

# **What is the importance of "Philosophy and Archaeology" by Merrilee Salmon for current archaeology?**

Salmon in her book tries to show how productive an exchange between archaeologists and philosophers can be. Archaeology can take advantage from the scientific models proposed by the philosophy of science in many ways. Archaeologists can learn how simplicity is essential to analyse, but also which limitations have the models they apply. The attempt to adapt the scientific models, built for philosophy or some other science often fails to propose a valid scientific explanation, but certainly the fact that such models are used undoubtedly means that archaeology is developing as science. But the problem of what is archaeology, if science or humanity, still remains unresolved. Salmon argues that the problem is not only proper of archaeology, but also of any other science that is interested in individuals but has not yet developed a valid scientific language common to all these sciences.

Moreover, many sciences are less than absolutely exact, but still this is felt by archaeologist a target to become a real science. We can think to mathematics, which permits the division of a number to the infinite, but not till the absolute zero. As already the first philosophers objected, such as Zeno of Elea, if we apply the pure mathematical law to the world of physics, we obtain paradoxes and invalid explanations, even applying mathematical and physical laws, but without any logic and reasoning. The most important thing for archaeology to be a real science is to use scientific methods. Archaeology can be a science with the same dignity as the others, and it is, we have only to recognise this and use finally appropriate methods.

Salmon suggests that archaeology has to import not only methods, but also the way of reasoning. For example, skills in doubting the familiar and imaging the unfamiliar are more helpful than trying methods that need to be perfect to be scientific.

- **Laws in archaeology**

The first thing to do in order to achieve a good scientific methodology is to make archaeological laws more scientific. It is problematic to define scientific laws; however it is possible to explain them as statements that describe persistent and significant connections among observed regularities. Law statements are normally general for content and form. They are logical generalisations. A further distinction is necessary: laws can be universal, when there is a relation between at least two whole classes, or statistical when in a relation like the previous at least one class is involved

only partially. Examples of these two types of relations in laws, respectively, are phrases as: "No pre-ceramic societies are societies which practice copper metallurgy" and "60% of burials contain daggers". It is not necessary a percentage to have a statistical law, even if this is the most common case. What is necessary is just a specification that the class is not comprised in the whole. Universal generalisations therefore may be thought as limiting cases of statistical generalisations, as a 100% percentage for every class involved.

This distinction of laws in two types is made considering the property of being of one type or the other as a logical property of statements. This means that it is a property of that statement to be universal or statistical, it is not determined by the logical structure or by the content. The language in particular not only does not help in discriminating the two types, but sometimes it could obscure at a first view the sense of the statement. For example a phrase like "For all highly specialised cultural systems it is less likely that the evolution to the next stage will occur". Apparently in this case there are two whole classes, one evidenced also by the "all", instead the keyword here is "less likely". It means that the phrase refers to a probability; a class can, or cannot, be applied to another in the whole. If this law involves all the highly specialised cultural systems, not necessarily the same effect can be applied to these: according to a similar law some systems, probably the major part, will have difficulties to achieve the next stage of evolution, while some other systems will develop quickly. For this reason it is necessary to analyse each law. It is not possible to do a correct distinction just looking to the presence or not of numbers or percentages in a law.

An error in the interpretation of the law will lead to a general misunderstanding of the results of a study, since laws generally are presented in, and sometimes as, conclusion of a work. It is therefore important to use a clear language, especially when doing generalisations using scientific laws. A scientific law often is a conclusion, even if open, and consequently it is part of our knowledge. When a law is correctly formulated, it can help in the understanding of new findings, giving importance immediately to some evidence that will sustain or change the law itself. This will permit a selection of materials according to their importance since the earliest stage of excavation.

The view that every event, which occurs, can be included in some universal law is called determinism. The truth, or not, of determinism has been discussed for centuries with different results. The best and most important thing for a researcher is to not consider laws as infallible truth, which cannot be modified. Archaeologists should definitely use statistical laws without pretending to produce universal laws that in any case would be limited. This does not interfere with the consideration of archaeology as a science. Science uses laws. Which laws depends on the subject. Archaeology has to find its own way on science and not to self-impose an existent model of "being a science". Also the consideration that archaeology is not a science because it does not apply any recognised model has no validity: each science studies a different subject and therefore uses, or could use, a different model. The fact that archaeologists can use scientific laws is a proof that archaeology is also a science.

