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# *TRAC 2012*

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THEORETICAL ROMAN ARCHAEOLOGY CONFERENCE

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edited by

Annabel Bokern, Marion Bolder-Boos, Stefan Krmnicek  
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## TRAC 2012: Programme

### TRAC SESSION 1: ROMAN COPIES AND GREEK ORIGINALS. THEORIES, METHODS, PERSPECTIVES

Session organiser: Anna Anguissola

- Gabriella Cirucci *'Authentic Greek'. Transformations of ancient Greek artworks in the Roman World*
- Angela Palmentieri *Roman statuary in marble and bronze from Salerno in Campania*
- Britta Rabe *Incorporating Egypt. A case study*
- Anna Anguissola *Marks of imitation or signs of originality? Struts in Roman marble sculpture*
- Fiona Mowat *The adoption and adaptation of Greek sculptural prototypes in the Roman cinerary monuments dating from the late first to early second centuries A.D.*
- Marike van Aerde *Augustan visual language revisited: from copy criticism to creative emulation*

### TRAC SESSION 2: THE ROMANISATION OF THE ROMAN WORLD. NEW THEORETICAL, PRACTICAL AND METHODOLOGICAL APPROACHES TO AN OLD PARADIGM

Session organisers: Michael Sommer and Miguel John Versluys

- Sergio Gonzales Sanchez *Post-colonialism, globalisation and beyond: a comparative approach to national perspectives on 'Romanisation'*
- Dragana Mladenovic *Romanisation and Anglo-American post-colonial discourse – a case of collateral damage?*
- Blanca Misić *'Psychoanalysing Romanisation'. The concepts of 'Romanisation' and acculturation from a psychological perspective*
- Marleen Termeer *The Romanisation of the Roman World: early Roman expansion in central Italy*
- Lenhart Gilhaus *What comes afterwards? Uniformity and distinctiveness in the Roman Empire of the 2nd and 3rd centuries C.E.*
- Dianne van de Zande *Regional and Mediterranean contexts of rural funerary structures in Roman Syria: a theoretical exploration*



TRAC SESSION 3: RELIGION IN ROMAN ITALY: CONTINUITY AND CHANGE,  
CONTINUITY IN CHANGE

Session organiser: Annalisa Calapà

- |                     |  |
|---------------------|--|
| Andrea Carini       | <i>The indigenous element in Latin colonisation of Italy and Roman cults: persistence and innovation</i> |
| Marion Boos         | <i>Venus in the Roman Republic</i>   |
| Claudia Widow       | <i>Samnite sanctuaries. Formation and dissemination of temples in Samnium</i>                            |
| Annalisa Calapà     | <i>Sacra Volsiniensia. Civic religion in Volsinii after the Roman conquest</i>                           |
| Valentino Gasparini | <i>The cult of Jupiter in Pompeii</i>  |

TRAC SESSION 4: PHILHELLENISM AND THE ROMANS

Session organiser: Kelly Olson

- |                   |   |
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| Gunnar R. Dumke   | <i>Dead, yet agile – Hellenistic rulers in Roman material culture</i>   |
| Kathryn Lomas     | <i>Colonising the past: cultural memory and civic memory in the Hellenistic World</i>   |
| Karen A. Laurence | <i>Roman transformations to the Isthmian games and the creation of new Corinthian identities</i>  |
| Roman Roth        | <i>Double penetration: Greeks, Romans and Apennine tribes in South-Central Italy</i>  |
| Constanze Loesch  | <i>A glimpse of greek 'savoir vivre' in remote areas of the Imperium Romanum? A Roman 'wedding' ring with 'homonoia' inscription and a Dionysos bust from a girl's tomb from a Roman farmstead in Rheinbach-Flerzheim, North Rhine Westfalia, Germany</i> |
| Kelly Olson       | <i>Greek dress and Romanitas in Roman antiquity</i>   |

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TRAC SESSION 5: 'LIVING NEXT DOOR TO ANNIUS': ROMAN NEIGHBOURHOOD RELATIONS IN URBAN CONTEXTS

Session organisers: Anna Kieburg and Renate Storli

- Eeva Maria Viitanen,  
Laura Nissinen and  
Kalle Korhonen *Hanging out in Pompeii: testing neighbourhood relations?*
- David Griffiths *Illuminating Pompeii: 'after-dark' activities and the urban consumption of artificial light at Insula VI.1*
- Hanna Stöger *The 'collective insula' – a Severan neighbourhood in Ostia*
- Heini Ynnilä *Understanding neighbourhood relations through shared structures: reappraising the value of insula-based studies*
- Evan Proudfoot *Next door neighbours: doors as a 'way in' to Pompeian neighbourhoods and social rhythms*
- Jeremy Hartnett *Overhearing? Soundscapes and society in the Roman neighbourhood*

TRAC SESSION 6: EMBODYING VALUE? THE TRANSFORMATION OF OBJECTS IN AND FROM THE ROMAN WORLD

Session organiser: Clare Rowan

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- Gordana Ciric *The continuity of objects and landscapes from the Roman period to the Medieval period in Serbia – reasons and meanings*
- Katherine M. Erdman *Votives and values: communicating with the supernatural*
- Eva M. Mol *The concept of Egypt in networks of being and becoming: a thing theory approach to Egyptianised objects in Roman domestic contexts*

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Nick Ray	<i>Modelling Roman materialism</i>
Stefanie Hoss	<i>Recycling all metal? Towards a revised model of refuse dumping patterns</i>
Jay Ingate	<i>Roman bridges with a native view: an exploration into how traditionally 'Romanised' elements of the town interacted with meaning-laden pre-historic waterscapes</i>
Sylvie Barrier	<i>How to quantify and analyse the Romanisation in internal Gaul by the study of fine wares (200 B.C.–A.D. 50): new methodological approaches and results</i>
Jennifer Wehby	<i>Agency and intent: production of ancient construction mortar in Ostia (Italy)</i>

## TRAC SESSION 8: CONCEPTUALISING FRONTIER MARKETS, THE FREE MARKET, IMPERIAL SUPPLY, AND EXPRESSIONS OF LOCAL IDENTITY

Session organisers: Tyler Franconi and Meike Weber

Tyler Franconi	<i>New paths to economic theorisation of the Roman frontier</i>
John Creighton	<i>Financing the military: the supply of coin to the Roman armies</i>
Meike Weber	<i>One army, one market, same supplies? Discussing regionality in the organisation of frontier markets and military supply</i>
Anthi Kaldeli	<i>Trade and exchange in Roman Cyprus: reflecting the economy of the eastern frontier regions</i>
Victoria Leitch	<i>Pottery on the fringe: ceramic approaches for modelling frontier markets</i>

