Archaeological Literature in the Computer Age

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Scientific publications in Archaeology seem to be going through a kind of crisis : a, paper and editing costs are increasing everyday ; b, the number of publications is growing ; c, at the same time, the adequacy of traditional ways of writing for modern research purposes is being questioned ; d, many criticisms are expressed towards archaeological reasoning as well as towards archaeological linguistic habits.

Some time and thinking have been devoted to these questions by J.-C. Gardin and his team since 1968. (see references at the end). It is perhaps worth briefly describing the more recent work of this team on the content analysis of archaeological publications, since it can be said to be a by-product of computerized experience in an Archaeological group. The papers mentioned (Ref. 1, 4, 5) are all analyses of interpretative monographs, with a view to define more adequate reasoning and writing patterns.

One of the objectives of these exercices is practical, i.e. to provide archaeologists with documents which would be easier and quicker to scan and evaluate.

Another objective, of a more theoretical order, is to demonstrate that rigourous writing patterns can contribute to more rigourous reasoning.

The subjects of the original articles which have been thus "processed" are varied :

- Iconographical interpretation of a Seldjukid
  stela (Anatolia, 13th century A.D.) (ref. 4, study n° 1)

- Historical study of Iranian mints, based on the characteristics
  of an Arabo-Sasanid coin (8th century A.D.) (ref. 4, study n° 2

- Architectural reconstitution, historical and cultual characte-
  rization of the remains of a paleo-christian chamber (Geneva,
  5th century A.D.) (ref. 1).

- Reconstitution and datation of ancient irrigation systems in a
  plain of Eastern Bactria (from the Bronze Age dawn to modern
  times) (ref. 6).

In each case, one has tried to fit the contents of the article
into a general diagram, which takes into account the usual main
logical divisions of traditional interpretative monographs in
Archaeology or history of art. This diagram is the following : .

A. IDENTIFICATION OF MONUMENT(S) AND PURPOSE OF STUDY

B. DESCRIPTION OF MONUMENT(S)

C. STATE OF THE ART

D. INTERPRETATION

E. VALIDATION

F. NEW HYPOTHESES

Each of these titles can be considered somewhat as computer
program "declarations" : they are meant to specify the type and
structure of the data inside each division. At the same time,
each division, called a "block", must be considered as a finite
set of homogenous data.

Block A thus contains a minimum set of descriptive characteris-
tics which constitute the presentation of the monument under
study (situation, brief description, known function etc..).
"Monument" must be taken in the very broad sense of "archaeolo-
gical unit under study". In connection with the presentation of
the monument one should also state the reasons or justification,
and precise objectives of the study (for instance, new find to
be integrated into a well known series of comparable data, new
interpretation of a monument as regards function or chronologi-
cal attribution etc..).

In block B, DESCRIPTION are grouped all the descriptive informa-
tions which can be considered as "entries" or initial data as
regards the interpretative construction. They include all manner
of characterization of the monument (observations about material,
size, structure, color, stylistic properties, chronological at-
tribution etc..) which, in the original text, play the role of

starting points for argumentation, but are not themselves questionable, so to speak, from the point of view of the author.

Block C lists all external documents which are explicitly referred to by authors in connection with interpretative statements. These cover all documentation sources which are not the monument itself (Bibliographical references, particulars of other monuments, quotations from original written sources ...).

· Block D, INTERPRETATION : in this block are transcribed all interpretative statements contained in the original text. They are written in the following format :

D1 ———→ D2	Argumentation	Sources

where

- D1 are initial data (from block B, DESCRIPTION).

- D2 are new data (as inferred from D1) which constitute provisional or final conclusions.

- The arrow represents the passage from D1 to D2 (inference process).

- Argumentation : one or several statements justifying the passage from D1 to D2.

- Sources : references to lines of block C, STATE OF THE ART, if any.

Example (from ref. 1) :

D1	D2	Argumentation	Sources
In spite of several soundings under the ground of the monument, no grave was found ... [from Block B, Underground, line 40]	.. we must assume that the grave was inside the chamber itself..	... as it was often the case.	Block C, Source n°., referring to several paleochristian chapels.