- **Confirmation in Archaeology**

Any statement in archaeology, like laws but not only, needs to be confirmed. Once confirmation is interpreted as a relation between statements, it is time to use logic. Logic allows to reach a confirmation saying that the truth of some statement can guarantee the truth of others. Logic also provides guidelines that enable us to reject some statements on the basis of others. Deductive reasoning is important in archaeology, but it is inductive reasoning the most important for archaeologists since the problem of confirming statements about the past on the basis of material evidence in the present is a problem of inductive logic. However inductive arguments in their conclusion provide more information than in their premises and this means that they could be false even if all their premises are true. One of the favourite methods proposed by new archaeologists is the hypothetico-deductive method. This is constituted basically of three phases: the formulation of a hypothesis and then the deduction of some prediction, which through observation will be considered true or false. If the prediction is true, the hypothesis is confirmed; if not, it is disconfirmed.

This method seems to be inadequate for archaeologists since they use essentially statistical hypothesis and this method produces using hypotheses other statistics that have to be considered. The result is a loss of simplicity and with it a major possibility of error. This method is however important for the most scientific part of archaeology, less when human behaviours are considered. Other, more reliable, methods are possible. A key-point is however the hypothesis and how it is formulated: it must be simple and related to true evidence. A problem is then which hypothesis to test, since often the testing process in archaeology involves excavation. It must be considered the importance of the elements given by the hypothesis, but a consideration of its validity prior of testing is normally very subjective. Even applying particular statistical methods, there is still a probability of being true or false, till the definitive testing: the dig. It is important therefore to formulate hypotheses in a correct way according to well-defined method that could easily confirm or not the validity of the thesis.

To individuate a successful hypothesis it is employed also analogy. Simple hypothesis that are similar to other successful are likely to be successful too. The use of methods based on the distinction cause\effect are not effective: it is hard sometimes to argue which is the cause and which the effect. Alternative methods of confirmation are however possible and these are based especially on the knowledge of archaeology and related fields, imagination and experience. To confirm a hypothesis then there is no better alternative than the fieldwork for archaeologists, but the methods presented above as well other new methods could help in the understanding when they do not complicate things. Much more complicate things are much higher is the possibility of errors and misunderstandings.

- **Analogy and Functional Ascription**

The analogical reasoning is based on similarities, also called analogies. The observation of similarities in some aspects of things permits to individuate further similarities. The use of analogical reasoning in archaeology is wide: for example, found some material evidence and compared with another appropriate, it is used to

infer similar functions and/or behaviours. Given an object with a particular shape, or form, archaeologists often deduce its function comparing it with other objects similar in form. "Form" can be either material composition or shape in this discussion. This can be cause of confusion, since many times it is a mental process not explicated in the reasoning. Consequently begins a discussion to determine why it has been determined such a function for the object and alternatives are proposed. Instead stating clearly that an analogy has been found the discussion would be simpler and effective. An element that must be used to obtain as much correct as possible inferences from an analogical reasoning is the consideration of context. This functions as a limit for possible comparisons and analogies, and restricting the possibilities helps also in achieving a limited number of valid results quickly. Context and the use of experimental archaeology therefore help archaeologists in viewing the relevance of material remains to behaviour and social organisation.

Analogy can be helpful to generate strong generalisations, to suggest hypotheses and to produce a critique to other previously accepted generalisations. "It seems that in archaeology the most common and valuable use of analogy is that of establishing prior probabilities of hypotheses. These priors are used not only to determine which hypotheses are to be tested, but also the relative degree of confirmation after testing". This is shown especially by the work of ethnoarchaeologists. The sort of conclusion that can be established by any inductive argument such as analogy depends not only on its form but on its content, that can be refined with the use of analogies establishing prior probabilities, but still is a work that archaeologists have to do on their own. "Uniformitarianism" is a series of principles that can help the archaeologist in producing inferences. Thanks to ethnoarchaeology, it is possible to observe the function of many objects in the present and then try to ascribe functions to objects from the past that could have the same cause. This happens because it is believed that there is a sort of uniformity in the processes that cause some specific effects and evidence. For example, the finding of metalwork means that it was known the technique on producing them. So, people at the time were able to build a furnace. This is an inference that is produced with the use of principles of uniformity and that can be treated as an assumption in further reasoning. Of course also in this case errors are still possible, but the point is that the use of these principles do not causes more errors. Therefore they can be used productively. A functional explanation based on a functional ascription obtained using the uniformity principles is consequently well founded.