# Romanisation in Gaul: New Methodological Approaches for the Study of Gaulish Fine Wares (200 B.C.–A.D. 50)

*Sylvie Barrier*  
(translated by Marquita Volken)

## *Introduction*

The concept of Romanisation can be considered useful when it can be qualified and analysed at different levels in order to compare the acculturation rates, frequency and structure of the phenomenon among the regions within the Empire. Merely applying the idea of Romanisation, without a specific understanding of its multiple facets, can lead to a skewed view, particularly among specialist studies. The focalisation on regional assemblages reduces the overall scope of the phenomenon. Among the European francophone regions, it is only recently that research concerning Gaulish and Roman periods has risked expanding the scope to a supra regional scale. Against this background, the purpose of this paper is to examine the qualitative and quantitative aspects of acculturation among Gaulish fine wares (200 B.C.–50 B.C.). Based on a corpus of 130 assemblages from 21 urban sites (*oppida* and unfortified towns, Fig. 1) extending from the western centre of France, Auvergne, to the Swiss plateau and Luxembourg, this study is characterised by new methodological techniques relying on the calculation of a ‘Romanisation index’ (quantifying the level of Romanisation of an assemblage on a scale of 1 to 100) and the analysis of the phenomenon’s modalities, performed with statistical tools such as seriation and factor analysis. The diachronic and cartographic examination of the obtained results showed large disparities in the acculturation processes concerning fine wares. This article concentrates on the methodological aspects utilised in the analysis for the categorization of Romanisation levels of Gaulish fine wares as well as exploring the initial results. The methods used for processing the pottery elements and the fragments themselves are not included in this article (but see Barrier 2009 and 2012).

## *The quantitative analysis: definition of a ‘Romanisation index’*

The analysis of the rhythm and intensity of a phenomenon like acculturation of fine wares on a widespread geographic and chronological scale necessitated the elaboration of a comprehensive quantification method, here described as the Romanisation index. Developed from previous systems (see Paunier and Luginbühl 2004: 343; Barrier 2009; Barrier 2010), the final methods for index calculation, presented below, are based on the attribution of a value for categories of pottery techniques, types of forms (which in this system are linked to the form) and in function of cultural groups (see below and table 2 and 3). The final result is presented in the form of a numeric value between 0 (absolutely

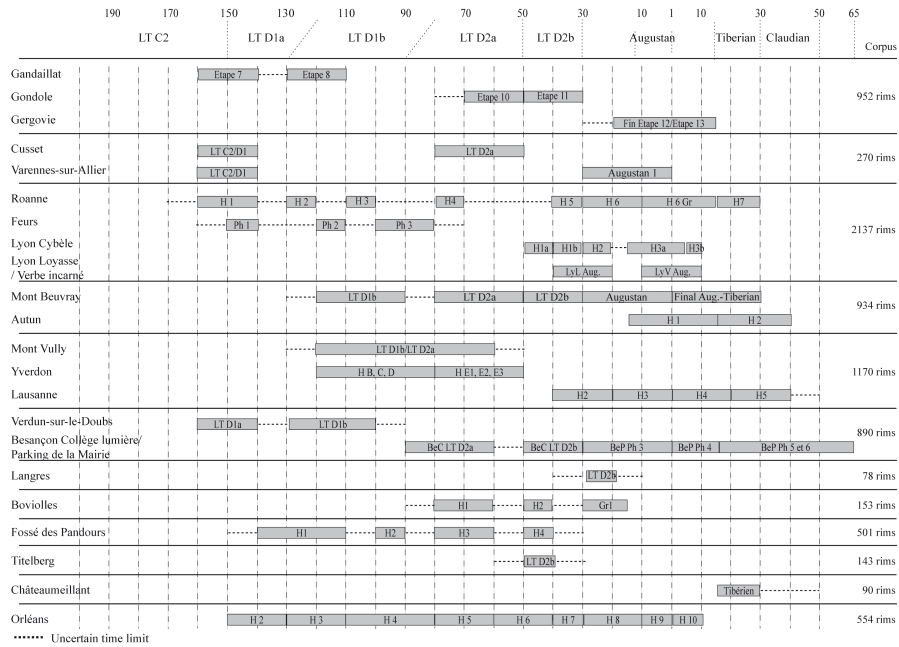


Figure 1: Comparative chronology of the sites used for the corpus, with phases related to the La Tène period and the corresponding absolute dates

no sign of Romanisation) and 100 (completely Romanised) that permits comparisons between the different levels obtained as well as revealing obvious spatial or diachronic phenomena. For example, the Romanisation index value for the assemblages studied at the site of Bibracte is 21 at the end of the second century B.C., while the value for the assemblages of Orleans falls between 3 and 6, but index values for both sites reach 50 by the end of the first century B.C. It is necessary to point out that this number is a relative and not absolute value. It constitutes the manner for permitting the comparison, integration and analysis of the data within a chronological and geographic scale. The analysis is limited by the breadth of the parameters.

*System and calculation methods* (Table 1). The system utilised is founded on the attribution of a category value and ceramic type value within the cultural group (La Tène = 0, Mediterranean = 1). Once these values were attributed, they were totalled for each type and each individual / fragment in the assemblage, thus obtaining a total value (totV). The Romanisation index value was calculated in the following manner: total value (totV) / number of individuals in the assemblage / 2. The division by 2 was performed to obtain a base 1 from the values that could go for each occurrence up to 2. This result was multiplied by 100 in order to obtain values between 0 and 100, which were easier to represent.

Categorie	CV	Form	Type	TV	IN	TotV
Campana B	1	Plate	Lamb. 5/7	1	1	2
Campana C	1	Bowl	Morel 2680	1	1	2
Italic sigillata	1	Plate	Ha.1b	1	3	6
	1	Cup	Ha.7b	1	2	4
	1	Bowl	Consp. R3	1	1	2
Italic thin walled	1	Beaker	Mayet XIV	1	1	2
	1	Beaker	Mayet XVII	1	2	4
Thin walled Beuvray type	1	Beaker	Imit. Mayet II	1	3	6
	1	Beaker	BG11b	0	1	1
Clear fabric flagons	1	Flagon	BCr4a	1	1	2
	1	Flagon	BCr5b	1	3	6
	1	Flagon	BCr6	1	2	4
	1	Flagon	BCr8c	1	1	2
Painted ware	0	Bottle	BBt2	0	2	0
	0	Pot	BP4b	0	1	0
Smooth grey ware	0	Plate	Imit. Ha. 1b	1	1	1
	0	Plate	Imit. Lamb. 5/7	1	4	4
	0	Plate	Imit. Lamb. 31	1	6	6
	0	Plate	Imit. R-POMP 1	1	1	1
	0	Coupe	Imit. Lamb. 18	1	1	1
	0	Bowl	BB8	0	2	0
	0	Bowl	BB10b	0	2	0
	0	Beaker	BG10d	1	1	1
Terra nigra	0	Plate	Imit. Lamb. 5/7	1	3	3
					46	60
RI = (60/46/2)*100 = 65						

