Abstract: In recent years, archaeological research has relied on large datasets, both temporally and geographically, with some archaeologists discussing that there should be a shift towards a more scientific form of conducting archaeological research called “macroarchaeology.” Ironically, and contradictorily, this shift towards large-scale research has involved the use of inductive approaches, which means that archaeological material needs to be converted into universal quantitative values. The inductive approaches used by archaeologists today, as argued by Karl Popper, and other authors in recent years, cannot be considered scientific in the strict sense of the word, since there is always a degree of uncertainty in inductive reasoning. This study suggests that archaeological data can be considered as traces of the past, clues that allow us to reconstruct past phenomena. As Carlo Ginzburg’s evidential paradigm demonstrates, thinking of the past in terms of traces and clues is much more scientific than appears at first. In addition to traces and clues, a second interpretative procedure can be conducted on data. Based on Ginzburg’s conjectural paradigm and discussion on fiction, we can recognize the past as real, while at the same time, conjecture the several ways past agents could have acted otherwise.

Keywords: induction, deduction, abduction, possibility, quantitative, agency, microhistory, evidence, proof, conjecture

1 Introduction

What you’ve got to understand is this. A gene isn’t a thing. It’s an idea. An idea about information. A fingerprint is a thing, a trace.

Ian McEwan

Lessons

The connection between archaeological practice and traces, clues, and fiction has been highlighted multiple times in archaeology (e.g. Crossland, 2009; Holtorf, 2003; Ribeiro, 2019a; Sørensen, 2019) yet archaeology has developed towards directions that have rarely included these elements. In fact, as a discipline that wants to claim itself as serious and respected by other disciplines (Perreault, 2019), archaeology has embarked on a journey towards the authoritative status of other disciplines – and to do this it has donned the trappings of technological science (Kristiansen, 2014). While technology has played a role in most of archaeology, it has had a particularly strong impact in prehistoric and protohistoric archaeology. As John Moreland claims, archaeology had a period where it was considered a handmaiden or parasitic upon history (2001). The societies which
contain documentation must be considered different than those that do not, since documentations are agents of transformation (Moreland, 2001, p. 26). With technology, however, it has become possible to mitigate the separation of prehistoric and historical societies (e.g. Whittle, 2018).

It seems only reasonable that archaeology, as a discipline, would ally itself with the rapid development of technology – molecular biology, isotope analysis, and computing have improved considerably in the last few decades and there is a natural assumption that technology equals scientific objectivity (Lyotard, 1984). Given the inextricable link between capital, technology, and science, for the sake of the maturity of archaeology, there is really no other direction it could go. The disciplines that archaeology wishes to impress are no longer history or anthropology – but rather those that carry the financial capital for scientific, large-scale, transnational, and culture-neutral research.

In the process, archaeology gradually moves towards a paradigm dominated by induction and proof by correlation. In 1965, Gordon Moore postulated that the number of transistors in a dense integrated circuit would double every year and so far, he has been right. Given the rapid rise of computing power since the 1960s, it comes as unsurprising that science would abandon the hypothetico-deductive approach in favour of inductive approaches, which with today’s technology can operate at a much larger-scale and can accommodate vaster amounts of data-points. While archaeology still relies on the hypothetico-deductive approach, there is an undeniable rising popularity in inductive Big Data and macroarchaeology, despite claims of the opposite (cf. Perreault, 2019).

This development in archaeology is undergirded by a much larger one, that of late capitalism and the rise of post-Fordist labour (Callinicos, 1989; Jeffries, 2021; Mandel, 1975; and for archaeology Ribeiro, 2023). As archaeology goes from national projects to global enterprises, the archaeological labourer has become more flexible, travelling from country to country, to work on whatever gig is available. Thus, the ideal archaeologist becomes that who has no allegiance to chronological period or location, but to a set of skills, which can be used anywhere in the world. Additionally, given that large-scale funding is usually capped at 4–6 years, the production of archaeological content has to be considerably faster and more aggressive than in earlier times (Cunningham & MacEachern, 2016). These conditions, and many others, have become normalized under the new spirit of capitalism (Boltanski & Chiapello, 2018) and have affected how archaeology is practiced nowadays.

Against this tendency, the current study will argue that there are political and scientific reasons to rely on a methodological remedy for the ills imposed by the dizzyingly fast-paced and larger-than-life archaeology of today, an archaeology that relies on traces, clues, and fiction. These elements, among others, have been the ingredients of Carlo Ginzburg’s legacy in history, his microhistorical corpus, and the humanities in general. Bear in mind that this is not an argument for a radical re-structuring of archaeology; it will not engage in the age-old rhetoric that everything is wrong with archaeology and that I have somehow figured out how to “fix” all of it. In general, archaeology is fine, but it does require fine-tuning and a reminder that there are other ways of conducting archaeology in a serious and sober manner (Ribeiro, 2016). Additionally, against the argument that an archaeology of traces and clues could be or is unscientific, it will be argued that on the contrary, the evidential paradigm of Ginzburg pays considerably more respect to the dictates of evidence than that which appears at face value.

