Proposal for the study and publication of the amphorae stamps through the silicon mould method*

Introduction

In the studies that we can undertake from the stamps applied before the firing over Dressel 20¹ amphorae, it is essential the presentation of the graphic documentation of the finds. The obtained results will vary depending on its quality. In order to understand the existing problem about the several systems used in the graphic presentation of the stamps, it is necessary, first of all, to think about some peculiarities of the stamp process².

STAMP PROCESS

The print of a stamp provides us with basic information about two aspects that are affected by the process of their generation, with different characteristics:

Interpretation: it is necessary to establish the connection of letters, ties, stops, and different signs that we find in the stamp as a previous step for its interpretation and development.

*This method has been developed by José Salvador Barea, Juan Luís Barea, Juan Solís and Juan Moros in the book: *Figlina Scalensia: un centro productor de ánforas Dressel 20 de la Bética*, Instrumenta 27, pp. 167-180. Barcelona, 2008. Translated by J. M. Bermúdez.

¹ What it is stated in this article is focused in the printed stamps on Dressel 20, that it is our field, but it can be logically extrapolated to any type of stamp, done over more or less curved surface and found in any kind of material. This method can be used as well for epigraphy found on pieces that can not be photographed due to the size or position.

² These aspects have been treated as well in a volume with the results of a Workshop held in Barcelona in May 2003 about Greek and Latin amphorae epigraphy (REMESAL -Ed.- 2004).

Moulds comparison: In each family of stamps we found variants (Remesal 1977-78: 102), what it means prints into a group that obey to different moulds and distinguished by design due to any reason³.

We must remind that prints are the result of the application of a plane mould, generally of clay (plate 1), although they could possibly be also metallic⁴ and even made of wood⁵. Over curved surfaces, generally of handle, but it is also over neck, rim, belly or base. Professor Remesal highlighted the difficulties that we face after carrying out the print test with a marker stamp found in La Catria⁶ (plates 1, 2). The basic issues that influence the final result of the print would be:

- Humidity level of clay at the moment of the print application.
- Variability of the mechanical action that the worker must make.
- Geometrical incompatibility, as a result of the application of the markers plane stamps.
- Deterioration that could have suffered the marker stamps in daily use.
- Final application over amphorae of the superficial coat of barbotine or slip⁷ that it is accumulated in the space and it is sometimes handled on prints which are still cool.

We have to add the deterioration produced on the piece to the problems of the printing process and the making up of the amphorae. All these aspects cause that the prints are printed in a wrong way, in a bad condition, and sometimes, incomplete and distorted. In these conditions, stamps offer necessarily some interpretation doubts and they are susceptible to several interpretations. On the other hand, it might be that even two prints from the same marker stamp could have a very different appearance (plate 2) and could include dimensional clear variations, up to the point that they would not overlap each other if we put one over the other one⁸ (plate 3).

³ It is possible to set out the studies about innumerable aspects related to the variants of the stamps. For example, the internal chronology of the stamps with a long period of validity could be precise, dating the variants from Monte Testaccio. In case we would have these data, we could study the relative importance of its production into the workshop and its evolution over time, trying to establish the approximated validity of each variant, and particularize how many coincided. However, under the hypothesis of variants that could distinguish amphorae batches into the workshop, and could also contribute data about internal organization of the activity; to try to establish a relation between the people who made the amphorae and the variations of the stamps is a matter that it is still in a study stage (Remesal 1994b: 146, Aguilera 1999, Moretta 1999; 2003). On the other hand, the comparison of moulds is necessary in order to establish the production places of stamps when we have the same interpretations in several workshops, and this will enable to value if this responds to a decentralization of the production or, on the contrary, to a movement of the container into the production area, that we do not know well. But the study of the marker stamps that arrived to us made think prof. Remesal to establish his hypothesis about the use of moulds and counterdies of clay in this process (Remesal 1977-78: 98; 1986: 19). We think that in a methodological scheme that allow us to establish and order the variants of the stamps.

