

19

APONTAMENTOS

de Arqueologia e Património

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DE INVESTIGAÇÃO
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EDITORIAL

*“Vemos, ouvimos e lemos. Não podemos ignorar.”
[Cantata da Paz, Sophia de Mello Breyner Andresen]*

Dizia há tempos Slavoj Žižek que nos estamos a colocar à margem dos processos de investigação, escrita e leitura. Sublinhava que cada vez mais se vai pedindo à Inteligência Artificial (IA) que faça a recolha e análise de dados, que escreva o artigo, para que alguém a seguir, em vez de o ler, lhe peça para fazer um resumo do mesmo. Em suma, vamos abreviando e paradoxalmente exteriorizando às nossas produções. A uma “morte do autor” (que não a de Roland Barthes) junta-se agora também a morte do leitor. Ou melhor, autor e leitor são o mesmo.

Também há dias José Pacheco Pereira, no Público, distinguia uma velha ignorância, baseada na insuficiente escolaridade e baixa qualificação profissional, de uma nova ignorância, de gerações escolarizadas, mas iludidas e progressivamente desumanizadas pelo fascínio tecnológico de contornos patológicos. Um pouco antes, académicos reclamavam a expulsão da IA do ensino universitário.

Do outro lado a visão oposta. “Artificial intelligence (AI) is changing the research landscape through automation, data analysis, and better decision-making in various ways that are of immense help to researchers in conquering obstacles and accelerating their discoveries. From literature search to data analysis, to design experiments and manuscript writing, AI-powered tools using robotics, machine learning (ML), and natural language processing (NLP) go a long way in facilitating easy research. Technology enhances efficiency by summarizing articles, recommending publications, and pointing researchers in the right path. [...]. Training and supporting policies are needed for skill shortages and to surmount resistance to change in order for full utilization of AI in research.” (Madanchian, M.; Taherdoost, H., 2025, The impact of artificial intelligence on research efficiency, Results in Engineering.26).

É fácil ver vantagens imediatas na IA, sobretudo ao serviço do mais, mais depressa, mais eficiente, mais barato. No entanto, programas internacionais de avaliação de conhecimentos estão a registar, desde 2010, um declínio na nossa capacidade de utilizar competências cognitivas, com uma erosão do raciocínio, da memória e da concentração provocada pela submissão tecnológica.

António Carlos Valera

AGAINST (A SOLELY) HUMAN PAST: DEEP ECOLOGY AND ITS CONSEQUENCES FOR ARCHAEOLOGICAL THOUGHT IN A MULTISPECIES ANTHROPOCENE

Mara Beatriz Agosto¹

Resumo:

Este artigo apela a uma reorientação do pensamento e da prática arqueológica, incorporando a filosofia da Deep Ecology de Arne Naess. Naess desafia o antropocentrismo com uma visão ecocêntrica que reconhece o valor intrínseco de toda a vida. Utilizando os oito princípios da ecologia profunda – tais como diversidade, uso limitado de recursos e melhoria qualitativa –, demonstramos o seu impacto em três aspectos centrais da arqueologia: substituir tipologias formais por um foco nos metabolismos materiais, redefinir a divisão natureza/cultura por meio de uma historiografia multiespécie que inclui agentes não humanos e mudar de um modelo de rede para a «meshwork» de Tim Ingold, na qual os sítios são vistos como nós dinâmicos em processos interconectados.

Palavras-chave: Arqueologia Teórica; Filosofia da Natureza; Filosofia; Deep Ecology; Meshworks; Metabolismos Sociais.

Abstract:

This article calls for a reorientation of archaeological thought and practice by incorporating Arne Naess' Deep Ecology philosophy. Naess challenges anthropocentrism with an ecocentric view that recognises the intrinsic value of all life. Using the eight principles of deep ecology – such as diversity, limited resource use, and qualitative improvement – we demonstrate their impact on three core aspects of archaeology: replacing formal typologies with a focus on material metabolisms, redefining the nature/culture divide through a multispecies historiography that includes non-human agents, and shifting from a network model to Tim Ingold's "meshwork," where sites are seen as dynamic nodes in interconnected processes.

Keywords: Theoretical Archaeology; Philosophy of Nature; Philosophy; Deep Ecology; Meshworks; Societal Metabolisms

“The nature before us is an anthropogenic environment, no longer simply an object but rather a pro-ject.”
Henrich, 2013, p. 32

“Ich singe unsre Katastrophen in tonier Zusammenbrüche”
Einstürzende Neubauten – Susej

0. Preamble, or why Deep Ecology is important in archaeological thought

Archaeology and the world stand at an ecological crossroads. Amidst environmental catastrophe, where global warming, mass expansion, and landscape degradation significantly interfere with the Earth's natural systems, our discipline can no longer view the environment as a natural backdrop against which the cultural fabric unfolds. In this sense, and in order to combat this tendency of a certain type of archaeology (e.g., Binford, 1962, 1978, 1980, 1990; Childe, 1951, 1956a, 1956b; Flannery, 1968, 1972; Willey, 1953; Willey, Phillips, 2001 [1958]), it is important to mobilise the philosophy of Arne Naess and his Deep Ecology (e.g., Naess, 1989, 1997, 2002, 2005a, 2005b, 2005c, 2005d, 2005e, 2005f, 2005g, 2005h,