2 On the Unbearable Weight of Having to be “Scientific”

In archaeology, the term “science” is used quite frequently but there is no common understanding of it, since it refers to a multitude of different things. First and foremost, science refers to specific methods and technologies applied to archaeological material. The most commonly applied scientific method is radiocarbon dating, which was originally used for prehistoric and protohistoric periods up to 40,000 years into the past. In recent years, radiocarbon dating has been pushed back an extra 10,000 years, and through AMS, it has been possible to date smaller samples, while gradually decreasing its overall costs (Wood, 2015). There is also, of course, the popularization of DNA analysis in archaeology, which has generated multiple headlines either by analysing the genetic code of the Homo Sapiens Neanderthalensis (Pääbo, 2014), the mapping of Yamnaya steppe herders
(Haak et al., 2015), and the admixture of modern genomes to infer about past social processes (Zeng, Aw, & Feldman, 2018). In addition to these, isotope analysis has also arisen as a very popular scientific method in archaeology, in order to understand diets and migratory behaviour (Bentley, 2006), as well as provenancing a wide range of extant archaeological materials (e.g. Tochilin et al., 2012). While these are some of the methods that one commonly associates with new technologies and laboratory work, one should also mention the application of very advanced forms of modelling such as Bayesian modelling of archaeological dates, summed probability distributions, the use of Agent-based modelling, among a myriad of other forms of mathematical/quantitative and computer-aided approaches, all of which together form what Kristian Kristiansen has termed the “Third Scientific Revolution” in archaeology (2014). These techniques have also given rise to a more specific understanding of “interdisciplinarity” in archaeology, where archaeological material is analysed through scientific methods (Lidén & Eriksson, 2013; Ribeiro, 2022a).

Despite the common association of technology with science, Lyotard has pointed out that this is a recent development, one that occurred in the second-half of the twentieth century, where science became commodified through the use of technology (1984, pp. 44–45). As Lyotard also points out, prior to World War II, science was not necessarily something one would perform exclusively through technology, but rather through a protocol – that of verifying, in the nineteenth century, and falsifying empirical claims, in the early twentieth century (Lyotard, 1984, p. 24). Verification was the logical principle that empirical claims could be verified through the senses, and these were cognitively superior to claims made in metaphysics, ethics, and the arts. While it had many precursors, the verificationist principle was best represented by the logical empiricist school, but there was no real agreement as to what sciences truly expressed this principle. In addition to this, there was also no clear consensus about what could or could not be realistically verified (Misak, 1995). In the early twentieth century, the verificationist principle was replaced by Karl Popper’s falsificationist principle. Unlike verification, which often relied on inductive logic, and thus failed in terms of providing conclusive statements, falsificationism alters the logical value of empirical statements, making them deductive and possible to be rejected and proven false in a determinate fashion. To put it in other words, according to verificationism, true premises might not lead to a true conclusion, whereas in falsificationism, if the premises are true, then the conclusion must be true as well (Kelley & Hanen, 1988, p. 46; Popper, 2002[1935], p. 19). As long as one was testing hypotheses through the falsification principle, that is to say, through the hypothetico-deductive approach, one was practicing science – since falsification was the rule that allowed the demarcation of everything science from everything non-science (Popper, 2002[1935], p. 11). Processual archaeology, the archaeology promoted in North America and the UK from the 1960s until the 1980s, was keen on explicitly adhering to the falsification principle via the explicit testing of hypotheses, regardless of the use of new scientific technologies (Binford, 1968, p. 17; LeBlanc, 1973, pp. 199–200). Alternatively, there were also those who were more interested in establishing de facto laws of human behaviour through archaeology (Fritz & Plog, 1970; Watson, LeBlanc, & Redman, 1971).

In the meantime, the search for laws of behaviour in archaeology has fallen completely out of favour, while the hypothetico-deductive approach is still used on occasion. But the dominant form of scientific reasoning in archaeology today is through induction. With the popularization of computer-aided approaches, which have sustained modelling and quantitative analysis, induction has become the standard of research in archaeology. At its most basic, inductive approaches observe data without a specific hypothesis to be tested, but rather with the aim of observing similarities, regularities, and changes in the patterns of data (Clarke, 2015[1968], pp. 20–21; Thompson, 1958, p. 1). More recently, inductive approaches have taken a step forward by observing not only a set of data, but also by dating various sets and correlating and cross-comparing them. This makes use of proxies to quantify elements of the past that are not themselves directly quantifiable, such as the quantification of inequality by measuring house sizes throughout history (Kohler et al., 2017). Unlike the hypothetico-deductive approach, which starts from the logical principle that a hypothesis can be tested against samples of data, most of which, of a reduced size, the inductive approaches of today are more data heavy, since they start from the principle that data will speak for themselves when observed in ever-increasing scales and with added proxies (Mazzocchi, 2015; for archaeology see Johnson, 2011). Also, unlike the hypothetico-deductive approach, which logically provides clear-cut certainty in its explanations, inductive approaches are plagued with scientific uncertainty (Kelley & Hanen, 1988, pp. 46–47). To use an example, no matter how
many crows one observes, it is never possible to claim with absolute certainty that all crows are black simply because it is not possible to observe all crows, past and present. Thus, with inductive approaches, what one ends up with is always a probabilistic answer. Granted, inductive approaches can operate and answer research questions, or they can be used to test models or assumptions; however, the results obtained from inductive approaches will nevertheless not have the certainty factor accorded to the hypothetico-deductive approach.