Table 1: Hypothetical example of registration and calculation of the Romanisation index

The values are attributed to categories according to their cultural origin (Table 2). Three groups were identified, with values of zero or one. The first group, imported Mediterranean pottery, includes categories of fine wares originating in the Mediterranean region, identified and classified as such since the nineteenth century and the beginning of the twentieth century (e.g. Campanian A, B and C, Italian thin walled fine wares, *terra sigillata*, etc.). Production groups from Southern Gaul were excluded so that a finer identification of the original groups that spread through the Mediterranean commercial networks could be separated from the tableware made in the Mediterranean tradition and produced in Gaul. Since the first group were produced in the Mediterranean region, the categories have been given a value of one (1). The second group unites pottery in which the technique is clearly Mediterranean (presence of barbotine or colour coated) but that the production centres were located in South and Central Gaul (e.g. flagons,

Campanian C from Southern Gaul, imitations of Pompeian red ware, pre-*terra sigillata* pottery, *terra rubra*, imitation of thin walled fine wares Beuvray types, etc). The imitations of Mediterranean pottery were also given a value of one (1). It appeared important to attribute the same value to both imported and imitation Mediterranean wares since the goal of the value index is to quantify the phenomenon and not an analyse of its modalities. The final group includes the categories in which the production was in Central Gaul and followed the La Tène tradition (firing methods, surface treatment: e.g. painted pottery, micaceous fine ware, light coloured fabric, burnished grey coloured fabric wares without glaze, polished smoked, etc.) though the forms and typology was partly influenced by Mediterranean styles (e.g. *terra nigra*). The local production and traditional character of the third group gives it a value of zero.

Categories and production groups	Values (CV)
Imported Mediterranean Group	1
Mediterranean technique Group	1
La Tène tradition category	0

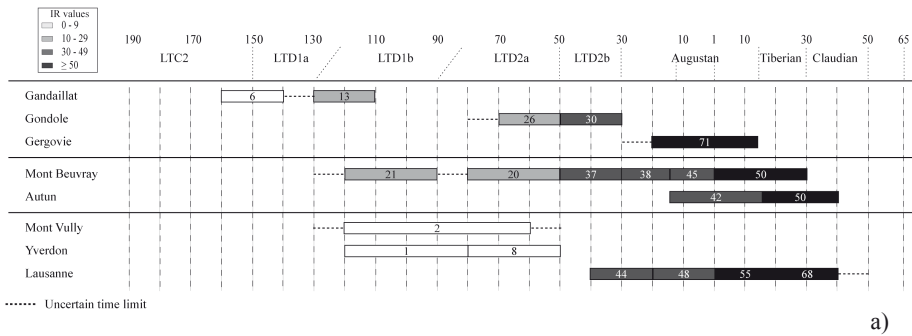
Table 2: Values attributed to categories and production groups (CV)

In this system, the types are defined by the form (plate, bowl, beaker, etc.) and by a numeric code attributed in function of the variation of rim angle. Following the example of the category values, types also have an assigned value between zero and one according to their cultural origins (Table 3). The Mediterranean types are included in the imported groups in which the production was clearly Mediterranean and have a value of one (1). The imitations are defined by the obvious similarity to the Mediterranean forms, while the derived examples show only a vague inspiration. The imitations and derived forms were produced in Gaul and used both Mediterranean and local ‘La Tène’ production techniques. Again, these types receive a value of one (1) since they reflect the desire for Mediterranean types through imitation. La Tène type pottery designates wares using traditional Gaulish production techniques and forms so receives a value of zero.

Types	Values (TV)
Mediterranean types	1
Imitations or derived types	1
La Tène types	0

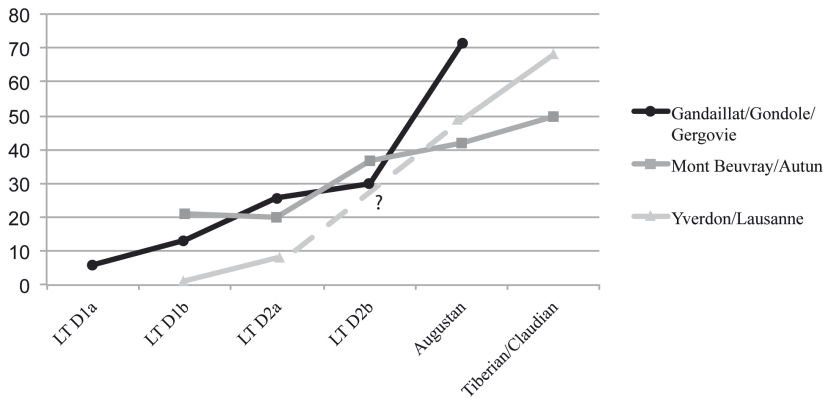
Table 3: Values attributed to types (TV)

*Results of the Romanisation index calculations.* In order to better understand the potential of this quantification method, some selected examples of the results are presented here. These show the diachronic evolution of the index values for the assemblages of three of the territories studied (*Arverni*, *Aedui* and *Helvetii*) and the comparisons of the results between the before and after conquest periods through the use of maps.



a)

Diachronic evolution of the romanisation index values



b)

Figure 2: a) Results of the Romanisation index calculation for the sites in Arvernian, Aeduan and Helvetic territories; b) Graphic showing the evolution of the indexing results for the sites in Arvernian, Aeduan and Helvetic territories

Through associating the results from the Arvernian, Aeduan and Helvetic territories, the diachronic evolution of the index values can be tracked and quantified from the middle of the second century B.C. and through to the Augustan period / Tiberio-Claudian period (Fig. 2a and 2b). The fine ware assemblages from the Arvenian territory (Gandaillat, Gondole, Gergovie) are excellent illustrations of the phenomenon of Romanisation showing an index value of six during the LT D1a, then 13 at LT D1b, rising to 26 and 30 during the periods LT D2a and LT D2b. The index value rises sharply during the Augustan period (71) for the assemblage at Gergovie. The site of Mont Beuvray shows a relatively high index value starting with the first occupation levels followed by a steady evolution (about 20 at LT D1b and LT D2a, and slightly less than 40 at LT D2b / beginning of the Augustan period), and ending at 45 for the final occupation period. These results are quite close to those observed for the first occupation levels at the small town of Autun (42 at the end of the Augustan period and 50 for the following period). Founded by Augustus in order to replace the Mont Beuvray fortified settlement



as the Eduan capital city, Autun was populated by the habitants who had progressively deserted the *oppidum*. The Helvetic assemblages from Yverdon and Lausanne show a very different situation. Yverdon's fine wares were only slightly Romanised and after a transition (LT D2b) became highly Romanised with levels similar to those of Lausanne, which was founded in the middle of the first century B.C. For better comparisons of the results, a shaded scale is used to indicate the range of Romanisation index values on the maps:

