WHITHER ARCHAEOLOGY ?

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CONTENTS

ARCHAEOLOGY BETWEEN FACTS AND FICTION: THE NEED FOR AN EXPLICIT METHODOLOGY

Torsten Madsen

"Archaeology needs to go back to go forward, to recover culture-history and to recover a coherent philosophical approach". This was the dictum from *Hodder* (*1986*,100) to end *theorism* in archaeology, and to resume a contextual archaeology where data and their context play a leading role (*1986*,141).

I have very much sympathy for this message, as indeed I have for large parts of his book "Reading the past". I do disagree, however, with some of his ideas and statements, as will become apparent in the following. I will go back if only for a few remarks, and then I will concentrate on what I consider the major problem of archaeology today: the linking up of data with the mental construct we call the past. It is a well-known fact that Scandinavian archaeology has an old and deeply rooted archaeological tradition. To archaeologists in other parts of the world this is part of the history of archaeology. To Scandinavian archaeologists it constitutes the core on which their archaeological training is based. Scandinavian archaeology of the preceding century was very much concerned with methodology (*Gräslund 1974*,16), and it is no coincidence that context and association (*Worsaae 1843*, *Müller 1884*) as well as the typological method (*Montelius 1884*, *1903*) were central issues. The extraordinary richness of the archaeological record in South Scandinavia led to a marked concern with data in their own right, especially artifacts.

Archaeology in Denmark is still data driven to a very high degree. With this I want to imply that learning data and learning basic ways of dealing with data, takes up the major part of archaeological training. Although Danish archaeologists are not ignorant of theoretical issues, they have remained marginally concerned with them. It was not just a joke when a colleague, returning from the recent TAG conference in Southampton, noted that a British archaeologist is a person with a theory looking for data, whereas a Danish archaeologist is a person with data looking for a theory. The processualism of the 70s and 80s had a limited impact on Danish archaeology. Much inspiration came from American and English literature, but even when various ideas and theoretical stances were included, most studies remained very traditional, and Danish archaeologists never felt comfortable especially with American studies. To go back and pick up the threads from before processualism is thus not very difficult for Danish archaeology to do. It will take us to a tradition of culture history that we have hardly ever left. It will take us to a renewed concern with basic methodology as well, an area where archaeology obviously has slacked off over the last decades.

Paradigms, the archaeological record, and archaeological data

To a high degree, Scandinavian archaeology has been dominated by an inductive, positivist attitude towards research. We find this very explicitly stated by *Mats P. Malmer* (*1962, 1963,*

1985). Still it is a common attitude in many studies, despite frequent claims to the opposite, but it is also very obviously a retreating position. Claims for alternative attitudes have covered a wide spectrum of views. One especially should be mentioned, as it is quite remarkable for the time when it was expressed, and because it is important today.

Arne B. Johansen (*1970*,18), using terms as "circularity" and "self projection", boldly stated that all archaeological knowledge concerning the past is determined by our preconceived model of culture. We cannot establish knowledge of past cultures that does not somehow reflect our own understanding of what human culture is all about, yes indeed reflects our self understanding as human beings.

One consequence of this view is that archaeological data do not exist by themselves. They only exist because we have a preconceived idea of how they relate to human culture (*Johansen 1970*,9-18). The famous example that will represent my point is, of course, the superb flint axes, that some hundred years ago were conceived in Scandinavia as lightning bolts. Another consequence is that recording of archaeological excavations will always be relative to what we expect to find (*Johansen 1970*,31). Thus we cannot "save" the archaeological record for future research as an objective technical rescue operation separated from research (*Madsen 1988*). A third consequence is that description and interpretation cannot be clearly separated. Rather it is an integrated process where not only interpretation is an outcome of description, but indeed description is an outcome of interpretation (*Johansen 1970*,34).