Underlying these approaches to the past is a universalizing/generalizing tendency, that is to say, the possibility to apply techniques that transcend local cultural and historical contexts. At its extreme, some of the projects of recent years have become global or quasi-global, such as the global study of inequality conducted by Kohler et al. (2017) or the genomic mapping of prehistoric Europe (Haak et al., 2015). Although these studies follow scientific standards, as they were briefly described above, many archaeologists have pointed out their limitations and how they tend to oversimplify very complex local and regional realities (e.g. Frieman & Hofmann, 2019; Furholt, 2018; Ion, 2017; Sørensen, 2017). Despite these critiques, archaeological science in all its variations is something hard to fight back – scientific archaeology has become the standard of archaeological practice, as there are more publications in archaeological science these days than there are in all the other non-scientific ways of conducting archaeology combined (Sinclair, 2016). Whether it is through epistemology or through the latest technological advances, the imprimatur of science gives archaeology a credibility that allows it to obtain large-scale funding and more permanent jobs in the academic context.

Does this mean that archaeology has become methodologically monist (Von Wright, 1971a), in the sense that there is only one overall methodology of scientific explanation? Not necessarily. Despite the dominance of the so-called archaeological sciences, there are those who still conduct research without the heavy reliance on technology, the hypothetico-deductive approach, or inductive approaches. This is a topic that is not discussed that often anymore: science is associated with two traditions, the Galilean and Aristotelian, with the former serving as the basis of the approaches described above (Descombes, 2001; Von Wright, 1971a). While not explicitly referred to, the Galilean version of science remains to this day very much attached to the idea of universality and laws – what is tested and concluded according to modern science must be a principle that is common (Dray, 1957, pp. 79–80). This has also been described by Michael Oakeshott, who claims that the sciences, in the Galilean sense, are those that grasp real-world experiences and converts them into a communicable experience that everyone can recognize. To do this, one needs to recognize the stability of the natural world (i.e. uniformitarian laws of nature), and communicate it in a quantifiable way (Oakeshott, 2015[1933], p. 132). This is not necessarily a claim that there are laws of nature and that these undergird science, but that there is something that can be scientifically analysed that is not limited by historical or cultural contingency.

Take, for instance, the effects of a medication on the human body – the testing is performed on a sample of the population, but it must be assumed that the effects go beyond that of the sample; the effects must be universally valid.

The Aristotelian sciences on the other hand are not dependent on testing or laws. Unlike what is conventionally considered science, they do not conform to explanatory statements that are subject to hypothesis testing nor are they usually supported by inductive probabilities or correlation. The standard of truth usually associated with the Aristotelian sciences is not bound by universal principles, but by understanding. Take for example a professor’s intention to go to a library or a university to conduct research and write – at no point can it be claimed that there is a universal law-like principle that states that professors do that, yet no one seems to have a problem in inferring that a professor has gone to a library or university to research and/or write a book (Braithwaite, 1968, p. 332). The question one can raise is how do we confirm that a professor has indeed done that? Confirmation can come from a professor admitting to conducting research and writing, but in the lack of spoken confirmation, one can recognize the traces of those activities.

Many of the Aristotelian sciences made their mark in the late nineteenth and early twentieth centuries. For instance, archaeology and modern criminology developed alongside each other during the late nineteenth century, a period that also witnessed the popularization of the crime novel (Holtorf, 2003, p. 532). In roughly the same period, Wilhem Dilthey and Max Weber were debating the separation of the human sciences from those of the natural ones. The argument, at the time, was that human actions were meaningful, and their understanding could only be uncovered in the meaning expressed by or through those actions (Rouse, 1992, p. 42). This separation of the natural sciences, with its Galilean methodologies, and the human sciences, following
Aristotelian presuppositions, would lead to discussions about the role of another discipline – psychology. Part of the problem for psychology was that it held connections to the natural world, through the study of the physiological brain but nevertheless required the interpretations of meaningful actions of people. While disciplinary boundaries became clearer later in history (Snow, 1998[1959]), scholars were not so sure what the human sciences truly were in the late nineteenth and early twentieth century, and how they could connect to psychology. The connection between criminology, psychology, and the human sciences is not an accidental one, with Ginzburg recognizing the affinity between them (Ginzburg & Davin, 1980).

Human action is subject to the morals and material contexts of their time. Given that, as history progresses, the phenomena we analyse as archaeologists are subject to conditions specific to their time and place, and thus irreversible (Ginzburg, 2012, p. 55). There is no possibility of testing how religions emerge, or upheavals take place, because the context in which these happen will be different from place to place and period to period. This is what makes past events unique and exceptional. Bear in mind that claiming that something is unique is not a metaphysical claim – one is not saying that the French Revolution is a singularity in the time-space continuum, that it has no similarities with other revolutions, and cannot be categorized as a “revolution”; when it is claimed that the French Revolution is a unique event, what this means is that its understanding must be achieved in its own terms, rather than through some general or universal explanation of how revolutions occur (Dray, 1957, p. 47). Central to Ginzburg’s historical epistemology is the idea of the exceptional and the unique, and more often than not, the hard sciences have found this to be the weakness of that epistemology. But it is not a weakness at all, much on the contrary, strength comes from exceptionality and uniqueness. As Ginzburg states:

The quantitative and anti-anthropocentric approach of the sciences of nature from Galileo on has placed human sciences in an unpleasant dilemma; they must either adopt a weak scientific standard so as to be able to attain significant results, or adopt a strong scientific standard to attain results of no great importance. (Ginzburg, 1979, p. 276)

This was a point that was also made by William Dray. When Carl Hempel argued that the migration of the Dust Bowl farmers to somewhere with better living conditions was an example of a law of historical behaviour (Hempel, 1942), Dray pointed out that this law is too trivial to be of any use (Dray, 1957, p. 28). Similarly, when the deductive-nomological approach was first used in archaeology, it established laws of human behaviour that were so trivial as to be ultimately worthless (Flannery, 1973).