- White = low value between 0 and 9
- Light grey = medium low value between 10 and 29
- Medium grey = medium value between 30 and 49
- Black = high value between 50 and more

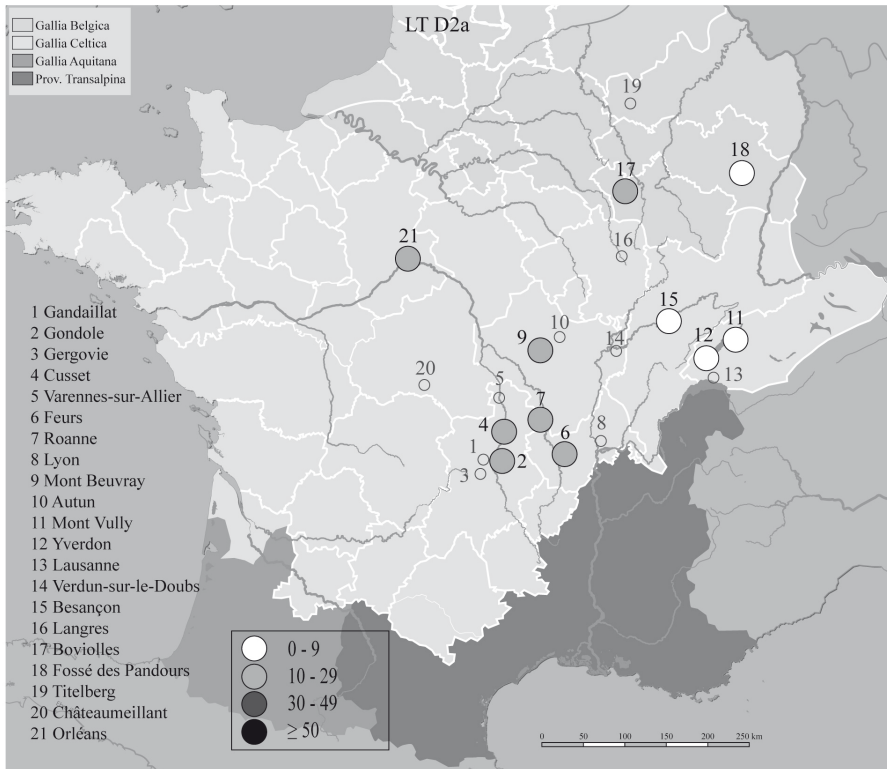


Figure 3: Index results for the group studied from LT D2a (map after Fichtl 2004: 9)

During LT D2a (Fig. 3), here represented by eleven sites, the categories of observed indexes are low. The first category comprises the corpus of Mont Vully (2), Yverdon (8), Besançon (6) and the Fossé des Pandours (1). The assemblages from Boviolles, Cusset and Orleans show a slightly higher index value (from 10 to 19). The index value for Boviolles is relatively high when compared with sites in North and East Gaul. The

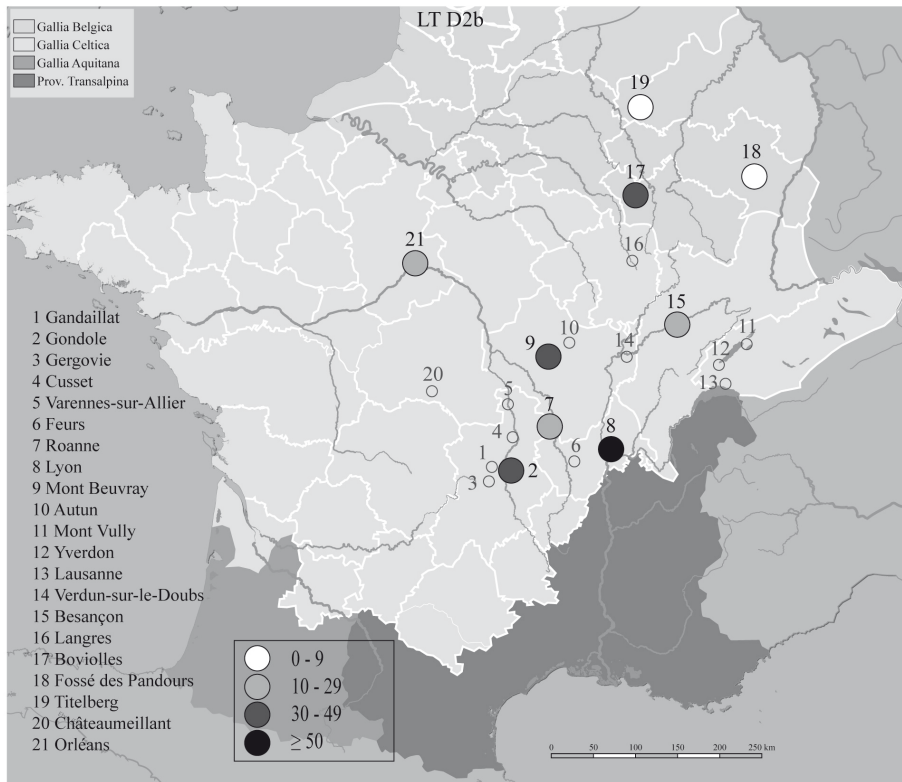


Figure 4: Index results for the group studied from LT D2b (map after Fichtl 2004: 9)

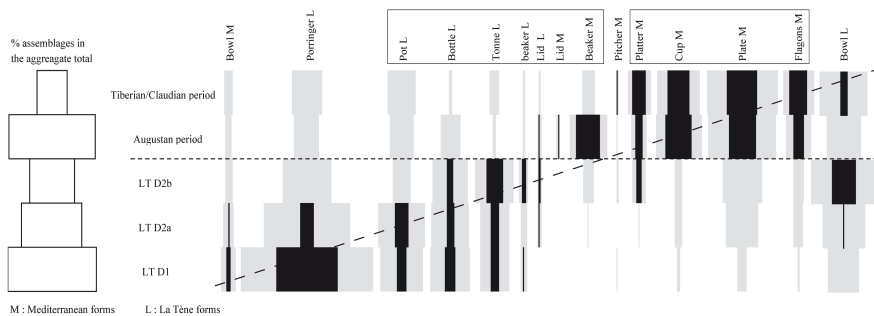
highest index values were observed at Gondole (26), at Feurs (19), at Roanne (25) and at Mont Beuvray (20). The most southern sites, generally in close proximity to the river routes, obtained the highest index values. The rising value for Orléans would appear to be related to the circulation of Mediterranean products on the Loire River.

