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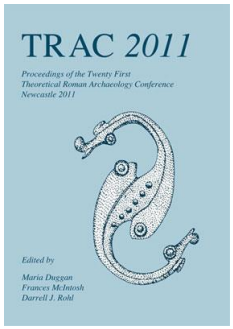

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Knowledge Systems in the Production of *Terra Sigillata*. Moving Beyond the Local/Global Paradox

Astrid Van Oyen

Introduction: the local/global paradox

This paper is centred on a recurring pattern in archaeology, namely the oscillating movement between local and global perspectives, or, otherwise stated, between an emphasis on the homogeneity or the heterogeneity of the material under study. That this is a matter of general concern across archaeological specializations, is illustrated for instance by the Bell Beaker phenomenon, of which one may wonder whether it is to be considered local or global in nature. On the one hand a significant degree of spatial and temporal difference can be noted in the material, but on the other hand there must be some unifying aspect for it to be commonly referred to with a single nametag. Once it comes to pinpointing the precise nature of this intuitive sense of boundedness, however, things tend to get rather complicated. A similar paradox characterizes Roman archaeology (Hodos 2010), in an even more explicit way, given the political and administrative unity of empire. The presence of this problem at multiple levels of the archaeological discipline is not only indicative of the broader relevance of the issue, but also of its urgency.

As with so many abstractions, 'scale' is both an important and a problematic concept. It has been widely employed, and widely critiqued, across many disciplines. It is problematic for a number of reasons, all to do with imposing a predefined hierarchical structure on a series of events. As a consequence, events and associations falling outside this standard straightjacket of 'political,' 'economical,' and other grand narratives are difficult to accommodate (Latham and McCormack 2010: 63–64; Slater and Ariztía 2010). Moreover, the illusion of a pre-existing scalar structure impedes any attempt to make sense of scalar transformations, of how phenomena can grow and dissipate, switch scales, or make the analyst define new scales.

In the following discussion, *terra sigillata*—the emblematic Roman red-gloss ceramics—will be forwarded to illustrate how a rethinking of our research framework might actually take place. The history of production of *terra sigillata* started off in Italian workshops after some eastern predecessors (notably Eastern *Sigillata* A) before the last quarter of the first century B.C. Around the same time, the forms were copied at different sites in southern and central Gaul, and some of those eventually developed into important production sites of *sigillata* themselves. As a consequence, the archaeological signature of *sigillata* production has been cast in a bipolar mould: on the one hand, the 'local' imitations, on the other hand, the 'global' real *sigillata*.

Within traditional *sigillata* scholarship, two narratives have been forwarded to account for this duality. Firstly, a broadly evolutionary paradigm inscribes the phenomenon on a linear, teleological scale of development, sometimes even associated with a value judgment. Criteria of technological superiority (Desbat 2001), ethnicity of potters (Wells 1990), and formal resemblance (Bémont 1990) are maintained to distinguish the real *sigillata* from the imitations. Picon (2002) has developed the second paradigm, largely in an attempt to counter the previous

tendency. His is a model of costs and markets, according to which *sigillata* production should be categorised based on the technological criterion of mode A (reducing atmosphere, 'imitation') versus mode C (oxidizing atmosphere, 'real *sigillata*') firing. Moreover, these different sets of production should not be considered phases in a linear evolutionary development, but denote opportunistic alignment of technology with the economic situation. The argument runs as follows: mode C production was essentially a more expensive choice demanding higher investment, and would only have been viable in the case of guaranteed massive long-distance export; else the cheaper mode A production would have suited local and regional demand. To the extent that mode C *sigillata* equals a higher quality product, only long-distance consumers (thought to be primarily the Roman army) are granted the agency of having a critical preference of taste feeding back into the technological choices.

Without entering into the detail of those traditional models, it is important to highlight their major shared deficiency which impinges on the present research, namely that they conceive of the existence of a dualist local/global reality as a given. Instead, we should try to account for *how* scale was realized through contingent, world-building practices. Can we thus find a way to preserve the importance of scale by reformulating it as a dynamic notion rather than a static category, or, in other words, without fitting examples into a predefined narrative of 'local' and 'global' forces?

