direct match was found with any of the known reference groups in the Rhineland⁹.

More samples of fabric C should be analyzed to verify the results. According to its chemical composition, there is no reason to doubt the Rhenish origin of fabric C. For the analyzed amphorae of fabrics A and B this is less clear but regarding the overall chemical similarity a production within the region is very probable.

Chronology

Stuart 24 were apparently in use during the later 1st and early 2nd centuries: they are absent in the pre-flavian legionary fortress *Vetera I* at Xanten, but quite well represented in the flavian *canabae* of the 10th legion at Nijmegen. Probably

the type went out of use during the first decades of the 2nd century¹⁰.

Distribution

The distribution is limited to *Germania inferior* (fig. 8). Most vessels come from military sites in the Northern part of the province. The type is poorly represented in the *coloniae* Xanten/*Colonia Ulpia Traiana* and Cologne/*Colonia Claudia Ara Agrippinensium*, as well as in the *villae rusticae* in the hinterland such as Cologne-Widdersdorf.

Discussion

Stuart 24 is a copy of the Levantine vessels in all typological details: Thick-walled examples with deep angular grooves have, for instance, been recorded amongst the finds of the Beirut workshop BEY 15 (Type B)¹¹. The copies are of the same size as Camulodunum 189. As Camulodunum 189 has brown or red clay, the color coating of Stuart 24 should give an impression close to the original, but, for instance, during the late 1st century there were sources of iron rich clays in use at Nijmegen, Xanten, and Cologne.

There are no records of Stuart 24 amphorae associated with kiln sites. However, the distribution, the fabric groups and the results of chemical analyses give clear evidence that the type was produced in the Rhineland¹². The chemical

⁹ There is a lack of data from Nijmegen, cf. G. SCHNEIDER, Chemische Zusammensetzung. In: S. Weiß-König, Neue Untersuchungen zur Feinkeramik von De Holdeurn. In: B. Liesen (ed.), Römische Keramik in Niedergermanien. Produktion – Handel – Gebrauch. Xantener Ber. 27 (Darmstadt 2014) 143–147. The reference groups from Xanten and Cologne are sufficient: LIESEN 1994, 128–140; G. SCHNEIDER, Materialanalytische Untersuchungen. In: B. Liesen, Neues zur Produktion römischer Keramik in Xanten. Bonner Jahrb. 201, 2001, 212–215; G. SCHNEIDER, Chemische Zusammensetzung. In: M. Sieler, Engobierte Backplatten aus Xanten. In: B. Liesen (ed.), Römische Keramik in Niedergermanien. Produktion – Handel – Gebrauch. Xantener Ber. 27 (Darmstadt 2014) 130; A. BOCQUET/D. LADURON/F. VILVORDER, Carte d'identité physico-chimique des céramiques fines engobées produites dans les ateliers de Cologne et de Trèves. SFECAG. Actes Congrès Tournai (Marseille 1992) 228–230; A. BOCQUET, La production et la distribution des céramiques fines engobées et métallescentes dans le Nord de la Gaule: approche minéralogique et géochimique. In: R. Brulet/R. P. Symonds/F. Vilvorder, Céramiques engobées et métallescentes gallo-romaines. Actes du Colloque organisé à Louvain-la-Neuve le 18 mars 1995. Acta RCRF Suppl. 8 (Oxford 1999) 136–156; BIEGERT ET AL. 2002, 19–21; G. SCHNEIDER/M. DASZKIEWICZ/C. HÖPKEN, Die chemische Zusammensetzung der Keramik aus Kölner Töpfereien. Kölner Jahrb. 37, 2004, 489–494. In *Germania inferior* non calcareous clay with low content of iron was also in use at Heerlen: M. DASZKIEWICZ, Appendix – Report on chemical analysis of pottery from Heerlen. In: J. Van Kerckhove/G. L. Boreel, A characterization of the pottery production in

Heerlen (Limburg, the Netherlands): fabric analysis and typo-chronology. In: B. Liesen (ed.), Römische Keramik in Niedergermanien. Produktion – Handel – Gebrauch. Xantener Ber. 27 (Darmstadt 2014) 278–283). – Soller: BIEGERT ET AL. 2002, 18–19. – Bonn: BIEGERT ET AL. 2002, 21–22, and some minor kiln sites not mentioned here.