The differences in the index values are particularly marked during the post Conquest phase (LT D2b) (Fig. 4). The assemblages at the Fossé des Pandours and at Titelberg show very low values (2 and 9) while the Besançon assemblage has a value of fourteen. The index values for Roanne (29) and Orléans (27 at level 5 and 30 at level 6) show a middle range of values. Three pottery assemblages achieved an index value of between 30 and 40: Gondole (30), Mont Beuvray (37) and Boviolles (40). Without a doubt, the most Romanised group is the assemblage from the 'Temple of Cybele' at Lyon with values ranging from 78 to 84. Again, the southern sites obtained higher values than the northern ones, with the exception of Boviolles, but this result must take into account the small quantity of fine wares available for analysis (29 sherds). The Rhone transport axis clearly shows its role of a privileged vector of the phenomenon for Lyon, where the Romanisation of the fine wares is very high from the first years following its foundation.

### *The qualitative analysis*

The Romanisation index allows a rapid and synergetic realisation of quantitative comparisons of acculturation between pottery assemblages, but it is also necessary to examine the qualitative aspects of the phenomenon. These analyses, here termed as ‘modalities’, are frequently limited to proportional comparisons (importations, forms, etc.). While retaining the basic analytic method, for cases with only two or three variables, the principal statistical tool is based on a computerized graphic system that appears to offer new perspectives on the obvious forms of acculturation, particularly for immense range of material in the corpus. The evolution of the pottery forms categories has been studied through seriation (see Desachy 2004) and factor analysis (Cibois 1983; Cibois 2006).

Advanced statistical tools were used for a finer analysis of the diachronic quantitative distribution of the forms. These were essential for obtaining a clear and precise result from the wide range of data. The goal was to determine the evolution of the form’s proportions among the La Tène and Mediterranean wares contained in the pottery corpus. In the statistical analysis La Tène is identified by the letter ‘L’ and Mediterranean by ‘M’ (for further details on form identification and cultural attribution, see Barrier 2009).



*Figure 5: Graphic seriation of the forms identified among the corpus*

The seriation consisted of generating a graph (Fig. 5) with the incidences of standard deviations with an average percentage (EPPM) by using the results from an Excel program, and grouping together the deducted variables in the number of occurrence in the assemblages. Through the calculations of the independent values (theoretical values for the variables) and the independent differences (differences between the theoretical values and the real values), the aggregate values of each form could be transformed into a percentage of the total sum of forms by period. Standard deviations were obtained between each point and in relation to the aggregate average. Transforming the data into percentages eliminates the observable differences between the assemblages through establishing a base line of 100%, and is compensated by the presence (on the left of

the seriation graph), of a column symbolizing the portions of the forms in the aggregate total from every period of the data table. The data was then graphically interpreted by permutation of lines and columns according to their weighted mean (every line or column is multiplied by the row, designated by the number of the line or column, that occupies in the column), until the optimal diagonal organisation of the data was obtained. These two consecutive operations resulted in the generation of a graphic seriation that represents the variables above the aggregate mean (in black) and the aggregate total (in grey), with the complete results ordered by the serial structure symbolized by the diagonal organisation of the data.

This type of graphic treatment is pertinent only when the quantity of occurrences is sufficiently elevated in comparison with the variables. The assemblages were grouped together for the significant periods though it was necessary to exclude several of the under-represented forms from the aggregate total. The resulting table (Fig. 5) is based on 8082 incidents of forms distributed in five periods (rows) and fifteen pottery forms (columns). The actual test for chi 2 performed on the data obtained the result of 0, thus eliminating the possibility of the separation of the data by coincidence.

After a final re-organisation of the columns, a clear chronological seriation appeared in the diagonal organisation of the black blocks (Fig. 5, see the diagonal dotted line). The most striking element to appear in this seriation was the distinct separations between the Mediterranean and La Tène forms (Fig. 5, see rectangles), in particular the porringers, but also the pots, the bottles and the jars; forms which clearly characterise the periods of the LT D1 and LT D2a, and even LT D2b. The Mediterranean forms: platters, cups, plates and flagons, are representative of the Augustan and Tiberio-Claudian periods. This first result clearly indicates the substitution of traditional pottery forms by the Mediterranean types during the Augustan period. Several forms were revealed as unimportant for this study due to their scarcity or because the examples were too chronologically disperse, namely the La Tène and Mediterranean beakers, lids and pitchers. Lastly, bowls prove to have little differentiation in the chronological and cultural overview. Mediterranean examples are over-represented during LT D1a and LT D1b (presence of the Campanian bowls and their imitations). The La Tène bowls are associated with the LT D2b period, and also are highly represented in the Tiberio-Claudian period (presence of certain specific productions like the Roanne bowls and the imitations of *terra sigillata* in the Lausanne corpus).

Factor analysis of the correspondences permitted an alternative examination of the data (Fig. 6). Similar to seriation, it shows a geometric representation of variables according to the associations or of the oppositions, calculated from the standard deviations. The standard deviations are transformed into repositionable coordinates on a factor analysis axis (abscissa and ordinate that intersect at the origin). The interpretation of the scatter points obtained is in function of the angles that permit joining two points in relation to the origin (0). The steeper the angle, the more the data are associated, the more shallow angle obtained indicates the more the variables are in opposition.

On the chart here obtained (Fig. 6), two phenomena are visible. The first, symbolised by the parabola, clearly shows the chronological seriation of the data from the LT D1 to

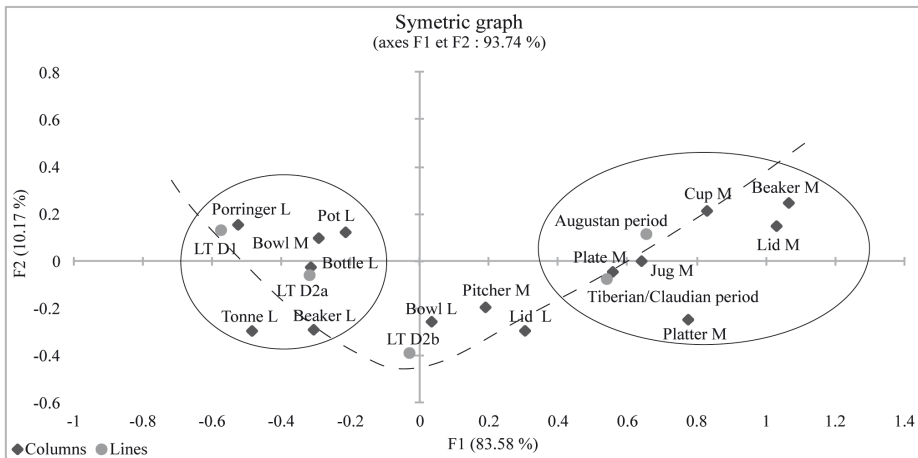


Figure 6: Results of the factor analysis on the categories of forms

the Tiberio-Claudian period. The second, represented by the circles, marks the position between the two extremities of the curve, on one side the period LT D1 and LT D2a, characterised by the La Tène forms of porringers, pots, bottles, jars and beakers; on the other side, the periods Augustan and Tiberio-Claudian, characterised by platters, plates, cups, beakers and lids, all of Mediterranean origin. The LT D2b period, associated with La Tène beakers, bowls and lids and with Mediterranean pitchers, is graphically distinct from the previous levels, marking a sharp transition between these periods.