The potential of Actor-Network-Theory

This paper argues that so-called Actor-Network-Theory (hereafter ANT) is able to provide a theoretically solid way out of these issues. As it is an approach with considerable potential, but also with considerable problems—especially if applied to archaeology—the focus will be on the single issue of how ANT mediates the local/global paradox.

ANT, originating in science and technology studies, participates in the recent attempts in material culture studies to move beyond the modernist object/subject or nature/society dichotomy (Hicks 2010). To do so, it places all entities—called actants—on the same ontological footing, and refuses to decide *a priori* what kind of actants will be the active forces in an analysis (Latour 2005). This is combined with a claim of radical relationality, whereby actants are entirely defined by their relations and considered to have agency only by virtue of the effects they entail rather than by any kind of moral virtue. Such an ontological baseline leads to a democracy of utterly concrete actors, encapsulated in contingent actor-networks, which can be humans, objects, but also thoughts, concepts, dreams; as long as they have an effect. Importantly, there is no place left for any notion of essence or substance superseding the concreteness.

Let us now return to the local/global paradox, for which purpose ANT's most important concept is the so-called black box. Black-boxing is the process whereby any contingent actor-network becomes so firmly entrenched in daily routine that its contents is taken for granted, and that it comes to be considered as a single actant rather than a set of associations and branches. A black box can exist at any level, from the UK to the London underground to a computer, the latter being one of the most eloquent examples. What we call a computer is made up of millions of parts, all developed in separate places by separate persons, machines and technologies, all of which have been assembled to become a hybrid thing, operating at a certain moment in a certain place. It has become a black box, which can be used in a straightforward way, without any concern for anything but its in- and output. However, if any actant in its constituent actor-network fails, the black box disappears and the computer again

becomes a heterogeneous assemblage of materials, formulas, handiness, physical laws, financing and so on. As such, black boxes play a focal role in ANT's approach to scale, allowing mixing and matching across scales, by their nature as switching devices between the absent and the present (Callon and Law 2004).

Moreover, ANT takes seriously the impossibility of analysing either end of a traditional scalar continuum. When considering a 'local' scene, one is invariably drawn to the presumed existence of a 'global' context, because in each 'face-to-face' interaction, numerous associations translate action directly or indirectly across archaeology's typical temporal and/or spatial scales. For instance, this paper has to be seen within the context of TRAC, but also of scholarship on ANT, and of *sigillata* studies. On the other hand, since a 'global' context invariably proves too abstract to grasp, action is redirected to more 'local' interactions. Indeed, if one tries to pinpoint the TRAC phenomenon, one will end up with a list of the participants, the papers, the conference venue, the proceedings, and so on.

The main lesson to be retained from this theoretical excursus is not to conceive of the local and the global as static categories, but to ask how they were created and maintained. This implies that *sigillata* is *a priori* neither local ('imitation *sigillata*') nor global ('real *sigillata*'). Rather, ANT dictates that analysis should shift from a preoccupation with labelling and categories to a consideration of practice, to examine how the practice of *sigillata* production was both the same and different at different times and places, how these notions of similarity and difference were enacted and maintained, and to highlight the input of effort by all actors involved.

Modelling the encounter between knowledge systems

Two major problems arise now. Firstly, both the works of ANT's spokespersons, and the few attempts at archaeological application so far (Shanks 2007; Knappett and Malafouris 2008; Webmoor and Witmore 2008) are pitched at an abstract level, and offer very little clues on how to carry forward ANT's principles in actual archaeological practice. Secondly, strict relationality—by which actors are fully defined by their relations—is not a tenable position for archaeology, since this would entail the impossibility of identifying patterns, and a neglect of material properties (Ingold 2007). Although full treatment of these issues exceeds the scope of this paper, it is important to realize that creative and flexible model building is needed to make ANT work for archaeology.

