Archaeological Discourse, Conceptual Modelling and Digitalisation: An Interim Report of the Logicist Program

Jean-Claude Gardin

C.N.R.S., 6 rue des Vertus
F-75003 Paris, France

Abstract. The digitalisation of the archaeological literature is undoubtedly a step towards 'the digital form of knowledge' heralded by CAA 2002. However, it provides only a partial answer to the information crisis of modern times, namely a growing gap between the volume of papers currently produced in our respective research fields and the amount of time that we can spare to *read* them. Granted that we tend mostly to *consult* them, we are led to envisage changes in the form of our publications, such as the substitution of conceptual models to narrative texts. The move towards a digital form of knowledge then takes up a different meaning, intellectual instead of merely technological. It is linked to the emergence of computational or logicist models in the human sciences, amenable to the same range of tests as mathematical models and endowed with a comparable scientific status.

Keywords. Epistemology and Interdisciplinary aspects, Inference and Archaeological discourse, Cognitive systems and Conceptual modelling, Tools for reasoning in archaeology.

1 Archaeological Discourse

'Archaeological discourse' in the title of this paper covers a wide variety of texts written by professional scholars in order to present the results of their research, namely archaeological finds and comments of all sorts regarding their interpretation, from standard attributions in terms of Time, Space and Function to more ambitious reconstructions of the human past on any number of levels (events, ways of life, socio-economic patterns, mental processes, etc.). The content and style of archaeological discourse in that broad sense varies according to the category of readers – or, more correctly, users – for whom it is intended. The archaeological community is one such category; but it is by no means the only one. Archaeological discourse is also produced for scholars or scientists outside that community, especially on the occasion of interdisciplinary programs in which they take part. Further, other users exist beyond the scientific world. Commonly designated as 'the general public', they can again be divided into different categories according to the context or goal of communication (e.g. museums, CRM, television, etc), as well as to more or less explicit sociocultural objectives of information transfer. No hierarchy is here intended between those various genres; they are all part of the desirable outcome of archaeological research. However, the considerations that follow concern mainly the first genre mentioned above, namely *scientific papers* written for the benefit of our colleagues in archaeology. The reasons for this restriction are twofold. Not all members of our profession share the same gifts over the whole range of archaeological discourse, so that some degree of specialisation may be preferable to the confusion of all genres in our prose. Secondly, the production of scientific papers in the humanities today raises a number of specific intellectual issues that are not met elsewhere; they seem sufficiently pressing to justify on my part a distinct treatment, despite the legitimate concerns of others for the production of differently targeted archaeological publications.

Scientific papers in archaeology are seldom made up of discourse alone. They usually include graphic components of all sorts – drawings, photographs, maps, diagrams, etc. – that play an essential part in the communication from authors to users. A separation will be made further on between the *information* provided in this graphical form and the *knowledge*

necessarily expressed in science by a textual or symbolic construct formulated in any given language, natural, mathematical or other (§3). Let us however ignore this distinction for a while and examine first the probable fate of our scholarly papers in the context of the digitalisation process discussed in this conference.

2 The 'information crisis' revisited

The ways of archaeological thought and discourse change from generation to generation. Some fifty years ago, the New archaeology regarded itself as innovative in both respects, in reaction against the so-called traditional patterns of previous times. A few decades later, the Post-processual school substituted its own modes of "reading the past" (Hodder 1986), eventually adding recommendations for presenting the end product in new narrative forms (Hodder 1989, Tilley 1989). Then, less than ten years ago, under the banner of a 'cognitive archaeology' to come, a return to "the well-established techniques of rational inquiry" was advocated, away from the exuberant prose of the previous decades (Renfrew 1994:9). Such rapid fluctuations indicate at least an enduring concern for the subject. My own approach has been to explore the structure of archaeological theories irrespective of their paradigmatic affiliations or claims (Gardin 1980, 1990a). The basic assumption is that our theoretical constructs can be expressed in terms of a 'calculus', in the computational sense of the word (*i.e.* data base + rewrite formulas), which brings out the differences from one to the other in the conflict of interpretations described by Paul Ricoeur as inescapable in the sciences of man (1969). A by-product of this translation process is a set of proposals for "a new rhetoric", *i.e.* a reshaping of archaeological publications aimed at conveying their cognitive import rid of the constraints or habits of linear discourse (Gardin 1980:146-164). Thus, while the gain in conciseness and clarity remains the primary goal of that 'logicist' program, practical consequences follow regarding possible changes in our publication patterns, in a long-term perspective.