Similar statements of the dependence between "the past" and our preconceived ideas of what is culturally meaningful are made by post-processual archaeology. Indeed one of the hallmarks of post-processual archaeology is the claim that "The ultimate aim can only be self-knowledge. In projecting ourselves into the past, critically, we come to know ourselves better" (*Hodder 1986*,101-102). I find myself in full agreement with this claim, but in disagreement with the limitations to the cultural models seemingly imposed by *Hodder*:

> "To discuss humanity in terms of general laws, is ultimately to deny people their freedom. The historical approach on the other hand, allows that people are free to think as they want: they are not bowed before universal theories which they cannot subvert" (*1986*,102).

This statement presupposes that individuals are free to think and act, and that their individual actions are what makes up history. There is no doubt that this is exactly what *Hodder* meant to imply (*1986*,6). It makes, however, the statement just another case of universal theory bent over the European eighteenth century philosophy of freedom and right of the individual. It applies well to European cultural self-understanding, but hardly to, say, Islamic culture, where individuals are bowed before the universal laws of the Koran. From the point of view of such a culture, it may be seen as yet another example of European cultural imperialism. Current discussions of the Human Rights Concept may be seen as a testimony to this.

I will maintain that there is no true paradigm from which to study the past. There are only paradigms of different relevance seen from one's own cultural background. Indeed the historical, contextual archaeology proposed by Hodder is of high relevance to me as an European trained within the Scandinavian archaeological tradition. It is possibly not relevant to archaeologists trained in other parts of the world, and with other cultural backgrounds.

The marked difference between *Malmer*'s inductive positivism, and *Johansen*'s culturally determined relativism led to a discussion concerning the objectivity of archaeological data (*Johansen 1982, Malmer 1980, 1985*). As noted by *Christophersen* (*1982*), the discussants overlooked that there is a distinct difference between what we may

term the archaeological record and archaeological data respectively. *The archaeological record* is an unbounded and hence undefined part of the current reality. This record is real in the sense that all reality is real, but it is certainly not objective, as there is an indefinite number of ways to view it. Only by imposing our personal views on this record can we make it usable for research.

Archaeological data may be viewed as the outcome of imposing our personal views on the archaeological record. The data are created through a categorisation carried out by individual archaeologists. They cannot be considered real, since they are defined abstractions based on preconceived notions of what is culturally relevant. However, despite the subjective act of creation, archaeological data can in some sense be considered objective. Once defined they become facts that may be rejected with reference to "the history" of their creation, but not changed or redefined. They attain an existence as "objective" data, where their original subjective birth is of little consequence. This is especially true with those data that become historical as a result of the destructive nature of excavations.

The archaeological record is a conceptual unity, of course. However, when archaeologists work with this record, they have to split the data they create into what they bring home with labels attached, and what they destroy on site. The latter data mostly consists of an entity we usually call layers, and of information on relations between layers and relations between objects and layers. As these data become historical on recording, we have no means of changing them later on. We may re-evaluate them against what we bring home from the excavation, and against what we learn from other excavations. As a result of our re-evaluation we may distrust and discard the data, but that is all we can do.

Movable objects may be anything we bring home, including complete "chunks" of the archaeological record (and not just artifacts in the classical sense). Movable objects constitute a continuously available part of the archaeological record that allows extraction of new sets of archaeological data at any given time. However, the exponential growing number of objects and their storage in dispersed locations, makes this availability a myth. Most of the time, we will have to accept data categorised from objects by others, often making the practical difference to data recorded in the field limited. A detailed discussion of the various types of data from archaeological excavations is given by *Andresen* and *Madsen (1992)*.

The failure to distinguish between the archaeological record and archaeological data is potentially damaging. The notion that "data are not objective but real" (*Hodder 1986*,170) is an open invitation to creative data manipulation in response to specific needs. It is the archaeological record that is not objective but real, and we may use all our creative forces (within accepted bounds) to observe this and turn it into data. Once the data have become defined, however, we are stuck with them as "objective" facts. We may discredit their validity as they are not real, but we may not subject them to a personal rewriting to make them "better" facts.