Firstly, the notion of a knowledge system will be taken to refer to an actor-network, with the ontological implications this entails—embracing material, social, political, economic, and other chains of reference. As an entrance point to access past knowledge systems, this paper adopts the notion of technological choices, and their social embeddedness (Lemonnier 1993). It is important to emphasize that technological 'choices' are not by definition exclusively associated with a paradigm of free will, rationality or conscious action (Sillar and Tite 2000). Rather, they denote a certain way of doing, of going about routine activities. Furthermore, the notion of 'technological choice' implies the existence of alternative ways of doing, even though these need not necessarily have been known, let alone consciously weighed. Variation will to a certain degree be tolerated within an existing web of social and material relations, or, in other words, within the actor-network of an existing knowledge system.

The analytical focus of these technological choices has to be on the contingent nature of specific actions rather than on generic activity labels. For instance, the significance of the activity of 'firing in a kiln' will only appear in its relational instantiation, for instance 'firing at

a constant temperature of 1050°C in an oxidizing kiln atmosphere,' as contrasted to 'firing at variable temperatures between 800 and 1000°C in a reducing kiln atmosphere.' Similar arguments have been made with regard to studies of motor development and skills, which demonstrated 'the necessity of breaking down technological activities to physical performance 'chunks' as opposed to conceptually unified activities' (Loney 2007: 188). As to the question of how deep-rooted individual technological choices were in a certain knowledge system, ANT is difficult to reconcile with van der Leeuw's (1993) model of cross-culturally valid degrees of embeddedness of technological choices in pottery production. According to van der Leeuw, there is a hierarchy in the likeliness of technological choices to be resistant to change. His categorization runs from 'conceptual anchors' (*e.g.* the conceptualization of the entities and sequence of a vessel, for instance which part has to be formed first), over 'executive functions' (*e.g.* the practical means and tools used for rotating and supporting the vessel), to easily modifiable choices (*e.g.* raw materials). This research does not disagree with van der Leeuw's categorization as such; the observation that some choices and practices are largely unconscious while others are potentially open to manipulation is a valid one. What it does question, however—from the point of view of ANT—is the cross-cultural validity of the contents of this categorization. It may well be that the use of certain raw materials proves to be the most deeply rooted technological choice in a certain knowledge system of ceramics production, while the method of forming can be altered without fundamentally shuffling the associations within this knowledge system. This will have to be investigated for each contingent articulation.

Secondly, a fruitful combination with Heidegger's tool analysis is possible. Heidegger theorized how our everyday dealing with things is prior to any conscious cognitive act (Harman 2002; Olsen 2010). It consists of using things to accomplish some purpose, 'in order to' do something. In this routine engagement with the world, things are *zuhanden* or ready-to-hand, or, in ANT terms, they are black-boxed, seen as a single actant. Their chains of reference, or their actor-networks, are rendered invisible by practical knowledge. This occurs when the knowledge system of *sigillata* production crystallizes and becomes a black box, or a category whose contents does not need to be rendered explicit in order to be understood. However, when an interruption occurs, we distance ourselves discursively from things, which then feature in another mode, *vorhanden*, or present-at-hand. This is akin to a black box no longer being taken for granted, and its constituent actor-networks being made visible, as in the example of the computer. With regard to the knowledge system of *sigillata* production, once opened up, its different embedded technological choices are rendered discursive and contestable again, and modifications of the relations are needed to reach a renewed state of compatibility between the actors in the knowledge system, so as to allow for black-boxing.

Heidegger's tool analysis tends to be interpreted as applicable only to tools *sensu stricto*: hammers, knives, chairs etc. However, in line with the material turn in social sciences in which ANT takes part, Graham Harman (2002) has argued that traditionally too great a focus is placed upon human action and morality in interpretations of Heidegger's writings, not in the least by Heidegger himself. It thus makes sense to expand the play of *vorhanden* and *zuhanden* to all entities—actants in the Actor-Network-Theory vocabulary. These twin concepts then come to denote different modes of being, on an ontological level, in a close parallel to ANT's most basic principles. Such a reading of Heidegger's tool analysis goes further than ANT in that it posits the black box as an ontological mode of being (*zuhanden*) of every actant.