2008), which is nothing more than an ecocentric theoretical system that reconceptualises humans within the web of dependencies of all beings on Earth. In this sense, archaeology is still a very human-centred discipline (e.g., see Braidwood, 1953: 79; Carver, 2011: 21; Childe, 1977: 11; Clarke, 1968/2015: 10; Hawkes, 1954; Kossina, 1926: 8; Kristiansen, 2009: 4; Wheeler, 1950: 122) despite recent theoretical developments that have challenged this idea (e.g., see Alberti et al., 2011; Harman, Witmore, 2023; Olsen et al.,

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2012; Olsen, Witmore, 2015; Webmoor, Witmore, 2008; Witmore, 2006, 2007, 2014). It is believed, however, that Deep Ecology can, using philosophy and archaeological thinking, provide new, more ecocentric perspectives. Furthermore, the advent of the Anthropocene has blurred the line between human activity and the natural activity of the Earth (e.g., Agosto, 2025), which are now inseparable, as humans already affect the entire globe (e.g., Crutzen, Stoermer, 2000; Edgeworth *et al.*, 2014; Edgeworth, 2021; Erlandson, Braje, 2014; Kluiving, Hamel, 2016; Lane, 2015; Quenet, 2017; Steffen *et al.*, 2007; Steffen *et al.*, 2011; Zalasiewicz *et al.*, 2011). This process of planetarisation is central to a greater understanding of the Earth as a global whole, rather than just as a particular entity. Once again, Arne Naess' philosophy is believed to be well-suited to meet the challenges of the contemporary world.

Thus, this article aims to integrate Deep Ecology with archaeological thinking, its ultimate goal, and to draw conclusions for archaeological practice. From a structural point of view, this article will begin with an exposition of the philosophical foundations of Deep Ecology, which will then be dialectically crossed with archaeological practice and the bibliographic *corpus* of theoretical archaeology.

In this way, we will explore three theoretical transformations in archaeological practice that align with this lens of Deep Ecology. The first of these will be an attempt to replace typological lenses with ecological ones, aiming to study, instead of static artefacts, the societal metabolism of communities. Next, the arguments of Deep Ecology strongly challenge the Cartesian paradigm of separation between body and mind, and, by extension, between culture and nature, thereby introducing a fundamental discussion on a multispecies archaeology. Although this dichotomy has already been criticised in archaeology (e.g., Antczak, Beaudry, 2019; Harman, 2014, 2019; Harman, Witmore, 2023; Hodder, 2010, 2011, 2012, 2014, 2017; Ingold, 2002 [2000]; Nativ, 2014), we believe that Deep Ecology can offer a new perspective that will help to strengthen this theoretical debate. The last of these transformations shifts the geometry of the past from networks of objects to *meshworks* of life-lines, objects and times, revealing sites as dynamic nodes of movement rather than static containers of objects, using Ingold's conceptual framework (see Hicks, 2016; Ingold, 2007, 2011, 2013, 2015; Munter, Salvucci, 2024).

Finally, Deep Ecology, following in the footsteps of post-humanist archaeologies (e.g., Cipolla *et al.*, 2021; Cipolla, 2021; Cobb, Crellin, 2022; Crellin *et al.*, 2021; Fredengren, 2013) and New Materialisms (e.g., Alberti *et al.*, 2011; Antczak, Beaudry, 2019; Olsen, Witmore, 2015; Witmore, 2005, 2007, 2014), seeks to reconceptualise the role of humans, who are, in fact, just one of many historical agents.

Similarly, Deep Ecology is more than just an ecological philosophy; it serves as a guide for action and a means of combating the current climate crisis. For this reason, we will also discuss how Deep Ecology can contribute to a deeper understanding of environmental issues in archaeology, thus fulfilling a higher purpose amidst a climate and ecological crisis.

It is believed, therefore, that these consequences make Deep Ecology more than just an ethical veneer on archaeological practice, but rather rewrite our analytical categories, our methodological habits, and our narrative forms. Rather than diluting disciplinary rigour, an archaeology governed by the principles of Deep Ecology is better equipped to face a world where environmental awareness increasingly plays a central role in our lives, and where archaeology, whether through the archaeology of the Anthropocene (e.g., Agosto, 2025; Carvalho, 2023; Cronin, 2020; Edgeworth, 2014a, 2014b, 2021; Edgeworth *et al.*, 2014; Erlandson, Braje, 2014; Kluiving, Hamel, 2016; Lane, 2015), of contemporaneity (e.g., Buchli, Lucas, 2001; Carvalho, 2024b; Etzeberria *et al.*, 2021; González-Ruibal, 2019, 2020; González-Ruibal, 2022; McAtackney, Penrose, 2016; Yaneva, 2013), or of garbology (e.g., Lehmann, 2015; Moss, 2021; Rathje, Murphy, 2001; Shanks *et al.*, 2004), increasingly plays a central role. In this way, archaeology can be a vital interlocutor in the discussion of these topics at a more general level than strictly archaeological, offering a new vision of a world in potential and one where all species increasingly matter.

1. Arne Naess' Deep Ecology and his ecosophy T: towards a critique of anthropocentrism

Arne Naess' *Deep Ecology* represents a vital critique of anthropocentrism. Verily, such critiques tend to take different forms (Fox, 1995: 14–18), although only four are presented here, due to fallacies in the fifth point (an *argumentum ad populum*):

1. The non-exceptionalism of human beings in relation to non-human animals, which tends to be based either on *anthropocentric chauvinism* or on a supposed human exceptionalism *vis-à-vis* other animals, which, through the latent belief that humans are not related to the rest of the biosphere, establishes a biological hierarchy that places non-human animals as inferior:

"On the other hand, nonhumans are by the same process degraded to the status of inferior human beings, species-anomalies: imbeciles, the senile, 'human vegetables' – moral half-breeds having rights without obligations (Singer), 'legal incompetents' needing humans to interpret and represent their interests in a perpetual guardian / ward relationship (Stone)". (Rodman, 1977: 94).

