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The Plasticity of the Earth.
For a plastic reading of temporality in the Anthropocene epoch

A Plasticidade da Terra.
Para uma leitura plástica da temporalidade na época do Antropoceno

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Abstract:
The realisation of the fragile state of the Earth – brought about by the current environmental crisis – has forced us to become aware of the impact that we humans have on the Earth's ecosystem. It is now increasingly accepted that we are in a new geological epoch called the Anthropocene, in which human beings have become a *telluric* or *geological force*. This prompts us to question what it means that the human being (a part of the Earth's biosphere) has become so strong as to affect the Earth's equilibrium and its impact so long-lasting as to access deep time. It is a clash of temporalities that Malabou addresses in the essay *The Brain of History, or The Mentality of the Anthropocene* and which is the starting point of our analysis aimed at understanding whether the concept of plasticity can once again be a *driving scheme* to understand the perceptual crisis that the Anthropocene poses to us and what a possible path to overcome the environmental crisis in which we participate might be.

Keywords: Malabou. Anthropocene. Plasticity. Temporality. Environmental Aesthetics.

Resumo:
A tomada de consciência do estado de fragilidade da Terra – provocada pela atual crise ambiental – obrigou-nos a tomar consciência do impacto que nós, seres humanos, temos no ecossistema terrestre. É hoje cada vez mais aceito o fato de que nos encontramos em uma nova época geológica, designada por Antropoceno, em que os seres humanos se tornaram uma força telúrica ou geológica. Isto leva-nos a questionar o que significa o fato de o ser humano (uma parte da biosfera da Terra) se ter tornado tão forte ao ponto de afetar o equilíbrio da Terra e o seu impacto tão duradouro ao ponto de aceder ao tempo profundo. É um choque de temporalidades que Malabou aborda no ensaio *O Cérebro da História, ou A Mentalidade do Antropoceno* e que é o ponto de partida da nossa análise com o objetivo de perceber se o conceito de plasticidade pode voltar a ser um esquema motor para compreender a crise perceptiva que o Antropoceno nos coloca e qual o caminho possível para ultrapassar a crise ambiental em que participamos.

Palavras-chave: Malabou. Antropoceno. Plasticidade. Temporalidade. Estética ambiental.

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1. From telluric force to historical force: the nature of the human in the age of the Anthropocene

In recent decades, scientific studies have shown how delicate environmental balances are and how profound (sometimes even irreversible) the damage caused to the Earth's ecosystem by human beings, devastating technologies and socio-economic behaviour aimed at overexploiting natural resources can be. For this reason, there is an increasing tendency to refer to the current era as the age of the Anthropocene, a term that has now become part of the philosophical language but whose introduction into the international scientific debate continues to arouse much controversy[1]. The discussion around this concept concerns not only its definition in the strict sense but also the analysis of its meaning as an *idea* and the right to give *scientific legitimacy* to such an epoch (BELLI, 2019, p. 19).

Let's outline the *cartography of this controversy*. In that case, we realise that the term in question was initially used as a technical expression to indicate a new epoch in the geological time scale (determined by the impact of human activities and measurable on specific anthropogenic indicators such as the intensification of carbon dioxide emissions or the cementing of the soil) soon "overflowed" from the banks of the strictly scientific debate, involving political, social, economic and psychological sciences, anthropology and philosophy in a multidisciplinary perspective[2].

The fact that this concept is a "symptom" of the crisis in the relationship between human beings and nature (at least as conceived in Western culture since modernity) is evident if we consider the need to emphasise, in scientific texts and even using neologisms, the fact that human beings, through their activities, have succeeded to modify the Earth's ecosystem (STEFFEN, 2014, p. 479)[3]. The adoption of the term "Anthropocene" (composed of the Greek

[1] For a brief introduction to the Anthropocene concept see: Missiroli 2002; Padoa-Schioppa 2021. On the controversy concerning the correctness or otherwise of adopting the term see: Kulesko 2018.

[2] Cf. Smith, Zeder, 2013, pp. 8-13 in which the approaches used by scholars from various disciplines to analyse the topic are summarised and compared.

[3] To cite just a few of the best-known examples, let us recall that the French naturalist Georges-Louis Leclerc, Count of Buffon (1707-1788), in *Des Époque de la Nature* speaks expressly of the "epoch of man" to identify the seventh epoch of Earth's history, the last in a parallel established with the seven days of creation (BUFFON, 1778 [1960], p. 9); in 1854, the Welsh geologist and professor of theology Thomas Jenkyn (1794-1858) was the first to make public