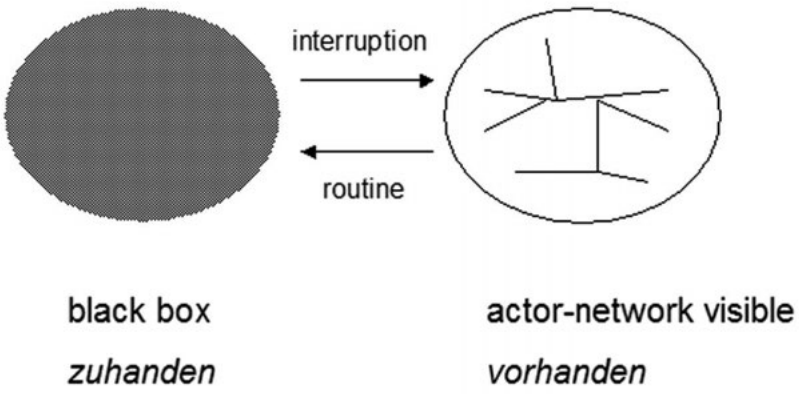

Figure 1: Black-boxing of knowledge systems

The interruption triggering the transition from the ready-to-hand to the present-at-hand mode—graphically represented in Fig. 1—can have various guises: a breakdown, something missing or in the wrong place, the depletion of resources, the salient properties of things themselves – all phenomena which can be identified archaeologically. Another triggering event can be an encounter with a different knowledge system. Fig. 2 serves as a visual aid for the process described hereafter. The encounter serves to bring to light the constituent networks of both previously black-boxed systems. This opens up scope for discursive choices, enacted in new relations within or between the different networks of knowledge. Routine engagement with the modified actor-network will eventually lead to it being taken for granted again, again taking the guise of a single actant. This implies that neither of the actor-networks remained unaltered, since their relations were changed, a conceptualization which reverberates well with current insights in postcolonial theory. The model of knowledge systems can indeed potentially provide a structural backbone for the interpretive framework of hybridity as defined by Homi Bhabha (1994). In this regard, it is important to realize that different knowledge systems do not come with equal possibilities of 'sedimentation,' or, in other words, of being black-boxed.

Approaching knowledge systems in sigillata production

To illustrate this approach, the present paper will sketch a brief example of how this would work for the choice of clays in the different fabrics used throughout the production of *terra sigillata* at Lezoux (central Gaul, near present-day Clermont Ferrand (Puy-de-Dôme)). Lezoux was one of the major production centres of *terra sigillata* in central Gaul, having exported significant amounts of finewares, especially in the second century A.D. This example will follow the pathway of one particular technological choice throughout its networks, and trace how this affected the knowledge systems involved.

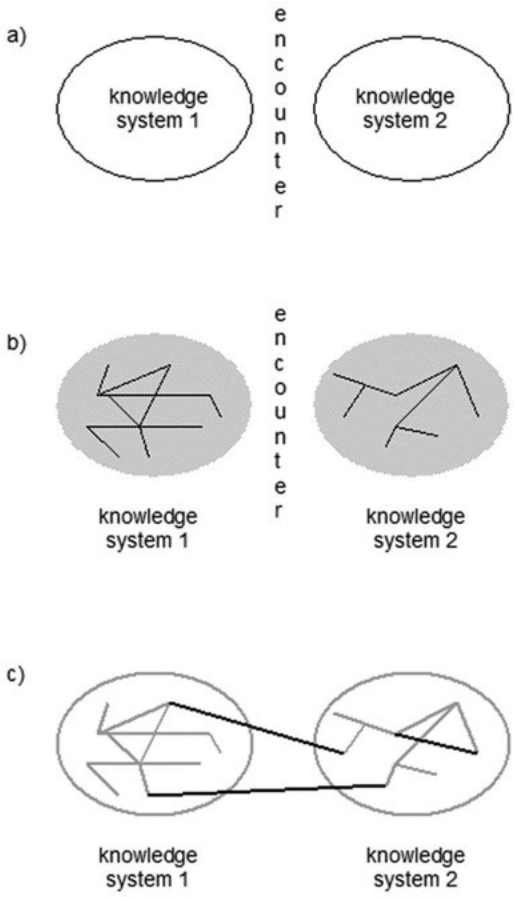

Figure 2: a) Encounter between knowledge systems, b) Opening up of black boxes, c) New relations within or between knowledge systems