This view also stems from the assumption that humans represent the pinnacle of biological evolution, which contradicts the principles of evolutionary biology.

2. On the other hand, anthropocentrism has already proven to be a disastrous practice: from the overexploitation of resources, the mass extinction of multiple species, and the transmission of diseases from non-human animals through overexploitation of ecosystems, anthropocentrism is, in short, a guide to bad practices in ecological coexistence;
3. Furthermore, anthropocentrism, as a theoretical basis, is not coherent when taken to its logical conclusion, as there

are no eligible criteria that include all humans and exclude non-human animals;

4. "However, accepting any of these characteristics [like rationality or morality] as a criterion of moral considerability means that one excludes not only all nonhumans from the domain of moral considerability (or let us at least say this for the sake of the argument) but also some or all of the following classes of humans: members of "primitive" cultures, imbeciles, infants, the senile, human "vegetables", and people who are temporarily or irreversibly comatose. Conversely, any reasonably clearly discernible, morally relevant characteristic that includes all humans (e.g., being alive) will include many nonhumans as well." (Fox, 1995: 16).

Thus, in addition to the harmful effects of anthropocentrism, it also stems from a notion of universal humanity (which is nothing more than white, heterosexual, cisgender, Western, and physically and mentally healthy men), pruning the lush tree of complexity that the *Dasein* – the Heideggerian human way of being in the world – implies and reducing it to a handful of archetypes.

Other characteristics that link humans to this notion of exceptionality follow the line of argument that humans, as opposed to non-human animals, have a privileged connection with a divine or deity: which is nothing more than the simple anthropocentric projection of an idea of the cosmos.

5. Another point, also related to the previous one, lies in the idea of morality in non-human animals, where it is increasingly being concluded that human notions of morality are gradually coming to include non-human animals.

On the other hand, and in response to what is proposed here, it can be argued that, as we are human, our views are always governed by humanity – in a kind of *capital sin*.

However, such a view confuses concepts and overlooks the notion of scale, because:

"It confuses the inescapable fact of our human identity, the trivial sense of anthropocentrism, with the entirely avoidable possibility of human chauvinism or human imperialism, the significant sense of anthropocentrism. (The terms human chauvinism and human imperialism might for convenience be taken as emphasizing, respectively, the passive and aggressive faces of this significant sense of anthropocentrism.) Such a confusion amounts to the same as implying that a male who argues for equal opportunity or affirmative action for women is being "sexist" simply on account of the fact that his view is androcentric (i.e., male-centred) in the weak, trivial, tautological sense that it is a view put forward by a male. If this is granted, then all male views (and all female views for that matter) are equally sexist and the significant function of the word sexism is lost." (Fox, 1995: 21).

This constitutes a *fallacy of equivocation (equivocation)*, which is a fallacy of linguistic confusion: "Directing another person toward an unwarranted conclusion by making a word or phrase employed in two different senses in an argument appear to have the same meaning throughout." (see Damer, 2009: 121).

It is in this context – the failure of anthropocentrism and, simultaneously, of the natural world – that philosophy has sought to provide answers in the fields of action and theory to address this *twilight* – our last century on Earth (Naess, 2005b: 3). One of these answers, and perhaps one of the most radical, was the Deep Ecology movement founded by the Norwegian Arne Naess, which, being a strongly anti-anthropocentric and Heideggerian (see Holy-Luczaj, 2015: 91–149; Naess, 1997; Zimmerman, 1994) and Spinozian philosophy (Das, 2019; Jonge, 2016 [2004]; Naess, 2005c, 2005d), seeks to demonstrate how all life on Earth has the same value.

Deep Ecology is based on some basic assumptions for action, namely eight fundamental principles, the so-called Eight Points (Naess, 1989: 29; 2005e: 18–20; 2005g: 37–41; 2005f):

1. All life on Earth has intrinsic value, regardless of its usefulness to human life, which includes the entire ecosphere and all living elements, such as rivers, landscapes and ecosystems; similarly, all ecological processes should be preserved. This does not imply, for example, that we should not kill an insect that could harm us, since all living beings have the right to grow and develop (*to blossom*) and have intrinsic value equal to ours, and if something threatens this – as in the case of the insect – we can, for example, act in self-defence or move elsewhere (see Naess, 2005a, p. 68). This does not corroborate any thesis that seeks to see these forms of life as inferior beings or with less intrinsic value. Another relevant value, still within this first topic, is that of *proximity* between living beings: this governs our interrelationships, since the radical otherness between, for example, a mammal and an insect does not cause it to react in the same way with other mammals; or, in the case of a family member, we have an obligation to provide goods that we do not have with other members of society (see Naess, 2005a: 69);
2. The plurality of life on Earth is good in itself and needs no prior explanation. It contributes to realising and proving the first point, being valuable in itself and not only as a tool for "higher" forms of life;
3. Humans can only exploit this wealth of non-human animal life to satisfy basic needs for self-sustainment. This notion of *basic needs* is, in Naess, deliberately ambiguous, as it is always dependent on a particular culture or context;
4. The flourishing of non-animal life is *compatible* with the reduction of human life on Earth; however, this goal should not be achieved through *forced* reduction, but rather through a phased process of population decline over the long term, as it is not beneficial even for humanity itself (because it reduces the biodiversity of the Earth as a whole);

5. Human intervention in the non-human world is currently excessive and must therefore be reduced – but not eliminated (as this is not conceptually possible);
6. Our notion of politics must be changed, which will affect all aspects of human life in society. Indeed, today's idea of sustainability is still only related to anthropocentrism, and not to the necessary *decentring* of the human species as *ruler* of the world;
7. Our changes in lifestyle will bring about a greater appreciation of our current quality of life (it is not a question of raising the *higher standard of living*, but of appreciating it more), as excessively high levels of societal metabolism lead to the collapse of the natural world;
8. Those who adhere to these principles must, in some way, try to apply them.

