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AMPHORA EPIGRAPHY: PROPOSALS FOR THE STUDY OF STAMP CONTENTS

INTRODUCTION*

The amphora types that transported baetican olive-oil are well-known. The Roman amphora Dressel 20 contained this product from the change of era until the IIIrd. c. A.D., being then substituted by the Dressel 23 and Tejarillo I, two new typologies of the smaller size. In the early Empire, the Dressel 20 occupied an outstanding place in the commercial exchanges, as part of the *annona* system (REMESAL RODRÍGUEZ 1986), becoming the best represented vessel in Rome and the German and British *Limes*.

Due to the control exerted by the *annona* during the long export of this product, the Dressel 20 is nowadays the amphora that supplies the major number of stamps within the group of imperial amphorae. Moreover, it has a special painted inscription (*tituli picti*), unique, fixed, with a cursive control of fiscal character which evolved progressively and parallel to the changes inferred by the Roman administration in different periods (about the nature and meaning of painted inscriptions: RODRÍGUEZ ALMEIDA 1984, 175).

Together with the arguments already mentioned, there are varied factors that make the stamps of this amphora type as an appropriate paradigm to introduce the computer tool that we propose as a new approach to the study of *instrumentum domesticum inscriptum*. We will limit ourselves to remind the main points, already suggested by J. Remesal (REMESAL RODRÍGUEZ 1992, 108-110):

– a great number of stamps are known thanks to the field by G. Bonsor and M. Ponsich (BONSOR 1931; PONSICH 1974, 1979, 1991) for almost one hundred workshops which produced Dressel 20 amphorae;
– thousands of stamps are recorded in France, Great Britain, Germany, Holland, Switzerland, etc. (CALLENDER 1965; REMESAL RODRÍGUEZ 1986; MARTIN-KILCHER 1987);
– the material collected in the Mte. Testaccio (Rome) by H. Dressel, E. Rodríguez Almeida and the research group that currently runs the excavation under the direction of Prof. J.Mª Blázquez (DRESSEL, *CIL* XV; RODRÍGUEZ ALMEIDA 1974-75 (1977); 1978-79 (1981); BLÁZQUEZ, REMESAL RODRÍGUEZ, RODRÍGUEZ ALMEIDA 1994), allows us to link stamps to *tituli picti*. If a stamp is associated to a *titulus*, we can manage to put together all the information on a particular point in the Baetica;

* This paper summarizes the basic aspects that have been used in the manufacturing of the epigrafic *corpus* of amphora epigrafy, that is being developed in these last year by

– amongst the data contained on the painted inscription, the consular date appears, so that absolute dates can be given to stamps. If the frequency of these stamps are added and their widespread distribution in the Western Roman Empire, it can be concluded that they constitute an excellent fossil director to date any European excavation.

The interpretation of the meaning of the amphora stamps results often confused by the obscure meaning of their texts, since they normally register personal names with one or more letters. Sometimes, these names combined with other abbreviations make confusing the identification of recorded parts, so that their interpretation becomes more difficult. It is possible to sort this problem, which is present in thousands of stamps, out in the short term, but we believe that the most logic approach is to analyze the stamps in the production area, as J. Remesal has suggested many times: «*A questo proposito, riteniamo che gli studi sull'instrumentum domesticum debbano mirare sopratutto alla localizzazione dei luoghi di produzione dei vari instrumenta, in modo tale che l'informazione, sia tipologica che epigrafica, possa essere ordinata secondo i centri di produzione; soltanto in questo modo acquisteranno senso pieno gli oscuri testi dei bolli*» (Remesal Rodríguez 1992, 108. The basis of the systematic study, which stemms from one of Remesal's early works: Remesal Rodríguez 1977-1978).

Our proposal for the study of the stamps contents shows the basis for a new methodology resting on three new concepts: "**family of stamps**", "**codex**" and "**structure**". The inclusion of these ideas in the computer process helps us decipher the meaning of thousand stamps, offering, as well, a new tool which will allow us to classify the management systems in the production centres.

1. Basic concepts[1]

1.1 *Stamping system*

If we analyze closely many Dressel 20 stamps, we can observe that few show signs of quality. Many reveal a coarse design, without polishing, the letters of two equal stamps lack of a regular pattern.

We know so far only one die, found by G. Bonsor at Arva (Bonsor 1931, Lám. XXIII). It is made of clay and has letters in relief and the direct reading is: QFRRIV (Q. F( ) R( ) RIV(enses)). The result produced by this die are stamps of inverse reading and cutting relief, however the examples recorded from this stamp have projecting relief and direct reading (*CIL* XV 2869b).

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[1] We only include the following bibliography in order to avoid excesive references on the numerous stamps employed in our explanations: *CIL* XV; Remesal Rodríguez 1977-78, 1986; Ponsich 1974, 1979, 1991; Blázquez, Remesal Rodríguez, Rodríguez Almeida 1994.

As Remesal says (Remesal Rodríguez 1986, 18-19), most of these stamps were made by clay counterdies[2] obtained from «original dies» of clay or metal, that left stamps on the amphorae with direct reading and projecting relief. When a counterdie was broken and lost, the potters made a new from the original «die». If this was not available they used a stamp already on the amphora as die. Stamps, which seem to come from the same die, are distinguished from that die in their size, as the clay contracts when firing and drying. If the counterdie was made from an amphora stamp, its size would be smaller than the original one.