Those early proposals soon found some support in the acknowledgement of changes of another sort regarding our uses of the archaeological literature. A number of respected scholars now admit that the quantity of pages currently

produced in their respective areas of research is such that they are unable to *read* more than a fraction of it; instead, they *consult* that literature, in search of the parts that are relevant to their research interests of the moment – data, interpretations, underlying arguments, *i.e.* the interrelated components of archaeological theories which logicist analyses aim to make readily accessible. I have mentioned elsewhere some of the archaeologists who have raised this reading *vs.* consultation issue over the last decades. None of them, however, suggested any way to solve it beyond the usual aids to information retrieval – abstracts, keywords, etc. – which obviously fall short of our requirements. For the gist of the matter is the following paradox: why do we keep writing our papers as if they were going to be read – and ask our students to do the same – while admitting that such is not the actual destination of most of them ? Our irresolution in this respect was well demonstrated at a conference which took place many years ago under a significant title: "Scholarship and Technology in the Humanities" (Katzen 1991). In his introductory speech, Sir Anthony Kenny, then President of the British Academy, stated the paradox in the clearest possible way, backed by a statistical analysis of the Production/Consumption ratio in his own field, a branch of philosophical research which he modestly described as 'narrow'… Yet, the outcome was a set of rather disastrous figures, showing that he could not hope to read more than a very small part of the articles directly relevant to his interests published in England and the US alone. His conclusion took the form of a question addressed to all scholars present in the conference: "does it make sense to operate a system of publishing articles whose real readership is so small ?" (Kenny 1991:7). Most participants had been invited because of their applications of the new technology in various branches of the humanities; it is all the more surprising that none of them except my humble self thought fit to take up Dr. Kenny's challenging question at any time in the conference.

This leads me to the revisiting of the 'information crisis' announced in the title of this section. The phenomenon thus named is understood in different ways depending on the angle of sight (financial, editorial, institutional, etc.). To me, from a scientific viewpoint, the 'crisis' is first and foremost a bio-cultural or evolutionary matter, which does not concern the humanities alone. It has been elegantly summarised in a recent book by Pierre Joliot, a physicist of international repute who teaches cellular bioenergetics at the Collège de France in Paris. "Researchers have not waited for the development of communication networks to be swamped by a flood of publications which exceed their capacities of assimilation. Even if we limit ourselves to articles published in scientific journals, it has long been impossible to accumulate all the available information in one's own domain" (Joliot 2001: 88-89, my translation). The reason follows: "while the communication and information technology develops explosively, the capacities of our brain to acquire, store, assimilate and produce information remain unchanged […] hence a growing inadequacy between those techniques, more and more efficient, and man, whose

biological characteristics remain stable" (*ibid.*, pp. 86-87). In other words, we are faced with a typically ecological problem: a growing production of scientific papers, on the side of Culture, *vs.* the fixed neuronal capacities of their potential users, on the side of Nature. Advices differ as to the causes of growth. Some link it to the demographic explosion of the world population, with its corollary though not proportional increase in the number of scholars active in most disciplines; others to the development of interdisciplinary research programs, with the resulting obligation to widen the range of our readings. Be it as it may, we seem to have no control of the growth factor, no more than we have any control of the development of our neuronal system. Yet, a popular idea is that the computer revolution is likely to be of help at this juncture by providing an artificial extension of our intellectual faculties comparable to the progress of our mechanical command of natural or material processes following the industrial revolution. Examples can easily be found in support of that analogy, but they should be accompanied by evidence of its limitations. The interesting point, anyhow, is that once more nothing is said or done in that optimistic perspective about the paradox recalled above. Assuming that the whole bibliographic heritage of archaeology was made accessible on our PCs, we would still be faced with the same issue, namely the design of efficient strategies that would enable us to locate in that immense store of knowledge the parts that are relevant to any number of research queries, notwithstanding the well-known inadequacies of our present forms of publication in that respect.