These principles serve as a guide for action in a natural world in decline, and will be discussed in detail below. Naess begins by establishing a distinction between what he calls shallow ecologies and Deep Ecology. The former is the simple fight against pollution and the depletion of natural resources, with the wealth of the industrialised world at stake; while the latter – *Deep Ecology* – advocates, as already explained, a total reconfiguration of humanity within the framework of natural relations on Earth, as well as the constant questioning of all political measures through the lens of Deep Ecology.

Unlike other ecological perspectives, Deep Ecology is based on conscious theoretical and philosophical assumptions. However, in defining his ecosophy, Naess does not intend to be totalising and monolithic, having chosen an ecosophy T to symbolise the multiplicity of possible ecosophies: it is up to Naess' readers to construct their own ecosophy – always based on reflection and flexible in terms of its changes over time – with that of the aforementioned thinker being merely an example (Naess, 1989: 37, 163). Furthermore, Naess is very clear when he states:

“The complete formulation of an ecosophy is out of the question: the complexity and flexibility of such a living structure make that impossible, perhaps even meaningless.” (Naess, 1989: 196).

In fact, it was never the intention of this thinker to formulate a dense and intricate philosophical basis, seeing this exercise as futile and useless, since it is impossible for a philosophical system to encompass all the diversity of life on Earth. Thus, the Norwegian philosopher sought only to establish the general principles of a possible ecosophy – in this case, T (the letter was chosen at random by Naess) – that would serve as the basis for his ecological movement.

Thus, Naess divides the general movement into a new ecological attitude (*Deep Ecology*) and a strictly philosophical attitude (*ecosophy T*), even though the latter supports the former and does not claim to be absolute and inflexible.

Etymologically, *ecology* derives both from the *eco-* in *economy* (and thus refers to the idea of *oikos*, home and its management) and, naturally, from *ecology*. In this sense, *ecosophy* is above all a philosophical system inspired by the conditions of life in the ecosphere (Naess, 1989: 38), based on certain philosophical principles, which will, in short, be the theoretical foundation of this current, as (see Naess, 1989: 164–179; Naess, 2008: 95–98):

1. Humans only exist because they are part of a natural web and only retain meaning within *that* fabric. Thus, instead of a *man-in-environment* logic, a *total-field image* that contemplates all ecological agents is advocated. Furthermore, human identity only develops within its relationships with the rest of the biosphere, whether between humans or other elements;
2. Biospherical egalitarianism advocates the axiom: the equal right to live and blossom of all life on Earth, without humans being at the centre and core – in an attitude of superiority – *vis-à-vis* the rest of the biosphere. However, it is emphasised that in the overall picture of human interaction with non-human animals, some oppression – and even death – is necessary, so this clause is included only as a general principle. This does not invalidate Naess' advocacy of the right of nature – including humans – to develop: his adage that *unfolding of potentialities is a right* (Naess, 1989: 164). This is not, in fact, synonymous with placing the interests of non-human species above those of humans, since they all have the same intrinsic value. This value is absolute, developing beyond any characteristic that distinguishes the various forms of life, whose arguments are usually grouped into the following formulations:
 - a. If the being has an *eternal soul*;
 - b. If the being is endowed with reason;
 - c. If a being is self-aware and has the capacity to choose;
 - d. And, finally, if it is more *evolved* on the general scale of evolution.

For Naess, none of this constitutes an argument that overcomes the indivisible web of life on Earth. Accepting any of the four premises outlined above opens the way to a hierarchy of living beings, where certain species have more intrinsic value than others, which is unacceptable in *ecosophy T*.

3. Human life is part of a much broader *historical complex* (Naess, 1989: 165), which includes geological temporality and all terrestrial life. What distinguishes *Homo sapiens sapiens* is not its physical or biological adaptability, but rather its cerebral cortex, which places it in an advantageous position for understanding this unity of life on Earth and the emergence of a form of life that can contemplate its uniqueness. What unites all this uniqueness, however, is not so much the instinct for self-preservation, as is commonly believed in ecology, but rather a feeling of self-realisation, or self-unfolding –

Spinoza's *perseverare in suo esse* (to preserve in its being);

4. It is also based on the principles of *diversity* and *symbiosis*, both as a way of increasing the chances of survival and as the ecological principle of *survival of the fittest*, which should only be interpreted as an opportunity to cooperate with other living beings and not, as is often interpreted, as a form of competition;
5. A strongly anti-class position. While rejecting the idea of revolutions or overall plans for the future, he seeks to extend the three principles outlined above – total-field image, biospheric egalitarianism, and diversity and symbiosis – to the issue of social disparities and classes. Furthermore, Naess mentions that the principle of solidarity essentially stems from a logic of identification of A by B, which can – and even more easily given that we are of the same species and therefore apply a principle of *proximity* – give rise to interpersonal relationships in a less oppressive work context that allow for *self-realisation*, as opposed to the growing alienation between the producer and the produced;
6. The principle of *complexity-not-complication* is central to *ecosophy T*, with complication being like trying to find a particular route through a chaotic city, while complexity is a multiplicity governed by laws (*lawful*) that form a *unity* or a *system*. The purpose of Deep Ecology is to advocate societal complexity, not in a logic of fragmentation of work but rather in a division of labour;
7. Ecosophy T defends ethical judgment at different scales depending on the specific situation, and an ethical judgment of collective life or its essence.