1.2 *Stamp content*

The stamps on Dressel 20 amphorae contain, generally, the name of a free individual (*tria nomina*[3], written frequently with only three letters: T. A( ) A( ), and sometimes partial or completely expanded: T. A( ) ASIATICI, T. ATILI ASIATICI. Besides, it may represent a family business: II CAMILI MELISSI, o two families: III F( ) F( ) [*et*] II L. V( ) P( ). Secondly, the names of workshops are common, including either *figlina*, *fundus* or, occasionally, *officina*: FIG(linae) ASSVLEIANENSES, FVNDI PERSEIANI, EX OF(icina) C(orneli) BEL( ). Then, *servi* and *liberti* names followed, *figuli* which were names in nominative followed or not by abbreviations F(ecit): HERMES F(ecit); or in genitive: PEREGRINI. There are also other elements such as the abbreviation PORT(us) and other, that have not been deciphered yet.

These elements may appear on one amphora combined in an unique stamp: P. A( ) H( ) SCAL(ensia) H( ) (*tria nomina* + workshop + *servus*/*libertus* name); or stamped independently with a maximum of three stamps: II IVNI MELISSI ET MELISSE + F(iglinae) PATERNI + VENER F(ecit); or with two: I( ) S( ) VIR(ginensia) + ROMVL(us) F(ecit). The number of stamps used to stamp an amphora and possible combinations basically depends on three factors: product ownership, managing system in the production region, and the socioeconomic changes affecting the Baetica during the Principate.

1.3 *Stamps classification*

Any stamp, whatever its content is, can be classified in one of the following categories: stamp of single content and stamp of composed content. The importance of each group is quite simple, let see how they work:

[2] The shape of the counterdie may have been simple (normally rectangular), perhaps with a handle. Many stamps document finger prints on the cartouche border, which would explain that they were normally held on their border while stamping.

[3] According to J. Remesal, the people represented by the *tria nomina* identify the owner of the product, either the *fundi* or *figlinae* owner, or a middleman buying goods from a few producers: Remesal Rodríguez 1986, 20-21. In the case of the Baetican olive-oil, the product was consumed basically by the *annona* system, the brand diffusion is not related to its quality, of standard type, but its production capacity: Remesal Rodríguez 1977-78, 92. Other authors do not share Remesal's hypothesis, they consider the *tria nomina* as the potter's name, or *figlina* owner. Colls *et al.* 1977, 27 note 30; Liou, Tchernia 1994, 142-43.

1.3.1 Stamps of simple content

– **one name**: the ones represented with any name's part of a free citizen: T. ATILI ASIATICI, C. MARI, POLYCLITI, etc.

– **workshop**: the ones represented by production centres, either a *figlina* name: FIGLINA TREBECIANO(rum), a *fundus*: FVNDI PERSEIANI, and occasionally *officina*: EX OF(ficina) C(orneli) BEL( ). Sometimes the type of centre is omitted from other variants: ASVLE, although, in many cases, this term figures in other variant: FIG(lina) ASVLEIANENSES. Nevertheless, there are still doubts for stamps such as SAXO FERREO (*figlinae?*, *fundi?*, *officina?*), as well as the ones with a prefix F( ), which does not specify whether it refers to F(iglinae) or F(undi)[4].

– ***servi et liberti* names**: they are written in nominative followed or not by the abbreviation F(ecit): HERMES, HERMES F, or in genitive: VRSI. These names identify *figuli*, people in charge of the workshop management.

– **symbols**: we know only the cases *ramus palmae* and *delfinus dextrorsum* in the stamping system of Dressel 20 (*CIL* XV 2604, 2605, 2617). In some metal dies, these type of marks are represented normally on the handle (Buonocore 1990, fig. 73). In the present example, these marks come together with a stamp of composed content with the name of the product owner and the workshop. This may suggest an alternative way of registering symbolically the *figulus* production in a workshop.

– **words of obscure meaning**: including all the words subjected to other interpretations. The most famous and controversial case are the stamps "PORTO", a word that appear to substitute the workshop and potters' names in regions of Baetica with higher density of production centres, being almost exclusive for La Catria region (Remesal Rodríguez 1977-78, 116. According to this author, the word PORTO can be understood as «regulating warehouse» for the supply of Rome and the Army: Remesal Rodríguez 1986, 50). This word comes always together with a *tria nomina* as prefix or sufix: PORT(o) P( ) M( ) H( ), C( ) E( ) F( ) PO(rto). Sometimes it goes with a toponym: P(orto) ARVA, P(orto) CARMO. When Severus took the power (A.D. 193), there were major changes in the way of stamping Dressel 20s. One of the shifts affected the stamps "PORTO", that, for first time, did not appear with the *tria nomina* in an unique stamp. From now on, they were associated with the word POPVLI (people's), probably a demagogic sign in the Severian policy (Remesal Rodríguez 1986, 50).

[4] The *tituli picti* can be of great help to solve this problem, since δ, which is a fiscal control in cursive below the amphora handle, registers often the name of the production centre, where commodities were controlled before being transported along the Guadalquivir river downstream to *Hispalis*, where they were loaded in a sea-going ship. For instance, F( ) SCIMNIANI can be read as *figlinae Scimniani* in *CIL* XV 4350, and the same goes for *figlinae Saxoferreo* in *CIL* XV 4171. A general list about figlinae and *fundi* names in *tituli* δ in *CIL* XV: Rodríguez Almeida 1980, 84. For a study about workshop of amphorae Dressel 20: Remesal Rodríguez 1980; Mayet 1986.

1.3.2 Stamps of composed contents

– **nominal associations**: the stamps recording more than one free individual. Generally, they identify societies that consisted of various members of the same family: II C. L( ) M( ), II MIN(iciorum) ACR( ) ET CAL( ), III MINICIOR(um); occasionally there are examples specifying the kind of relationships: II AVR(elii) HERACLAE PAT(er) ET FIL(ius). Sometimes the nominal associations do not include any number to indicate the number of people who took part in the society. The stamps omitting the number use a duplicate of the initial letter in the *praenomen*: MMCS = [*duo*] M. C( ) S( ); or *nomen*: MFQF = MQFF = M. F( ) [*et*] Q. F( ); the reading of these stamps may arise some problems and may lead to strange interpretations and wrong nominal sorting. The nominal associations among members of different families are less frequent. The known examples show societies made of two, three or five individuals of two different families: GRADOS = G. R( ) A [*et*] D. O( ) S( ), IIQQETCFS = II Q( ) Q( ) ET C( ) F( ) S( ); IIIFFIILVP = III F( ) F( ) [*et*] IIL( ) V( ) P( ).