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words *ἄνθρωπος* (man) and *καινός* (a suffix that properly means "recent" and that contributes to the formation of the compound terms of geological chronology) is considerably more recent and dates back only to February 2000. The term was used for the first time publicly by the atmospheric chemist and Nobel Prize winner Paul Crutzen, who used it within the framework of the International Geosphere-Biosphere Programme (Cuernavaca, Mexico) to differentiate the current geological era from previous ones, which in his opinion were characterised by a different relationship between the Earth and its inhabitants (CARRUTHERS, 2018)[4]. After the *Pleistocene* (which started the Quaternary period two and a half million years ago) and after the *Holocene* (which began about eleven and a half thousand years ago), it seems appropriate to call *Anthropocene* the present geological epoch, dominated in many respects by human action. In fact, in this epoch, human beings are beginning to act as a *force of nature*, not by adapting themselves to nature, but by adapting nature to themselves (DI PAOLA; PELLEGRINO, 2018, p. 84). So, according to scholars, the Anthropocene is characterised by the devastating impact of human activities (considered as only a particular expression of the biosphere) on the totality of the Earth System (GUARIENTO, 2016, p. 15). Therefore, the *Anthropocene* is an epoch that, in Crutzen's opinion, also needs to be terminologically and philosophically distinguished from its predecessor, the Holocene, a term composed of the Greek words *ὅλος* and *καινός* and which we can translate as "entirely recent" since, when it was coined by the great English geologist

the idea that it was possible to identify scientific evidence for a geological epoch that he defined as the *Anthropozoic era* (JENKYN, 1854 and Id., 1854), a term also used a few years later by the Reverend Samuel Haughton (1821-1897) in his *Manual of Geology* (HAUGHTON, 1865) and by the Italian geologist and prelate Antonio Stoppani (1824-1891), who stated in his *Corso di geologia* that human activity represented a new telluric force. Moreover, to define the latter, he proposed introducing the term *Anthropozoic epoch* (Stoppani, Corso di geologia, G. Bernardoni e G. Brigola, Milan 1871-1873). Or we can still remember the Russian mineralogist and geochemist Vladimir I. Vernadsky (1863-1945), which in 1926 introduced the term *noosphere* as opposed to the concept of *biosphere* (VERNADSKY, 1994), a term later taken up by the palaeontologist and Catholic thinker Pierre Teilhard de Chardin (1881-1955) in his posthumously published essay *L'Hominisation* to emphasise the growing power of the human mind in shaping its future and that of the environment (TEILHARD DE CHARDIN, , 1957, p. 77-111).

[4] In 1980, the American biologist E.F. Stoermer had informally used this term in his university lectures; together, the two scientists published in 2000 the scientific article marking the beginning of Anthropocene studies (see Crutzen, Stoermer, 2000). Crucial for the establishment of the term were also the following two articles: Crutzen, 2002 and Steffen, Crutzen, McNeill, 2007.

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Charles Lyell (1797-1875), it indicated the last period of the Quaternary or Neozoic era[5]. Thus, the ancient Greek term *holon* is intrinsically linked to the idea of a totality of entities, prompting us to interpret the Holocene as "the epoch in which the Earth as a whole prevails", in an equilibrium that, paraphrasing Kant's *Kritik der teleologischen Urteilskraft*, we could define as "organismic" since it is based on a peculiar relationship between the parts and the whole and between the parts themselves in their systemic interactions (KANT, 1790 (1999), p. 203 ss)[6].

The proposal to identify a new geological epoch, marked by anthropogenic activity and understood as a decisive geological force, has not yet received unanimous support from the geological community. While the International Commission on Stratigraphy refused to recognise the Anthropocene as a valid subdivision of geological time, in 2016, the Working Group on the Anthropocene, with a large majority, officially recommended such recognition to the bureaucratic bodies.

Since 2003, following the publication by Paul Crutzen and Will Steffen of the article emblematically entitled *How long have we been in the Anthropocene era?* (CRUTZEN; STEFFEN, 2003), the dispute began to involve not only scientists and naturalists but also historians of science, philosophers and political scientists. Doubts about the choice of term and its appropriateness are beginning to be put aside, and the crux of the discussions is found in the problem of clearly identifying the starting point of this geological epoch.

The five most widely accepted hypotheses for determining the beginning of the "age of man" are based on two different conceptions of the "Anthropocene problem" and of the essence itself of human beings. If some scholars have identified the onset of the Anthropocene in a very recent epoch (making the starting point of the latter coincide with the discovery of America and

[5] The term Holocene was coined by Charles Lyell in 1833 and formally adopted by the International Geological Congress in Bologna in 1885 to indicate the post-glacial epoch, whose beginning is calculated to be between 12,000 and 9,000 years ago.

[6] For an organic reading of Kant's pages see Maggiore 2013.

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the establishment of the process of globalisation[7], with the industrial revolution[8] or, again, with the *Great Acceleration* of the 20th century[9]) others have backdated this beginning by identifying a turning point in the extinction of large mammals caused by the expansion of Homo Sapiens[10] or even in the agricultural revolution[11], which allowed humanity to intervene in the environment and transform itself into a biophysical force.

The primary focus in the first three cases is the capitalist production model, either emerging or already established, which is propped up by the dichotomy of subject and object, self and nature. This is why Jason W. Moore prefers to use the term *Capitalocene* instead of Anthropocene (MOORE, 2016). It not only highlights the current environmental crisis as one of the many complex issues of the capitalist system but also signifies a shift in our understanding. Moore is not merely referring to a geological epoch discernible in the stratigraphy of the soil but to a historical epoch marked by a unique relationship between specific modes of production and the natural world. Simultaneously, he implies that the responsibility for the current situation lies with a specific part of humanity, the more industrialised part.