On the other hand, *Deep Ecology* also advocates certain political principles (see Naess, 2008: 97–98):

1. The general fight against pollution and the depletion of natural resources, not as an end in itself and with a view exclusively to improving quality in the industrialised world, as *shallow ecology* would have it, but rather properly integrated into the overall framework of *Deep Ecology*;
2. Local autonomy and decentralisation, since the *vulnerability of a way of life is proportional to the weight of external influences* (Naess, 2008: 98);
3. Promotion of *friluftsliv*, which in Norwegian means *life in the open air*, but which is ethically and ecologically responsible. Furthermore, *friluftsliv* can be an educational tool for all generations on an environmentalist path.

All of this stems from deeper theoretical foundations and concerns than those found in shallow ecology, and their interrelationships can be summarised in the following diagram (Figure. 1).

Thus, it is inherent to self-realisation – a central concept in ecosophy T – not only the multiplication of well-being for all

species, but also the general increase in the diversity of life on Earth. This increase in diversity and complexity, in turn, leads to a reduction in intra- and inter-species exploitation, which can only be achieved through widespread symbiosis.

However, the ecological approach does not systematise its *ecophilosophy*, since ecologies generally have principles of action that are theoretically uncoordinated and not articulated within a philosophical whole – although there are other ecological currents, such as those of Naess, that do provide this theoretical framework. What Arne Naess provides, in contrast, is a philosophical system that serves as the basis for a rigorous critique of anthropocentrism and frames the era in which we live today: the Anthropocene.

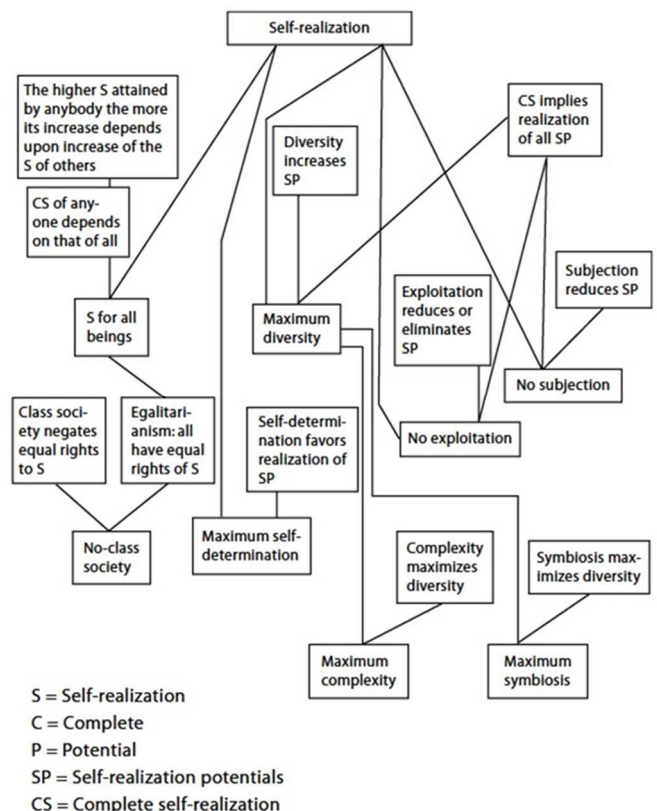


Figure 1 – Diagram summarising Arne Naess' philosophy: his ecosophy T. Taken from Naess, (2005g, p. 53).

2. Rethinking archaeology through the lenses of Deep Ecology

2.1. Societal metabolism vs typologies

The first consequence of applying Deep Ecology thinking is the transition from an archaeology dominated by typological taxonomies – the current archaeological (pre)paradigm of typology (cf. Rathje *et al.*, 2013: 196) – to an idea of *material metabolisms* (see Graedel, Allenby, 2010: 55), where materialities abandon their classificatory static nature – i.e., artefact qualities cease to be rigid categories to which a label is applied based on comparison with similar specimens – to encompass cycles of extraction, transformation, use, repair,

remelting and disposal, as well as subsequent processes of energy recovery (see Delfino, 2014; Graedel, Allenby, 2010; Haberl *et al.*, 2011; Krausmann *et al.*, 2008; Martinon-Torres, Rehren, 2008; Schiffer, 1999; Schröter, 2008). In this ecological logic, the question is not so much what type of materiality we have before us, but rather what its energy and chemical trajectory has been, what the biography of this materiality is, and how this materiality fits into the overall picture of the ecology of artefacts and objects that dot a given society.

To answer this question, tools from industrial ecology can be imported, such as *Material-Flow Analysis* (e.g., Bringezu, Moriguchi, 2002; Eurostat, 2018: 240–244; Graedel, Allenby, 2010), which calculates stocks and flows of a substance within a system, and *Life-Cycle Assessment* (e.g., Eurostat, 2018; Graedel, Allenby, 2010: 161; Guinée, 2002), which quantifies energy, emissions and waste at each stage of a product's biography.

This first concept – *Material-Flow Analysis* – is, in essence, a mass accounting applied to the past, i.e., it measures how much material enters a system, how much material circulates internally, and when it leaves or remains in reserve, delimiting the flows spatially and temporally. This involves reconstructing stocks and flows. Archaeologists can use multiple sources to obtain these metrics, such as the volume of slag, compositional analysis that distinguishes primary metal from remelted metal, dendrochronology, and geochemical proxies, including lead isotopes in coins or trace-element concentrations in landfill soils, among others. This concept enables, first and foremost, a link between archaeology and debates on circularity and the internal metabolism of societies (e.g., Bray, Pollard, 2012), a crucial process for analysing not only prehistory but also the contemporary world.