The stamp arrangement with nominal associations may follow certain rules that affected the final composition of the stamp, with the aim to reduce it because of its limited space. For instance, two relatives usually omitted the *praenomen* when they have different *cognomina*: II MIN(iciorum) ACR( ) ET CAL( ), F( ) M( ) F( ) A( ); and they even ruled out the *cognomina* if differences were multiplied with more than two individuals: III MINICIOR(um).

– **multiple single associations**: the ones that combine the two or three classes already explained in one stamp.

The double combinations are the most common and they may include the following classes: ONE-NAME + WORKSHOP, ONE-NAME + *SERVUS/LIBERTUS* NAME, WORKSHOP + *SERVUS/LIBERTUS* NAME, "PORTO" + ONE-NAME, NOMINAL ASSOCIATIONS + WORKSHOPS. These are some samples: L. I( ) D( ) F(iglinae) ITALICAE, Q. N( ) D( ) PRIM( ), FIGVL(inae) GEME(llianae) SILVINI L(iberti), Q. AE( ) OP( ) POR(to), II AVR(elii) HERACLAE PAT(er) ET FIL(ius) [*ex*] F(iglinis) CEPAR( ). There is no rule to fix the elements' order in the combinations, though generally, the *tria nomina* appears before the workshop name, which goes normally before the *servus* or *libertus* name. The composed stamps with "PORTO" are an exception. This word goes together with the *tria nomina*, occupying many times the first position.

In the triple combinations, the classes ONE-STAMP + WORKSHOP + *SERVUS/LIBERTUS* NAME are documented in one stamp: P. A( ) H( ) SCAL(ensia) H( ). The employment of this stamping system is not frequent, due probably, to the use of more than one stamp.

– **multiple associations with complex elements**: those stamps with composed content which include little current elements and of difficult interpretation such as numbers: Q( ) XIIII[5]; abbrevations with obscure meaning C( )

[5] Some stamps of *figlinae* appear with a number, whose function is to single out

V()[6] = P. M( ) O( ) C(larissimus) V(ir) FIG(lina) PALMA; and singular words: PORTO POPV(li), P(orto) ARVA; etc. This epigraphic system affects approximately one tenth of the amphora epigraphy of Baetica.

2. The concept "structure"

It codifies the formal composition of the stamps in the fields **variant** and **structure**. The image of a stamp can be reconstructed graphically, approaching to the real form, when employing the data introduced in both fields. The systematic arrangements of the data obtained with this tool allows us to classify the stamping system of different kilns in a workshop, to study the evolution of each production centre, as well as, the management system of each production region. The Baetican stamps associated to *tituli picti* provide often, relative dates and very occasionally absolute dates, with which we can supply a chronological framework to each variant.

The concept "structure" classifies only the structured features of stamps, disregarding the study of the qualitative traits such as style and font quality (the stamp left by a die or counterdie on different amphorae may alter easily these attributes. It will depend on the stamping method: hand movements, pressure exerted, position chosen in the amphora, die or counterdie cleanliness etc.).

2.1 *The 'variant fields'*

It has a fixed length of 4 digits. The first two stand for the reading direction of the stamp (D) and the letters relief (R), the remaining ones identify the cartouche shape (FA).

To avoid including all the multiple forms (the simple form – rectangular – is the most common, with either straight sides or slightly bended; there are also: with single handles, dented, circular, oval, etc.) and attributes (decoration in cartouches is less frequent in this type of amphora; certain types of bands can be distinguished: forming ears, dented, dotted, etc.) of classified cartouches, we only list the first values of each group.

Cell value	Direction	Relief	Form	Attributes
0	Indeterminate	Indeterminate	Indeterminate	Indeterminate
1	direct	projecting	without	without
2	inverse	cutting	simple	central trait
3	mixed	mixed	simple double	band

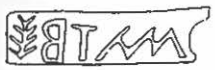
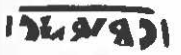
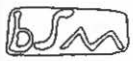
the production of each kiln. See the case of *figlina Virginensia* at the end of this paper.

[6] The first interpretation of CV as *Clarissimus Vir* was done by D. Manacorda for the stamps on Tripolitanian amphorae. G. Chic included this possibility among other hypothesis for the Baetican stamps with CV. In 1989, J. Remesal wrote the first paper on the use of the *Clarissimus* in the Baetican stamping system with the example of *Lucius Fabius Cilo*. A study continued by the recently deceased F. Jacques. Manacorda 1983; Chic García 1985, 21; Remesal Rodríguez 1989; Jacques 1990; Chic García 1994.