A more critical and historically keen eye will notice that the authority of science, as it is understood in archaeology today, derives not from a de facto infallible and objective method that can attain absolute truths about the past, a “smoking gun” method that puts all other methods to rest, but rather from a historical situation where capital, technology, and research became intertwined during the rise of late capitalist economics (Jameson, 1991; Mandel, 1975; Ribeiro, 2023). Other methods of analysis in archaeology, those that are considered non-scientific or under-scientific, have never gained mainstream popularity not because they are de facto unscientific, but because they fail to profit from the knowledge-commodity exchange that sustains science today. As Lyotard poignantly argued, science is a capitalist endeavour – science must be something that involves financial expenditures, which means scientific proof can only be obtained through money (1984, p. 45).

The very concept of scientific “proof” itself is poorly understood and more often than not, proof is not used and barely a decisive factor in the sciences, especially as science is practiced today. In fact, “proof” is not even originally a concept of the sciences; it is concept originating from the legal sphere (Ginzburg, 2012, p. 55; Ho, 2003–2004). For example, earlier in the article, I provided an example of how medications are tested against a sample population – in no case is this testing providing proof that a medication works in clear-cut manner, with different members of the sample population manifesting very different effects, with some members manifesting no effects at all, and an uncertainty of how the medication might affect larger populations. That is why, it comes as little surprising that across multiple scientific fields, around 70% of scientific researchers have failed to reproduce another scientist’s experiment (Baker, 2016). The same can be said of many of the scientific methods of archaeology, which barring those conclusive studies using the hypothetico-deductive approach, cannot provide “proof” – at most they provide approximations based on what data are
available and what proxies can be reconstructed. As Ian Hodder argues, the accumulation of proxies on top of proxies ends up producing arguments so disconnected from actual data that they enter a world of fantasy (2018, p. 44). Given that data are not some objective element that is simply there and always available (Hacigüzeller, Taylor, & Perry, 2021; Wylie, 2017), but rather a carefully selected item that is subject to varying levels of availability, research history, and of course, the archaeologist’s choice, the results we obtain resemble house-of-cards rather clear-cut proofs of what actually happened in the past.

3 On Traces and Clues

At a certain level of generality, archaeologists can in fact proclaim that certain things happened with definitive certainty – whether it was that there was a transition from the Palaeolithic to the Neolithic, the building of certain monument in the past, the use of metals at a certain time, etc. No one can deny the existence of the Neolithic or the pyramids of Egypt without sounding somewhat insane or nit-picky; there is just too much evidence that these things do exist and happened during the past. At the same time, at this level of generality, there is no need for science and its approaches in archaeology; some basic training in the principles of archaeology would be enough to confirm basic archaeological truths. It becomes more complicated when the aim is to explain how and why things happened in the way they did.

In the current Zeitgeist, in order to explain past processes, archaeological data tend to be reduced to quantifiable data-points. This leads to a science where only what is discrete and repeatable has any weight in scientific discourse. The Galilean sciences are beholden to the principle that objects of science must be clearly distinct from one another, a principle that was conceived in mathematical logic (Castoriadis, 1984, p. 209; Ribeiro, 2021; Sørensen, 2016). If for some reason, an object of analysis denotes either any form of vagueness or if they are unique (and thus non-repeatable), they are pushed out of the realm of the hard sciences. Take for example the study of inequality in archaeology, one of the more popular methods is through the application of the Gini index, which measures the disparity of wealth in different time periods and cultures (e.g. Kohler & Smith, 2018). This is only possible to apply to archaeological contexts with the presupposition that there are data that simultaneously correlate to inequality and are measurable in a numerical way. These measurements do tell us something about the past, but they do have the limitation of ignoring all the qualitative aspects associated with wealth inequality such as the actual quality of life of past peoples (e.g. Arponen et al., 2015) as well as the actual experience of inequality itself (Neerdaels, Tröster, & Van Quaquebeke, 2022). For instance, if a past society differentiated their members not in any quantifiable way, but rather, through some qualitative properties of the artefacts they use, such as decorative patterns or the origin of source material, then this will not be recognized by quantitative approaches used in archaeology.