¹⁰ No. 47 was found in a pit at Cologne-Widdersdorf dated to the 4th century, but this context included other 2nd century vessels: LIESEN 2003, 486.

¹¹ Cf. REYNOLDS ET AL. 2008–2009, 103 fig. 7, 12–20.

¹² For fabric description and chemical composition of carrot amphorae from Beirut see M. ROUMIÉ ET AL., Use of PIXE analysis technique for

analyses show that there were at least two different clays in use. Thus we have to take into consideration that the type was possibly produced in several workshops in *Germania inferior*.

It is difficult to analyze this amphora type in its economical setting: The distribution provides evidence that Stuart 24 was used for the transport of goods and involved in a small-scale regional trade. The distribution indicates that the type was more common in the Northern part of the province, but it is likely that the lack of published data from almost all military sites along the German part of the Rhine frontier is responsible for this. The contents are unknown, but one can assume it was used for the same kind of food as Camulodunum 189. One can suppose that imports from the Levant or elsewhere in the Mediterranean, which had been carried in larger containers, were filled into the small Stuart 24 in order to distribute them to the markets in the region¹³. The characteristic shape had since a long time been known at that time and made these amphorae easily identifiable as containers for dried fruit. As S. Weiß-König recently pointed out, the high quality legionary pottery 'Nijmeegs-Holdeurnse Ware' of the late 1st and early 2nd centuries reflects the social and economical level of the Roman military and associated persons. Maybe the same goes for the Stuart 24 amphorae, whose contents were not accessible to the majority of the consumers due to the relatively high transport costs¹⁴. Concerning the situation in *Britannia*, D. T. Howells presumed that Camulodunum 189 reflects a military elite situation, but for *Germania inferior* this idea was denied by J. van den Berg¹⁵.

It is less likely that Stuart 24 served as containers for local products, as there is no kind of fruit from the North-Western provinces that could be substituted for the prestigious contents from the East.

There is not much known about the amphorae produced in *Germania inferior*, but most of them are flat bottomed containers related to South Gaulish wine amphorae¹⁶. Certain types were produced in reduced size and in small quantities¹⁷.

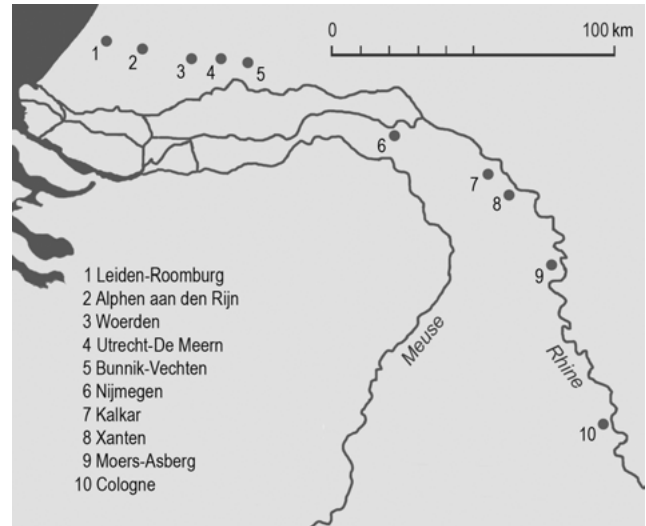


Fig. 8. Carrot amphorae (Stuart 24). Distribution.

There is no evidence that Stuart 24 was produced by potters which had previously been working in the Eastern provinces, since no further Rhenish imitations of Levantine vessel types were recorded.

Catalogue

The catalogue consists of all Stuart 24 amphorae which provide the database of this article. Site names are listed according to their geographical position from North-West to South-East.

Leiden-Roomburg

1. Fabric A (?). – M. POLAK/J. VAN DOESBURG/P. A. M. M. VAN KEMPEN, Op zoek naar het castellum Matilo en het St. Margarethaklooster te Leiden-Roomburg: Het archeologisch onderzoek 1999–2000. RAM-rapport 109 (Amersfoort 2004) 41; 43 fig. 20a.