From around A.D. 10 onwards, local imitation of Italian *sigillata* forms is attested at Lezoux (Brulet, Vilvorder and Delage 2010: 108). Instead of meddling with the debate on terminology concerning the term 'imitation' (Wells 1990; Picon 2002), the interest of this case study lies in accessing the practices emanating from and making up the knowledge system involved in this early phase. At this point, the fabrics used were non-calcareous (*i.e.* contain generally less than 2% and certainly less than 4% CaO (Picon and Vertet 1970; Picon, Vichy and Meille 1971; Picon 1973)), with among others a notable component of mica inclusions. This corresponds to the chemical signatures of fabrics across the range of locally crafted ceramic types, be they coarse or fine wares. However, this is also in contrast to the contemporary productions of Italian *sigillata*, which were at least known through imports, and whose composition is generally calcareous (*i.e.* roughly between 9 and 11% CaO). Moreover, the slip was not sintered—again in contrast to the Italian products—and the vessels were

probably fired in a reducing atmosphere, with temperatures not exceeding 900–950 °C (Picon 1973). Contact with sufficient fresh air in the post-firing phase would provide an oxidizing cooling atmosphere, and allow for a red exterior colour, probably mimicking Italian *sigillata*. As such, the appearance of the imported *sigillata* vessels was reproduced more or less faithfully, whereas the choices made (form, colour) did not require the black box of the anchored knowledge system to be opened up. Rather, these choices could be implemented in a non-discursive way, entailing only minor alterations of the existing *chaîne opératoire*, and by extension of its social embeddedness. New forms could be learnt by trial and error, and passed on in a similar practice of teaching (Wallaert-Pêtre 2001) as the existing repertoire, which was itself subject to continuous change.

During the Flavian period, towards the latter half of the first century A.D., experiments were made at Lezoux within the parameters set by the Italian *sigillata* production. The fabric was now calcareous, the slip sintered, and the vessels fired in an oxidizing atmosphere (Picon's (1973) mode C). Nevertheless, this transition does not appear to have been instantaneous. First, the technique of firing and cooling in an oxidizing atmosphere does not seem to be perfectly mastered initially, to which partially sintered examples testify (Brulet, Vilvorder and Delage 2010: 115; Vertet 1967: 257). Secondly, the anchored *chaîne opératoire* of choices of clays and firing persisted, not only with regard to other fine wares (Brulet, Vilvorder and Delage 2010: 324–26) and coarse wares (Picon, Vichy and Meille 1971), but also to *sigillata*, with a similar repertoire of forms as the 'new' strand. Consequently, until around A.D. 140, production of *terra sigillata* at Lezoux seems to have witnessed a cohabitation of different *chaînes opératoires*. Any answer to the question of what exactly caused this progressive switch still belongs to the realm of speculation. In any case, highly complex chains of 'wandering potters' (Hartley 1977; Vernhet 1967: 260–261), mutual contacts between different production centres, economical, military (Delage 1998: 284) and political considerations need to be borne in mind. Moreover, it is as yet not possible to discern whether this technical transition occurred within existing workshops, although current evidence seems to point towards a spatial relocation of production activity within Lezoux (Bet 1988; Delage 1998: 281). Picon for instance recognizes the first partly successful attempts at producing a sintered slip, but argues that these are to be attributed to a relatively short time span (Picon and Vertet 1970; Picon 1973). Consequently, he does not believe that the switch in firing mode could have been a process of trial and error, to be framed in an evolutionary narrative. Both traditional strands of *sigillata* scholarship sketched in the introduction seem to be mesmerised by a limited set of interests, among which a quest for origins (of potters, of investment, of technological know-how) looms large.