⁴ We know half a dozen of bronze moulds that could have served to stamp the Dressel 20, but in any case could have been associated with known stamps. However, the sharp silhouettes have some stamps that make think in moulds carried out with this kind of material (Berni 2007: 131, NOTA 253).

⁵ After Remesal, a copy from La Catria with Redding ALFO (Remesal 1977-78: plate 27, n° 38 seems to have a mark of the wood streaks made by the mould.

⁶ Remesal 2004b: 138 and next ones and plate II.

⁷ Barbotine or slip are a paste made by clay of the same kind that has been used to make the object, or with a better quality, which are presented very liquid due to the added water. In the first case (barbotine), it is used to link several parts of the not fired amphora. In the second case (slip), it is used to finish off the joint with superficial application, reducing their porosity and giving their characteristic pale chestnut color.

⁸ Only when the prints coincide with a defect we can state unequivocally that come from the same stamp marker. (Barea & Al. 2008: nrs. 5j, 5q, y 11a –in this volume-). Observing these series we can get to understand the difficulties of the mould comparison.



Plate 1.- Marker stamps made of clay, used for the stamping process of the Dressel 20. 1.- Arva (Bonsor 1931: Lám. XXXV n. 168,169, photography: Ponsich 1974: Lám.III); 2.- La Catria (Remesal 2004b: 138 and following); 3.- Alcotrista (Museo Histórico Municipal de Écija).

METHODS OF PRESENTATION

Throughout time, and in parallel with the technical advances in impression of documentation, several methods have been used in order to publish the stamps. At the same time that we describe them, we will try to value how the interpretation and comparison of moulds are affected with their own use.

The study of modern amphorology began at the end of XIX century, by the wise German, H. Dressel. His work of those years in Rome with Bruzza is reflected masterly in several publications and particularly in the volume 2 of CIL XV. In our matter, we emphasize two achievements among his work:

• To establish the basic contents of the stamps and to organize the corpus in relation with these contents⁹.

⁹ In the Studies devoted to the stamps of the Dressel 20 it is common ton ame this kind of organization "nominal system" (Rodríguez Almeida 1974-75: 199, Remesal 1977-78: 100 SS; 1979: 384; 1986: 17; 2000: 379), in order to tell the difference from the alphabetical (Callender 1965; Beltrán 1970; Amar & Liou 1984; 1989; Mayet 1978; Chic 1985; Jacques 1991...) more like a research stage when we had not so much information about the contents of the stamps. Finally, the nominal system is set to present the stamps in the best conditions in order to study (EHMIG 2003, ÉTIENNE & MAYET 2004). In our opinion, the name adopted for the organization taken by Dressel does not cover all the possibilities that the system set out and would be more suitable the terms as organization by elements or by the content of the stamps. Actually, it is not important how we call the system as long as we know its impact. The basic contents of the stamps, according to our classification would be: tria nomina, place names, cognomina (BAREA & AL. 2008: CAP.2.1). The key factor of the matter is explained by Piero Berni: in the nominal system, the backbone of the organization will be established by the contents of the representativeness degree that we give to these elements. (Berni 2007: 213, footnote 376). For Dressel, pioneer when he established the contents of the stamps (Dressel 1878), it was important to put in order the in epigraphically logical series the great quantity of stamps that could retrieve with Bruzza. In the moment of the identification of the workshops names and the personages- particularly its tria nomina in several series, these elements give some security when they are together and took and order of priorities: place name, tria nomina, cognomen (CIL XV-2). With the advance of research, among the corpora that follow this system and pick up stamps found in the consumption centre, it is used an order of priorities: tria nomina, place name, cognomen. This organization provides, for example, the study of the familiar groups and the activities areas. But if we study the stamps of a certain workshop it seems more reasonable an orden: tria nomina, cognomen, place name (BAREA & AL.. 2008, footnote 13) or if we study the names of the workshops and properties, give more value to these elements and return to use the order adopted by Dressel (BAREA & AL. - in press 1- Though the apparent lack of unity, we think that it is advantageous to be reflective in this matter and to take out all its potential. This way, each researcher can establish the order more convenient to the aspect in order to study the stamps, though it would be necessary to explain these



Plate 2.- Different aspect that shows the marks made with a marker stamp found in La Catria. Tests of impression made by prof. Remesal (Remesal 2004B; plate II).