The second concept, *Life-Cycle Assessment*, serves as environmental accounting, encompassing the entire life cycle from conception to disposal, and considering the impact of a product or process at every stage, from raw material extraction to final disposal or subsequent recycling. Through this concept, it is possible to abandon typologies as the only method of classification and begin to understand the energy and chemical footprints that an artefact has left behind. It also re-conceptualises the chronologies and temporalities we attribute to materials, allowing a piece of pottery to be not just a piece of clay baked 3000 years ago, but a piece of clay baked with a much more complex history and biochemical trajectory.

All of this is in the name of an archaeology that is not bound by the anthropocentric constraints of yesteryear (see Nativ, Lucas, 2020), seeking to free itself forcefully from a vision that only considers its discipline worthy if it serves the purpose of understanding human reality.

In this way, archaeologists can reconstruct the metabolism of ancient or contemporary societies, providing a truly ecological perspective on reality. And, as the literature has amply demonstrated, these concepts, with the proper laboratory

methodology, produce very tangible results (e.g., Inácio, 2015; Inácio *et al.*, 2017; Moreno *et al.*, 2010).

From a theoretical point of view, we move from a formal description of materialities and a game of comparison and parallelism, into a logic of energy intensities, energy and matter flows, as well as an accurate biography of materialities over time (e.g., Gosden, Marshall, 1999; Hoskins, 1998; Kopytoff, 1986), whether at the material, chemical or biological level.

Furthermore, this vision of a biography of objects from an ecological perspective does not necessarily and exclusively have to include laboratory analyses, especially considering the material realities that the Anthropocene creates, such as digital realities and their materialities – their hardware – which enter a constant and permanent recycling cycle, where various issues of elementary climate justice and privacy preservation are also at stake, as already pointed out in the bibliography (Carvalho, 2024a).

2.2. Nature/Culture and the multispecies question

The second topic that an archaeology infused with the spirit of Deep Ecology allows us to address is the division between culture and nature, which since the 17th century have belonged to ontologically separate spheres: one sphere reserved for the human, rational and historical; and the other given over to the non-human, the mechanical and the timeless: perhaps these are the foundations of the modern Western project, the so-called *Great Divide*, as Bruno Latour would call it (Latour, 1993: 12, 39–40, 97).

This idea also has a political function, for since 17th-century Europe, in the midst of building colonial empires around the world, in what is a process of planetary colonisation, Europe needed a philosophy and an ontology that would allow it to manipulate plants, animals, minerals and other populations as natural resources, while at the same time positioning itself as the centre of rationality and, therefore ontologically superior to those it controlled (Latour, 1993: 97). This question of the *Great Divide* is, in turn, more a strategy of control and governance than a robust philosophical theory about the world: for a long time, the human, which slowly became a geological force capable of infecting all areas and layers of the globe, already manipulated the boundaries between the technical and the biological.

In fact, Deep Ecology allows us to think beyond this founding myth of the Western world, as anthropological research, ranging from Descola (Descola, 2005) to Viveiros de Castro (Castro, 1998), has already shown. Ethnographic realities reveal a way of life that is distinctly different from that of the Western world, where, in optimistic animistic regimes, rivers can be considered relatives, rocks are perceived as having intentions, and plants are not relegated to the margins of society, for they are also integral to it. In this sense, Deep Ecology advocates a greater ontological justice capable of encompassing the totality of the world that does not want to be governed – due to the harmful effects on the environment, as we experience them – by the dictates of Heidegger's *Gestell*

(Dahlstrom, 2013: 169–171), i.e., the essence of modern technology, which enslaves the human to it.

But returning to archaeology: the deconstruction of the mythical character of the *Great Divide* and the concrete application of Deep Ecology in its version of justice through non-Western ontologies, or the ontologies of the *Global South* (Santos, 2018), implies admitting, for example, that the Amazonian soils of *Terra Preta* are not manufactured by bacteria, ants, and the human communities that inhabit them: they are fields that constitute ecosystems that bring together both human and natural realities (see Lombardo et al., 2022; Schellekens et al., 2017). This implies rewriting the narratives of the past and present as chronicles of alliances, or conspiracies, between humans, other living beings, and other *vibrant matter* (Bennett, 2010). From a practical point of view, this logic can also help in the preservation of archaeological realities, in the sense that the vegetation of a particular archaeological site can be beneficial for the conservation and stabilisation of masonry (see Carrari et al., 2022; Lucas, 2001), as well as respecting, in other geographies than strictly western Europe, the claims of native communities on the idea of place-being.

Furthermore, it would not be possible in the Anthropocene to operate such a strict division between nature and culture, thus making it possible to conduct an archaeology of the natural, as in the case of the archaeological deconstruction of an anthill or a forest (Agosto, 2025).

In this way, an archaeology of Deep Ecology allows us to tell stories about all historical agents, whether human, non-human, organic, or non-organic, without being governed by a strictly anthropocentric logic. The very notion of agency changes, where humans are no longer the exclusive holders of agency. It should also be noted that this perspective of blurring the ontological boundaries between materialities and living beings is already advocated by Manuel Delanda (*Assemblage Theory*) (see DeLanda, 2016), Bruno Latour (*Actor-Network-Theory*) (see Latour, 2005), and Graham Harman (*Object-Oriented Ontology*) (see Harman, 2002, 2009, 2016, 2018).