A predictable counter-argument is that qualitative correlations about artefacts and wealth cannot be achieved in prehistoric archaeology. There might be some truth to this, but the same can be said of quantitative considerations – that large quantities of artefacts, say in burial contexts, or large house sizes, might not be indicative of wealth, primarily because we do not know the assigned value of the things that are being measured. To use a modern example to facilitate the reasoning – hoarding today is not a symbol of wealth, in fact, it is usually the lower-classes that hoard items today, while some members of the middle and upper-class have adopted minimalist practices. From an archaeological standpoint, if we were to take things at face value, we would have to assume that hoarders are wealthier than minimalists, when in reality, it is usually the opposite that is true. Similarly, house size is also a very arbitrary and fluctuating metric of wealth – since this metric is very dependent on a variety of factors from building materials to location. In mid-eighteenth-century Britain, wealth was commonly associated with the landed gentry, who lived primarily in the countryside and sustained themselves through rental income (Burke, 1894), while poverty was associated with city life, where most factory workers lived. Throughout the nineteenth and twentieth centuries, the city became a place of modernization (Berman, 2010[1982], 131ff.; Lefebvre, 2003), with the postwar period seeing wealth being accumulated primarily in cities, and the middle and upper class living in much smaller houses. At the same time, wealth started to leave the countryside, which meant that the lower class could live in fairly big houses as
long as it was in rural contexts. All of this is to show that house size can undergo severely rapid changes in value, depending on historical and socio-economic contexts. Bear in mind that this is not to dispute the results obtained from large-scale quantitative studies, but simply to show that by reducing past societies to only elements that are quantifiable, one is obfuscating too much information.

A different way of thinking about data is as traces. In everyday life, it is not uncommon to search for small traces that people left behind. Whether it is a mother who checks the fridge to see if a packet of milk has been open, to see if her kids have returned home from school, or a security guard checking the lights of an office, to see if someone has decided to work over the weekend, much of how we proceed with archaeology is by checking for traces of human presence on the landscape. Traces are not a type of data per se, they are an interpretation of data, one that, unlike Big Data, requires its conversion into a quantitative element, reveals clues about the lives of people, past and present.

Furthermore, while seemingly mundane, the idea of traces is very much linked to the development of science in the late nineteenth century and early twentieth century, but not to the verificationist nor the falsificationist paradigms, but to a different evidential paradigm that is connected to the medical sciences. Between 1874 and 1876, a series of articles were published in the Zeitschrift für bildende Kunst by an unknown Russian scholar called Ivan Lermolieff (Ginzburg, 1979, 1989). In these articles, Lermolieff argued that paintings in museums were often misattributed – that many paintings had undergone retouches and there were a lot of imitations circulating around. To attribute a painting to its original artist, it would be wise to avoid looking at those features that were most common and conspicuous – such as the eyes raised towards heaven in Perugino or Leonardo’s smiles – it was better to look at those more technically challenging features, those details that often go unnoticed, especially those that imitators would not bother to perfect – the toes, fingers, fingernails, and earlobes (Ginzburg, 1979, p. 7; 1989, p. 88).

This method of attribution allowed for the reclassification of many paintings, although it was not infallible. Many art historians were not convinced, arguing that it would be strange for the personalities of artists to be found in features that were less important to the overall composition of a painting. Lermolieff argued that

![Figure 1: While realistic, computer-generated images, such as those produced by Midjourney, have difficulties in replicating hands and teeth. Credit goes to @mileszim on Twitter who kindly provided the opportunity to use his image.](image)
adventitious little gestures are more revealing of character than we assume. Some years later, Lermolieff revealed himself to be Giovanni Morelli, and his method, still used today, is known as the Morelli method, and has been applied to many forms of art, including aboriginal rock-art (Gunn & Lowish, 2017). Curiously, in recent times there has been a widespread use of AI and machine learning to produce artistic work; replications that take photos and artworks from big databases (i.e. Internet) and create new mashups. In these cases, it is in the details that once again reveal computer generation, like fingers and teeth (Figure 1).

Ginzburg traces the connection between Morelli and his articles to Sigmund Freud and the author of Sherlock Holmes’ Detective novels, Arthur Conan Doyle. At face value, the connection might not seem obvious – for Freud, there was something interesting about Morelli, especially the reading of adventitious gestures when producing little details in paintings, which could also become a psychoanalytical method. Instead of observing fingers, toes, and earlobes, in psychoanalysis, one should observe adventitious behaviours, those that the patient will put little effort in hiding or disguising (Ginzburg, 1989, p. 91). The connection to Sherlock Holmes follows a similar logic – the method of identifying an artist should be similar to that of the detective, not by looking at the obvious, but by paying attention to little traces, such as cigarette ashes, footprints, and fingerprints. What ultimately connects Morelli, Freud, and Holmes is medicine – Morelli had a degree in medicine, Freud was a physician, and Conan Doyle had practiced medicine before turning to literature (Ginzburg, 1989, p. 92).

In a way, the Morelli method is simultaneously an evidential paradigm and an interpretative one, which has links to semiotics as a way to “read” traces (Crossland, 2009; Sebeok & Umiker-Sebeok, 1988). Thus, it establishes a connection with the Aristotelian sciences, in that it concerns the understanding of the meanings underlying the actions of people. While it does have similarities to the hermeneutic approach popularized in archaeology by Hodder (1982, 1985a,b), “reading” in Ginzburg’s sense has wider application. Let us not forget that hermeneutics originated from exegesis, the reading of religious scripture and as such, it denotes some limitations when transposed to other fields (Descombes, 1986, p. 26). The reading of traces follows an abductive way of thinking:

An oriental fable that circulated among Kirghiz, Tartars, Jews, Turks, and others relates the story of three brothers who meet a man who has lost a camel or, in variant versions, a horse. They describe it for him without hesitation: it is white, blinded in one eye, and carries two goat-skins on its back, one full of wine, the other of oil. Then they have seen it? No, they have not. So they are accused of stealing and brought to trial. For the brothers, this is a moment of triumph: they demonstrate in a flash how, by means of myriad small clues, they could reconstruct the appearance of an animal on which they have never laid eyes. (Ginzburg, 1989, p. 93)

