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AN ANALYSIS OF THE USE OF THE TERM 'MODEL' IN SOME OF LÉVI-STRAUSS'S WORKS*

A second revised edition of *Les Structures élémentaires de la parenté* by Claude Lévi-Strauss has recently been published in France, and an English translation of this work will soon be available. Since social scientists seem to be increasingly mesmerized by Lévi-Strauss, it would appear well worth while to consider and discuss some of the salient aspects of his thought. Our aim is to deal with a somewhat formal but nonetheless basic problem relating to his writings, namely the problem of what exactly Lévi-Strauss is referring to when he speaks of 'elementary structures'. According to Lévi-Strauss himself, he is concerned with models rather than with empirical reality (1965: 17; cf. 1967: xix-xx).

Therefore, in order to understand fully the meaning of his arguments, we must investigate and if possible try to establish the precise content of the word model as he uses it in those of his publications in which it plays an important role.

The subject of this paper concerns two articles by Lévi-Strauss: 'La Notion de Structure en Ethnologie' (1958) and 'Critères Scientifiques dans les Disciplines Sociales et Humaines' (1966), where the following table is presented in order to establish the main differences among four branches of the social sciences:

	Histoire	Socio- logie	Ethno- graphie	Ethno- 'logie
observation empirique/ construction de modèles	+	—	+	—
modèles mécaniques/ modèles statistiques	—	—	+	+

The sign + corresponds to the first term of each opposition and the sign — to the second.

* When requested, Professor Lévi-Strauss declined to give any comment (*Note of the Editor*).

In order to understand the implications of such a definition, let us start by clarifying the dimensions under which the table is constructed. There is, first of all, a clearer way of presenting the same table, i.e., in the form of a twofold table where the content is the actual subject itself and not a set of signs:

	observation empirique	construction de modèles
modèles mécaniques	Ethnographie	Ethnologie
modèles statistiques	Histoire	Sociologie

One immediate objection to this table is quite obvious: i.e. the second pair of oppositions refers to only one of the first pair, and consequently, can be cross-cut only with this one. Evidently, sciences that devote themselves to empirical observation and do not construct models can hardly be classified with reference to the kind of models they construct.

I

Let us consider the second pair. First of all, the word 'model' must be defined. There is no trace of a definition in either of the two articles by Lévi-Strauss. Let us take one possible meaning, one currently used in modern logic. According to this, a model is an interpretation of an axiomatic system, i.e. a set of propositions connected logically, where the logical terms are replaced by empirical ones.¹ In other words, a *model* is what we generally call a *theory*: a set of hypotheses whose validity depends on empirical confirmation. Therefore, a model is not an analytical construct but a synthetic one.

What does 'mechanical' and 'statistical' mean in relation to this notion of 'model'?

According to Lévi-Strauss, a *mechanical model* is a model constructed 'à l'échelle' of the phenomenon (1958: 311; cf. 1966: 198). As he gives us no further hint of what he means by that, let us suppose that 'à l'échelle' of the phenomenon means that the relationship between

¹ See Coombs, Reiffe and Thrall (1960: 20).

the terms of the model and those of reality are bi-univocal.² That is to say, when a mechanical model can be constructed, the basic assumption the observer has in mind is that there is a complete isomorphism between his model and the particular set of elements he is abstracting from the real world.

This is one of the possible translations of 'mechanical' in terms of the *elements* of the axioms, propositions or hypotheses implied in the model.³

Another translation could refer to the specification of the *nexus* (causal or other) established between any two terms in the hypotheses or propositions of the model. In this sense, 'mechanical' could mean *deterministic*, in which case it could refer to the occurrence of any causal relationship between two events or terms. In other words, if the model is 'mechanical' as opposed to 'statistical', this is likely to mean that the probability of finding any relationship between terms established by hypothesis is $= 1$.

According to what we have defined so far, the first interpretation of the word 'mechanical' corresponds to a *description*, a codified construct made up of whatever elements (figures, words, letters) and which is supposed to correspond to 'reality' in the sense that any one element (event, fact or unit) has a correlative element in what is called the 'model'.

The second interpretation of 'mechanical' corresponds to a *set of hypotheses* (or propositions) in which any nexus is held to be deterministic. The general expression of any such hypotheses could be $A \rightarrow B$, in which $\rightarrow$ could be replaced by logical connectives such as 'implies'. So that, given certain specified conditions $C_1, C_2, C_3 \dots C_n$, any element of class A will also possess the characteristic that defines class B (in other words, it will belong to both class A and class B).