Plate 3.- Different curvature that shows two marks from the same straight mould because of the geometrical incompatibility (BAREA & Al. 2008: n. 2h 1,4).

• To understand the need of subdividing the interpretation by families of variants.

Stamps were presented this way as an ingenious typographic effort¹⁰ that still gives good results (plate 4).

The method that has been set some time ago in different publications consists of presenting the drawings of the stamps. The making of these drawings has been schematized along the time. It is common to make it from the exact replica in paper taken from the original piece and it is presented with different graphical agreement (plate 5).

As we have already tried to establish in the previous section, stamps are found distorted, badly printed and/or in a bad condition, so that they can state evident interpretation doubts. In cases like these, drawing method from the exact replicas is very subjective. Everybody notices that in order

circumstances in this chapter devoted to the organization of the corpus – organization by contents / order of priorities. From there, initiatives as the group created by Prof. Remesal-CEIPAC, University of Barcelona- will make possible to look up the stamps published, through the Internet in a general database, and we will access to them through many strategies of search (Berni & Aguillera 1995; Aguillera & Berni 2001; Remesal 2004). More information on the website http://ceipac.ub.edu. ¹⁰ We know from Prof. Remesal that Dressel made exact replicas of the stamps. These are still partly conserved. At the end of XIX century, the publication of the same ones should suppose an unavoidable problem.

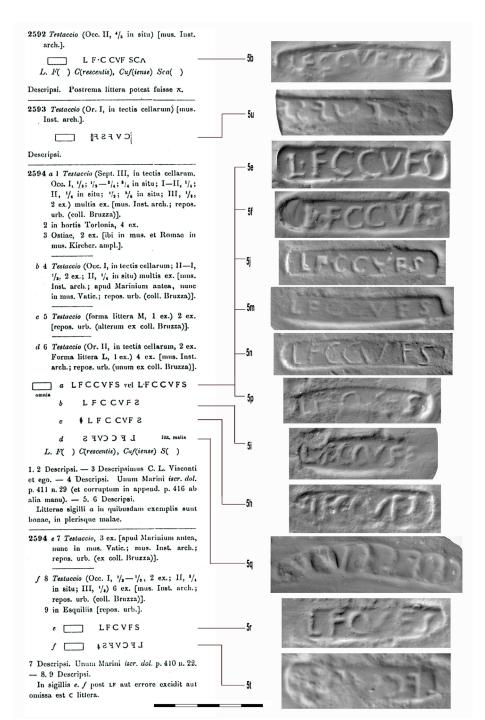


Plate 4.- Comparison between the variations of CIL XV-2 (BAREA & Al. 2008).

Though without images of the stamps, the typographic effort included into the CILXV-2, allow us to compare the variants established by Dressel with the new published copies. In the upper scheme we deal with the case of the family of the stamps of LF(---)C(---) from Scalensia (in this work from n. 2592 to 2594), regarding the variants registered in BAREA & AL. 2008: n. 5- in the same volume. These stamps are organized in the CIL XV attending to what Dressel understood as a place name: CVF(iense). In fact, he separates the series of L.F(---)C(----) in two groups because of this circumstance and the ones that do not show the elements "CV" are in the n. 2833. These ones are catalogued by the initial of its nomen. Either way, the first thing that it is remarkable that in general we can difference between variants. Just in the case of 2594a we have at least five variants that could correspond to the indicated by Dressel. The stamp n. 2592 can correspond to an incomplete reading of our variant n. 5a –LFCCVFSCAL- or to a variant still unknown in the Scalensia, so the only one that we have with the same text that 2592 has the particularity of presenting the "A" inverted at the end (n.5b), what is not specified for the copy of Dressel. It is also important to emphasize the good criterion of the author when ascribing the copy of 2593 to this family of stamps. As we can see, though having past more than a century, the work of Dressel is still contributing with valid information.