What this text describes is a way of inferring from partial and fragmented data, not too dissimilar to archaeology. At this stage, traces work as clues – in the sense that, the trace fills the role of evidence that something happened, and clues are the semiotic signs that allow us to recognize what could have happened. All of this can be linked to one of the legacies of processual archaeology – the study of how archaeological sites are formed (Schiffer, 1972; Shott, 1998). As a debate between Lewis Binford and Michael Schiffer demonstrated, the archaeological record is not a photograph of the past, of people as they were during the time they lived (Binford, 1981; Schiffer, 1985). Sites are not just fossil records of past cultural dynamics, but much more, the idea of traces is the recognition of human activity – of people doing and acting in ways that leave a sign to be read.

Recognizing human presence through traces, whether it is ashes in a fireplace or knapping material close to a quarry, seems fairly obvious and barely worthy of mention. The idea of traces, however, serves more than just establishing human activity; they also serve as clues to our understanding how and why people behaved in the way they did. Postprocessual archaeologists were correct in highlighting the importance of “context” in archaeological studies (Hodder, 1987; Thomas, 2000). By context one means the historical and social circumstances in which action takes place (Ribeiro, 2018). The act of knapping in a prehistoric setting and knapping in experimental archaeology are virtually identical if we see them purely from a material perspective, but they respond to different motivations, and are supported by different ethical values (Ribeiro, 2022b).

The context serves as some form of general abductive truth – an instinctive guess about the origin of a fact (Harrowitz, 1988, p. 180). This form of reasoning differs from the standard hypothetico-deductive and inductive
forms of reasoning. The former requires the testing of a general hypothesis against data, while the latter allows data to provide a probabilistic scenario. Given the way archaeology works with both the hypothetico-deductive and inductive approaches, there is no need for a context – general principles and vast collections of data are the source of information in themselves – that is what grants them the ability to transcend local and chronological contexts. In today’s archaeology, the lack of context is also the source of their popularity – a person in the US or Northern Europe does not need to plow through decades of field research and thousands of pages of reports and articles – all one needs today are the numbers contained in those reports and articles.

This is also the reason why the evidential paradigm promoted by Carlo Ginzburg is closely linked to microhistory and small-scale research in general (Ginzburg, 1993, 2015; Levi, 1991; Trivelato, 2011). In the scientific mindset and global trends of today, this might seem a weakness, but it is precisely the combination of context, traces, and clues that Ginzburg’s evidential paradigm gains its strength. Unlike the hypothetico-deductive and inductive approaches, which have to rely on generalizations, universals, or law-like statements, there is no such pressure in microhistory. When one uses microhistory to research a small site with the aim of understanding the behaviours of the people that lived there, the objective is to understand the site alone and what makes it unique, that is to say, one has the aim of understanding the site in its own terms. Bear in mind that this is not a claim that the site is incomparable or that it is non-representative of other sites of the same period and region, much on the contrary, it is precisely because one tries to understand a site in its own terms that one can get an accurate representation of what a site belonging to a certain period and region should be. To use a more modern example – to understand the French Revolution does not require a general list of what “revolutions” are supposed to be and then compare the French Revolution to this list and see where the overlaps lie; the study of the French Revolution by reading historical texts of the time and through the study of its material culture is what provides our understanding of what revolutions are supposed to be in the first place.

By keeping the focus on human activity within their context, one does not have to prove that all humans act in a certain way given certain circumstances; one only has to demonstrate those actions one is interested in understanding. For instance, by recognizing the presence of a footprint or a fingerprint, one can prove that certain person was at a crime site. Thus, besides the connection between traces and the medical field, as established, there also seems to be an undeniable connection between traces and the legal sphere. It is precisely in this sphere that the concepts of “evidence” and “proof” have a stronger foothold than in science. The work done by the archaeologist who studies the archaeological record is much closer to a team of lawyers or investigative journalists who gather independent lines of evidence to support events, practices, and human activities in general. The phenomenon reconstructed by the archaeologist, based on traces, is never watertight, since it is impossible to observe the phenomena as they happened – but these reconstructions are usually the closest to proof we can ever get.

Science is rife with cases of falsification and malpractice, sometimes followed by unfortunate consequences, such as the misconduct by stem-cell researcher Haruko Obokata (Rasko & Power, 2015), and sometimes without many consequences at all, such as when images were doctored by Sylvain Lesné in his research on Alzheimer’s disease (Piller, 2022). In both cases no criminal charges were levelled against the scientists, which ultimately is a good thing, of course. Investigative journalism, on the other hand, is held under considerably more scrutiny, and with a good reason given the gravity of accusations investigative journalists often make (e.g. Rele, 2022; Wiseman, 2022). It is precisely because of the gravitas of the claims made by investigative journalists that they rely on a very clear and direct evidential paradigm, the same as that described by Ginzburg. When Charles Perreault evokes the idea of a “smoking gun,” that is, incontrovertible evidence in archaeology, and goes on to even use an example from the legal world to promote a “macroarchaeology” (2019, p. 143), it feels a bit strange that he would ignore the evidential paradigm of Ginzburg, and its connection to detective methods and diagnostic medicine. Even stranger is that Perreault’s macroarchaeology is inductive in character, which means it is limited in its capacity for certainty, unlike the hypothetico-deductive approach, which can also be used in archaeology. This is not to undermine the contributions made by inductive approaches in archaeology, but to point out that from an epistemological standpoint, the evidential paradigm of Ginzburg, by extension, an archaeology that recognizes data as traces and clues, holds a much stronger connection to science and evidence than appears at face value.
4 On Fiction in Archaeology