2.2 *The 'structure fields'*

With variable length. It is a simple diacritic system based on 10 cases, which can be easily combined between them. The efficiency of this system was proved with thousand stamps, not only Baetican ones. With this tool, one can sort the different productions of a stamp in an alphanumeric way according to its formal composition: ligatures, signs between letters, change in a letter direction, etc.

case	diachronic mark	Example
1. Change of line	/	FSCIM/NIANO
2.1 Continuous ligature	(LETTERS)	(VR)(IT)(TI)PV
2.2 Discontinuous ligature. When two characters occupy the same place without joining	((LETTER)(LETTER))	POPV((L)(I))
3.1 Signs between letters (point, triangle, line)	(.)	VIR(.)IIII
3.2 Simbols between letters (*palma*, *hedera*, *amphora*, etc.): transcribed into latin	(simbol)	Q(palma)C(palma)C
4. Change in the direction of one letter with regards to the reading direction of a stamp	(letter)	EROTI(s)
5.1 Letter upside-down 180 degrees	(LETTER!)	MS(P!)
5.2 Letter upside-down 90 degrees	(LETTER!!)	QIM/(S!!)
6. Space	(_)	PN( )NN
7. Greek characters	($LETTER)	($D)IONY

Stamp	Variant	Structure
	1321	AQFVA[7]
	2121	(MA)TB(palma)
	1121	Q(hedera)(AE)(LI)(.)(MI)(NI)CI(ANI)
	2221	C(ALP)(VR)(NI)C
	1122	LIVNIM/ELIS(.)SI
	2121	M(s)(p!)
	1121	SC((AL)E)N(SI)A(GE)(ME)

[7] Scale 1:2.

Some complex stamps may lead to diverse interpretations. For instance, the stamps MAT and TAM seem to identify two different individuals, however TAM could also be also the inverse of MAT or the other way around. An additional problem is a badly-preserved stamp offering doubtous letters: PAT or PAI. Besides, ligatures bringing some confusion in the stamp reading: (TA)LFM or (AT)LFM. These difficulties can be solved employing symbols such as '&' (=AND) and '|' (=OR) in the following way:

Stamp	Variant	Structure
CIL XV 2653a-b and 2668a-c	0121	TAM & MAT
CIL XV 3202	1121	PA(T)|(I)
CIL XV 3202	1121	(TA)|(AT)FM

3. 'Index field' and 'ordinal fields'

The first field has variable length and is used to summarize in one word all the letters which allow us to sort a stamp in alphanumeric order. Each word is also known as "content index" of a stamp. Let see how an alphabetic list of "content indexes" is set up on the basis of the illustrated drawings of section 2.2

INDEX FIELD	VARIANT	STRUCTURE
AQFVA	1321	AQFVA
CALPVRNIC	2221	C(ALP)(VR)(NI)C
LIVNIMELISSI	1122	LIVNIM/ELIS(.)SI
MATB	2121	(MA)TB(palma)
MSP	2121	M(s)(p!)
QAELIMINICIANI	1121	Q(hedera)(AE)(LI)(.)(MI)(NI)CI(ANI)
SCALESIAGEME	1121	SC((AL)E)N(SI)A(GE)(ME)

The ordinal fields, which are also of variable length, allow us to sort the "content indexes" for every of the parts represented in the stamps: by name, *cognomina*, production centre, *servus* or *libertus* name, etc. With this tool, the stamps of "composed content" can be classified in the *corpora* for every of their multiple combinations.

The ordinal fields are five. The first three include separately the three parts of the name of a free citizen: ORD1 (*praenomen*), ORD2 (*nomen*) and ORD3 (*cognomen*). The workshop name appears in the ORD4 without indicating its type (*figlina*, *fundus*, *officina*, etc.). ORD5 is employed for the *servi* and *liberti* names. The ordinal fields show the names with upper-case for the initial letter and nominative case. If the complete name is unknown, this will be expanded up to the admitted part.

INDEX FIELD	ORD1	ORD2	ORD3	ORD4	ORD5
CIALB	C	I	Alb	-	-
CSEMPPOLY	C	Sempronius	Polyclitus	-	-
FIGMEDIANE	-	-	-	Mediana	-
HERMESF	-	-	-	-	Hermes
PAHSCALH	P	A	H	Scal	H
QFRRIV	Q	F	R	Rivensis	-
SCALESIAGEME	-	-	-	Scalensis	Geme

4. The concept "Codex"

Has a variable length. It codifies with numbers, letters and signs the elements recorded in stamps of simple and complex content according to our stamp classification. The string of characters introduced in the 'field codex' can be sorted alphabetically, allowing to study the way that different stamps were combined over the time, or in a production region, or in a "family of stamps". Each element introduced in the string "codex" can be analyzed apart, for instance when searching (e.g. stamps with the element "PORTO"). Afterwards selective sorting can be carried out (e.g. one-name stamps, workshops and *servi* and *liberti* names etc.).

4.1 *One-name stamps*

This class of stamps consists of a *tria nomina*, partially or totally expanded, though there are also stamps with only parts of the name. The following table enumerate the recorded cases on the Baetican epigraphy in the last column for the eight possible combinations. The numbers: '1', '2', etc., are the codex values for the one-name stamps.

case	*praenomen*	*nomen*	*cognomen*	example	codex value
a	P	N	C	C. ANTONI QVIETI	1
b	P	N	-	M. FVSCI	2
c	P	-	C	-	-
d	P	-	-	-	-
e	-	N	C	[P.] SED(ati) AVITI	3
f	-	N	-	[C.] STLACCI [OP( )]	4
g	-	-	C	[C. Semproni] POLYCLITI	5
h	-	-	-	-	

The following list documents some one-name stamps of people: *C. Antonius Quietus*, *M. Fuscius*, *C. Sempronius Polyclitus*, *M. Semp(roni?) Heli(odori?)*, and *P. Sedatius Avitus*. The rows of 'index field' (the "index contents") appear sorted according to multiple criteria: first, by name, then each "family of stamps" for the codex values; the complete sorting sequence in this example is: ORD2+ORD3+ORD1+CODEX.