3 Theories as Computational Structures

A possible way to tackle that issue consists in devising alternative modes of publication, in both conceptual and technical terms, that take into account the evolution from reading to consultation processes mentioned above The logicist program had that goal in mind, among others, when it took shape in the '80s; a number of interim reports have been published since about its progress, in various languages. As it is likely that most participants in this conference have never read them, let me summarise once more the proposed changes.

The major postulate, as recalled earlier, is that archaeological theories can be formulated as computational structures, with the two following components: (a) a *data base*, here understood as a set of declarative propositions that include not only descriptions of archaeological materials and their context, with associated archaeometric data, but also a large number of referential statements scattered in the thread of discourse to ground the successive inferential leaps that make up the interpretation process, from empirical observations to theoretical propositions, or conversely. Those statements are not usually regarded as 'data'; they include first and foremost vast sets of analogies, more often than not declared rather than logically argued or mathematically computed – e.g. archaeological comparisons, historical or ethnographical precedents, etc. – as well as statements diversely attributed to established knowledge, common sense, more or less widely shared beliefs, ideologies, etc. The point to bear in mind is that the function of such statements in our theoretical constructs is formally the same as that of the data coming from field observations or archaeometric analyses: namely, they provide a *basis* upon which the author feels authorised to build up an inferential structure, without calling for explicit antecedents. A dividing line can and perhaps should be traced between those two broad classes of 'data' according to their source: for example, 'direct observations' *vs.* 'referential knowledge', the latter being introduced to make sense of the former. With or without this dichotomy, it is clear that a data base in this perspective has little to do with the same concept or expression in the context of documentation programs, e.g. excavation archives, museum catalogues, national heritage files, etc. There

is no sense of hierarchy in this distinction; but neglecting or underrating it does not help to understand the relationships that develop in the course of time between information and knowledge. (b) The second component is an *inferential tree* (or *ladder*) made up of rewrite formulas '(IF) $p \rightarrow$ (THEN) q' expressing the steps observed as an author goes from one set of propositions to another in the argument. A bridge is thus established between the declarative propositions of the data base and the hypotheses or conclusions put forward by the author, through a succession of leaps from one or any number of levels of the argument to the next. Such a tree can be read in two directions, according to the order followed by the author: either empirico-inductive, from the data base to conclusions, or hypothetico-deductive, from hypotheses to the data base.

Fig.1 is the standard 'schematisation' of that structure, first published many years ago (Gardin 1980:103), and reproduced several times since. No separation is made in this simplified picture between the two broad compartments of the data base {Po} distinguished above, 'direct' or 'referential'. The intersecting lines indicate that the antecedents *p* of a rewrite formula may come from different levels of the argument. The unique logical operation is the *modus ponens*, the arrow connecting *p* and *q* being uninterpreted, as indeed it is in most discursive presentations of our inferences: we have not been trained to go at great lengths in eliciting the various formal relations that connect antecedents and consequents in natural logic (*i.e.* the logic of argument in natural language). Thus, the logicist analysis of archaeological theories does not pretend to go 'deeper' into their foundations and structure; it merely aims at rearranging their constituents in a primitive logical form that helps to apprehend the overall organisation of the interpretation process and to consult readily some of its parts without having to go through lengthy presentations in standard archaeological discourse.

4 Computer applications

The exercise could stop at this point, having hopefully satisfied our wish for more clarity and conciseness in our current prose. Early examples of logicist analyses were indeed of this kind, content with a comment of the reformulation process and its putative merits – as well as its limitations, to which I shall return later (§ 7). Again recently, I ended an archaeological book of mine, wholly traditional in its form, with a few schematisations in the style of fig.1 intended to give an idea of the degree of reduction that could be obtained without losing any part of its cognitive content. Losses of other sorts are of course incurred; their inventory shows that they concern parts of the text that fulfil functions other than cognitive proper, the utility of which is open to discussion (Gardin 1998:167-180). Some readers might wonder at this point why I chose to publish some 200 pages of text instead of the shorter logicist version. A rapid but on the whole correct answer is the strength of tradition, partly on my side, to be sure, but as much on the side of most academic
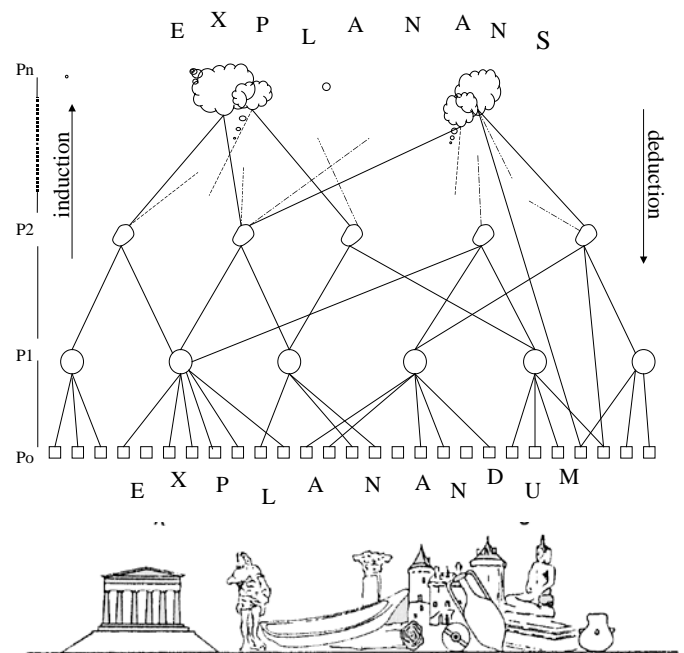