Plate 5.- Different graphical representations for the same reading of an embossed stamp. Bonsor's drawings do not have a graphical scale. The ones of Callender are include in the original with a 1:2 scale. Some drawings are not taken from the original piece, but, they obey to a re-elaboration of the included ones in other publications. We understand that this practice gives not only additional information but also it can adulterate the original one.

to draw in these conditions it is necessary to interpret, especially in the defective stamps and without any emboss. But, as P. Berni says, we will be in a better way to draw a stamp if we understand it before, for which the final result will depend on the experience, in many cases, and knowledge about the specific matter of the researcher, as well as his or her skill as drawer. The same author tells us how different drawings of the same original piece made by different and experienced researchers can observe obvious differences in a paleographic and dimensional ways (plate 6 and 7) (Berni 2007: 152 and f.). In these conditions, our opinion is that it will be very difficult to make studies of **moulds comparisons** about the drawings, which has more interest lately (compare footnote 2). But, in addition, this degree of subjectivity of the drawings makes them difficult to criticize if we do not have more graphical information that this one, because in doubtful cases, what the drawing shows is the researcher interpretation, that naturally does correspond with the suggested **interpretation**.



Plate 6.- The very same stamps of the published in Callender 1965 and Carreras & Funari 1998.

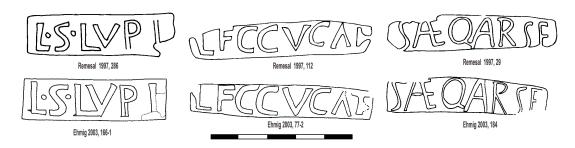


Plate 7.- Some examples of stamps found in Mainz (Germany), taken from two different publications.

An intermediate option showed in some publications consists of presenting directly an exact replica of the stamp¹¹. We think that this method lacks in precision. The thickness of paper, however thin may be, is a factor to think about. Some part of emboss is not reflected¹².

We can think that these matters would be solved publishing the direct photography of the stamp, but its use presents some limitations as well, some of them inescapable. It is true that in these cases we have the information as it is, so that it seems solved the question concerning its **interpretation**. But it is not technically easy to photography stamps. The best way of seeing an emboss is to apply side light, but if the stamp has much horizontal development, and given that it is usually situ-

¹¹ Recently, for the stamps found on mortorium central-Italian (PALLECHI 2002).

¹² It is so much so that the drawed stamps from exact replica must be conveniently retouched by the researcher, comparing the result of the exact replica with the original piece.







Plate 8.- (1) Photography of the original piece; (2) Drawing made from an exact replica taken from the original piece; (Fedière & Rouquette 1989: n°8 (3). Mould of the same reading and a variant taken from a piece in a better state of conservation (Barea & Al. 2008: 2b2).

We think that the researchers, with a good criteria and because of the state of conservation of the stamp, preferred to read a cognomen PAN(---) instead of P.A(---)H(---), understanding that generally, the tria nomina tend to be presented in front of the name of the workshop –SCAL(ensia)-. With this reading appears in many later publications (Garrote Sayo 1996: n. 208 = Blanc & Dijon 1998: n. 1240 = Chic 2001: p. 63 =Étienne & Mayet 2004: N. 1135). However, it results to be the only reading that we know in the Scalensia, that includes a structure of code: place name + *tria nomina*. The drawing of the stamp does not inform about the damage that the piece has, which is crucial in order to value the reliability of the reading. Nevertheless, and in this case, with a good criterion too, the original publication included the photography (fig. 6.8) and the drawing (fig. 5.8), aspect that has allowed us to carry on this analysis.