- **Functional Explanation**

Archaeologists normally state the function of items to explain their presence in the archaeological record. The definition of "function" can vary from the strict meaning of job that an artefact was designed for to the purpose for which it was used, consciously or not. It is possible to find in the archaeological literature also other, more complex, meanings. This approach of finding the function to explain the evidence comes from anthropology and it has been adapted in archaeology. Archaeologists often use functional explanations since they are really valuable for their work, but they have in many cases some sort of fear in admitting this. This is why sometimes euphemisms are employed in referring the type of explanation given.

The problem is that there are too many possible explanations. Hempel said for this reason that functionalistic explanations are in reality partial explanations or perhaps they are not explanations at all. Among the philosophical models used in science to explain facts and things, there is the Deductive-Nomological one. The model consists of some preliminary statements and a conclusion that is the description of the phenomenon to be explained. The relation between these two elements is deductive. This model requires universal laws, to be stated in the premises, but it is not very effective since with slightly more complicated argument than basilar ones, it gives only a partial explanation. Hempel instead proposed a model, the Inductive-Statistical one, which has its main difference in using statistical laws as premises. The result however does not change. Many archaeologists have accepted these two models of explanation, but as defective explanations. Even if these two methods can be helpful, they admit conclusion absolutely irrelevant, sometimes ridiculous, but they could be also subtly erroneous. This problem is addressed as a "relevance" trouble. Basically if some premises are combined without relevance in doing this, it is obtained a misleading result. Wright in particular tried to solve the problem simply considering acceptable cause not the result of such methods but a basic or fundamental notion instead.

A satisfactory model suggested after these critics is the Statistical-Relevance model of W. C. Salmon. This model does not see explanations as arguments, resulting in a functional explanation that provides sufficient conditions for the occurrence of some items. An argument is a set of statements where some of the statements, the premises, provide evidence for the truth of another statement, the conclusion. Introducing the time in the analysis, the conclusion becomes a prediction that is also a valid functional explanation. This occurs when the premises happened before the conclusion and both took place certainly according to material evidence. The model in this case individuates the statements that constitute premises and conclusion and then build a relation cause/effect between them. This model demands information about statistically relevant factors, which sometimes cannot be provided. However on the other hand it avoids stupid conclusions. The goal of the model is to correct the weaknesses of the other models, in particular requiring more work to individuate good premises, through a statistical, and therefore scientific, analysis.

- **Structure of Archaeological Explanation**

Salmon notes that even if a good explanation fits a particular model, this is not a guarantee of correctness since also erroneous explanations can fit them. This is why it is important to evaluate also alternative possibilities using that model before saying that it is correct. A limit of every model presented here however is their dependence on logical relations instead of causal ones. If a good explanation has to be causal, then the relation between the arguments in it should be causal too. Only the Statistical-Relevance model has been modified to account of causal connections, including an account of probabilistic causality, essential for the model to work. One main feature of the model is its refusal to presuppose that the world is governed entirely by deterministic laws. Consequently a probabilistic account of causality has to be employed. Probabilistic versions of causality take causal processes as fundamental. This was already the best method, and with these changes it is the only one that has a

possibility to reach satisfactory explanations limiting to a minimum the possibility of errors.

- **Theory Building in Archaeology**

If a probabilistic, statistical method, as we have seen, is the best choice, theories must follow the same way, trying to understand what could be called main meaning or reason of something, but also consider and leave space to alternatives that could have been coexisted. A series of theories is therefore the most sensed situation we can have. Theories should cover the whole matter and be chosen by archaeologists at the time of excavation depending on which evidence they have found. Archaeological theories should also be possibly connected with the other social sciences, which have the same subject to study: human beings. The best solution would be then a series of archaeological theories that cover the whole discipline considering also alternatives in a probabilistic/statistical scale and that are part of a more general series of theories about social sciences.

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