Both statistical methods used here show a similar phenomenon in two different ways. The first shows a 'perfect' chronological seriation of the succession from the La Tène forms to the Mediterranean ones. The second shows the division between the periods LT D1/LT D2a and the Augustan and Tiberio-Claudian periods, indicating an important cultural transition during the immediate post conquest period (LT D2b). The advantage of using statistical methods, particularly seriation graphs, is that it clearly shows the evidence from the exact moment the forms are chronologically characteristic, as well as the inverse; the asynchronous material from each period. This method allows an immediate resolution of problems linked to the material's life time usage, redeposit and residual presence within the assemblages, which a simple comparison of proportional relations between forms could not have distinguished.

### *Categorisation of the phenomena of Romanisation: an attempt to define Romanisation levels*

The two statistical methods used here were indispensable for quantifying and qualifying the rate, intensity and mechanisms of the acculturation phenomena of each of the pottery assemblages. It is now necessary to examine the data in a global manner and to prioritize the assemblages' Romanisation levels. This includes typical acculturation elements

such as importations, imitations, etc., and the observable principal influential factors on the phenomenon such as large-scale commercial activities, early contacts with the Mediterranean world, etc. These factors have been taken into account for establishing the Romanisation levels in order to attempt an interpretation of the phenomena's history.

These levels are based on the elaboration of a cluster analysis (Fig. 7), that represents, in a schematic manner, the groups of individuals presenting homogenous characteristics among the data groups (rows = assemblages), defined by a number of descriptors as columns (below). The methodological principle consists of automatically classifying the assemblages among the categories through an aggregation process. This is based on the calculation of 'dissimilarities' visible in the assemblages that corresponds to the measurable Euclidian distance between the points (obtained from the coordinates of the rows extracted through factor analysis). The result is expressed by the aggregation index value. Every step of the classification consists of iteratively merging the assemblages that possess the most similar characteristics, i.e., those with a low aggregation index value.

The result appears as a dendrogram, in which the different categories are encapsulated. The level of the nodes represents the degree levels of acculturation between assemblages. The connections, represented by the vertical lines, serve to define the number of categories relevant to the classification (in function of the aggregation index value: the higher the value, the less homogenous the class). Proportional descriptors (Table 4 and 5) taken into account for establishing the cluster analysis (for the details of each group, see above: system and calculation method):

- Importations: wares imported from the Mediterranean.
- Mediterranean technique, La Tène types: wares produced using a Mediterranean technique but with La Tène forms and types.
- Mediterranean technique and type: wares produced using a Mediterranean technique and imitating Mediterranean forms and types.
- La Tène techniques and types: wares produced using a La Tène technique for La Tène forms and types.
- La Tène techniques, Mediterranean types: wares produced using La Tène techniques but the forms and types imitate a Mediterranean model.

The cluster analysis revealed three principal categories, among which sub-categories could be established. Three levels could be established A, B, C, from less to more Romanised (Fig. 7), and these were further divided into two sub-levels (A1, A2, etc.). It goes without saying that these levels, defined by the data from the corpus, could well be brought to a more advanced state through the introduction of additional data.

*Hypothetical model and historical analysis.* After defining the levels, an attempt at constructing a hypothetical model for the phenomena of acculturation of fine wares was formulated in order to produce an analysis of the general history of the phenomenon of Romanisation. The totality of the assemblages are presented in classification tables, permitting a concise presentation of the data and preserving groups of index values that reflect the corresponding proportions of each analytic criteria for each level (Table 4). Those levels are associated with the Romanisation indexes (see above: the quantitative analysis) and can be used to compare the results of both methods. Further discussion of

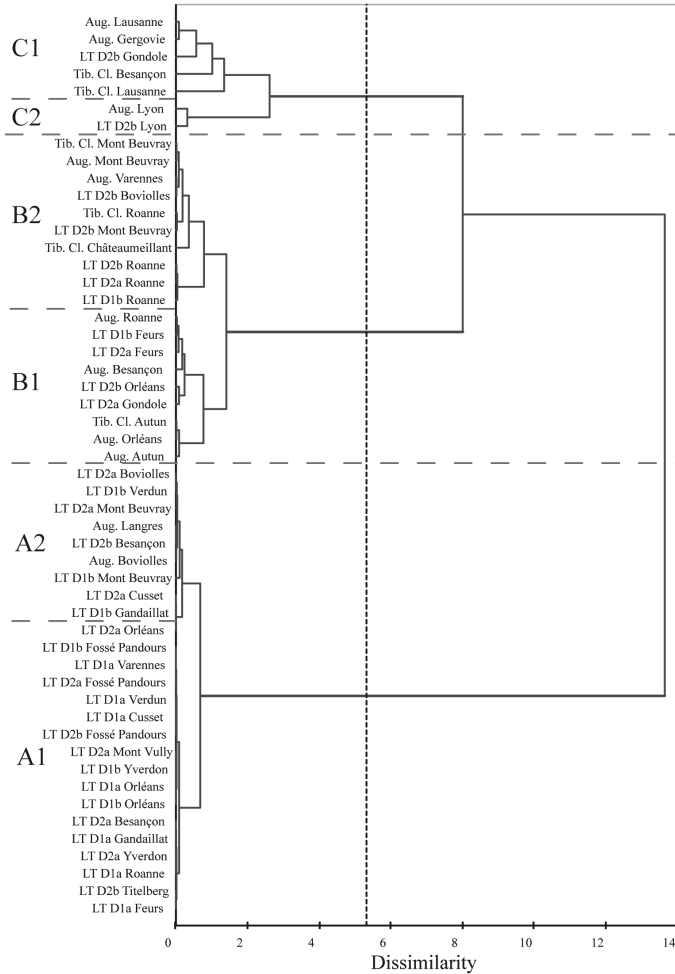


Figure 7: Results of the cluster analysis

these elements consists of precisely qualifying each of the Romanisation levels with an explanation of the principal factors.

Level A = Pre-acculturation, very low to low acculturation.