It often happens, though, in the archaeological literature, that interpretative statements (D2), are offered without any mention of sources, or even without any argumentation.
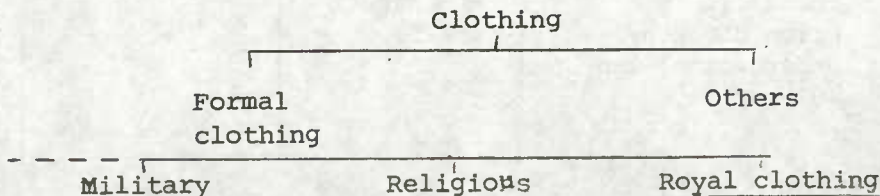
Example (from ref. 4, study n° 1)

D1	D2	Argumentation	Sources
Block B, Description of the clothing of two male figures represented on Seldjukid stela.	The small figure (on right) represents the son of the sultan (on left).	Because the clothing of both figures, being the same, indicate the same lineage.	no sources

In similar occasions, we must still admit that the interpretation has some sort of implicit logical foundation (Otherwise, a good number of interpretative statements could be considered as not founded at all). If we refer to something like "general knowledge" to account for this kind of situation, we still want to figure out how general knowledge can generate, on demand, such and such particular arguments in such and such specific situations. Even if we are unable to deal with such an enormous psycho-linguistic problem in se, we can still admit that reference knowledge, even having a somewhat fuzzy content, is logically organized in such a way that it can produce, in a deterministic manner, suitable arguments for one specific interpretation. To account for argumentations founded on general knowledge or "universal semantics" (U.S), J.-C. Gardin (ref. 4) draws "Logico-semantic organizations" (L.S.O) : they are bodies of ad hoc concepts organized in hierarchical trees, where divergent branches represent mutually exclusive classes of concepts, and where vertical links indicate compatibility.

In the example cited above, two adequate L.S.O'S might thus be :

First L.S.O :

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                          Clothing
          ┌─────────────────┴──────────────────────┐
       Formal                                    Others
       clothing
 ─ ─ ─ ┌─────────────────┬──────────────────────┐
    Military          Religious           Royal clothing
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Second L.S.O :

Iconographical
representations of lineage or parenthood

Same gesture or attitude	Same side on the picture	Same attribute held in hand	Same clothing

Hence the interpretation for small figure.

It must be noticed that in each of the case studies mentioned, L.S.O's are all approximately similar to the above as regards semantic extension and non specificity.

Inside block D, each line of interpretation should be related to some explicit hypothesis. In this way, one can quickly confront hypotheses and conclusions for evaluation.

Block E, VALIDATION

In some cases comparative data or complementary documents are confronted to conclusions at the end of studies, in order to add some weight to the construction. These additions could be located inside Block E, because, formally speaking, they are supposed to play a role for external validation. Actually, they only constitute an extension of the initial basis of the construction, and in fact play exactly the same logical role as the data in block B or C. It seems very clear, indeed, that they have been put aside for confrontation, but in a purely fictitions or ritual manner : which author could avoid to use meaningful data if they are well known to him at the time of his research ?

Thus our block E is to remain empty except in cases where totally new data are discovered after the present construction under study has been completed.

F, NEW HYPOTHESES :

In this block are stated new hypotheses, as implied by (or deduced from) conclusions. They cannot be used to validate conclusions or add weight to them, except in time, as they prove to be founded in another research context.

Such analytical attempts show that even the more systematic articles do not fit easily into the simple diagram which has been proposed. The main reasons, which indeed incite to some critical reflexion, are the following :

a. Informations (data or statements) of all types of logical status are scattered everywhere throughout the construction. For instance, if some descriptive informations are given at the beginning of an article, several new ones appear in the middle, where and when they are needed for a particular interpretative statement.

b. Some blocks are not represented at all, in many articles. Such is the case of block A (PURPOSE OF STUDY), which makes it difficult for the reader to evaluate conclusions.

c. As regards block C, STATE OF THE ART, it is always easily filled. However, it should be noted that logical connections between interpretative statements (in block D) and sources (block C) are often lacking. References to external sources seem to be traditionally considered as sufficient scientific guarantees as a whole, as if they could replace missing argumentation.

d. Filling block D, INTERPRETATION in a satisfactory manner is not so easy for the analyst. First, as noted above in a, arguments are scattered everywhere and often implicit. Secondly, the use of Universal Semantics is so frequent that rewriting an exact argumentation is somewhat tricky.

It is too early, at this stage of our research, to define in detail a new adequate writing format. Our first attempt, such as summarized above show, at least, that a computer-like format acts as a filter to detect the shortcomings of traditional reasoning and discourse .

References :

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(6) LAGRANGE (M.-S.) - Analyse d'une démarche de prospection
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