Archaeological data have an important position in archaeology in their own right. Although we should view data as constrained by preconceived cultural models, they do take on an existence of their own, and become facts that remain valid across time despite changes in the cultural models. Many frequently used data in Danish archaeology stem from the preceding century, and although many types of information are missing, compared to what we would categorise today, they are still considered valid data. The implication is of course that there is a consistency in the way we view culture that allows us a long time build up and use of archaeological data. As stated in the beginning, Scandinavian archaeology is very much based on the traditions of the preceding century.

Data have a conservative impact on our perception of culture, and a limiting effect on the type and range of reconstruction of the past we can present. This is not only due to limitations posed by preconceived ideas at the time of categorisation into data. It is also because interpretation elements become embedded in the data through the subsequent analyses creating new sets of data that are heavily loaded with meaning. This is true for interpretations of excavations (*Andresen - Madsen 1992*,56) as well as for object typologies.

The embedding of meaning in data is one of the major problems facing archaeology. Not because meaning and interpretation should not be attached to data from the outset - I believe it should, but because the embedding of meaning in data, when inseparable from these, quickly becomes a straitjacket. The interpretation of the Iron Age village of Hodde for instance (*Hvass 1985*) is so complex that you will have no other options than to accept the picture given in the publication. It is impossible to separate interpretation from observation, and it is impossible to redo interpretations as they are presented as observations. When the results are used for the construction of further models of the past, the contents of these models are bound a *priori*.

The research process

The archaeological record is a static contemporary phenomenon. This is a trivial statement, of course. Less trivial is the claim: we cannot draw conclusions from archaeological data to what the past reality was like. It may appear that we do so, and we may indeed believe that this is what we do. I will argue, however, that there is no way we can infer, applying rules of logic, from the archaeological record to the past. There is no set of rules as suggested by *Binford* (*1977, 1983*) - except in trivial cases of physical determinants (technology, etc.; *Hodder 1986*,103) - that allows us to conclude that a given structure A observed in the data implies that a certain process B was at play in the past.

The reason is simple. Any structure in the archaeological record can be the result of numerous relationships in the past. We have no means of knowing what specific combinations caused the pattern we observe. There is a one way logic that goes from the past to the present. Had we known the past reality, and had we known all the successive transformations creating the archaeological record, then we could predict this record in great detail, but we cannot go the other way. The same objection applies to *Hodder*'s claim (*1986*) that we can read the archaeological record in the same way as we read a text. It is acceptable, I agree, to view material culture as meaningfully constituted, and readable as a text. We cannot, however, automatically transfer this property to material culture as preserved in the archaeological record. One thing is that material culture can be read, when actively displayed in its live context. It is quite another matter to read the fragments of material culture preserved in the archaeological record not even knowing the transformations that have occurred from the live to the dead context. Some elements of meaning may of course be better preserved and more "readable" than others, but even if, in a specific case, we believe that we can read the data correctly, we still have a problem of making our readings plausible to others. Indeed, it makes little difference if you read or dream. The problem remains the same: how do you verify that you go back correctly across the transformation?

Accepting that the logic goes from the past to the present, we may claim that given a model of what the past was like and a fair idea of the type of transformation active, then

we will know something of what this implies to the archaeological record. Going from the model of the past, we can look for discrepancies between what we expect, and what we find. Continuously in a dialectic process we can change our perceptions of what the past was like, and of the data we create from the archaeological record, to maintain a concordance between expectations and observations. Although we will never know if we are correct in our expectations of the past, we will have to believe that gradually we can build up an increasingly correct picture of the past. This view of the archaeological research process is closely matching the one assumed by *Johansen (1970,23)*. The results we obtain are very much dependent on the paradigm from which we work, of course. However, given a paradigm relevant to ourselves and our society, then we will learn something valuable and "true" about the past.