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[7] Simon Lewis and Mark Maslin have proposed that the beginning of the Anthropocene coincides with the *Orbis Spike*, i.e. the drastic reduction in the concentration of carbon dioxide in the atmosphere, the historical minimum of which was recorded in 1610 and the causes of which have been traced back to the so-called *Columbian Exchange*. This term refers to the exchange of plants and animals between the eastern and western hemispheres following the discovery of the Americas in 1492. Indeed, the most important consequences of the progressive growth of large-scale trade contacts between the Old and New Worlds can be traced precisely at the biological level: a process of globalisation of food, certain domestic animals and pathogens took place, resulting in a radical reorganisation of life on Earth.

[8] Crutzen, for example, believes that this geological epoch began in 1784, the year in which the British engineer James Watt (1736-1819) patented the first steam locomotive, giving a symbolic start to the Industrial Revolution and laying the foundations for a cycle of carbon dioxide emissions that is continuing today. See Missiroli, 2022, p. 13 and Zalasiewicz, 2015.

[9] The reference is to the economic growth after the Second World War: due to the increase in demographic and socio-economic indicators, there was an apparent increase in resource consumption, atmospheric gas emissions and waste generation. Considering the Great Acceleration, the starting point of the Anthropocene is the option most reasonable for most members of the Anthropocene Workin Group. See in this regard: Chakrabarty, 2014, p. 66; McNeill, Engelke, 2018 and Steffen, Grinevald, Crutzen, J. McNeill, et al., 2011.

[10] In this case, it is the human being himself who, due to his intimate Promethean essence, can be considered an "ecological serial killer": he possesses that "human spark" that allows him to abstract from the natural world and deny its determinations. This destructive essence can already be seen in the disintegration of the Pleistocene megafauna and the extinction of *Homo neanderthalensis* by *Homo Sapiens* (HARARI 2017).

[11] Timothy Morton follows the same lines as Harari. Still, he postpones the origin of the Anthropocene to the spread of the first agricultural practices in the Fertile Crescent, an exercise linked to the development of a practical-epistemological attitude that he calls *agrilogistics*, aimed at the imposition of a human order on external nature.

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If this perspective can still provide some glimmer of light for the future by affirming that the environmental crisis is determined by a production system to which we have given rise but which can – at least in principle – be corrected or replaced, the case of the second perspective outlined is different: it is the human being as such who is responsible for the Anthropocene as a negative being, a being whose main trans-historical characteristic is that of constitutively denying the environment in which it is placed. It is no coincidence that in *Eros and civilisation*, echoing the Greek myth, Herbert Marcuse uses the term *Prometheanism* to indicate the attitude that characterises the human being as such and drives him to attempt to dominate everything other than himself, using technology to counter the limitations of his nature[12]. Marcuse writes:

> «the predominant culture-hero is the trickster and (suffering) rebel against the gods, who creates culture at the price of perpetual pain. He symbolizes productiveness, the unceasing effort to master life; but, in his productivity, blessing and curse, progress and toil are inextricably intertwined» (MARCUSE, 1974, p. 161).

«It can be argued that the *Anthropos* of the Promethean discourse on the Anthropocene could only lead to the generation of the Anthropocene, which is thus configured as an inevitable destiny» (MISSIROLI, 2021, pp. 153-1549). In this *naturalistic narrative* (BONNEUIL, 2015, p. 18), the problem would, therefore, no longer be *economic-productive* but *anthropological*.

2. The problem position: the Anthropocene and the aesthetic rethinking of our relationship with temporality

Regardless of the position taken, it is evident that, unlike other designations of geological temporal units, the concept of the Anthropocene has a transformative power that extends beyond strictly geological issues, invoking political, economic, sociological and philosophical reflections. It entails, firstly, the crisis of the traditional humanistic distinction between natural history and human history: «philosophers and students of history have often displayed a conscious tendency to separate human history – or the story of human affairs[...] – from natural history, sometimes proceeding even to deny that nature could ever have history quite in the

[12] For a brief history of the *Promethean attitude* towards nature, see Hadot, 2006, pp. 89-148.

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same way humans have it» (CHAKRABARTY, 2009, p. 201). That distinction opposes the *profound time of nature* (the *deep time*) to the *organic time of living beings*: it traces the differentiation (dear to the ancient Greeks, undoubtedly more precise than we moderns in conceptual determination) between the time of the *zoè* (a cyclical, rhythmic operating on vast time scales) and that of the *bios*, the linear time that characterises living beings. As Chakrabarty points out:

> «Anthropogenic global warming brings into view the collision—or the running up against one another—of three histories that, from the point of view of human history, are normally assumed to be working at such different and distinct paces that they are treated as processes separate from one another for all practical purposes: the history of the earth system, the history of life including that of human evolution on the planet, and the more recent history of industrial civilization (for many, capitalism). Humans now unintentionally straddle these three histories that operate on different scales and at different speeds» (CHAKRABARTY, 2014, p. 1).