The criterion to be applied in order to know whether one is dealing with a scientific hypothesis is that there must exist a logical possibility for an element of the class A not to belong to class B, provided always that the conditions $C_1, C_2, C_3 \dots C_n$ are present, while the validity

² In Lévi-Strauss (1958b: 311) the term *scale* is related also to 'statistical models'; " 'modèle statistique', celui dont les éléments sont à une échelle différent". This use of the term *scale* seems to be rather odd, because in any of its common uses it connotes nothing other than bi-univocal relationships between two codes.

³ This is the interpretation we find in an article by Dan Sperber (1967: 133): "le modèle mécanique est à la même échelle que le système...; c'est-à-dire qu'à un élément du modèle correspond un élément du système et vice versa".

of the hypothesis would be destroyed by any empirical evidence of such a logical possibility.

In this context, let us try to establish what a '*statistical model*' might be.

According to the first interpretation of the 'mechanical model' (in which it is considered a descriptive construct isomorphic to 'reality') and supposing that 'statistical' means 'not mechanical', a statistical model will be a construct in which there is a given probability that any particular element corresponds or not to an element of the set of 'isolates from reality' that the observer is describing.

In the second meaning of 'mechanical', the opposite term 'statistical' will be represented by a set of hypotheses with a nexus establishing that given a certain class of A elements, *some of them*, under given conditions $C_1, C_2, C_3 \dots C_n$, will also have the characteristics of class B.

We are once again concerned with *empirical* (i.e. synthetic) propositions, whose validity will depend on the existence of sets of A elements whereof a proportion is going to belong to class B also (the required number of A could be established with regard to 'any N_A '). Moreover, that proportion must be found to correspond to the one predicted by hypothesis.

The above conception is known as the 'intrinsic probability' of a hypothesis ⁴ and, to express it in another way, it refers to a nexus establishing the relative frequency with which B elements ought to be found in a set of A elements. A singular proposition referring to any particular A and establishing its probability of being also B, is merely an extrapolation of that relative frequency of B in a set of A elements.

In these terms, the difference between the first kind of models (with a deterministic nexus) and the second (with a probabilistic nexus) is that in the first all the relevant C_n are supposed to be known, and in the second case there are a certain number of C_n that are not known and cannot be established, so that they do not permit a definition of a complete class of elements corresponding to the relationship established by hypothesis.

What I am trying to emphasize with this definition of 'statistical nexus' is that the words 'probability', 'statistical' or 'stochastic' do not ever refer to an inherent characteristic of any set of elements, but to

⁴ As opposed to 'extrinsic probability' which is related to the degree of confirmation of a hypothesis.

the fact that certain conditions required for the establishment of a deterministic nexus in a hypothesis are absent or unknown.⁵

II

So far, we have described the two kinds of models that Lévi-Strauss presents with two different notions of the word 'model'. The first one corresponds to what is generally considered a 'description', and it is related to *observation*, in so far as observation is concerned with the categorization of facts by an observer. The second one relates to *theory* and presupposes a preliminary categorization of the facts to be observed. It consists of the specification of a set of axiomatically related hypotheses.

It is not at all clear from the article of Lévi-Strauss which of these meanings of 'model' is involved. It would appear that when he talks about models, he could have three quite different things in mind:

- (a) the first meaning refers to the definition of the subject of the social sciences and divides into 'mechanical' and 'statistical' models;
- (b) the second meaning would appear to refer to two stages in scientific knowledge and is concerned both with models related to observation and with models related to experimentation:

"L'observation des faits, et l'élaboration des méthodes permettant de les utiliser pour construire des modèles, ne se confondent jamais avec l'expérimentation au moyen des modèles eux-mêmes." (Lévi-Strauss, 1958 b: 307);

- (c) the third one refers to the actors rather than to the observer and divides into 'conscious' and 'unconscious' models:

"Les modèles peuvent être conscients ou inconscients, selon le niveau où ils fonctionnent" (Lévi-Strauss, 1958 b: 308),

and he adds that "les modèles conscients" are those "qu'on appelle communément des 'normes'..."

Therefore, if marriage rules are given as examples of how mechanical or statistical models could be constructed (Lévi-Strauss, 1958 b: 311), social scientists are supposed to build up models whose composite parts are yet other models.

⁵ In Lévi-Strauss (1958 b: 314), there is another possible meaning of the words 'mechanical' and 'statistical' in relation to time (reversible and non-reversible time). I do not consider this meaning because it falls outside the limits of the subject under consideration and concerns specifically the relationships between History and Social Anthropology established by Lévi-Strauss (1962).