Plate 9.- Comparative exact replica / mould

Letters in the exact replica appear are more separated from the edge of the cartouche that in the mould, which makes visibly lower. This way, for example the height of the "X" in the exact replica is of 1,2 cm while the mould we have is 1,3 cm. In this case, this supposes almost an 8% of difference. This percentage will depend on the made of the print and, particularly of the depth (non published material).

ated on curved surfaces, the photography will have inevitably with overexposed results in front of areas that get not much light. If we do not use direct light, the results will have a worse quality. But assuming that we get to take a perfect photography, we have the perspective too. The image does not appear in a real magnitude when developing on surfaces with a different curvature and it can vary the position of the camera. In these conditions the analyses of **mould comparison** that we can do over them are ruled out, because it will not be possible to take the measures of the stamp from the photography. Nevertheless, the combination of photographies with drawings has obvious advantages¹³.

Up to this point, we have tried to describe the fundamental methods used until now in the graphical presentation of the stamps, as well as the limitations that in our opinion present in each case. We understand that it is necessary to develop a neutral method, objective and reproducible, that enables to present the information in the best possible conditions that can be used by any researcher without any manual skill or any knowledge about the specific matter that can be fast and enable to preserve the reproduction of the stamp for the future analyses though we do not have the original piece.

¹³ The Works of M. Ponsich in the Valley of Guadalquivir include, as well as the draws of the exact replica, the photographies of the stamps (Ponsich 1974, 1979, 1991). We think that this is the best way of presenting the finds between the used ones up to this moment and it is an unavoidable tool in order to value the grade of verisimilitude of some interpretations and to propose new interpretations about the doubtful cases.

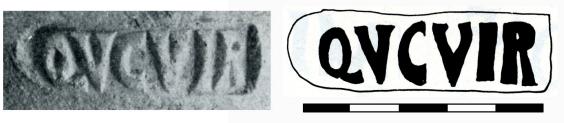


Plate 10.- Comparative photography / drawing

Though the used example presents a stamp of medium size (we know examples that arrive to double this dimension), it is observed, as in the beginning and the end of a photography how it is produced a reduction in the axis "x", because of the perspective. On the photograph, the stamp measures 5,1 cm while in the drawing we have 5,5 cm. The photography, though of an evident quality, it does not present a homogeneous illumination (Ponsich 1974 p.99, n. 143 fig.27; pl.XXVIII).

DESCRIPTION OF THE METHOD

The used product

The base of the method that we suggest consists of reproducing the stamp over an elastic mould. The used product is an elastomeric silicone of two components (base+catalyst) that links itself in a room temperature for a reaction of policondensation. The resulting material is elastic and stable. It can be easily found in the market and it is usually called simply as "silicone to make moulds". There are many kinds with their own features; the one that has been used in our case¹⁴ includes the following advantages:

- 1. It presents a doughy or greasy pastosity, so that it is easy to handle and to apply it to the piece at the same moment that it enables to fill the intricate and difficult access. The air is eliminated without subjecting it to vacuum.
- 2. With the curing-process at an room temperature presents a high dimensional precision, with a contraction lower than 0, 5%.
- 3. High definition: it copies the minimum details of complex and intricate pieces.
- 4. The final product presents a good resistance to be torn and great flexibility and duration.

PROCESS

Preparation of the piece

Before applying the product is necessary to stamp the pores of the piece and to stabilize these areas that can come off during the process. It can be used commercial stampers or as in our case, a solution of glue in water that applied over the surface, it creates a thin protective coat that dries quickly and soluble to the water (plate 12).

Preparation and application of the product

Mixture of the two components: Add the indicated proportion by the manufacturer (plate 11 and 13). The two components can be mixed by hand or with an electrical or pneumatic mixer used at low speed

¹⁴ Rodorsil RTV 3325P of the Rhodian mark.

in order to reduce to the minimum the introduction of the air in the mixture. This one presents a sticky touch that can make difficult its manipulation, which we can solve adding an oily product on the hands.