Fig.1 The standard "schematisation" of argument in archaeological Constructs

institutions and publishers, understandably worried about the reception of such innovations.

Habits are liable to change, however, in the humanities as elsewhere, and especially so today, under various pressures linked to the computer revolution. First, the computational format adopted in logicist versions of archaeological constructs is an invitation to consider applications in artificial intelligence; for the two components recalled above – data base and rewrite formulas – match the structure of knowledge bases in expert systems where a similar dichotomy obtains between 'facts' and 'rules'. This is not the place to summarise the lessons of our past experiments in this direction (Gardin *et al.* 1987; Francfort 1992), nor the reasons that led us to concentrate later our efforts on the subject of archaeological publications. Computers are again present in that context, but in a different capacity. Their function is to provide an electronic support for recording logicist schematisations of archaeological theories on web-sites or CD-ROMs. The navigational tools of hypertext are then available to *consult* publications of that form in all sorts of ways, depending on the degree and type of knowledge required. Pieces of the overall construct can be accessed directly, without any need to read a long linear discourse in order to locate them. In the same time, the overall interpretation process is immediately visible, together with the data that support each of its successive steps. The example presented at this conference by Valentine Roux is an illustration of the gains expected from the condensation of a 500 pages book, written in traditional discourse, into a logicist structure recorded on a CD-ROM. This electronic version is sold with the book, so that anyone can assess, qualify or deny those gains and hopefully suggest better ways of meeting the same goals. The point to keep in mind is that an electronic publication of the sort has nothing to do with the digitalisation of a printed journal or book: *the major innovation lies in the rethinking and rewriting of its substance prior its recording on a computer* (Gardin 1991).

I should at this point add a confession, namely that the proposed course is to me only a partial answer to the information crisis discussed above (§ 2). If, as I believe, the deeper source of our ecological problem is demographic growth, following P. Joliot's argument, there might come a time when the expanding knowledge networks contemplated here will exceed our ability to 'control' them fully, in a neuronal sense. Changes of quite another sort will then have to be envisaged in the organisation and conduct of scientific research world-wide, which will have to do more with politics than with technology. However, since this paper is expected to deal with present issues, I may be excused for going back to more immediate concerns, both theoretical and practical.

5 Relation with current epistemological debates

The Model/Narrative Duality

The anticipated evolution of scholarly discourse is not an isolated projection confined to archaeology alone. It is essentially an extension of a broader debate opened a few years ago on the relation between two major ways of accounting for human phenomena, past and present: *models* on the one hand, calling at some point on the language of mathematics and computers, and *narratives* on the other, relying mostly on the syntax and semantics of natural language. A multidisciplinary seminar was organised on this subject by a sociologist, Claude Grignon, from 1995 to 2000, culminating in a book published last year (Grenier *et al.*, 2001). Its most significant lessons for our present concerns are a twofold acknowledgement and an open question. (a) The bulk of our knowledge of the past comes from the writings of scholars who till recently made little or no use of formal models. (b) This knowledge is entitled to a scientific status on the same basis as the knowledge embodied in mathematical models in so far as it lends itself to the two kinds of tests required for the building of science: tests of coherence (formal consistency) and tests of correspondence (empirical conformity). Critical reviews of historical constructs at least seem to take for granted, if implicitly, the relevance of such tests in the humanities. (c) Now, the open question: is it not therefore tempting to single out in the thread of narrative accounts of the past the kind of elements that are questioned in such critiques and to regard them as components of underlying qualitative models, subject to the same formal and empirical refutations as all models, mathematical *or other* ? In other words, are we not likely to find in scholarly publications the substance of cognitive models, more or less logically articulated (and 'formal' in that very loose sense), that eventually stand or fall according to the standard criteria of science, differing in that respect from the rhetorical discourse in which they are traditionally embedded? The logicist program is nothing but a tentative answer to that question, among others (Gardin 2001b).