Stating that the human being is transforming from a mere biological agent into a geological agent implies an aesthetic rethinking of our relationship with temporality or, in other terms, a reflection on our perception of time and our actions in the world. As Catherine Malabou[13] has pointed out in her article *The Brain of History, or, The Mentality of the Anthropocene*, to speak of the human being as a *telluric force* systematically places the power of human action (*agency*) on a planetary scale (MALABOU, 2022, p. 190); it means making the human being access deep time, considering him as an agent that is able of *making history* along lines that envisage time spans far broader than those we are used to interpreting human affairs. So, talking about the Anthropocene means moving on simultaneously large and small-time scales, some of which escape the traditional units of measurement of human affairs. As Zoltán

[13] The French thinker Catherine Malabou was born 18 June 1959 in Sidi Bel Abbès in Algeria. After graduating in 1979 from the École Normale Supérieure de Lettres et Sciences Humaines in Fontenay-aux-Roses, she defended her doctoral thesis on Hegel on 15 December 1994, supervised by Jacques Derrida (1930-2004) and published under the title *L'Avenir de Hegel: Plasticité, Temporalité, Dialectique* (MALABOU 1996). She began her academic career as *maître de conférences* at the Université Paris Ouest Nanterre - La Défense, where she taught philosophy courses until 2011, when she was appointed full professor at the Center for Modern European Philosophy (CRMEP) at the University of Kingston, UK. In 2017 she was appointed Professor of Comparative Literature and European Studies and Languages at the University of California at Irvine. She also teaches at the European Graduate School in Saas-Fee, a Swiss municipality in the canton of Valais. His works focus on the relationship between philosophy, psychoanalysis and neuroscience, opening up theoretical, aesthetic, philosophy of mind and gender studies perspectives.

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Boldizsár Simon points out, «if we, in the humanities and social sciences, are to take the Earth system sciences seriously in debates about the Anthropocene (as I believe we must), then we have also to take seriously the "more than human" nature of the temporalities of the Anthropocene» (SIMON, 2024). Conversely, the Anthropocene event requires us to rethink *larger-than-human temporalities* because, by abstracting from human time, the Earth in its inorganic dimension appears alive, dynamic and changing as much as the organic world. A problem well highlighted by Chakrabarty:

> «I call these gaps or openings in the landscape of our thoughts rifts because they are like fault lines on a seemingly continuous surface; we have to keep crossing or straddling them as we think or speak of climate change. They inject a certain degree of contradictoriness in our thinking, for we are being asked to think about different scales simultaneously» (CHAKRABARTY, 2014, p. 3).

«Out of the collision between the times of the Earth system and the times of modernity emerge what I would like to call the human times of the Anthropocene – new times that cannot be reduced either to the human times inherited from modernity or to the times of the Earth system» (*ibidem*), say Simon. Therefore, it is necessary to rethink categories of thought, such as those of *animate* and *inanimate*, starting from the assumption that "living" is not so much that which is endowed with a "soul" (in the terms in which this concept has been elaborated by Western thought), but that which can breathe, exchange, share and connect to the whole. In a critical passage of *Facing Gaia* that marks the prelude to such a way of thinking, Bruno Latour states that «we live in a world made up of Galilean objects and in a world also composed of agents that we could call Lovelockian» (LATOUR, 2020, p. 99), namely *animated with life*. Hence, the current environmental crisis forces us to come to terms with the traditional way of understanding the relationship between human beings and the rest of nature, an anthropocentric and ego-centric way of relating that leads to a logic of opposition: what we are experiencing is a climate and environmental crisis, but also a crisis of perception as the perception of ourselves and of our relationship with what is traditionally defined as 'nature'.

I believe that a key to understanding this crisis can lie in a new interpretation of the human-nature relationship, illuminated by the concept of *plasticity*, a central theme in

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Catherine Malabou's work (COMBET, 2018; GIESBERS 2018; MAGGIORE 2020a, 2023c; MALABOU 2000; MALABOU, LAWLESS, 2016; WORMALD, 2020)[14]. As Serenella Iovino states, precisely because it challenges established historical-philosophical conceptions, the Anthropocene can be seen as «a thinking machine, as it serves as a structure that connects phenomena that would otherwise remain disjointed» (IOVINO, 2022, p. 6).

3. The paradigm of plasticity in Malabou's thought

The elaboration of the plasticity paradigm in the thought of Catherine Malabou finds its first formalisation in the essay *L'Avenir de Hegel: Plasticité, Temporalité, Dialectique* (MALABOU, 1996a). In this work, Malabou, starting from an original reading of the twenty-five paragraphs of the *Encyclopaedia of the Philosophical Sciences* that make up Hegel's *Anthropology* (Hegel, 1817 [2000], §388-412) defines plasticity as the « the dominant formal motif of interpretation and the most productive exegetical and heuristic tool of our time » (MALABOU, 2004a [2009], p. 57). Re-reading Hegel's work, the French thinker identifies the specificity of man not in a capacity (the upright posture, the use of the hand, etc.) but in the aptitude to combine the modelling of self with that of trans-differentiation (MALABOU, 2004b [2008], pp. 15-31), the capacity to change and to be the same, the giving and the receiving of form.