Is there any connection at all between 'models' and 'structures'? Are 'structures' the referents of 'models'? We find that this can hardly be so. Structures, says Lévi-Strauss (1958 b: 305) are models of a special kind. Once one has a model with the following characteristics, one can be sure that one is dealing with a structure:

- (i) it "exhibits the characteristics of a system. It is made up of several elements, none of which can undergo a change without effecting changes in all the other elements";
- (ii) "for any given model there should be a possibility of ordering a series of transformations resulting in a group of models of the same type";
- (iii) it is "possible to predict how the model will react if one or more of its elements are submitted to certain modifications";
- (iv) it "should be constituted so as to make immediately intelligible all the observed facts" (Lévi-Strauss, 1963: 279-280).

From these four characteristics one can derive that there is not only an epistemological confusion between 'models' and 'structures', but also between these concepts and the one of 'system'.

An ontological question can also be posed: *are models, and therefore structures, empty forms or are they various different sets of empirical referents that conform to certain patterns of organization?*

Since "la structure n'a pas de contenu distinct: elle est le contenu même, appréhendé dans une organisation logique conçue comme propriété du réel" (as we learn in Lévi-Strauss, 1960: 3), how can it be then that "le principe fondamental est que la notion de structure sociale ne se rapporte pas à la réalité empirique" (Lévi-Strauss, 1958 b: 305)?

Even if Lévi-Strauss's intention is to elucidate the meaning of the word 'structure', particularly in the articles we are discussing, and also in 'Les Limites de la Notion de Structure en Ethnologie' (1962), it seems to me that he does not go beyond what is said by Kroeber and which Lévi-Strauss himself quotes: "what 'structure' adds to the meaning of our phrase seems to be nothing, except to provoke a degree of pleasant puzzlement" (Kroeber, 1948: 325).

How can it be that 'structure' is "le contenu même" but at the same time "ne se rapporte pas à la réalité empirique"? How can it be that it is "le contenu même" and it is also "rather a method"? Lévi-Strauss, 1963: 279).

It seems to me that for Lévi-Strauss, the connotations of 'structure' (just as the connotations of 'model') summarize the sum total of 'scientific knowledge', i.e. empirical reality, conceptualization, analytical

units, codification, explanation, theory, models and validation. And therefore the connotations of 'structure' do not, in fact, add anything to the meaning of a statement.

One could add also, that what is meant by 'structuralism' is no more than an admonition not to treat any element out of context. It sounds like a rather useless piece of advice since it is hard to think of anyone trying to explain anything as an isolated element without any kind of system to support it.⁶

III

Up to this point, we have been concerned with the elucidation of the words 'model' and 'structure' as used by Lévi-Strauss in some of his works. It would be now useful to consider Lévi-Strauss's own anthropological examples of how the pair 'mechanical-statistical' models are to be applied. First of all, there is the example of suicide (Lévi-Strauss, 1958 b: 312) which he does not carry any further than Durkheim's treatment of the subject. Briefly, what he says is that a 'mechanical model' of suicide would consist of a description of the characteristics of the people who committed suicide, and a 'statistical model' of the frequency of suicide in different social contexts.

One comment on this example could be that the differences between two descriptions can hardly be seen in terms of 'probability', since a description cannot possibly be made in statistical terms. 'Frequency' has as univocal a relationship with events as personal characteristics. 'Statistical' is a concept that can hardly be related to descriptions. It is concerned with 'prediction', which is quite a different matter.

The same conclusions, and some others, can be derived from the example referring to 'marriage rules'. In primitive societies, he says, marriage rules can be represented by mechanical models

"calling for actual grouping of the individuals according to the kin or clan. No such distribution exists in our own society, where types of marriage are determined by the size of the primary and secondary groups to which prospective mates belong, social fluidity, amount of information, and the like. A satisfactory... attempt to formulate the invariants of our marriage system would therefore have to determine average values-thresholds; it would be a statistical model. There may be intermediate forms between these two. Such is the case in societies which (as even our own) have a mechanical model to determine prohibited marriages and rely on a statistical model for those which are permissible" (Lévi-Strauss, 1963: 283).

⁶ If, as Lévi-Strauss claims (1958 c: 354) the concept of 'structure' is very close to that of 'gestalt', structuralism could fairly be criticized much as E. H. Madden has criticized the Gestalt theory (E. H. Madden, 1953: 559-595).