Within the current reality archaeologists work at two levels. One is the matter of fact level of archaeological data. The other is the theoretical level of the mental construction we call the past. Archaeologists do have a tendency to concern themselves with either one or the other of these levels. The essence of archaeology, however, is to create a concordance between them to minimise the conflict between the structure of our data and the structure of our conception of the past. A very similar view of the archaeological research process has been stated by *Dwight Read (1990)*. He proposed that archaeological research progresses through a comparison of two sets of models. One set - the theoretical models (Model$_T$), based on our theoretical standing - specifies what the past reality was like. The other set - the data models (Model$_D$) - outlines structures of archaeological data. We compare the structure and consequences of our Model$_T$ with the structure and content of our Model$_D$.

Read presented this scheme related to a strict formalised mathematical model, and a processual theoretical view. The scheme, however, is valid for informal modelling as well, and the theoretical view need not be processual either. Indeed, archaeological research follows this twin modelling pattern in general, with a dialectic two-way interaction, I will argue. At the low level end of the scale, the theoretical models are often of a rather axiomatic nature. At the high end the interaction is much more bilateral. Not only do we try to shape a Model$_T$ to fit a Model$_D$, we often try to manipulate data as well to create a Model$_D$ that either fits or does not fit a specific Model$_T$, depending on whether we seek to promote this model or reject it.

How we arrive at our Model$_T$ is immaterial, but it is important that we are explicit when we formulate it, and explicit about its assumed consequences for a Model$_D$. The concordance check between the two sets of models is the only way in which we can exercise control and gain some confidence in our reconstruction of the past.

Archaeological methodology

What makes archaeology an academic discipline in its own right is not as much its purpose - this may certainly vary considerably with the paradigm we adopt - nor is it the data, as many other disciplines use material culture as data. A definition of archaeology as the study of human society based on material remains and with reference to the notion of culture is thus not a sufficient definition. What makes archaeology a discipline in its own right, separable from other disciplines, is its methodology.

While we may say that we understand our data through the theoretical dimension, then certainly we view and sense the data through the methodological dimension. I consider

a method to be: a systematic procedure through which we create, represent, transform or compare data. The last point also includes the comparison between the consequences of our $Model_T$, the "expected" data, with the structure of our $Model_D$, the actual data. Archaeological methodology thus consists of a set of acknowledged systematic procedures for working with data. "Acknowledged" means that there should be a consensus within the community of archaeologists that the procedures are applicable. "Systematic" means that the procedures must be explicit and reproducible.

It is of course not possible to delimit precisely what constitutes archaeological methodology, nor can we expect that archaeological methodology in Scandinavia is exactly the same as in America. Within any particular tradition, however, there is a fairly consistent assessment of what constitutes a valid methodology.

On the other hand, the demand that the methodology should be explicit and reproducible can and must, I will argue, be set up as a universal criterion. We cannot accept claims for a methodology that is not made explicit and reproducible. Concerning the development in recent years we may very well be tempted to share the worries of *Costis Dallas*:

> "The liberal adoption of structural and semiotic terminology in questions involving the meaning of material culture is rarely matched by operational procedures that would allow the rigorous examination of propositions and theories against empirical data. This frequent lack of formalisation creates the suspicion that structural or semiotic explanations often amount to little more than post-hoc accommodative arguments, or, still worse, mere exercises in free association" (*1992*,230-231).

There are three areas where archaeological methodology comes into play. One is where data initially are categorised from the archaeological record. Although this categorisation is a subjective act of creation, it is far from being unsystematic. On the contrary much effort is given to the definition of systematic procedures for the optimal data acquisition. These procedures create standardisation and quality control of the data acquired, but (at the same time) they also act as a conservative element in research, making it difficult for new types of data to enter the scene and become accepted as valid and relevant.