Nevertheless, the author points out that the term *plasticity* (which derives from the Greek expression *πλαστική τέχνη*) has never been dealt with philosophically in an exhaustive manner since, over the centuries, it has been associated from time to time with only one of the two defining components mentioned above.

To trace a brief history of the term, we can state that it only entered the German language (and, more generally, the European philosophical lexicon) in the 19th century: as Malabou point out, the term *Plastizität* was introduced into the cultural debate by Goethe to refer to a restricted field of study (the artistic one)[15] and only later it was used in its French and English translation

[14] On Malabou's thought in general and his relations with the French and international philosophical scene, see: Bhandar, Goldberg-Hiller 2015; Hope 2014; Martinon 2007; Wormald, Dahms 2018.

[15] The adjective, declined in the feminine form, appears, for example, in the title of the short paper *Plastische Anatomie* [GOETHE, 1832 [2013], p. 847), a text in which Goethe compares himself to the art of waxwork artists

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(MALABOU, 2000) to indicate the work of the sculptor and, in a broader sense, the *art of modelling* (MALABOU, 1996a, p. 21)[16]. The *plastic arts* are thus defined as «all those arts whose main task is the elaboration of forms; we also classify architecture, drawing and painting among them» and, by extension, «the aptitude for shaping in general, the shaping action exercised by culture, by education» (*ibidem*), comments the thinker. The meaning of the term – initially limited to the artistic context – immediately extended beyond these boundaries, taking on new meanings in the pedagogical and humanistic spheres, to then evolve further over time and be used from the 1970s, also in the medical field to indicate a particular form of body sculpting: the *plastic surgery*.

Alongside this *active function* of plasticity, which allows us to account for the *giving form*, Malabou also highlights a *passive function* that will enable us to respond to the complementary needs of *receiving form*. Indeed, as the French art historian Didi-Huberman points out,

> when we speak of "plastic arts", we implicitly assume, etymologically, that the visual arts do not exist without this plasticity that matter offers to the action of forms. "Plastic arts" means plasticity of material: it means that matter does not resist forms, that it is ductile, malleable, mouldable, and foldable at will. In short, it humbly offers itself to the possibility of being opened, put to work, put into shape (DIDI-HUBERMAN, 2000, p. 210).

Thus, plasticity has to do with the art of shaping, and it is a peculiar property of all materials able to be moulded (such as wax and clay). Indeed, although characterised by a certain solidity at specific stages of their production, artificial substances (rubber, PVC, etc.) are pliable enough to be shaped by exploiting the effect of temperature or pressure.

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and engravers who, following the detailed instructions of university anatomy lecturers, produced veritable didactic works of art. If, in such an occurrence, Goethe uses the term, leading it back to the meaning of "'sculpture", the use of the term is different in Goethe 1808-1831 [2020], p. 1643. We can read: «Thanks to a certain natural talent and practice, I was able to outline well; I also easily arranged on paper what I saw before me in nature; but I lacked the plastic strength [*die eigentliche plastische Kraft*], the ability to give body to contours through well-measured chiaroscuros». Here, the adjective is associated with the noun Kraft to indicate the force that can give shape to the image, while limiting the meaning of the concept of plasticity to its active meaning. See also the entries *Plastik, Plastiker* and *plastisch* in Deutsches Wörterbuch von Jacob und Wilhelm Grimm, 16 Bde. in 32 Teilbänden, Leipzig 1854-1961.

[16] Aesthetics has been interested in plasticity, mainly about the active capacity to model matter, the focus of a pivotal text of 18th-century reflection, J.G. Herder's *Plastik* (HERDER, 1778 [2010]).

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The *passive function* of plasticity was recognised by the French essayist Roland Barthes, one of Malabou's philosophical reference, who in his *Mythologies* emphasises the close link between plasticity and the character of openness and modifiability that characterises living beings. Plasticity indicates the aptitude to adapt to the environment, enacting a tendentially infinite transformation of self. Therefore, «as its common name indicates», it is «ubiquity made visible; it is [...] a trace of movement. [...] It is, in short, a spectacle to be deciphered: the spectacle of its results» (BARTHES, 1957, p. 160)[17]. Although the adjective plastic is defined in opposition to terms such as *rigidity*, *fixity* and *ossification*, it should not be considered a synonym for the adjectives *polymorphic*, *elastic*[18] or *flexible*[19] since plasticity is the peculiar characteristic of a material that, as Malabou emphasises, «retains an imprint and thereby resists endless polymorphism» (MALABOU, 2004b [2008], p. 15).