A1: The assemblage appears to have an absence of acculturation (100% La Tène pottery) or is in a state of pre-acculturation (more than 90% of La Tène pottery, see table 4). For the few assemblages that occur in a favourable milieu for the assimilation of new forms and types of wares within the La Tène production tradition (up to 5% of types imitating the Mediterranean models) we can say that the assemblages indicate weak relations with Mediterranean trade networks (up to 5% of importations) or few



Romanisation levels	Importations	Méditerranéan technique, La Tène types	Méditerranéan technique And types	Laténian technique and type	La Tène technique, Méditerranéan types	Romanisation index
A1	0 – 5 %	0 %	0 – 5 %	85 – 100 %	0 – 5 %	0 – 15
A2	1 – 10 %	0 %	1 – 20 %	70 – 85 %	0 – 15 %	5 – 20
B1	1 – 15 %	0 – 5 %	1 – 15 %	45 – 70 %	10 – 50 %	20 – 35
B2	1 – 20 %	0 – 10 %	10 – 40 %	30 – 45 %	20 – 40 %	35 – 50
C1	1 – 25 %	5 – 30 %	20 – 60 %	15 – 60 %	0 – 20 %	30 – 75
C2	25 – 45 %	0 – 5 %	40 – 60 %	10 – 20 %	1 – 5 %	80 – 95

*Table 4: Categorisation of the different Romanisation levels*

exchanges with Mediterranean Gaul. At this level, the Romanisation index value of the assemblages is between 0 and 15.

A2: At these levels, the acculturation of the assemblage is very low to low (between 85% and 95% of La Tène wares). The levels are based on a slightly higher level of contact with the Mediterranean trade networks, (less than 10% of imported wares) and with Southern Gaul (up to 5% of wares made with a Mediterranean technique). The principal difference lies in the proportion of imitations of forms and types among the La Tène pottery (between 0 and 15%), illustrating a slightly higher adoption level of new imitation ware than the level A1. The Romanisation index value corresponding to level A2 is between 5 and 20

Level B = Average to high levels of acculturation.

B1: La Tène technique fine wares represent less than 90% of the majority of the corpus (Table 4). This value shows a growing assimilation of new forms and types among the traditional La Tène repertory (10% to 50%) as well as the beginnings of an assimilation of new production (up to 5% of La Tène types produced with Mediterranean pottery techniques). The contacts with the Mediterranean world (larger commercial networks and exchanges with southern Gaul) are not much higher in comparison than with the level A2 (between 1% and 15% of importations). These elements allow the acculturation qualification of level B1 as average. The Romanisation index values are between 20 and 35 for this level.

B2: This level of acculturation is relatively high since ware produced with La Tène techniques represents less than 80% of the corpus, among which 20% to 40% are imitations of Mediterranean types, while the proportion of borrowed cultural elements is over 50%. These imported wares are from Mediterranean commercial exchanges (up to 20% of imported wares) and from southern Gaul (more than 15% of wares made with Mediterranean pottery techniques). The trade relations with southern Gaul increase



but also those with central Gaul as illustrated by the presence of imitation and local wares made with Mediterranean pottery techniques (10% of La Tène types). This rate illustrates a partial substitution of the traditional forms and very probably, a negligible modification of the customs linked to the usage of the fine wares. For level B2 the Romanisation index values are between 35 and 50.

Level C = hybrid culture / colonisation. This level of Romanisation appears after the conquest and groups together the majority of the assemblages from the Augustan and Tiberio-Claudian periods.

C1: The principal signs of this level are the high levels of Mediterranean pottery techniques, representing between 30% and 70% (table 4) in the groups of assemblages. These consist of both La Tène forms and types and Mediterranean imitations, an indication that a part of the production was in Central Gaul. The proportions of imported wares, which reflect the relations with the Roman *negociatores*, are rather close in relation to those seen at level B2. The imitations of Mediterranean forms and types among the groups of La Tène wares are greatly reduced in relation to the levels for B2, an indication of a loss of interest in the traditional ware categories, which are represented by only a small amount in most of the assemblages. Here we see the emergence of a hybrid culture with a mixture of traditional elements, borrowed elements and a majority of re-interpreted elements that were produced in Gaul by local potters, potters of Italian origin or ones from southern Gaul. The Romanisation index values of the assemblages of level C1 are between 30 and 75.

Assemblages	Romanisation levels	Importations	Méditerranéan technique, La Tène types	Méditerranéan technique and types	Latenian technique and type	La Tène technique, Méditerranéan types
Boviolles	A2	4	0	9	75	12
Langres	A2	5	0	10	78	8
Besançon	B1	16	0	12	62	11
Roanne	B1	12	0	9	54	24
Varennes	B2	3	0	17	45	34
Mont Beuvray	B2	8	1	17	34	40
Autun	B2	19	8	2	38	33
Orléans	B2	15	7	13	35	30
Lausanne	C1	13	13	35	27	12
Gergovie	C1	22	11	34	15	18
Lyon	C2	45	1	43	8	3

Table 5: Romanisation levels of the assemblages during the Augustan period with percentages of cultural descriptors

C2: La Tène type pottery is clearly a minority in the C2 level assemblages (less than 20%). Within this percentage, less than five percent are imitations of Mediterranean techniques or forms and types. This low level indicates that the La Tène forms were not re-interpreted nor a mix of traditional and borrowed elements typical of a hybrid culture like those observed at the C1 level. The majority of the corpus consists of Mediterranean techniques and types. The level C2, which was only observed among the assemblages from the colony of Lyon, can be qualified as being ‘culturally transplanted’ from the Roman world, and only slightly affected by the La Tène based cultural substrate. The Romanisation index values are at 80 for this level.

*Analysis of acculturation levels: the example of the Augustan period.* The theoretical model of the acculturation levels permits an interpretation, in historical terms, of a diachronic map of the observed levels for the assemblages studied, particularly for the Augustan period.

One generation after the conquest, all of the acculturation levels are present, with the exception of the lowest (A1) (Table 5). The fine wares from the sites of Boviolles and Langres show the lowest levels (A2). The assemblages from Besançon and Roanne are at the level B1 while those from Varennes-sur-Allier, Mont Beuvray, Autun and Orléans are at B2. The level C1 includes the assemblages from Lausanne and Gergovie while the assemblages at Lyon represent the level C2.

The map (Fig. 8) of the results clearly indicates that the most northern sites, Langres and Boviolles, remain the least Romanised. Nevertheless, these two assemblages contain more wares produced with Mediterranean techniques (produced in Southern or Central Gaul) and imitations of Mediterranean types made with La Tène techniques than importation of Mediterranean wares, indicating that imitations were being assimilated into the groups of traditional fine wares. In the case of Langres, the statute of *Lingones foederati* was granted to the town during the Caesarean period and the title of colony (July 2003: 232) appears to have had little influence on the acculturation of fine wares. Prudence is required in the interpretation of the observations for these two small assemblages, both of which have a chronology situated in the transition between LT D2b and the Augustan period.