A second major methodological area is the creation of data models. That is the area where we look for pattern and structure in our data and for concordance with our theoretical models. It is the general area of analytical methods in archaeology ranging from typologies to complex quantitative methods. A large part of the more complex methods available in this category goes beyond the average archaeologist. He either ignores them, uses them in a helpless fashion, or misuses them. This is unfortunate as the work with data models is very essential for good results in archaeology, and it is certainly one of the areas where marked improvements are needed.

The third area is concerned with the control of concordance between theoretical models and data models. This is an essential methodological area, covering comparisons for concordance from the very simple to the very complex. As a low level example we may take the rule of stratigraphic succession. This is a strong rule resulting in a clear and simple theoretical model that few archaeologists feel tempted to reject. As a very well defined formal method to check for concordance with a data model we may use a directed graph (*Ryan 1988*,329). Lack of concordance will normally not reject the theoretical model in this case. Instead it will make us look at the data model for misrepresentations, observational errors, etc.

As an example from the "high end" of the scale we may take *Hodder*'s "Domus/Agrios" model (*1990*). How do we perform a concordance check of this type of theoretical model against the data? We are certainly beyond the simple mechanical check in this case, and one may be pessimistic about our ability to formalise within this area. However, we must maintain as a minimal demand that it should be possible to build up arguments for concordance in a clear language. How are the consequences of the model for data, and do the data we find fit our expectations? If we cannot do this we have to discard the theoretical model as beyond the reach of research.

Problems in current archaeology

The amount of data available to archaeology today is truly staggering. In Denmark excavations are carried out every year worth a couple of million pounds. Fifty years ago a Danish archaeologist was expected to have an all round knowledge of all data material from Danish prehistory. Twenty-five years ago teaching at the universities was still geared to give students a "total" knowledge of the data material, even if it was becoming obvious that the totality was an illusion. Today, only crude surveys are given, and even the lecturers are far from having a total knowledge of the data within the limited fields they teach. The trend towards specialisation among archaeologists is very obvious, and the understanding of the past based on a range of data becomes increasingly cumbersome as the knowledge of what lies outside one's own narrow field of specialisation decreases. The problems not only relate to the amount of data produced, however. They are also associated with the availability of data. Fifty years ago, almost all data ended up at the National Museum, and even if far from all has been published, it hardly mattered, as most researchers were based in Copenhagen, and would use the National Museum as their base for research. Today, data and research are dispersed across close to fifty institutions in Denmark, and although publications are more numerous than ever, the proportion of the available data published is smaller than ever. The rest remains practically unavailable.

There is a clear tendency in archaeology for a division between researchers concerned with data and researchers concerned with theory. Some researchers concern themselves almost exclusively with data, and contribute very little to our picture of the past. Others are very keen on presenting syntheses and statements of meaning of the past. Unfortunately, they seldom work with data, and generally they have very little, if any, knowledge of the data they refer to in their often sweeping statements. At the same time researchers working with syntheses increasingly tend to confront their ideas with the ideas of others rather than with the data (*Trigger 1989*,16).

The problem of an increasing distance between "theory modellers" and "data modellers" seems more pronounced in the culture-historical tradition than in the processual tradition. The reason is that within processual archaeology a very direct relationship between data and theory is often assumed. All you need is a theory and some data, and you have got a case. It is a problem that the data used are often of inferior quality, which may be one of the reasons why processual archaeology has had so many problems producing sound results.

In culture-historical archaeology, on the other hand, it is quite understandable why the division between "data modeller" and "theory modeller" should occur. There is not the same notion in this case, that any set of data can be seen as the outcome of some specific piece of

theory. On the contrary, building up a large coherent data model is considered an aim by itself. It is thus difficult to reproach those who work predominantly with data, with little concern for theory. Likewise there is a clear prompting to write up syntheses covering large areas and/or periods. This is clearly demonstrated by the constant stream of literature coming out in various European countries covering parts and themes of European or national prehistory.