Approaching this phenomenon from the perspective of knowledge systems can renew these dead-end debates, by giving us some idea of the repercussions for the practices involved. As Olsen recently remarked, a commitment to ANT's principles 'does away with the origin-of-action trajectory' (Olsen 2010: 142), by focusing on the question *how* something happened rather than *who* did it. We can assume that the phenomenon triggering the 'opening up' of the black box in this case would have been either a mismatch between the non-discursive knowledge system and the changing external conditions, or the encounter with a different knowledge system—be it through direct or indirect influence. Indeed, there does not appear to have been an internal incentive to introducing profound changes to the existing knowledge system, which had been producing vessels with a similar appearance and performance as the Italian *sigillata* imports, within an already embodied framework. In any case, the result was an

objectification of the constituent actor-networks of both the 'existing' and the 'new' knowledge systems, rendering the technological choices discursive.

One discursive choice was that of clay procurement. Picon has shown that the distinction between calcareous and non-calcareous clays would have been either visible, or in any case obvious through some simple trials (Picon and Vertet 1970; Picon and Vichy 1974). As such, the change from one type of raw material to the other would have entailed both a conceptual (different categorization of 'good' and 'bad' clays for *sigillata*) and a bodily (different clay beds, routes, preparation, *etc.*) reformulation of practice. The deliberate, '*vorhanden*' nature of this choice is highlighted by the observation that the region of Lezoux yielded both calcareous and non-calcareous clay beds. Moreover, an entire new kiln technology was needed to ensure an oxidizing firing atmosphere. Consequently, higher and more consistent temperatures needed to be reached—around 1050° C—in order for the slip to be even and sintered (Picon 1973). It is a commonplace observation to point towards the financial investments required to build and fuel new kilns (although very little structural evidence is available, experimental archaeology goes some way to simulating past choices (Fernandes, Fernandes and de Casas 2005)) and to transmit knowledge, but also to gain access to new clay beds (Dannell 2002). As such, we can agree with Picon that the two knowledge systems would be tied into different economic relations (Picon 2002). However, the model of knowledge systems urges for a contextual and relational exploration of the different entanglements of these technological choices, and warns against the assumption of a dominant one-to-one correlation between *chaîne opératoire* and economic opportunity. Indeed, so far this assumed financial investment has not been correlated with practices, routines, and knowledge systems. ANT shifts the analytical focus from static labelling to dynamic practice, from abstract structural forces (evolution, economy) to real-life multifarious actors (clays, kilns, potters). Even though the exact nature of all actors involved cannot be archaeologically pinpointed, ANT introduces a general sense of complexity, thus countering simplistic essentialising readings with universal claims (be they linear evolutionary phases or formalist economic laws).

After around A.D. 140, the resulting knowledge system of *sigillata* production was again so firmly grounded in embodied practices at Lezoux, that its relations became black-boxed. ANT emphasizes that practices may be extended, but only with considerable effort, so as to slowly alter the entire actor-network. To reach a black-boxed, *zuhanden* or global category, considerable effort is needed to align the actors within the knowledge system, to make different sets of relational entanglements compatible. Black-boxing is thus aided by the phenomenon of standardization, by which some pathways through the knowledge system are preferred to others, and some connections within the actor-network become more defined and straightforward than others. The Latourean perspective generally claims that once a significant effort has been made to routinize a certain pathway, the 'costs' of altering the entire actor-network can be too high, and relative stability can be realized. Others, such as John Law (Law 2004), warn that continuous re-enactment of the black-boxed relations through practice is necessary to maintain the effect of black-boxing. Crucially, no actor or knowledge system is *essentially* local or global; rather, for some their contingently situated anchorage is visible, while for others, this relational embeddedness recedes into the background, freeing them to circulate more widely. Minor changes and choices in the technological choices were still made on a daily basis after the black-boxing of the knowledge system of *sigillata* production, but these were articulated without fundamentally shuffling the actor-networks, until the fourth century A.D. But that is a story for another paper.