Alphen aan den Rijn

2. (fig. 3,1). Fabric A. – M. POLAK/R. P. J. KLOOSTERMAN/R. A. J. NIEMEIJER, Alphen aan den Rijn – Albaniana 2001–2002. Opgravingen tussen de Castellumstraat, het Omloopkanaal en de Oude Rijn. Libelli Noviomagenses 7 (Nijmegen 2004) 139 table 3.
3. Fabric A. – H. KOP, Aardewerk: scherf, pottenbakkerstempel, olielamp, speelschijf, slingerkogel, graffito, dakpanstempel. In: P. Bakker/J. W. Bron (eds.), Gered uit de Grond. Romeinse vondsten van Castellum Albaniana (Leiden 2013) 30 no. 1.102.

Woerden

4. Fabric A. – Provinciaal Archeologisch Depot Alphen aan den Rijn, RU 1975–1984, vondstno. 008/00268.

the study of Beirut amphora production in the Roman period. Nuclear Instruments and Methods in Physics Research B 215, 2004, 196–202; REYNOLDS ET AL. 2008–2009, 77–78. According to macroscopic observations there are certain fabric groups of probably mediterranean carot amphorae, whose mineralogical and chemical composition has not been described yet.

¹³ Cf. P. GOHIER/C. CAPELLI, Les amphorettes levantines du dépotoir du site «5 place Jean-Baptiste Massillon» à Arles. Un module miniature des amphores Célestins 1A? Approches typologiques et pétrographiques. SFECAG. Actes Congrès Amiens (Marseille 2013) 549–554.

¹⁴ Generally oriental amphorae are not common in the North-West: VILVORDER ET AL. 2000; VAN DEN BERG 2012, 216–222.

¹⁵ HOWELLS 2009, 75–79; VAN DEN BERG 2012, 220–222.

¹⁶ Cf. LIESEN 1994, 42–43 pl. 8,3–7; J. VAN KERCKHOVE/G. L. BOREEL, A characterization of the pottery production in Heerlen (Limburg, the Netherlands): fabric analysis and typo-chronology. In: B. Liesen (ed.), Römische Keramik in Niedergermanien. Produktion – Handel – Gebrauch. Xantener Ber. 27 (Darmstadt 2014) 260; 266 fig. 8,7895.

¹⁷ Miniature imitations of Dressel 20, probably used as ritual offerings, were attributed to workshops in the Dutch coastal region: R. A. J. NIEMEIJER, Bergen op Zoom – Paradeplaats: Een bijzonder vondstcomplex met mini-amforen. Auxiliaria 9 (Nijmegen 2009). Small amphorae of undeterminable type from Bladel may have had the same function: N. ROYMANS/T. DERKS, Rural cult places and the symbolic construction of supra-local communities. In: N. Roymans/T. Derks/H. Hiddink (eds.), The Roman Villa of Hoogeloon and the Archaeology of the Periphery. Amsterdam Archaeological Studies 22 (Amsterdam 2015) 237 fig. 6. A single fragment, probably of a small pointed amphora, comes from a workshop at Xanten: B. LIESEN, Legionsware aus Xanten. In:

B. Liesen/U. Brandl (eds.), Römische Keramik – Herstellung und Handel. Xantener Ber. 13 (Mainz 2003) 121 fig. 3,16. Small copies of Mid Roman Amphora I were produced in Cologne: B. LIESEN, Kölner Kopien afrikanischer Amphoren. Kölner Jahrb. 34, 2001, 481–484.

5. Fabric A. – Provinciaal Archeologisch Depot Alphen aan den Rijn, RU 1975–1984, vondstno. 011/00357.
6. Fabric A. – Provinciaal Archeologisch Depot Alphen aan den Rijn, RU 1975–1984, vondstno. 011/00357.
7. Fabric B. – Provinciaal Archeologisch Depot Alphen aan den Rijn, RU 1975–1984, vondstno. 011/00357.

Utrecht-De Meern

8. Fabric A. – Gemeentedepot Utrecht, LR 58_4, vondstno. 154.
9. Fabric A. – Gemeentedepot Utrecht, LR 58_4, vondstno. 323.
10. Fabric A. – Gemeentedepot Utrecht, LR 58_4, vondstno. 342.

Bunnik-Vechten

11. Fabric A. – VAN DEN BERG ET AL. 2012, 64–65.
12. (**fig. 3,2**). Fabric A. – Gemeentedepot Utrecht, PUG collection, no. 2902. – provenance doubtful (perhaps Wijk bij Duurstede).
13. (**fig. 2,1**). Fabric A. – Gemeentedepot Utrecht, PUG collection, no. 7361. – provenance doubtful.