However, it is necessary to take this *Flat Deep Ecology Ontology* to its ultimate consequences: from the reconceptualisation of museum catalogues, which can record a ceramic vase as an artefact and, due to the yeast colony it may contain, as a biotope. Similarly, it is possible to cross-reference soil isotopes and phytoliths with human circulation networks, thereby quantifying biocultural flows within a single data system that aims to provide a greater understanding of the totality of human, faunal, and immaterial reality. Finally, combining cultural realities with, for example, wildlife routes can provide insights into specific chronologies or social realities under study, whether past or present.

There is indeed a reality that is more than human, and where, for example, museums can embrace this diplomacy between species with a view to a more inclusive past and, it must be said, closer to the challenges of contemporary life in the midst of the Anthropocene (e.g., Celermajer et al., 2021).

Furthermore, it is important today to explore the objectivities imposed by the Anthropocene, such as the reality of *hyperobjects* (Morton, 2010, 2013a, 2013b) – objects that extend far beyond the human experience, such as global warming, the Anthropocene itself, or the capitalist system.

All of this has a very concrete consequence for historiography: we are moving from a historiography dominated by anthropocentrism to a multi-species historiography that starts from the principle that the human past is, in fact, a past shared with a myriad of organisms and substances that produce the biological and social realities that archaeologists study (see Brittain, Overton, 2013; Hamilakis, Overton, 2013; Overton, Hamilakis, 2013; Windle et al., 2025). Thus, instead of the question being centred on humans, attention turns to the collectives that have emerged, composed of all historical agents, and how these have evolved over time.

These multi-species collectives make archaeology essentially a science of interdependencies, where ants fertilise the land that will be used by humans, isotopes date it, and humans tell the collective history of planet Earth.

2.3. Meshworks vs networks

Finally, Deep Ecology results in a shift from a *network* model to a *meshwork* model, to use Tim Ingold's concept (see Ingold, 2011: 70–71, 151; 2015: 3–5, 87).

In this reality, it represents a true ontological revolution in which lines of force emanate from nodes, rather than the other way around. We must imagine the past as a flow of exchange and a living fabric of intersecting biophysical trajectories, leaving behind the image of static points – be they sites, people or artefacts (Ingold, 2015: 64–70).

Thus, archaeological sites are more than just places of human settlement, but rather places where various lines, which are active threads, generate enough tension to temporarily stabilise themselves in a node (Ingold, 2011: 151). These lines range from water currents, prevailing winds, dunes, wildlife routes, nutrient flows or even human itineraries, which together can stabilise.

This point is ultimately a consequence of the others mentioned above, where settlement ends up being the continuous process by which multiple lines, whether water, animal, plant or human, rub against each other, creating a place. This does not imply that this is a deterministic philosophy, but rather that, instead of obeying a linear sequence of cause and effect, it is a self-reinforcing co-circulation whose coherence rests on the reciprocal tension of the threads.

This concept of self-reinforcing co-circulation – although the term is not used – is essentially a circuit in which each flow simultaneously feeds back into the others (Ingold, 2015: 87–88). Take an estuary, for example: the tides push fine sediments inwards, and these sediments slightly raise the muddy banks, which in turn support halophytic reeds. However, the roots of the reeds slow down the current and capture even more mud, while the new vegetation deflects the

wind and deposits nutrient-rich dust. All these processes feed into one another, and human reality, in its ecological interaction, is no different. The notion of place is thus nothing more than a quest for balance through reinforced cross-cycle processes. A Roman site for metal extraction, for example, exemplifies this reality: the opening of galleries drains groundwater, which dries out the slopes and favours more flammable grasses; as a result, this increases the frequency of fires, exposing bare soil to erosion, which makes it more difficult to transport ingots by river, as the frequency of gravel falling into the river increases, increasing silting. This will require the construction of canals, which in turn drain the slope even more. This ecological system has remained cohesive, temporarily, because the losses of flow are the conditions that make the next possible. When it is no longer possible to transport raw materials by boat, an alternative method will be employed. However, the site has only been occupied as long as this game of opposing forces keeps the knot tight without letting it break.

In this sense, the landscape itself can be seen as a self-reinforcing *co-circulation*, both in the defence of heritage and in the analysis of archaeological reality, which forces us to do three things: 1) diagnose the dominant threads, or which flows drive the knot; 2) measure the elasticity of the tensions; 3) establish a choreography that prevents the system from collapsing. This last point is especially important for the sustainability not only of archaeological heritage but also of a settlement, because without this criterion, it is not possible for this knot to remain intact for a long time.

From this perspective, excavation ends up being the act of deciphering these lines: more than a point in 2D, or even 3D, artefactual realities gain vectors that indicate the direction, speed and frequency of displacement (in this case through post-depositional processes). More than a cost-distance relationship, or *least-cost-path*, they integrate true dynamic fields, since it is at the intersection of all these lines that reality is formed, and not in a single economic factor – or set of factors.

Adopting this *meshworks* logic has a more serious consequence for modernity itself: if lines have always established the world, then the metaphor of the network, with its new sovereigns and discrete connections, reveals itself to be essentially ideological, targeting societies as isolated and governable units. We counter this reality with the intertwined process between territories, heritage and histories, where conservation is also a practical ethic – as well as the management of tensions – which are increasingly less static points, but rather the junction of lines, allowing us to listen to the vital flow of the environments we inhabit.