In this *consistency paradox* (DIDI-HUBERMAN, 2000, p. 213), the human body can, therefore, be defined as "plastic", able of undergoing an environmental modelling action and simultaneously being the engine of that action (MALABOU, 2004a [2009], p. 57)[20]. However, Malabou explores the concept even deeper and considers that these meanings of the term only partially succeed in elucidating its scope. In all the cases mentioned, we are, in fact, only dealing with *positive* plasticity that accounts for the *normal flow of life* and is conceived «as a kind of creative work, in a material and biological sense, spontaneous, which forms our identity»

[17] It is in this adjectival sense that the term is used in the biological sphere: Darwin, for example, makes use of it in the first pages of the *Origin of Species* where he states that he has the impression «that the whole organism has become plastic and tends to differ to a small degree from that of the original type» (DARWIN, 1858 [2006], p. 48). In Malabou, 2015, p. 49, the French thinker states that a careful reading of the Origin of Species reveals that the concept of plasticity is one of the central motifs of Darwinian thought. The "biological" reading of plasticity also constitutes the key concept of Mawani 2015 and Meloni 2019.

[18] Elasticity is the «ability to revert to the original form» (MALABOU 2004a [2009], p. xxviii); it indicates the property of reversible materials capable of returning to their initial form after deformation. However, plastic material has no memory: although it possesses ontological continuity (constancy), it cannot remain unchanged in deformation and resists infinite polymorphism.

[19] Flexibility indicates the capacity to bend to external demands, to take a turn, not give it: «what flexibility lacks is the resource of giving form, the power to create, to invent or even to erase an impression, the power to style. Flexibility is plasticity minus its genius (MALABOU, 2004b [2008], p. 12). Thus, it takes up only one of the meanings of plasticity, that concerns the reception of form.

[20] A crucial theoretical reference can be found in Nietzsche, 1874 [1972], p. 265. For the German philosopher, the plastic force can «grow in its way upon itself, transforming and incorporating past and extraneous things, healing wounds, replacing lost parts, reshaping broken forms within itself» forging an identity in confrontation with something external.

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(JARDINILO MACIEL, 2019, p. 16). This conception harmonises with the traditional metaphysical interpretation of *substance* (intended as the *substratum* that remains unaltered by the accidents of life): it allows us to explain why for the living being, change in terms of superficial bodily modifications (gaining or losing weight, tanning, growing, etc.) is *ordinary* and *understandable*. Plasticity is, in fact, «conceived as a sort of natural sculpting that forms our identity, an identity modeled by experience and that makes us subjects of a history, a singular, recognizable, identifiable history, with all its events, gaps, and future» (MALABOU, 2009 [2012], p. 3).

However, positive plasticity, whose purpose is *to safeguard personal identity*, fails if an accident/accident stops the individual's story, opening a rift in our existence to initiate an existential novelty that marks a deep fold in the individual's life (Isetta, 2015, p. 106). «One often thinks of plastic construction without a real connection to a radical form opposed to it; instead, construction is always counterbalanced, according to Malabou, by a form of destruction. Creation, invention, is never separated from its destructive counterpart: this is a fundamental law of life» (JARDINILO MACIEL, 2019, p. 17). As the thinker states, « No one thinks spontaneously about a plastic art of destruction. Yet destruction too is formative. A smashedup face is still a face, a stump a limb, a traumatized psyche remains a psyche. Destruction has its own sculpting tools» (MALABOU, 2009 [2012], p. 4).

It is, therefore, necessary to admit the existence of a *negative plasticity*, which eradicates the existing form and is opposed to the gradual progression that characterises its positive declination[21]. «This gradual existential and biological incline, which can only ever transform the subject into itself», Malabou states in this regard, «does not, however, obviate the powers of plasticity of this same identity that houses itself beneath an apparently smooth surface like a reserve of dynamite hidden under the peachy skin of being for death. should not make us forget the power of the plastic deflagration of this identity, a power that finds refuge beneath its apparent smoothness, like a hidden reserve of dynamite» (MALABOU, 2009 [2012], p. 1). It is

[21] On negative plasticity, see Maggiore 2019a, 2019b, 2023a, 2023b; 2023d.

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an *explosive plasticity* (MALABOU, 2009 [2012], p. 3) that acts like a "terrorist act" and which, thanks to the devastating power of an accidental event, disrupts our life, disorganising it, as witnessed by the etymological commonality of the term plasticity with the French word *plastiquage*. This word indicates a plastic bomb, a substance capable of provoking violent detonations, generating the *rupture of form* and its *disintegration into formlessness* (MALABOU, 2004b [2008], p. 84-85).

Thus, an accidental *event* can be an element of «creation and collapse, [...] it is an unconscious work, an *invention* in the sense of the unveiling of what was hidden, of the expectation of what is to take place» (VIRILIO, 2007, p. 9) and which lies beyond the threshold of the accident itself. Indeed, as Tessier points out, «in the singular experience of the accident, the question "Who am I?", which implies the concept of personal identity, is suddenly replaced by the question "Who have I become?" and sometimes even by the question "What have I become?"» (TERRIER, 2015, p. 217).