INDEX FIELD	ORD1	ORD2	ORD3	CODEX
CANQVIE	C	Antonius	Quietus	1
GANTQVIETI	C	Antonius	Quietus	1
ANTONIQVIETI	C	Antonius	Quietus	3
QVIETI	C	Antonius	Quietus	5
MFVSCI	M	Fuscius	-	2
PSAVITI	P	Sedatius	Avitus	1
SEDAVITI	P	Sedatius	Avitus	3
MSEMPHELI	M	Semp	Heli	1
CSEMPPOLY	C	Sempronius	Polyclitus	1
CSEMPO	C	Sempronius	Polyclitus	2
POLYCLITI	C	Sempronius	Polyclitus	5

4.2 *Stamps of workshops and* servi/liberti *names*

The first type is codified with the letter 'a', the second one with the letter 'b'. In the following list, it can be noted that the value "codex" is fundamental to divide both classes of stamps. Every class clusters their rows according to the content of the ordinal column, then the "contents indexes" are sorted alphabetically; the complete sorting sequence is: CODEX+ORD(4 / 5)+INDEX FIELD.

INDEX FIELD	ORD1	ORD2	ORD3	ORD4	ORD5	CODEX
FCAERARI	-	-	-	Ceraria	-	a
FCERARIA	-	-	-	Ceraria	-	a
FGERARIA	-	-	-	Ceraria	-	a
FICN	-	-	-	N	-	a
SAXFER	-	-	-	Saxum Ferreum	-	a
SAXOFER	-	-	-	Saxum Ferreum	-	a
SAXOFERR	-	-	-	Saxum Ferreum	-	a
SAXOFERRE	-	-	-	Saxum Ferreum	-	a
SAXOFERREI	-	-	-	Saxum Ferreum	-	a
SAXOFERRI	-	-	-	Saxum Ferreum	-	a
SAXXO	-	-	-	Saxum Ferreum	-	a
AVGVS	-	-	-	-	Augustalis	b
AVGVSTAL	-	-	-	-	Augustalis	b
AVGVSTALF	-	-	-	-	Augustalis	b
HERM	-	-	-	-	Hermes	b
HERMES	-	-	-	-	Hermes	b
HERMESF	-	-	-	-	Hermes	b
VRSI	-	-	-	-	Ursus	b

4.3 *Stamps "*PORTO*" and symbols*

The last two classes of stamps of simple content use the letters 'p' and 's' respectively as codex value. As they do not employ an 'ordinal field', they

can only be sorted according to the 'field index'. The "index content" of symbol is obtained translating its meaning into latin, in capital letters and in brackets.

INDEX FIELD	ORD1	ORD2	ORD3	ORD4	ORD5	CODEX
PORTO	-	-	-	-	-	p
(DELFINUS DEXTRORSUM)	-	-	-	-	-	s
(RAMUS PALMAE)	-	-	-	-	-	s

4.4 *Stamps with associated names*

The computer application of this stamp class works similarly to the one-name stamp, but with some particularities. When a stamp shows different names: II MIN(iciorum) ACR( ) ET CAL( ), F( ) M( ) F( ) A( ), this duplicates its index content as many times as required to make all the sorting combinations. If the one-stamp CLM (a *tria nomina*) has the value '1' as codex, the association IICLM (two *tria nomina*) duplicates the value: '11'; so the codex '444' represents a family business of three people registered with only a surname: III MINICIOR(um).

To make it clear, let see how some name associations are codified in the following list. The "indexes contents" appear to be sorted by a name sequence: ORD2 + ORD3 + ORD1 + INDEX FIELD.

INDEX FIELD	ORD1	ORD2	ORD3	CODEX
IICAMILIMELISSI	-	Camilus	Melissus	33
MFQF	M	F	-	22
MQFF	M	F	-	22
MFQF	Q	F	-	22
MQFF	Q	F	-	22
FMFA	-	F	A	33
IIIFFIILVP	-	F	F	33311
FMFA	-	F	M	33
IIQQETCFS	C	F	S	331
IIMINACRETCAL	-	Minicius	Acr	33
IIMINACRETCAL	-	Minicius	Cal	33
IIIMINICIOR	-	Minicius	-	444
GRADOS	D	O	S	11
IIQQETCFS	-	Q	Q	331
GRADOS	G	R	A	11
IIIFFIILVP	L	V	P	33311

4.5 *Double and multiple composed associations*

Let see now various ways to organize the information working with stamps of composed content.

The first list includes a series of stamps that we have related with the

figlina Scalensis[8], and sorts the rows according to the *servi/liberti* names (ORD5) and then, the 'index field'. This classification permits us to relate the initial C and H of the stamp PAHSCAL, with the endings CELS and HER, which are the abbreviations of two *figuli* employed in this workshop.

The following list classifies three groups of "family of stamps" that reveal three different models in the amphora production in Baetica: the *Aurelii Heraclae* had a decentralized production (*Barba*, *Ceparia*, *Grumensis*); whereas, Q( ) F( ) R( ) bottled his olive-oil in various workshops located in the region of Arva (*Mediana*, *Rivensis*, *Salsensis*, *Statianiensia*); besides, the different generations of *Enni* concentrated their production in the family estate known as *Saenienses*. The three family groups follow the sorting sequence: ORD2 + ORD3 + ORD4 + CODEX + INDEX FIELD.

The last classification by name comprises a series of stamps from La Catria (Lora del Río, Seville) associated to the word *portus*. The list demonstrates the high concentration of individuals with different *nomen*, linked to this important particular region in Baetican producing olive-oil[9].