3. Synthesis

This article aims to contribute to a new way of thinking about the environment by combining Deep Ecology and archaeological thinking, which cannot be equated with a mere natural setting where human action unfolds. This has mobilised the philosophy of Arne Naess – an ecocentric philosophy that shifts humans from the centre of the planetary

web of interdependencies – and provides a guide for action. It is precisely this day of action that is applied here, guiding methods, analytical categories and archaeological narratives that are more appropriate to an era of climate change and growing environmental responsibility. The aim is thus for archaeology, freed from its chronological constraints – in the sense of being understood solely as a science of the human past – to open up to the contemporary world and become a central interlocutor in ecological debates, contributing long-term perspectives to the understanding and mitigation of the global environmental crisis during the current sixth mass extinction.

Heidegger's thinking on nature serves as a propaedeutic to Deep Ecology. This stance denounces the anthropocentrism that transforms nature into an energy reserve, a perspective that, in the works of Arne Naess, takes the form of Deep Ecology. In short, Heidegger inaugurates a critique of technology that Naess radicalises, offering a philosophical and political programme to overcome anthropocentrism and reinscribe the human in an ecology of co-responsibility with the entire biosphere.

This differs from a superficial ecology, which limits itself to combating pollution within an industrial paradigm, whereas a Deep Ecology radically displaces humans from the centre of agency in the world. This sets out the eight founding points of this Deep Ecology, which aims above all to be a guide for action, namely intrinsic equal value for all forms of life; celebration of diversity; use of resources only for basic needs; voluntary population reduction; drastic reduction of human intervention; revision of political institutions; qualitative, not quantitative, improvement of life; and practical commitment to these principles.

In this sense, Naess proposes what he calls *ecosophy T* to illustrate how anyone can articulate their own *ecosophy* – the *T* is merely illustrative. Its pillars are 1) total-field view instead of “man-in-environment”; 2) biospheric egalitarianism; 3) primacy of self-realisation (in the manner of Spinoza) over self-preservation; 4) appreciation of diversity and symbiosis; 5) criticism of class hierarchies; 6) the pursuit of complexity without complication; and 7) situational ethics. Naess' philosophy is essentially a philosophy of potentiality and self-realisation, where no being is ontologically superior to another, this aspect being absolutely central to a new ecological way of being on Earth.

Thus, the adoption of this type of thinking will interfere with three pillars of archaeological thinking: 1) it replaces formal typology with the study of material and societal metabolism, where artefacts are traced through their circles of extraction, transformation, use, repair, remelting and disposal; 2) the nature/culture dichotomy is dismantled, as Latour's paradigm of the *Great Divide* between human and non-human gives way to a multispecies historiography, where rivers, ants, bacteria, rocks and people are co-actors of reality, overcoming the functionalist ontology of the Western world; 3) finally, we move from a logic of networks to Tim Ingold's *meshwork*: the world becomes encapsulated not by tales but by nodes and lines, where all historical agents are lines that intertwine, sometimes

creating nodes with tension, i.e., a site. These threads are held together by reciprocal tensions in self-reinforcing circuits, where, from an ethical point of view, intervention must take into account all the other lines that interfere with the knot. From an archaeological point of view, excavation thus becomes an act of reading lines and conservation a careful choreography of living flow.

In this way, Deep Ecology offers a means to liberate archaeology from anthropocentrism, providing a systemic, multispecies, and ecologically committed approach to the past, the present, and, by extension, to the future of an increasingly unstable planet.

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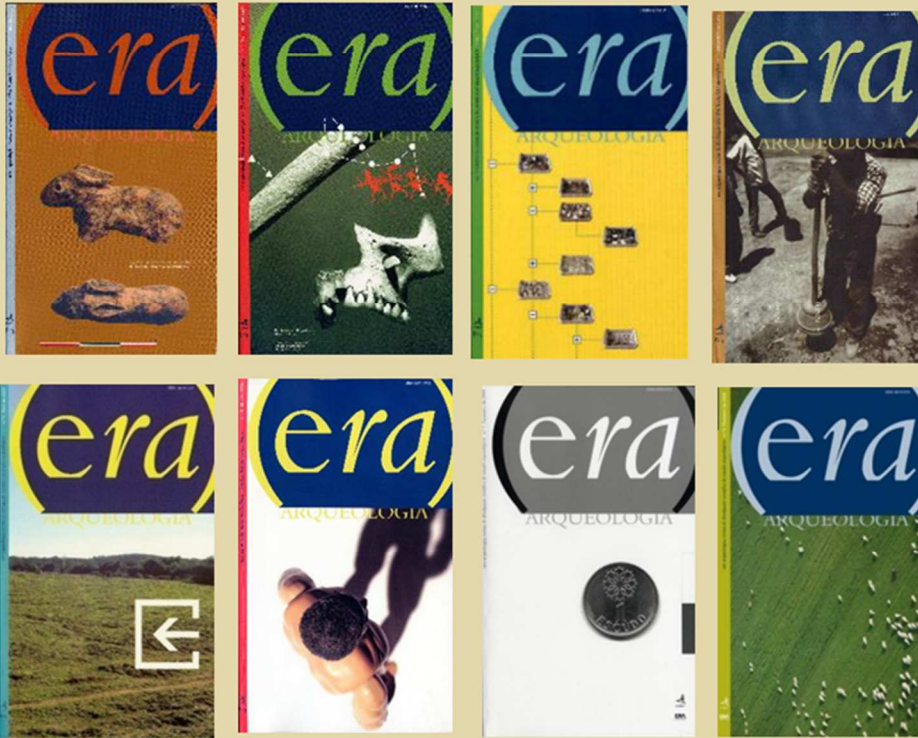
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