There is a catch, however. Whereas you can work with the data model without caring to much about the specifics of a corresponding theoretical model, then the opposite is not appropriate. Yet, it is exactly what happens, and increasingly so. We are becoming haunted by run-away theoretical models, that may be interesting and inspiring reading, but leaving those knowing the particular data, on which they supposedly are based, unmoved. Not because I specifically wish to pick on *Ian Hodder*, but his "The domestication of Europe" (*1990*) is a very good example. The book is a very exciting reading. It contains many original ideas, some of which certainly seem right. Its presentation of data (at least from Scandinavia), though not flawless, is good. Yet the main thesis of the book means nothing to me on a background of Scandinavian material. As one of my colleagues very politely has expressed it in a review:

> "I find it difficult to argue with the book because of its structure and logical consequence. However, reading through the chapters one gets the feeling that the Domus symbolism is carried too far. The arguments become constrained because all observations are related to a few, preconceived concepts" (*Nielsen 1993*,218).

I am tempted to add that perhaps the problem is really the lack of a dialectic process between the building of the theoretical model and the data model. The theoretical model is imposed on the data, rather than "negotiated" with the data.

The major problem of archaeology today is really an information processing problem. Information is created as never before. Yet, to the individual archaeologist it becomes increasingly difficult to procure and process the information needed to elucidate a question at hand. As a consequence, the archaeological synthesis - the theoretical model - begins to float more and more freely in the interpretation space.

Whither archaeology?

"Archaeology needs to go back to go forward" - yes, but in doing so we should not forget that the conditions have changed, and very much so. The access to data and the conditions for working with data have changed drastically. When in the sixties archaeology began to change, the emphasis was clearly on methodology as a response to the growing size and complexity of the data base. Somehow the focus shifted towards theoretical issues, leaving the methodological problems somewhat behind. Now we are right back and no better off. On the contrary, we see a growing lack of coherence and concordance between our models of the past and our data models, the latter becoming increasingly vague, ambiguous and even mythical due to the growing distance between researcher and data. If archaeology is to improve, I will argue, it has to concentrate on its methodology, and it has to concentrate on improving the data modelling. I see little prospect in continuing the concern with theory, if we cannot bring the data to bear. What we need to do is to improve the structure of the data models and the processes used to obtain these structures, to improve the availability of the

data models, and to improve the clarity of the linking between theoretical models and data models.

How to achieve these goals is not the issue of this paper. A few points should be made, however. The nineties are not the sixties in more than one sense. We have meanwhile entered the Information Age. The computer has been present in archaeology since the sixties as a calculator and a storage device for categorised information. It has not, however, been a versatile tool for information processing until recently. We cannot discuss methodology and data handling today unless we discuss it in relation to the information handling potentials of computers, the more so as, to a large degree, our problem today is a problem of information processing. Unfortunately, this has not yet been realised in archaeology. Computers are still being looked upon with considerable indifference. It is considered a tool for storing data, for word processing, and for calculations on numerical data, but very few archaeologists have yet realised that the computer represents a versatile tool for information processing, and even fewer have started to study archaeological data from a formalised information processing point of view. To improve the structure of the data models, we have to analyse the nature of our data very carefully. Archaeologists have become accustomed to think in static, reductive terms when recording data. Data are traditionally considered as "pure" descriptions based on predetermined categories, and only when all descriptions have been jotted down, can we start making analyses, creating "results".

Archaeological data, however, are not at all like that. Naturally, there are data that can be considered categorised, "descriptive" information, as layers and objects identified in the archaeological record, as well as statements like "object x belongs to layer y". We have to keep these "primary" data separate, as they become historical data, that cannot be changed as soon as the "dig has turned into a dug". The major part of archaeological data, however, consists of "derived" data created through the process of applying often very basic theoretical models to data, and hence creating new data. The resulting data may be combined with existing data to form the basis of new data models, which confronted with other theoretical models may create new data, and so forth.