INDEX FIELD	ORD1	ORD2	ORD3	ORD4	ORD5	CODEX
SCAAGR	-	-	-	Scalensis	Agr	ab
PAHSCALC	P	A	H	Scalensis	C	1ab
SCALCELS	-	-	-	Scalensis	Cels	ab
SCALFID	-	-	-	Scalensis	Fid	ab
PAHSCALH	P	A	H	Scalensis	H	1ab
SCAHER	-	-	-	Scalensis	Her	ab

INDEX FIELD	ORD1	ORD2	ORD3	ORD4	ORD5	CODEX
IIAVRELHERACLEPATETFILFBAR	-	Aurelius	Heracla	Barba	-	33a
IIAVRHERACLAPATETFILFCEPAR	-	Aurelius	Heracla	Ceparia	-	33a
IIAVRELHERACLAPATETFILFGRVM	-	Aurelius	Heracla	Grumensis	-	33a
PECSAENI	P	E	C	Saenianes	-	1a
CENHISPSAE	C	Ennius	Hispanus	Saenianes	-	1a
HISPSAEN	C	Ennius	Hispanus	Saenianes	-	5a
IIIENNIORIVLSAE	-	Ennius	Ivl	Saenianes	-	333a
QFRMED	Q	F	R	Mediana	-	1a
QFRRIV	Q	F	R	Rivensis	-	1a
QFRSALS	Q	F	R	Salsensis	-	1a
QFRSTSIP	Q	F	R	Statianiensia	Sip	1ab

[8] Besides the series PAHSCAL, the other stamps have been found in Cerro de los Pesebres, north of Palma del Río, where this workshop was located. The stamp P. A( ) H( ) is only known associated with the term POR(to) in Baetica and appears in the other extreme of the Guadalquivir river, in the localities of Villar de Brenes and Cruz Verde, nearby Alcala de Rio. The great distance between the two production regions casts doubt on the hypothetical relationship between P.A( ) H( ) SCAL( ) and the *figlina Scalensis*, that we pretend to show with practical aims in this example.

[9] La Catria is probably one of the areas producing Dressel 20 with a higher density

INDEX FIELD	ORD1	ORD2	ORD3	ORD4	ORD5	CODEX
QAEOPOR	Q	Aelius	Optatus	-	-	1p
AEMOPTPO	-	Aemilius	Optatus	-	-	3p
LCANTP	L	C	Ant	-	-	1p
CEFPORTI	C	E	F	-	-	1p
PQFLFL	Q	Flavius	Flavianus	-	-	p1
PORQHEHE	Q	He	He	-	-	p1
SEXIRVP	Sextus	I	Ru	-	-	1p
PMHEPOR	P	M	He	-	-	1p
PORCPR	C	P	R	-	-	p1
CQFP	C	Q	F	-	-	1p

4.6 *Multiple associations with complex elements*

The codification of these elements is established on the basis of 'n' = number, 's' = simple words, 'c' = *clarissimus vir* (CV). As happened with the stamps in the section 4.3, they do not use the 'ordinal field' and can be only sorted from the 'index field'. The examples seem to be sorted according to the sequence: CODEX + INDEX FIELD.

FIELD INDEX	ORD1	ORD2	ORD3	ORD4	ORD5	CODEX
LFLVCCVFP	L	F	Luc	P	-	1ca
LFCCVFSS	L	F	C	Scalensis	S	1cab
VIRIIII	-	-	-	Virginensia	-	an
PARVA	-	-	-	-	-	ps
PORTOPOPV	-	-	-	-	-	ps

4.7 *Stamps with undeterminated parts*

All the stamps with uncertain value for "index content", or for "codex", or any of the ordinal fields can be included here. The derivative cause is of three types: by truncation, by multiple expansion, by the presence of doubtous elements.

4.7.1 By **truncation**

It appears when the work is uncompleted due to diverse reasons such as erosion on the surface, breakage or deficient stamping.

Many uncompleted stamps may reconstruct their "indexes contents" thanks to the existence of epigraphic parallels. Nevertheless, if this was not possible, the affected value in the codex would be labelled with an asterisk '*'.

of this material. Its main feature is the wide variety of stamps, that according to J. Remesal can be related to the particular organization of the supply of Rome and the army: 1986, 50. In La Catria, only stamps with *tria nomina* are known, some with the word *portus* added. See Remesal Rodríguez 1977-78 on the epigraphy recorded in this production centre.

For instance, the stamp ...CCHREST (*CIL* XV 2745), seems to be an incomplete one-name stamp. The codex value will be '*', since, despite identifying its class, we cannot determine to which one-name combination it belongs. The truncation direction must be also added on the "index content": ...CCHRESTI, and the first letter in ORD2 labelled with a question mark, which may or not correspond to the *nomen* initial; besides, dots will indicate the possible loss of *praenomen*.

The truncation may also affect a stamp of composed content, known with multiple endings, as is the case of the family of stamps of the series LFCCV ... (LFCCVFS, LFCCVFCAT, LFCCOL, etc.). If breakage or erosion affects a stamp of these features, for instance, LFCCV[..., we indicate in the codex the possible elements loss with a '*'; in this case the resulting value will be '**1c***'.

INDEX FIELD	ORD1	ORD2	ORD3	ORD4	ORD5	CODEX
...CCHREST	...	C?	Chrestus	-	-	*
LFCCV...	L	F	C	-	-	1c*
...POLY...	C	Sempronius	Polyclitus	-	-	*
CSEMPO....	C	Sempronius	Polyclitus	-	-	1

4.7.2 By **multiple expansion**

This comes out when the stamp expansion gives many possible answers, as we will explain below, affecting the values of the "index content", and ordinal field and codex.

Sometimes we come across stamps that have no evident reading direction such as the *tria nomina* TAM, which can be also MAT. The "index content" must be duplicated to include two sortings; the data in the ordinal fields ORD1 and ORD3 (*praenomen* and *nomen*) area labelled with question marks: M?, T?, thus it is impossible to determine the real correspondence of such values; the codex is not affected.