Problems and prospects

This brief case study has indicated a general direction in which ANT's archaeological potential can be carried forward, helping archaeology move beyond static categorizations and dichotomies such as the vocabulary underlying the local/global paradox. A question to be considered by further research is how deep-rooted the choice of clay in the existing knowledge system at Lezoux before the late second century A.D. actually was, and how it related to other elements such as form and function of the vessels? As explained above, the principles of ANT invalidate van der Leeuw's (1993) model of cross-culturally valid degrees of embeddedness of technological choices in pottery production. In terms of the example of the Lezoux *sigillata* production, it can provisionally be argued that the choice of calcareous clay reorganized the existing knowledge system of production, and was as such more far-reaching than the previous choice of mimicking Italian forms. The latter seems not to have been anchored in a unique web of knowledge, since it crossed the different fabrics in use at Lezoux, where similar forms are attested in the same refuse dumps, executed both in coarse wares and in 'calcareous' *sigillata* (Picon, Vichy and Meille 1971: 197). As to consumption, however, which was not explicitly considered in the example, it might well be that form proves to be the element with the most far-reaching relations, impinging for instance on dining practices (Hawthorne 1998). A different picture will appear when the red colour is considered, which appears to be part of a more restricted set of associations than form, but is still visually realized in both calcareous and non-calcareous fabrics. An important asset of the framework presented in this paper is that it can guide the approach to practices of consumption as well as production.

Furthermore, although theoretically the net should be cast as wide as possible, a certain definition of analytical scale will inevitably come into play. The nested nature of different actor-networks will obviously be all the more convincing if different analytical scales can be taken into account. To do so, different case studies will need to be approached through the lens of knowledge systems to reassemble (Latour 2005) how black boxes were created, opened up, and translated.

Finally, ANT—and, by extension the model of knowledge systems—entails a particular stance towards the role of explanation. As such, 'to explain is not a mysterious cognitive feat, but a very practical world-building enterprise that consists in connecting entities with other entities, that is, in tracing a network' (Latour 2005: 103). In archaeology, however, 'description' should not be read as a plea for a return towards the culture-historical charting of typologies. Rather, it is a way to avoid projecting backwards the resulting stability of a complex process of the creation of black boxes, and thus, scale. The approach inspired by ANT followed in this paper thus aids the creation of new questions, by employing a new analytical framework, but does not in itself offer an interpretation. The latter will have to be developed through an eclectic gathering of relevant insights. As hinted at earlier, the connection with the interpretive framework of hybridity as developed by Homi Bhabha (1994) needs to be developed in further detail in this regard, which will in turn enable more specific questions to be raised about interacting people in a contingent historical matrix.

Conclusion

This paper has discussed how ANT allows us to deal with the continuous oscillating movement between 'global' and 'local' perspectives—or between 'homogeneity' and 'heterogeneity' in archaeological analyses, especially of the Roman period. The aim was twofold: to

problematize the use of local/global labels, and to introduce the relevant concepts offered by ANT to bypass this problem. A brief case study considering the practice of using clay in the production of *terra sigillata* at Lezoux has shown how these theoretical contemplations can actually renew our approach to some well-rehearsed questions. Tracing knowledge systems through technological choices provides a way of moving beyond the *a priori* categorizations that have long paralysed debates in Roman archaeology. The ontological starting point of ANT does however not exclude topics such as scale and power relations from the analysis, but opens up this analysis to potentially include a much wider array of actors, in a more contingent matrix. This is not to pretend that ANT can generate new knowledge about the past, since it is still the archaeologists' job to make a theory work for the specific issue at hand. What it can do, however, is urge the analyst to ask new questions, which will then allow either to picture old data in a new frame, or to search for new data. Throughout this process, an active re-modelling of theory will always be paramount.

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