5.2 The Third Culture Option

One of those alternative answers is a wholesale rejection of the question, regarded as out of place in the humanities. The arguments are well known; they are mostly variations on the theme of an intrinsic difference between natural and human phenomena, the orders of Science and Literature, etc. However, since there are such things as ' human *science*s' or '*sciences* of culture', the problem arises of defining the ways of thought and discourse that characterise them, distinct from the ways of other scientific disciplines, as well as from those of common sense or literature. The solution generally proposed consists in

postulating a middle mode of reasoning and writing, situated somewhere between the two poles of such dichotomies – in brief, a *Third culture*, neither science nor literature or art, endowed with its own epistemological status (Lepenies 1985). I have raised elsewhere a number of questions regarding this intermediate or hybrid genre (Gardin 1990b, 2001a); since the organisers of this conference included epistemology in its program, I thought I had to mention this other case of a relation between the evolution of archaeological discourse envisaged in this paper and the ongoing debates on the status of the social sciences and humanities.

5.3 Metatheoretical or Metaphorical Discourse

An alternative approach of the same matter consists in changing the level of our perspective. In the preceding section, the argument bore on the possible location of historical disciplines *between* two poles variously described as Science and Literature, Formal reasoning and Common sense, etc. Let us now rise to a higher standpoint and look for a possible characterisation *above* those two universes of discourse. Attempts of that sort have not been lacking in the past centuries, under the pen of philosophically oriented scientists or scientifically trained philosophers. To make a long story short, let us concentrate on the sole case of archaeology. A contemporary example of the kind is the call on the perspective of *semiotics* as offering a proper framework for the study of our interpretation processes. The logicist program, for one, did make reference to that discipline in its early years, through its very designation: one of the members of the logicist school founded in Vienna by Carnap and others was Charles Morris, whose book on *The Theory of Signs* was cited among our sources of inspiration (Gardin 1980:175). In later papers on the subject, I again acknowledged that connection, but with an emphasis on its essentially metaphorical rather than metatheoretical function: the logicist analysis of archaeological papers does indeed look at them as symbolic constructs or 'systems of signs' as understood by Charles Morris, but it makes no use of the concepts or tools proposed in his presentation of semiotics (Gardin 2000).

References to that (meta)discipline again cropped up recently when the Society of American Archaeology included a session on "Semiotic Approaches to the Study of Meaning" in its 66th annual meeting (2001). C.S. Peirce was abundantly cited, his famous triad being proposed as a productive framework to explore the meaning of archaeological sites or monuments. Other sources were named, from Saussure to Foucault, again on the assumption that their findings on the linguistic or sociocultural functioning of symbolic systems could be fruitfully incorporated into our own ways of making sense of archaeological materials. Doubts were expressed on this last point, including by the present author, on the ground of a possible confusion between metatheoretical and metaphorical discourse. However, ideas differ on this matter, as illustrated by the fierce reactions of scholars in the social sciences and the humanities to Alan Sokal's famous hoax. All I wish to stress at this point is that the issues discussed in the present paper are also related to that broad debate.

The Validation Dilemma

Yet another epistemological moot point is the place and nature of validation processes in archaeology. Opinions have varied remarkably over the last fifty years on this crucial matter. While the New archaeology insisted on the necessity of

empirical tests, said to have been rather neglected before, the Post-processual school which followed gradually shifted the emphasis on the sociocultural basis of evaluations (Hodder 1984), ending up with a rejection of the validation concept altogether in archaeology (Hodder 1986:13-14). A few years later, the pendulum again swung back to empirical requirements when, under the auspices of Renfrew's Cognitive archaeology, James Bell presented testability as the founding stone of scientific constructs (1994).