The multiple development can be also produced on stamps with no parallels, where partial erosion of a letter may confuse the real meaning of the character. A problem of these characteristics appears in the one-name stamp *CIL* XV 2848, that reads TFF or IFF, because the upper part of the first letter is broken. The value of the 'field index' is duplicated with a question mark at the end: TFF?, IFF?; in ORD1 the letter affected is also labelled with a question mark; the codex is not affected since it is a *tria nomina* stamp.

The third case affects those stamps that, despite being well-preserved, its epigraphic composition may lead to more than one reading. For instance, in the multifamily association IIMVSETFPR, there are two possible interpretations: II M. V( ) S( ) ET F. P( ) R( ) = three *tria nomina*, or II MV( ) S( ) ET F. P( ) R( )= two *duo nomina* and one *tria nomina*. In this case, the three

"index contents" had respectively the codex: '**111**', '**331**', and '**??1**' when sorted by F. P( ) R( ); the affected ordinal fields are labelled with a question mark.

INDEX FIELD	ORD1	ORD2	ORD3	ORD4	ORD5	CODEX
MAT	M?	A	T?	-	-	1
TAM	T?	A	M?	-	-	1
IIIN	-	N?	-	-	-	444
NIII	-	-	-	N?	-	an
IFF?	T?	F	F	-	-	1
TFF?	I?	F	F	-	-	1
IIMVSETFPR	M?	V?	S	-	-	111
IIMVSETFPR	-	MV?	S	-	-	331
IIMVSETFPR	F	P	R	-	-	??1
SISEN	S?	I?	Sen?	-	-	1
SISEN	-	-	Sisenna?	-	-	5
IISER	S?	E?	R?	-	-	11
IISER	-	Ser?	-	-	-	44

4.7.3 By the presence of **elements with doubtous meaning**

Generally it affects stamps of composed content, with unknown elements or with difficult interpretation. For instance, the complex identifications of the final letters in the stamp LSPECVLAEFCPM, with the structure L(.)SPECVLAE/F(.)C(.)P(.)M(palma), makes difficult the systematization of all its parts; although FC can be interpreted as a *figlina* or *fundus* name, the last two letters are completely unknown. Besides, the stamp TAAPA may read as T. A(tili) A(siatici) P(orto) A( ), being perhaps PA equivalent to P(orto) A(rva?). If we want to show some doubts, a question mark should be included in the codex instead of the element affected.

INDEX FIELD	ORD1	ORD2	ORD3	ORD4	ORD5	CODEX
TAAPA	T	Atilius	Asiaticus	-	-	1p?
XIIIIHP	-	-	-	-	-	n??
LSPECVLAEFCPM	-	Licinius	Specula	C?	-	3a??

5. The concept "family of stamps"(Remesal Rodríguez 1977-78, 110)

It allows us to study family groups of stamps, either common to an unique individual, members of the same family, workshop, production region, etc. It permits us to outline the meaning of the stamps of each production region, becoming a good element to decipher the meaning of the stamps. Lets see three practical examples.

5.1 *Only one person*

The family of stamps Q. N( ) D( ) was grouped on the basis of the

examples collected by H. Dressel in Mte.Testaccio and the recent excavation of the mount (*CIL* XV, 3039 a-m ; Blázquez, Remesal Rodríguez, Rodríguez Almeida 1994, n° 286).

The stamp identifies a person who lived in the mid II c. A.D., dated in the years A.D. 154 and 161 (*CIL* XV 4300 and 4356). Although we do not know where the stamp was produced, the *titulus* δ 4356 mentions the *conventus* of *Corduba*. So far, this "family" has only provided stamps of composed content, with the simple association: *tria nomina* + *servus/libertus* name, with a codex '**1b**'.

The "indexes contents" of this person appears sorted in the following list according to the sequence: ORD5 + INDEX FIELD + STRUCTURE + VARIANT. The reading is quite simple, its stamps followed a well-defined system associated to four *figuli*: AND( ), FAB( ), PHI( ), PRIM( ), each one with multiple structures. PRIM( ) has widely documented production, perhaps he worked for Q. N( ) D( ) years later than FAB( ) did.

QNDAND	1121	Q(.)ND(.)AND	
	2211	QND(.)AND	
QNDFAB	1121	Q(.)ND(.)FAB	
	1121	QNDFAB	154 A.D.
QNDPHI	1121	Q(.)ND(.)PHI	
QNDPR	2121	(palma)QNDPR(palma)	
QNDPRI	1221	Q(.)N(.)D(.)P(.)R(.)I	
	1121	Q(.)ND(.)PRI	
	1121	Q(n)DPRI	
	2121	QNDPRI	161 A.D.
QNDPRIM	1121	QNDPRIM	
	2121	QNDPRIM	

5.2 A workshop

The following family of stamps comprises the most outstanding series from Villar de Brenes, stamps directed or indirectly associated with the *figlina Virginensia*. The data recorded by H. Dressel at the Mte.Testaccio – more specifically in an intensive survey (noting finds regarding the height and slope position in the mount: e.g. Occ. II 1/3 *in situ*) and some excavations (noted with *litterae* A, B, C ...M) – provided a great number of relative dates for the stamps of this production centre. With the information available, the production of this workshop can be sorted in two particular well-defined chronological periods.

The first group of stamps is dated in the mid II c. A.D. (*litterae* A, B, C = A.D. 145-161), with the common element WORKSHOP = '**a**'. The codex classifies four groups of stamping systems: '**1a**' (*tria nomina* + name of *figlina*), '**a**' (name of *figlina*), '**an**' (name of *figlina* + number), '**a?n**' (name of *figlina* + unknown element + number).