In traditional archaeological recording we seem to be in trouble no matter what we do. If we record derived data together with, or perhaps more commonly substituting, the primary data, then we end up with a credibility problem. How do we know that something described as a posthole is really a posthole? On the other hand if we insist on just being "objective" and record the primary data, then we are bound to end up with an interpretation problem. Many aspects of excavations are far more easily and reliably interpreted, when it is done in the field rather than later from endless recording lists.

The computer has the capability of holding not only the primary data, but also all derived data as well as the theoretical models used to derive these data. The whole descriptive and interpretative structure can be stored and processed within one dynamic system, where all data (primary or derived) are available for further analysis as soon as they are created, but where it is still possible to see what were the preconditions (categorisation or theoretical model) for any set of data present. The computer can handle such a dynamic information system, but archaeology has to find out how to structure the system to make it reflect the research process dealing with archaeological excavation. It is an exercise in dealing with complex contextual (relational) information (*Andresen - Madsen 1992*) that far too few archaeologists have concerned themselves with. Yet it is the way we must go if we wish to proceed.

Modern information technology allows us also to embed methods with data. This is a feature that will add considerably to the dynamic qualities of systems handling archaeological information. In the long run it may very well turn out to be the most decisive feature. There are many methods that can be applied to data from archaeological excavations. Methods that check data for consistency, or search for distribution and contextual patterns. Such methods are often intimately associated with specific types of data, and as a result we may state the association between data and methods in general terms, and indeed claim that the methods can be seen as a property of the data. The potential of integrating methods with data may radically change archaeological research from being analysis driven to become data driven. Indeed, this may happen when even very circumstantial operations on data become a matter of background routine operation. Again if these things are to become true, archaeologists have a huge work in front of them defining and formalising the relationships between data and methods.

Improving the availability of data models to the archaeological community is another major problem. Traditional publications are strongly reductive to the data they represent due to their sequential structure. Because of this reduction they are difficult to perceive. To preserve a clear impression of the data, much thought has to be given to the way in which the reduction should be carried out. Further, because of their structure and the reduction that takes place, specific information may be difficult to retrieve. This is especially true if retrieval has to occur "across the library" rather than within one publication.

We shall find that modern information technology could change our approach to information sharing radically. Firstly, we may in fact get rid of the data reduction if we drop the traditional printed publication as the medium for data dissemination, and instead use an electronic form capable of presenting the complex multivariate structure of data. Further, if data from various archaeological excavations is kept in compatible structures, then data retrieval may occur across all available sources just as easy as within one source. It is a matter of time only, when the development within information technology will make the physical location of data of no consequence for the possibilities of sharing the data. What we are looking at is the possible "democratisation of archaeological knowledge" (*Reilly - Rahtz 1992*,18). It is not, however, something that will happen by itself. Apart from social problems within archaeology that have to be overcome (Huggett 1993), there are structural problems as well.

Finally, all the structural, methodological and technical work we have to carry out with respect to the data modelling in archaeology will help us very little, if we cannot, at the same time, be explicit about the linking up of the theoretical models with the data models. I imagine that part of this process can be formalised and accomplished as an integrated part of the systems we create. However, when we deal with complex theoretical models and data models, I am doubtful whether we will ever succeed in creating sufficiently precise formal representations to allow an automatic linking.

It is not important, however, whether sometimes in the future we shall succeed to formalise the linking process or not. What is important, here and now, is a strive to be explicit in discussing the concordance between theoretical models and data models. If we do not take the explicit linking between fiction and fact serious, then archaeology will die as a research discipline. Knowledge within archaeology is neither created by manipulating facts nor by formulating theoretical statements. Only at the interface between fiction and fact can we gain

knowledge, and only if we are explicit about our arguments, open for others to check, can this knowledge gain credibility.

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