Even if Lévi-Strauss does not say so explicitly, it is quite clear from this quotation, that he relates 'mechanical models' to 'elementary structures' and 'statistical models' to 'complex' ones. It would appear that the first task here is to determine what exactly is the referent of a structure (elementary or complex) and then to establish whether or not the models correspond to them.

When M. Godelier (1966:229-231), in an attempt to bring the thoughts of Lévi-Strauss and Marx together, deals with the question: "si, du modèle, la structure est la pertinence, à quoi renvoie le modèle?", he replies that "la dominante d'un système est et n'est que son invariant structural".

One can go on to ask: 'à quoi renvoie la dominante d'un système?' and 'à quoi renvoie l'invariant structural?'

It would seem, from Lévi-Strauss's quotation about marriage rules, that for him 'structure' leads to 'rules'. As in all of his analyses of kinship structures, Lévi-Strauss concerns himself with rules, and the problem facing us is that of elucidating what are the rules he is thinking of and which are their indicators.

In the preface to the second edition of *Les Structures élémentaires de la parenté* he makes it quite clear that 'elementary structures' are not to be confused with prescriptive systems, as Needham has interpreted them, mainly because he could not possibly devote such a big book to such a small number of cases (p. xviii). And also because "les notions de préférence et d'obligation . . . ne connotent pas des réalités sociales différentes" (p. xix).⁷

Thus, it is not possible to translate his own example of marriage rules, expressed by means of a mechanical model, into the rules inferred from a prescriptive terminology.

If he is not talking about kinship terminologies and, moreover, if prescription and preference can be included in the same category of phenomena, there are very different kinds of the so called 'rules' implicit in his examples. One could not possibly think that social anthropologists are concerned with mechanical models because their task is to deal with descriptions of crystallized systems, namely kinship terminologies, while it is up to the sociologists to construct statistical models because they are concerned with the prediction of individual behaviour within the framework of any kind of society.

Thus, where does the difference lie? Is it in any sense useful to put

⁷ See also Lévi-Strauss, 1965: 17-18.

into one and the same category of thought things as different as inferences of equations of kinship terminologies, inferences of average values of actual alliances, institutionalized laws, and expressions of what people within a society think about how things ought to be done?

If it is terminology that matters, any kinship system would be well represented as a 'mechanical model', because with any kind of terminology one cannot give anything but a description. From this point of view, the description of the Sarakatsani terminology would be as mechanical as that of any prescriptive one. One cannot do anything other than present each term one by one. The conclusions deriving from the relationship between terms lead to assumptions about how many choices one single individual has (if the terminology corresponds to the actual system of alliances) or could have had (if the terminology does not correspond with the actual alliances and one supposes that there was correspondence before).

If the actual alliances count, the process seems to be: (i) a description of the actual alliances, which in any case could be called 'statistical' (even if one is dealing with a large population and a sample is needed, because in this case the only probabilistic statements would refer to the relationship between the sample and the universe, but not to the description of what actually happens); and (ii) probabilistic inferences about the chances one individual in a defined social category has to marry any other equally defined individual. In this second step, any inference would be equally probabilistic, no matter what the characteristics of the kinship system inferred from the description of the actual alliances.

Thus, whether concerned with terminologies or with actual alliances, the observer cannot distinguish between different systems by means of the models employed. The nature of the constructs used depends on the kind of elements to which the units of these constructs refer, and specifically to the kind of relationship established between the units.

IV

Conclusions

- (i) *Models.* The concept of 'model' as used by Lévi-Strauss, does not refer to any particular stage in the process of scientific knowledge. Therefore, it does not constitute anything of distinctive analytical use in the study of social phenomena.

- (ii) *Models and Structure*. The concepts of 'model' and 'structure' are not clearly differentiated in the works of Lévi-Strauss. The concept of 'structure' does not give us a relevant clue to the understanding of sets of social facts. It seems to provide no more than yet another way of saying that the analytical units of any particular set of elements have no meaning if considered in isolation.
- (iii) *Models and the Social Sciences*. The concepts of 'mechanical' and 'statistical' models make some sense only if applied to the processes of 'description' and 'prediction'. In this case they do not seem to help us to distinguish one social science from another.
- (iv) *Models and Kinship*. 'Mechanical' and 'statistical' models are not good tools for an analysis of the different levels (terminology or actual alliances) at which kinship systems could be studied. They do not refer, in Lévi-Strauss's examples, either to his own bipolar typology of 'elementary-complex structures' or to the different levels at which kinship systems can be considered.

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