Group I:

1a	QVCVIR	1121	QVCVIR	C(2).
a	VIRCIN	1121	VIRCIN	
a	VIRG	1121	VIRG	
		2221	VIRG	B(2).
a	VIRGIN	1121	VIRGIN	
a	VIRGINENSIA	1121	VIRGI(NE)N(SI)A	
an	VIRI	1121	VIR(.)I	B(2).
an	VIRII	1121	VIR(.)II	
		1121	VIRII	
an	VIRIII	1121	V(.)IR(.)III	A, B(2), C.
		1121	VIRIII	B(4) C.
an	VIRIIII	1121	VIR(.)IIII	B(2), C.
		2221	VIR(.)IIII	
a?n	VIRAV	1121	VIR(.)A(.)V	B(4), C(7).
		1121	VIR(.)AV	
		1121	VIRA(.)V	
		1121	VIRAV	A(2).

The stamps in the second group are dated later, most of them were collected in the western slope of the mount (*litterae* K, L = A.D. 179-180), whose lowest date is the year A.D. 170. The new codex values identify a clear shift in the stamping system before A.D. 180. From this moment onwards, the constant element is the *SERVUS/LIBERTUS* NAME = '**b**' instead of the workshop name, now hardly present. The classification groups are three: '**3b**' (*duo nomina* + *servus/libertus* name), '**b**' (*servus/libertus* name), '**3a**' (*duo nomina* + workshop name), this last one normally stamped on the rim, *CIL* XV 3160, and associated *in ansa* to the *servus/libertus* name ROMVL(us) F(ecit) (='**b**').

Group II:

3a + b	ISVIRG	1121	I(.)S(.)VIRG	+ ROM(VL)(hedera)F
3b	ISCALLIF	1121	ISC(AL)LIF	Occ.III
3b	ISHERM	1121	IS( )(HE)RM	
3b	ISHERMF	1121	IS(HE)R(MF)	Occ.III
3b	ISMILOF	1121	ISMILOF	Occ.III
b	AVGVSTALF	1121	AVGVSTAL(hedera)F	
b	CAL	1121	CAL	
		2121	CAL(palma)	
b	CALLISTVSF	1121	CAL(.)((L)(I))STVSF	
		1121	CAL(hedera)(LI)(STVS)F	
b	HERMES	1121	HERMES	
b	HERMESF	1121	HERMESF	K(2)
b	MILONF	1121	MI(hedera)LON(hedera)F	K, L(2)
		1121	MILO(NF)	
		1121	MILONF	
b	ROMVLVSF	1121	RO(.)MV(.)LVSF	
		1121	RO(.)MV(hedera)LVSF	
b + 3a	ROMVLF	1121	ROM(VL)(hedera)F	+ I(.)S( )VIRG

The historic interpretation of the data introduced was solved by J. Remesal years ago, following the same constructive logic (REMESAL RODRÍGUEZ

J., 1980, 136-140). According to this author, the *figlina Virginensia* came to depend on a *fundus* "Virginense" possesed by Q. V(erginius) C( ), who exported his own olive-oil in the mid second century A.D. Under his ownership, the figlina management singled out the production of each of its kilns with a number VIR I, II, III, IV, V.

Before the death of *Marcus Aurelius* (A.D. 180), the *figlina* and *fundus* changed the owner, I( ) S( ), who apparently did not have any family relationship. Instead of five numbers to identify the kilns, the new stamps show *servi/liberti* names: *Augustalis*, *Callistus*, *Hermes*, *Milo* and *Romulus*. This fact, according to the author, suggests that the *figuli* were freedmen, obtaining an independent role in the workshops.

5.3 Production region

Joining possible family groups with the stamps recovered in Mte.Testaccio when the initial in the *nomen* coincides, becomes a dangerous task and probably fruitless. However, the applications of this system on the isolated study of each production region allow us to establish family relationships between the people represented in the stamps.

The example we are going to analyze includes a series of stamps produced in the important region of La Catria (Remesal Rodríguez 1977-78), referring to the family group with *nomen* C( ) and *praenomen* L( ). With the data obtained from the position of these stamps in Mte.Testaccio we can reconstruct the chronological sequence of these three individuals: the oldest, L. C( ) ANT( ), is dated in the year A.D. 160 (*CIL* XV 4343); followed by L. C( ) M(y...) and dated in K before A.D. 180. (the excavation in K also generated various stamps with the structure LC(MY), which probably gives us the second letter of the *cognomen*); the third name L( ) C( ) HEC( ) is postseveran. Therefore, we can reconstruct the possible relationship between members of the same group with foundations of origin and chronology.

1	LCANT	1121	LCA(NT)	Test.89, context 161 A.D.
1p	LCANTP	1121	LC(ANT)P	160 A.D.
		1121	LC(.)A(NT)P	C(3)
		1121	LCA(NT)P	
1	LCH	1121	LCH	Occ.
		22h1	LCH	
	LCHE	1121	LC(HE)	Test. 89. post-severian.
		22h1	LCH($E)	
		1121	LCHE	Occ.
		11h1	LCHE	Occ.
1	LCM	1211	LCM	K(2)
		1211	LCM	Occ.III 1/4-1/3.

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ABSTRACT

This paper deals with the theoretical aspects of the manufacturing of study models through computer database programs for the *instrumentum domesticum*, especially in the field of Roman amphora stamps epigraphy. The stamps from the Dressel 20 amphora (Spanish olive-oil typology), of which we have thousands of examples spread principally over Rome and Western Europe, have been used as documentary information to compose the theoretical criteria.

The proposed concepts for the study of stamps are the following: the "concept structure", which serves to codify and group the stamps according to their graphical image; the "concept codex" aims to codify and analyse the present elements on every stamp; the "concept family of stamps" allows to relate family groups of stamps (like variants of individuals, a workshop, or a production region).

The proposed model can be used for every type of amphora stamp. We, however, recommend to principally use it on the information obtained from workshop regions, the only site from which we can decipher the complex meaning of the stamp text.