Regardless of the methodological strictures in how we conceive data and consequently how we interpret them, there is no foolproof approach that guarantees absolute truth when it comes to interpreting the past. The hypothetico-deductive approach, inductive approaches on large datasets, and Ginzburg’s evidential paradigm can only provide educated guesses the moment we try to infer the actions of past peoples. To understand the intentional actions of people is always a conjectural act (Ribeiro, 2022b) – it is an act of trying to make sense of why people did things the way they did. To the criticism that we cannot reconstruct past intentions, the same can be said of present intentions as well (Tilley, 2004).

Thus, the idea of recovering “smoking guns” is unwarranted in a discipline such as archaeology, because of the inherent limitations of archaeological data, which no matter how much number-crunching one performs, will always only provide approximations of truth at best (Holtorf, 2003, p. 537; Von Wright, 1971b). Granted, these uncertain approximations remain nevertheless very valuable in painting a picture of what the past could have been like. But given the impossibility of arriving at absolute truths when it comes to past human behaviour, we must conceive a way of conjecture where multiple strands of data support a varied number of interpretations. This is because it is very rare for data to support only one interpretation – a problem that in philosophy of science is known as “underdetermination” (Boyd, 1973; Douven, 2000; Newton-Smith & Lukes, 1978; Stanford, 2017). Knowing basic facts about reality rarely translates into the truth – knowing that a person has 10€ and that oranges cost 1€ and apples cost 2€, does not tell us how many apples and oranges one will buy, in fact, one cannot even know whether the person would want to buy either apples or oranges – the person might choose to not buy anything at all. So, with regards to multiple interpretations, one is referring to the interpretation of the actions of past people, which we reconstruct based off traces and clues – one is not referring to multiple interpretations like in physics or biology, but rather to the understanding of how humans act in their socio-historical context, otherwise known as “agency” (Ribeiro, 2019b, 2022b).

One of the more conventional ways of thinking about agency is by assuming people could have “chosen or acted otherwise” (Chisholm, 1976; Pleasants, 1997), and while this understanding of agency is more complex than meets the eye (Ribeiro, 2022b), the underlying idea is that there are situations where people could have chosen between multiple different actions. Thus, when we use traces and clues to reconstruct the past, we can assume that there were multiple ways the past could have gone – archaeological data support multiple interpretations. This has led in recent years to the idea that human history could have gone in multiple directions (Furholt, 2021; Graeber & Wengrow, 2021) and the entertainment of the idea that archaeological discourse ultimately contains elements of fiction (Van Dyke, 2015; Van Helden & Witcher, 2020).

Evocations of the relationship between archaeology and fiction often conjure up comparisons between scientific scholarship performed by serious archaeologists and historical fiction, such as Jean Auel’s novels (e.g. The Clan of the Cave Bear and The Mammoth Hunters). There are, of course, very big differences between these two types of work, but what they have in common is what is interesting to us. Although historical fiction lacks a scientific methodology, they nevertheless set their stories within a reality that we, archaeologists, readily recognize. The Rankian idea that history recreates the past as it truly was (“Wie es eigentlich gewesen”) has given way to the idea of a history as it could have been. As Alessandro Manzoni points out, history operates on a separation of what was and what could have been, that is to say, a tension between reality and the verisimilar (Manzoni, 1984, p. 74), or in Ginzburg’s words, between what is real and what is possible (Ginzburg, 2012, p. 55).

It is important to remember that the separation of a truly historical work, in the disciplinary sense, and fiction, has not always been easy, in large measure because fiction is not total invention (Ginzburg, 2012, p. 77) – fiction is a form of representing reality, much like history and archaeology. It comes then, as no surprise that archaeologists of the past, such as Heinrich Schliemann, used texts such as The Odyssey and The Iliad to identify the ancient city of Troy. Similarly, if one were to read Hanya Yanagihara’s A Little Life, published in 2015, or Douglas Stuart’s Shuggie Bain, published in 2020, one would be able to discern elements of reality, such as the cities they take place in, the culture in which the characters circulate in, the language and mannerisms, and the circumstances of the characters, because all of these elements are real. This is also known to literary critics, who recognize in literature deeper historical truths. Edward Said’s Orientalism (1978) and Erich
Auerbach’s *Mimesis* (2003[1946]) are cases in point, since both of these works of literary criticism aim towards recognizing a deeper *Zeitgeist* that is transposed into literary form. The literature analysed by Auerbach would all qualify today as fiction. Literature such as Stendhal’s *The Red and the Black* and Virginia Woolf’s *To the Lighthouse* are in fact fictional, but to qualify this literature simply as fictional would have horrified Auerbach, since for him they provide a deeper understanding of the West than we initially assume (Ginzburg, 2012, p. 137). For instance, when commenting on *The Red and the Black*, Auerbach remarks on how Julien Sorel, the protagonist, is caught making some unfavourable comments about Mademoiselle de la Mole (Auerbach, 2003[1946], p. 455). This event in *The Red and the Black* might seem rather innocuous and of little importance, but Auerbach points out:

