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## Bricolage – Theory and Practice

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### translation from the French: Jennifer Higgins

When Xenakis creates compositional implementations of theoretical models, he frequently “intervenes” and introduces many “discrepancies”. All Xenakis specialists, when comparing the theoretical models with the scores, have noted that there are important “gaps” between the data predicted by the former and the data found in the latter. In other words, the implementations are not mechanical, but are mediated through manual interventions. Sometimes, these interventions affect not only the musical implementation of the formal system (the theoretical model), but also its construction.

Henri Barraud was one of the first commentators to point out that Xenakis was in the habit of transforming the results of his calculations, and in the 1960s, presumably in an attempt to legitimise the use of computers, he made the following observation regarding the works born of the computer programme *ST*: “[Xenakis] retains what needs to be retained and modifies what he feels needs to be modified, grafting his own choices (in which his taste and sensibility play a role) onto the machine’s choices [...] We can conclude that this way of working allows the musician’s personality the freedom to emerge” (H. Barraud, 1968, 195). However, such a statement would risk attracting the criticism of Pierre Boulez (1989, 378, our translation), who, without referring directly to Xenakis, states that “correcting” the system equates to seeing it as “an aid, a crutch, a stimulant for the imagination, which, without such a system, would be unable to create a real conception of a dream world: I choose, therefore I am; I only invented the system to provide me with a certain kind of material, and I have a licence to deform it according to what I judge to be right, beautiful or necessary”.

One source of discrepancies between composition and model shows that the mismatch is not always a result of “choice”: mistakes. In formalized music, mistakes are common and can be explained in at least two ways (apart from simple printing errors): mistakes in the calculations, and mistakes in the musical transcription, that is, the passage from one system of representation to another, for example from graph paper to musical score. Another major source of discrepancies is the need to adapt calculations to a musical situation, to the musical material, or to an instrumentalist’s technical capacities. One final source is the conscious choices and preferences that formed part of the process. In practice, it is often difficult to distinguish between these multiple sources. Xenakis rarely discussed the issue, but we do have this comment from an interview with Jan Vriend (1981, 44), relating to *Nomos Alpha*:

“a) in the heat of the action I made slips of the pen which I discovered only too late, after publication [...]; b) I sometimes change details because they appear to me more interesting for the ear and c) I make theoretic errors which entail errors in the details. I have done everything possible to be consistent in what I write, but I don't always succeed completely (...) I believe, however, that a bi-univocal exactness *realisation* <---> *theory* may be sometimes non-absolute”.

Analysis of *Nomos Alpha*, one of the most formalized works, by several generations of Xenakis specialists, has come to symbolise the study of these discrepancies: cf. Vandenberg 1968, Delio 1980, Vriend 1982, Solomos 1993 and 1997, Schaub 2014. My own detailed analysis shows that although the incidence of discrepancies is sometimes extremely high (as is the case for the first version of the piece, due to a significant error in its theoretical construction) the overall incidence for all formalized elements in the whole piece is only 18.5%.

This figure shows that while there are a significant number of discrepancies, the theoretical systems are not completely torn apart. This is why, for Xenakis, the practical implementation of theoretical systems is an important moment – an autonomous moment, we might say – in the composition process. In this respect, Xenakis's approach differs from an algorithmic method, which is a key difference between Xenakis and Pierre Barbaud, who also pioneered the use of computers in composition. Some post-Xenakis composers who have also dealt with the question of formalization, and who are in line with Xenakis in believing that formalization need not be applied mechanically, have theorized the notion of *manual interventions*. In an important article on formalization, Horacio Vaggione (1996, 268) says: "Science, regardless of its deductive or empirical nature, tends at least ideally towards an equivalence of process and result. Music shows no tendency of this kind, for the rigor of the generative process does not guarantee the musical coherence of the work". This is why Vaggione recommends interaction between the *formal* and the *informal*, recalling Adorno's 1961's article, "Vers une musique informelle", which criticised the serialist thought of the 1950s, which tended towards automatic calculation.

I propose using the term *bricolage* to denote these manual interventions. It's a word that cannot be exactly translated into English, but is close in meaning to 'do-it-yourself', and was developed as a concept by Claude Lévi-Strauss in *La Pensée sauvage (The Savage Mind)*. As we know, Lévi-Strauss conceives the magical thinking of scientific thought not as two stages of evolution, but as "two parallel modes of acquiring knowledge" (Lévi-Strauss 1966, 13). The proof, he says, is that "there still exists among ourselves an activity which on the technical plane gives us quite a good understanding of what a science we prefer to call 'prior' rather than 'primitive', could have been on the plane of speculation. This is what is commonly called 'bricolage' in French" (Lévi-Strauss 1966, 16). What is peculiar to bricolage, as opposed to rational thought, is the nature of its tools and the way they work:

The "bricoleur" is adept at performing a large number of diverse tasks; but, unlike the engineer, he does not subordinate each of them to the availability of raw materials and tools conceived and procured for the purpose of the project. His universe of instruments is closed and the rules of his game are always to make do with "whatever is at hand", that is to say with a set of tools and materials which is always finite and is also heterogeneous (Lévi-Strauss 1966, 17).

The two characteristics described here are particularly applicable to the *bricolage* practiced by Xenakis. On the one hand, the tools are "heterogeneous": this is confirmed when we examine the way in which Xenakis constructed any given theoretical system. On the other hand, the *bricoleur's* toolkit is limited. This is not true if we are thinking of Xenakis's theoretical systems as a whole – he always tried to extend this universe, using new theories. But it is true if we limit ourselves to one of his specific formal systems; if, during its musical implementation, he realizes that it is not working as

he wishes, he does not try to find another more suitable instrument, or to correct the system: he is working with “whatever is at hand”.

Lévi-Strauss tells us that, given these two characteristics, the result of *bricolage* “will always be a compromise between the structure of the instrumental set and that of the project. Once it materializes the project will therefore inevitably be at a remove from the initial aim (which was moreover a mere sketch), a phenomenon which the surrealists have felicitously called ‘objective hazard’” (Lévi-Strauss 1966, 21). This is very true of Xenakis’s manual interventions. Due to the discrepancies introduced by the interventions, the implementation of a theoretical system does not mean that the resulting work is an illustration of the system: *Nomos Alpha* is not an illustration of group theory, *Herma* is not an illustration of symbolic logic, *Horos* is not an illustration of cellular automata, and so on. Theory and practice are two complementary, but independent, stages: the musical work is *autonomous*.

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