Those oscillations in the archaeological community are a reflection of similar hesitations or controversies in the human sciences in general. The adepts of Models seem ready to accept by and large the ultimate verdict of *empirical evidence*, as universally understood in science, while the authors of Narratives are prone to deny its relevance or feasibility in their trade, acknowledging instead the primacy of *sociocultural criteria* of evaluation, with their inevitable liability to change in time and space. The question which we have to answer is then as follows; assuming that archaeological theories belong to the intermediate or hybrid genre discussed above (§ 5.2), in what way does their transformation into computational structures affect our position in this dilemma?

Logicist positions: a summary

The relations established between the subject of this paper and a number of ongoing epistemological discussions in the human sciences invite me to summarise my positions in the particular case of archaeology.

(a)   The logicist analysis of archaeological discourse may be regarded as metatheoretical in so fas as it applies to archaeological theories of any school (processual, marxist, post-modern, cognitive, etc.), but it does not call on any general theory of interpretation, semiotics or other, beyond the standard principles of scientific reasoning. In fact, the reference to logicism becomes unnecessary as archaeological theories tend to accept the same constraints as other historical constructs produced in the natural sciences (geology, paleontology, etc.). The literature of prehistory, in particular, provides more and more examples of the kind.

(b)   Schematisations of argument are, according to the definition proposed by the Swiss logician J.-B. Grize, "models generated by a discourse in natural language". I would add 'conceptual' models, inasmuch as they express the ways in which scholars conceptualise the past on the basis of archaeological remains. A distinction should then be made from the kind of 'conceptual modelling' which computers experts have in mind in their efforts to devise a system of standard categories that would make it possible to process queries through data bases established for different purposes and therefore expressed in different though not unrelated concepts. The two undertakings pursue separate goals, equally worthwhile, but which it would seem difficult to merge into a common framework at the present stage.

(c) The conceptual models derived from the analysis of

archaeological theories are said to represent their *cognitive component*. As such, they are liable to evaluations according to the same criteria as scientific models in general, in part empirical, in part sociocultural. The relative weight of the two parts varies in time and space, but the long run trend in archaeology seems to indicate, ultimately, the precedence of the former.

(d) The elements of archaeological discourse that are left over in the schematisation process are taken to represent the *rhetorical component*. It is subject to wholly different criteria of value (stylistic, hedonistic, literary, etc.) which also play a part in the reception of archaeological theories by particular groups – or 'discursive societies', in M. Foucault's perceptive terms.

(e)   Those two components are intricately mixed in the thread of natural discourse; but there are signs of a move towards a separation of the two genres, both necessary for the build-up and dissemination of knowledge, but preferably in distinct works rather than in the hybrid genre that now prevails.

(f)   The emphasis on the place of literary visions in archaeology, next to scientific constructs, was an explicit part of the logicist program from the very beginning (Gardin 1980:178-180). Critics at the time condemned, among other things, the 'inconsistency' of this conclusion in a book mainly concerned with the formal structure of archaeological theories. Times have changed, however, and the Models *vs.* Narrative debate (*supra*, § 5.1) has done much to establish the complementary nature of those two ways of knowledge – a position already reached years ago by an eminent scholar in cognitive psychology (Bruner 1986:11-43). Meanwhile, the idea of a third, intermediate genre remains an ill-defined option. Fig. 2, read from top down, is a way to represent that evolution; it hardly needs any comments, except for its lower part which takes us to the dangerous waters of Anticipation – the subject of the next and final section.

5 Back to archaeological publications

The bottom line in this figure suggests the probable destiny of archaeological publications as I see it in a more or less distant future. My first assumption is that a vast majority of our printed journals and books will continue for quite some time to follow the discursive traditions of the Third culture, mixing the cognitive and rhetorical "uses of argument" studied by Stephen Toulmin throughout his career (1958, 2001). The major factor in support of that course is not so much the present efforts towards its justification, in epistemological or sociocultural terms, as the power of academic institutions attached to that traditional form of discourse in the social sciences and the humanities. However, a second assumption in fig.2 is that various forces are at work in favour of a return to the two modes of thought and discourse depicted by Jerome Bruner as 'natural kinds'- the 'logico-scientifc' mode (Science) and the 'narrative' mode (Literature), in his terminology.