Application of the product: the degassing process is easier if we spread the product slowly. In our case, we take a portion equivalent to a sphere of the mixture of 2 cm of diameter and, beginning by a border of the stamp, we advance slowly up to distribute it over the whole surface, in order to spread it later. (plate 14, 15 and 16). It is necessary that the layer of the product did not have much thickness and it must be as smooth as possible all over the whole surface.

Curing-process: It is produced between 16 and 24 hours after having prepared the mixture.

It depends on the room temperature; it is quicker when this one is higher. Once have been retired of the piece, the mould is easy to store.

Note: The piece can suffer a change of color that it goes away in some time.

Photography of the mould

The result of the mould is a flexible product. The idea is to achieve to photography of the plane development of the mould. For this, it has been changed a box of a convenient measure, replacing its original lid with a glass of a certain thickness fixed by hinges. The box contains a foam rubber almost at the same level of the lid. This way, introducing the mould, this one is leveled with the weight of the glass. The limited thickness of the mould and its smooth will make that the plane development of the same one will not distort the measure of the stamp. In these conditions, the execution of the photography will not be technically complicated. In order to appreciate the emboss in a better way, we apply a side light that, in this case, will illuminate in a uniform way the mould. It is necessary to focus the camera in a manual way in order to avoid the glass. Turning the box on a pivoted surface 90 degrees each time, we get to take photographies with the light going into the four vertex - upper right, upper left, lower, left, lower rightwithout any need of moving the light. In order to get the best position of the camera, we must have a table of reproduction (plate 18). Depending on the piece, the results will be better with some lights than with others, so that we will able to choose the most convenient in each case (plate 19).



Plate 11.-



Plate 12.-



Plate 13.-



Plate 14.-

Computing process of the photography

The resulting photography presents the negative of the stamp, which is the most similar with the original mould. But we are used to see the stamps, not its moulds, so that we must solve two problems:

- 1. It is necessary to turn the photography around in order to, generally, obtain a direct interpretation of the stamp.
- 2. The positive-embossed stamps appear negative in the mould and vice versa. But the difference that they present at a concave surface regarding a convex one, depending on the light. If we convert the illuminated area in shadows and vice versa, we will get that the stamps would be presented as it really is, because of the direct light, in the stamps with a positive emboss, the letters are more illuminated that the deep area.



Plate 15.-



Plate 16.-

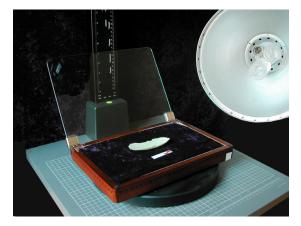


Plate 17.-

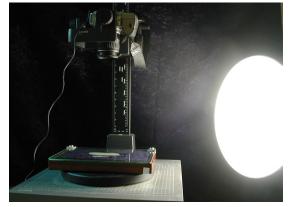


Plate 18.-

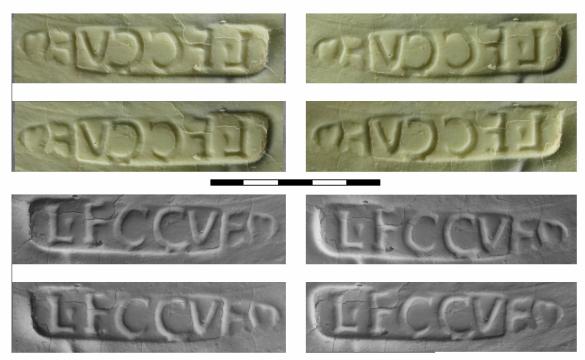


Plate 19.- Photographies of the moulds with light coming from its four vertex and once have been corrected

We think that the last stamp that we interpret as an "S", the only part of the reading that in this case can offer some difficulty, it is specified better on the image up-right and this one was selected to represent this piece (Barea & Al. 2008a: n. 5e1). In damaged stamps the position of the light will be necessary to observe better some details (fig.21). Observe how the mould has some fissures that had the original piece.