The assemblages from Besançon and Roanne, both at level B1, show a similar proportional repartition marked by important quantities of importations (*terra sigillata*) and wares made with Mediterranean techniques, as well as 11% to 24% of imitations of Mediterranean forms made with La Tène techniques (Table 5). These observations reveal well-developed commercial contacts and a growing assimilation rate of new elements in the assemblages from these towns.

The four assemblages at level B2 can be divided into two groups. The first group contains Varennes-sur-Allier and Mont Beuvray, both of which have a corpus that contains around 50% of elements that are Mediterranean reinterpretations and pottery made with traditional techniques plus a significant quantity of Mediterranean technique pottery produced nearby or in Central Gaul (Beuvray type fine wares, Arvern or Lyon type barbotine plates, Aco – Lyon type beakers, etc.). The second group, the assemblages from Autun and Orléans, shows more commercial contact with the Mediterranean with

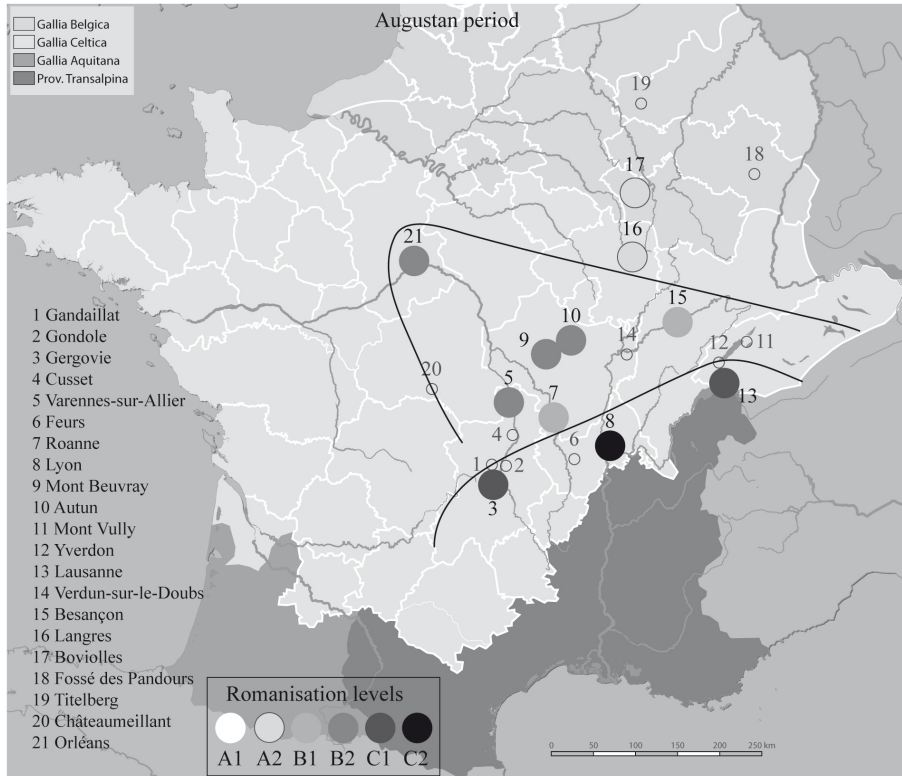


Figure 8: Map of the levels during the Augustan period (map after Fichtl 2004: 9)

15% to 20% of importations (Table 5). In the case of Autun, we know that this new city was created in the last decade B.C. (Barrier forthcoming) to replace Mont Beuvray as administrative centre for the *Aedui*. We can assume that the displaced native population from Mont Beuvray brought pottery with them to Autun thus producing a similar acculturation level. The principal difference lies in the proportions of imported wares, which is higher in Autun due to the presence of high quantities of *terra sigillata*.

The highest level, C1, is a characteristic of the ‘new’ towns of Lausanne and Gergovie, where a La Tène occupation is attested for only the first generation. The proportional representation of fine wares is similar in both towns, with a significant importation level (13% and 22%), an important quantity of Mediterranean technique and type wares (35% and 34%) and a group of La Tène technique pottery showing strong influence by Mediterranean types, in spite of very little residual material at these sites. The fine wares show a mixture of traditional elements and borrowed forms in equal proportions, to the point that it can be described as a hybrid group. At Lausanne, the phenomenon is more significant since some of the Mediterranean technique wares were produced locally (Luginbühl and Schneiter 1999: 160–161). Unsurprisingly, the colony

of Lyon attained the maximum level (C2), characterised by 45% of 'importations' and Mediterranean techniques and types produced locally in independent Italian workshops (43%). La Tène type wares represent only 11% of the fine ware corpus. Here we see a case of true cultural implantation with a minority of native cultural elements and a majority of elements from the colonising culture.

### *Conclusion*

Understanding a complex phenomenon such as Romanisation of fine wares through the implementation of statistical methods seems to be possible. The quantification of the phenomenon through the use of a Romanisation index that gives a clear numerical value permitted the comparison of the rates and intensity on a large scale, notably through the use of diachronic maps. The use of statistical tools (seriation and factor analysis), which in spite of their importance, are hardly used by French researchers for studies of late La Tène pottery. Yet here have brought new insights for the interpretation of the Romanisation phenomena among pottery forms. This application has proved superior to the previous simplistic graphic proportional comparisons.

The analysis of the phenomenon of Romanisation of fine wares by gathering the aggregate data in quantitative and qualitative 'levels' (modalities) as based on cluster analysis and the Romanisation index values, permitted the data to be transformed into a model associating the observed results with a historical interpretation. In spite of the potential of this type of approach, I am aware that the results rely on a limited number of urban sites. Future research should extend the analysis to cover a larger group of sites, including both urban and rural examples. By providing a clear definition and quantification of levels, new possibilities for comparisons are opened for other acculturation subjects, such as the cooking wares, small finds, numismatics and architecture. The comparison of results obtained here can be compared with those from other cultural subjects and those from ethno archaeological research (e. g. Kramer 1977, Longacre 1991, Skibo *et al.* 1989). This comparison permits a clearer understanding of the changes visible in the pottery assemblages as being due to stylistic adaptations or a real acculturation. If the transformation of fine wares in Gaul at the end of the La Tène period is a concrete example of Romanisation, it remains to be seen at which level this is a reflection of acculturation among individuals or a group of individuals who adopted these pottery forms. The processes that led to the Romanisation of pottery among the Gauls remains undefined. The factors may include: the psychological mechanisms linked to the acquisition of Roman wares, the desire to achieve a higher social status through ownership of prestigious items, fashion trends, demand for high quality wares, the novelty of foreign items, display of 'modern attitude' or pro-Roman affinities.

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