Nijmegen

14. (**fig. 2,2; 3,3**). Fabric A. – Nijmegen, Museum Kam, inv. 2.2.27.
15. (**fig. 3,4**). Fabric A. – Nijmegen, Museum Kam, inv. 5a.
16. (**fig. 3,5**). Fabric A. – Nijmegen, Museum Kam, inv. 26/2.
17. (**figs. 2,3; 3,6**). Fabric A. – Nijmegen, Museum Kam, inv. IV 340. – STUART 1977, 43.
18. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, find no. 2.
19. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, find no. 1959/I.
20. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, find no. 1959/II 6.
21. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, find no. 1960/199.
22. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, find no. 1960/426.
23. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, find no. 1961/812.
24. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, find no. 1963/1094.
25. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, find no. 1963/1161.
26. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1990.000.4097. – KLOOSTERMAN 2014, 125.
27. (**fig. 3,7**). Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1990.34.3595. – KLOOSTERMAN 2014, 125.
28. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1990.38.4347. – KLOOSTERMAN 2014, 125.
29. (**fig. 2,4; 3,8**). Fabric A. – Sample X430. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1993.95.6801. – KLOOSTERMAN 2014, 125.
30. (**fig. 3,9**). Fabric A. – Sample X433. – Nijmegen, Pro-

vinciaal Depot voor Bodemvondsten van Gelderland, CA 1993.95.7141. – KLOOSTERMAN 2014, 125.

31. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1993.98.7243. – KLOOSTERMAN 2014, 125.
32. Fabric A. – Sample X431. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1993.98.7244. – KLOOSTERMAN 2014, 125.
33. (**fig. 3,10**). Fabric A. – Sample X434. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1993.98.7246. – KLOOSTERMAN 2014, 125.
34. Fabric A. – Sample X435. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1994.62.7965. – KLOOSTERMAN 2014, 125.
35. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1995.87.8950. – KLOOSTERMAN 2014, 125.
36. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 391.122_u_129.
37. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 387.038_u_051_u_083.
38. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1983_(3)59_(30)907.
39. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1960/428.
40. Fabric A. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1961/812.
41. (**fig. 2,7; 3,11**). Fabric B. – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1990.33.3587. – KLOOSTERMAN 2014, 125.
42. (**fig. 3,12**). Fabric A or B (burnt). – Nijmegen, Provinciaal Depot voor Bodemvondsten van Gelderland, CA 1992.79.6508. – KLOOSTERMAN 2014, 125.

Kalkar

43. Fabric A. – LVR-Amt für Bodendenkmalpflege im Rheinland, NI 2013/0071, Stelle 3, Position 10, Fundnr. 27.

Xanten

44. (**fig. 2,5; 5,1**). Fabric A. – Sample X429. – LVR-Archäologischer Park Xanten, find no. C 24885.
45. (**fig. 2,8; 5,4**). Fabric C. – Sample X542. – LVR-Archäologischer Park Xanten, find no. C 2690.

Moers-Asberg

46. (**fig. 1**). Fabric A. – Stadtmuseum Düsseldorf, Inv. A129.

Cologne

47. Fabric A. – LIESEN 2003, 486; 485 fig. 28.10.
48. Fabric A. – Cologne, Römisch-Germanisches Museum, FB 1969.002, context RS-0090.
49. Fabric A. – Sample X385. – Cologne, Römisch-Germanisches Museum, FB 2004.001, find no. 1713-0330-09.
50. (**fig. 2,6; 5,2**). Fabric A. – Sample X543. – Cologne, private collection.
51. (**fig. 5,3**). Fabric B. – Sample X438. – Cologne, Römisch-Germanisches Museum, FB 1996.025, FZ 18734.

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Illustrations

Fig. 1: Stadtmuseum Düsseldorf

Figs. 2; 4; 8: B. Liesen, LVR-Archäologischer Park Xanten / LVR-RömerMuseum

Fig. 3,1: R. P. Reijnen, Auxilia, Radboud-Universiteit Nijmegen

Figs. 3,2–12: L. Berger, Cologne

Fig. 5: S. Arendt, LVR-Zentrum für Medien und Bildung Düsseldorf

Figs. 6–7: M. Daszkiewicz, Warszawa