Malabou has attempted in his writings to investigate the mechanisms that can lead to the *petrification* of the person, to the *telluric becoming* of the human being, devoting ample space in his essays to the analysis of «the phenomena of destructive plasticity, of split identities, sudden interruptions, the deserts of Alzheimer's patients, the emotional indifference of some who have suffered brain injury, those traumatized by war, victims of natural or political catastrophes» (MALABOU, 2009 [2012], p. 2), trusting that her interest in such forms of "temporal ego-blocking" stemmed from personal motivations and, in particular, from the fact that her grandmother, to whom she was very close, suffered from a severe neurodegenerative disease (MALABOU, 2007, 2011)[22]. In pathologies such as Alzheimer's syndrome, says the French philosopher, the body is not altered in its configuration, but everything that the individual lives and experiences after the onset of the disease are experienced in an alienated manner, as if it were happening to someone else, as if it were the subject of a narrative no longer autobiographical but in the third person.

[22] On the analysis of diseases that testify to the action of negative plasticity in Malabou's thouhgt, see: Isetta 2015, 2019; Maggiore 2019d, 2020b; Žižek 2009.

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What can such an analysis tell us in relation not to the individual but to the human species as a whole? What can it tell us about that "*telluric force*" that characterises humanity in the Anthropocene epoch? A force at once active and passive, which is a small part of the biosphere but responsible for destroying the other three geospheres (the lithosphere, the hydrosphere and the atmosphere) and the biosphere itself? How can one part of Nature destroy the whole and itself? And why does this require us to redefine the concept of the subject of history?

4. Plasticity as a key to interpreting the Anthropocene event

In the essay *The Brain History or the Mentality of the Anthropocene*, Malabou proposes the idea of a «profound interaction between the sociological and the ecological, understanding them as parts of the same metabolism» (MALABOU, 2022, p. 189). According to the French thinker, the Anthropocene is a concept that sets in motion a series of conceptual rethinks, as it requires the study of the interaction between historical events on the one hand and biological and geological phenomena on the other. In the most traditional conception of the term, "history" is, for Malabou, what contemporary historiography today defines as *evenemential history*: a continuous and systematic narration of events considered crucial to the human species. In other words, it is a narration that aims to search for the meaning of events and their temporal representation; at the same time, it tries to explain and understand the direction of the development of historical processes. In summary, history is the time of *uninterrupted processuality*, of consequential and linear order; it is the time of *Chronos*, but also – as Malabou explained in his analysis of negative plasticity – what we can define as the time of *Kairos*.

The ancient Greeks were much more precise in their conceptual delimitation than we moderns, and they used four terms about the semantic area of temporality: *Aion*, *Eniautos*, *Chronos*, and *Kairos*. Examining the meaning of these terms during a period ranging from the Homeric poems to the Hellenistic epoch, the philologist Paula Philippson emphasises that the former indicates «duration free from any relation to time or life, absolute duration, eternity» (PHILIPPSON, 1949, p. 85). For that reason, this concept finds a timely counterpart in the Latin

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aeternum and the German *Ewigkeit*. Already from this concise definition, we realise the intrinsic impossibility of referring such a temporal conception to Nature: as Aristotle suggests in Book II of *Physics*, Nature is the principle and cause of the movement and stillness of the thing to which it is inherent first and foremost, not accidentally. Starting from this definition, we can observe that traditionally, the term "Nature" is intrinsically connected to motion and not to stillness. Thus, Aion is contrasted with *Eniautos* and *Chronos*, which attempt to specify the relationship between temporality and movement. The first of these two terms indicates, in fact, time that does not proceed in a rectilinear manner but moves «from period to period, from circle to circle» (PHILIPPSON, 1949, p. 93); it is a mode of temporality that is traditionally associated with the idea of Nature because it is linked to a principle of cyclicity, clearly evident in natural phenomena such as the alternation of the seasons, lunar cycles or the succession of day and night, but which can also note – as Gernot Böhme would state - in the Nature that *we are* (BÖHME, 2019), in the vital cycles that govern our bodies. The second one, the Chronos, is, on the other hand, conceived as the «ordering form of happening, numerically proceeding from the past to the future» (PHILIPPSON, 1949, pp. 90-91).

As Chakrabarty has pointed out, the Anthropocene confronts us with «relationships and a time that can in no way be approximated to the temporal horizon of human experience and expectations» (CHAKRABARTY, 2021, p. 89); it requires us to come to terms with our relationship to deep time. If our lives were much longer, we could indeed move into deep time; we could, for example, as the philosopher Holmes Rolston III suggests, find a gateway to the life of forests, which

> «take time by the decades and centuries, compared to the way humans take time by the days and years. The scale is at once of incremental and vast time; in a forest there is seldom any front-page news – perhaps a fire or a storm – but most of life goes on over larger time frames. Trees do not grow overnight; the big oaks in New England were there at the founding of the Republic. The towering Douglas firs in the Pacific Northwest were seedlings when Columbus sailed; sequoias can predate the launching of Christianity» (ROLSTON, 1998, p. 157).

But what I do feel is worth highlighting is the fact that however complex our attempt to access a temporal dimension other in duration than the human one may be, both human time

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and deep time, both *bios* and *zoè* can be inscribed within the horizon of Chronos. As the scientific essay *Principles of Geology* (LYELL, 1830) by the Scottish geologist Charles Lyell[23] demonstrated, the sum of the minor causes produces the most significant effects because they proceed by accumulation over a linear period. So, the difference between deep time and the time of human history is, from this point of view, quantitative, not qualitative.