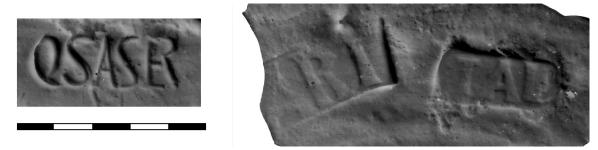


Plate 20.- The method applied on the stamps with a negative emboss and in a combination of different stamps applied on the same handle. (Non-published material).

In the image treatment with computers, these two corrections about the photography of the mould are included as basic actions for any program. For the first case, it can be called "horizontal turning"¹⁵, for the second, "invert"¹⁶. Moreover, taking the advantage of the batch processing that these programs include, a group of actions¹⁷ can be applied to all the images of a series, automatically. After this process, it will just to select the more convenient image for each stamps and cut off the important part of the information.

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¹⁵ For Adobe Photoshop: menu of Image/rotate canvas/horizontal turning.

¹⁶ For Adobe PhotoShop: menu of Image/adjust/invert.

¹⁷ The basic actions would be: turn into black and white/horizontal turning/invert/adjust shine-contrast/adjust size to 1:1 scale.

Advantadges of the method

We understand that the enunciated method gives new solutions for the study and publication of the amphorae stamps. In our opinion, it includes the following advantages:

- 1. It is easy to be done. Any person is qualified to carry out the process given that it does not require any manual skill. In many occasions, we have to take our data with no much time and in ambiances not much comfortable, which makes harder the intellectual work. The system solves this question because of the pure mechanical process. The researcher can present his or her finds without any need of having a great quantity of information about the specific matter.
- 2. Fast execution. It is competitive; in the time of effective execution until obtaining the final image- with regard to any of the systems that have been used up to this moment. Nevertheless, we need 16 hours to obtain the mould, depending on the room temperature. This aspect can be sometimes a problem. We understand that there must exist similar products that reduce this time.
- 3. The images are presented in a real magnitude and you can make on them paleographical and dimensional studies. This opens, in our opinion, a new way of study, because it enables to compare truly different copies of stamps and, this way, you can establish and put in order its variants (see footnote 2).
- 4. The information is neutral and objective. All the researchers, including the publisher, will have the same information to state the interpretation proposals and development of the stamps.
- 5. The method is reproducible. We can make many times the mould of a piece in order to get the same results.
- 6. The photography of the material does not present technical difficulty when developing on a plane surface. It can be done in laboratory conditions, which, inevitably will benefit in its quality. With help of the digital photography, the computing treatment that we have to apply can be automatic, taking the advantages that gives the batch processing. Taking the photos with different positions of light, we will choose the image that take the best profiles of the stamps; very useful for their publication and, particularly, to establish their interpretations in the case that they are damaged or without emboss (plate 21).
- 7. Moulds are durable- at least, this is what the manufacturer of the product says- and easy to organize and store. Moreover, we will be able to make future analysis without any need of studying the original piece, that normally, after some time, it will not be at our disposal. In order to make easier their study, they could be organized as a mould bank.

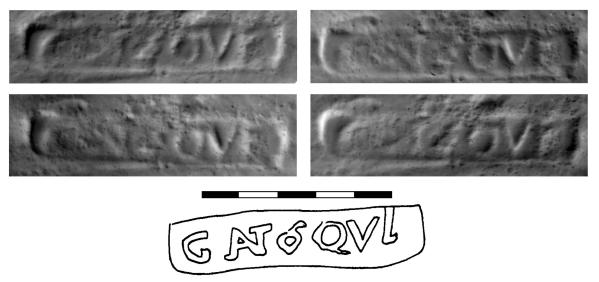


Plate 21.- The method applied to a stamp very damaged with a development: C. ANT(oni) (hedera) QVIE(ti).

Many interpretation details are better seen with a specific kind of light. In this case, the up-right image is chosen in order to represent this copy (Barea & Al. 2008: n.3). The inferior drawing is a very similar variation (Lyding Wil. 1983: n.12), where it is not possible to see the final link read as an "L".