> The scene, as I said, is designed to prepare for a passionate and extremely tragic love intrigue. Its function and its psychological value we shall not here discuss; they lie outside of our subject. What interests us in the scene is this: it would be almost incomprehensible without a most accurate and detailed knowledge of the political situation, the social stratification, and the economic circumstances of a perfectly definite historical moment, namely, that in which France found itself just before the July Revolution; accordingly, the novel bears the subtitle, *Chronique de 1830*. Even the boredom which reigns in the dining room and salon of this noble house is no ordinary boredom. It does not arise from the fortuitous personal dullness of the people who are brought together there; among them there are highly educated, witty, and sometimes important people, and the master of the house is intelligent and amiable. Rather, we are confronted, in their boredom, by a phenomenon politically and ideologically characteristic of the Restoration period. (Auerbach, 2003[1946], pp. 455–456)

The implication of Auerbach’s comment is clear – the actions of the people in the novel only make sense within a very specific socio-historical context, and more than just the story of a love triangle in the nineteenth century France, *The Red and the Black* is a source that allows us to understand the behaviours of people in a specific place and period. The idea that literature represents reality can be found in all periods, with recent books such as Orhan Pamuk’s 2008 novel *The Museum of Innocence* as a great example of the representation of Istanbul during the 1970s and 1980s, as a place of strained class relations, a clash of Eastern and Western ideologies, and of the role of women in a rapidly changing Istanbul. Naturally, one is not directly advocating the writing of archaeological texts as fiction, but rather, to see literature as a metaphor of something that contains contexts that make sense of the actions of people.

The idea is to think of Carlo Ginzburg’s methodology applied to archaeology as a two-step process, the first step requiring the recognition of traces and clues, which provide the context in which people in the past acted and developed their practices. This first step can be understood in terms of an evidential paradigm, one where the unique and exceptional highlight the variability of human behaviour. However, while traces and clues serve as evidence of human action, these remain nevertheless a source of underdetermination – many meanings and purposes can be associated with the actions of the past peoples we wish to understand, which is why we need a second step in our methodology, one that is conjectural. To conjecture is to think in the same way as fiction is written – as a context where several stories of human lives can occur, none of which are guaranteed, yet make sense in relation to the evidence available. This might sound fairly straightforward, but it does require a different attitude to both data and interpretation in archaeology – one that views science as ultimately less restricted to inductive approaches, proof by correlation, and the hypothetico-deductive approach.

5 Conclusion

As archaeology progresses through late capitalism, a newfound empiricist, induction-based, and scientifically charged discourse has arisen. This process has led to the dominance of the archaeological sciences in archaeology, especially those that are computer-aided and reliant on very large datasets. Besides changing the discursive landscape of archaeology, it has changed the way archaeologists approach data, converting and reducing it to numerical values. This has allowed archaeology to become faster, and for archaeologists to produce knowledge at the same rate as some of the hard sciences. Furthermore, this change has opened the possibility for a new and distinct form of interdisciplinarity to arise, one involving natural-scientific
techniques, but also allowing archaeological datasets to be compared and resemble those of other social sciences, such as human geography and quantitative economics. Naturally, this has benefited archaeology – this has generated more research funding and positions for archaeologists.

While certain things have been gained from this transition, certain things have been lost as well. Transitioning to a more scientific archaeology has also meant abandoning the contexts that allow us to make sense of the actions of past people – what we are losing is the more humanistic and empathetic side of archaeology, one that aims at understanding the motivations and reasons why people did what they did. Whereas the more humanistic type of archaeology requires slow and measured gathering and understanding of the data, through traces and clues, the scientific archaeology of today is aggressively extractive – one can simply download data online, for instance, of prehistoric Spain, while never stepping foot in that country nor having to carefully read the studies produced by Spanish archaeologists themselves.

At face value, despite the apparent scientificity and claims of objectivity of this new archaeology, an epistemological analysis reveals worrying problems. As Hodder points out, this new scientific archaeology is not dissimilar to the processual project of the 1970s and 1980s (Hodder, 2018), and the problems archaeologists faced at the time have not gone away, no matter how much computing power you throw at them. In response, some archaeologists have turned towards the micro-scale, emphasizing the importance of tried-and-true methods in archaeology (e.g. Riva & Mira, 2022). Certainly, archaeology cannot go without inductive and deductive approaches; these remain a very important element of how we do archaeology. As Raymond Thompson and David Clarke pointed out, discovering patterns and repetitions in data remains one of the most crucial forms of conducting archaeological practice. Similarly, the hypothetico-deductive approach, when used sensibly continues to be the most effective form of challenging outdated ideas and narratives in archaeology. Nonetheless, what this study has tried to do is recognize the importance of various elements with which archaeologists usually think, elements that more often than not, are used by archaeological scientists themselves, even though they are not mentioned explicitly and rarely advocated for. These elements – traces, clues, and fiction – still have an important role to play. Thus, the evidential paradigm of Carlo Ginzburg is more than just a methodological palate-cleanser in contrast to the fast-paced and larger-than-life archaeology of today, it is also a political statement on where archaeology is headed, and what will be lost if we stay on this track.

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