Two cultures:

SCIENCE
models
formalisation

LITERATURE
natural logic
common sense

Third culture:

HUMANITIES

Anticipation:

Time ↓

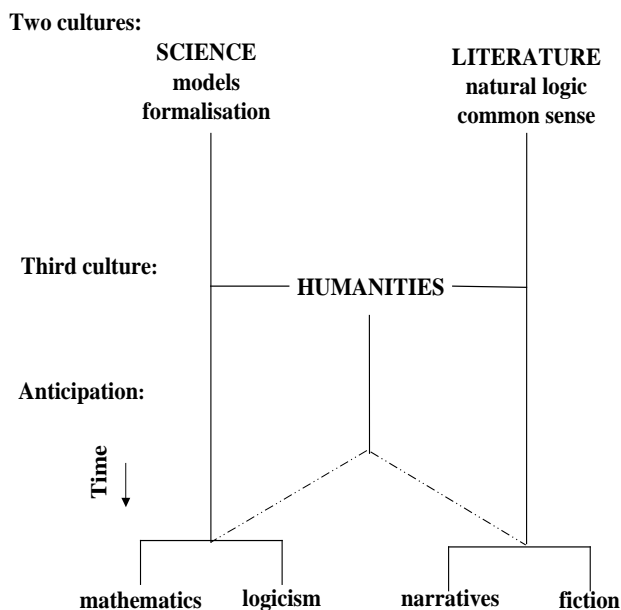mathematics   logicism   narratives   fiction

Fig.2. Archaeological discourse in the context of the Third culture and its possible evolution in the course of time

Support sometimes comes from the most unexpected sources. An eminent advocate of narrativity, Paul Ricoeur, widely known for his long-standing defence of hermeneutical approaches in the humanities (1969), gave a brilliant conference two years ago on "The writing of history and the representation of the past" (immediately published: 2000) in which he revised drastically several of his former positions – e.g. the heterogeneity of the orders of Nature and Culture, the condemnation of 'positivist' historians, the enforced distinction between Explication (natural sciences) and Comprehension (human sciences), etc. – ending up with a plea for a stricter separation of the cognitive and the 'scripturaire' components of scholarly discourse. Historians or archaeologists have not yet reacted much to this surprising manifesto; I nevertheless believe that its relevance to the Third way issue will not escape the attention of the next generations of researchers, as other considerations lead them to take up similar positions. Valentine Roux has gone through those factors of change in her contribution to the present volume. Some are material, related to the economics of electronic publications, others are intellectual, in the logicist perspective; they need not be restated here. Let me rather finish with a few words of caution regarding the interpretation of the bottom line of fig.2.

(a)   On the left side, the two blocks 'mathematical' and 'logicist' come under the general heading 'SCIENCE', at the top, for the reasons developed in this paper: they *both* represent the formal mode of knowledge, through quantitative and/or qualitative models.

(b) On the right side, the two blocks 'narrative' and 'fiction' come under the general heading 'LITERATURE' at the top. This term is here understood in a particular sense; it designates the unmarked pole of the binary oppositions established by Snow or Bruner, apropos of knowledge in general. 'Literature' thus covers works that have a *creative* value in amplifying the visions of the past provided in 'Science'; they differ in that respect from the ocean of discourse for which no such ambitions are claimed.

(c) A last point to bear in mind is that the various blocks of the lower line stand on the same *horizontal* level. In other words, no hierarchy is intended, neither between the left and the right half of fig.2, nor between the two blocks named in each half. The rationale behind all our distinctions is strictly *functional*. On the left side (SCIENCE), the choice between quantitative and qualitative modelling or any combination of both in the design of an archaeological construct is left to the author; no superior epistemological status is assigned to mathematical models. The knowledge produced in such forms is for the benefit of researchers alone; it is not meant to satisfy the expectations of a broader readership. The right half of fig.2 (LITERATURE) makes room for publications that take on this ambition, namely, the diffusion of archaeological knowledge in the 'general public' or any particular subset of that vague entity. Works of fiction are therefore part of our 'literature' inasmuch as they succeed in enlivening the findings of archaeological science – or even its very interpretation processes… Margaret Conkey's review of three recent novels written by professional archaeologists on that last subject is in this respect quite illuminating (2002).

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