But – what I want to emphasise most – between the history of the individual and the history of the Earth intended as a whole, there is a *plastic parallelism* that the Anthropocene has helped to highlight. If we admit (following the first theoretical line set out in the first paragraph and which turns out to be the one most widely accepted by those who question the date of the beginning of the human epoch) that the Anthropocene represents the outcome of a turning point in the relationship of human beings with Nature (a historically determined turning point that is not inherent in the human essence), then the Anthropocene qualifies as an *event*. Or even better, the Anthropocene is an *accidental event*. As Chakrabarty says:

> «Clearly, nobody is in a position to claim that there is something inherent to the human species that has pushed us finally into the Anthropocene. We have stumbled into it» (CHAKRABARTY, 2009, p. 217).

2323 The Scottish geologist Charles Lyell (1797-1875) can be regarded as the founder of modern geology: he studied law at Exeter College, Oxford, but during his university years, he attended the geology lectures of the Reverend W. Buckland, whose close friend he became and whom he frequently accompanied on his field research expeditions, becoming increasingly passionate about geology to the point that he gave up a career in law a few years after graduation. Having joined the Linnean Society and the Geological Society as early as 1819, he was also admitted to the prestigious Royal Society in 1826. From his early years, he was particularly attracted to the theory of uniformitarianism developed by the geologist J. Hutton, according to which the forces that shape the Earth today are the same as those that operated in the past and act gradually and constantly over very long periods. This theory found a central place in his thinking after he visited the Phlegraean Fields during a trip to Italy in 1828 and observed the columns of the so-called Temple of Serapis at Pozzuoli. He noticed the presence of the typical holes produced by the bivalve lithophagous marine molluscs (the dates of the sea) on a demarcated strip about three metres high. Knowing this organism's habit of living in shallow coastal waters, he deduced that the columns must have sunk into the sea at one time, only to re-emerge and continue to rise, a process known as bradyseism and still ongoing in the area. This phenomenon seemed so significant to him from the perspective of the theory of uniformitarianism that he chose the image of the three columns of the Temple in question for the title page of his Principles of Geology, published in 1830. Eight years later, he published Elements of Geology, a work dedicated to stratigraphic and palaeontological analysis, which was initially conceived as an extension of his previous work and later developed in an autonomous form. He devoted his entire life to academic teaching and made numerous study trips; in 1863, he published his last major work, The Antiquity of Man, which focused on the analysis of stones worked by humans found in sediments, certifying their antiquity. In this work, Lyell explicitly supported the evolutionary theory of his friend Darwin.

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The *time of the accident* does not, however, fit into the order of the temporal concepts analysed so far but into that of the fourth term listed by Philippson, the *Kairos*, for which the English language has no equivalent lexical formation and which is, therefore, difficult to understand. As Malabou points out in the small glossary attached to the anthology on time she edited for the Hatier publishing house, the event «is the name we usually give to that which arrives or arrives» (MALABOU, 1996b). It marks a detachment in the linear proceeding of the *Chronos* since it projects itself primarily towards the future. Thus *Kairos* indicates «the brilliant, that is, the fecundly creative moment, in which the fullness of Being [...] shines forth and reaches its culminating point» (PHILIPPSON, 1949, p. 91): it is the time «that approaches the "instant" of the never again and the not yet» (TESSIER, 2015, p. 200) and that «splits time in two» (*ibidem*), marking the culmination of what had happened before that moment and the beginning of something new.

The close link concerning the last two terms listed is indistinct in its Latin counterpart since the word "time" derives from the Indo-European root **tem*, which indicates the act of "cutting": it is found, for example, variously declined, in the Greek words *temno* (to cut), *tomos* (the slice, a term from which the Italian word *tomo* derives to indicate the section of a work divided into several volumes), *epitome* (the summary), *atomos* (the indivisible corpuscle) and *temenos* (the divine enclosure, an etymon also found in the Latin word *templum* that initially indicated the space delimited by the clergymen in the sky and later the space dedicated to the adoration of a deity). These terms all emphasise the character of "separation" of an element, or an individual, from a totality. As Malabou points out,

> «it seems that time is also defined as the separation of undivided elements: the instants that follow one another, and as the reunification of these elements: the passing of time is recomposed into a story, a life; the instants are not dispersed but articulated orderly» (MALABOU, 1996b).

In the *Chronos*, the dimension of unity of the succession of these moments prevails; in the *Kairos* prevails the fracture: a moment stands out from the background, becomes it is crucial and breaks the order of the *Chronos*, discouraging us – as we tried to highlight in the previous paragraph – to think time simply as a straight path as an uninterrupted line that from birth leads

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to death. As Malabou underlines about the individual life, sometimes the linearity of existence is broken, articulated, and shattered.

According to this definition, the current age, the epoch of the Anthropocene, represents precisely the epoch of never again and not yet: human beings are beginning to be aware that they are on a threshold, at the limit of a process that is about to prove to be a point of no return. The outcome of actions carried out over centuries or even millennia (the fruit of a technological creation capacity that we could read again in the perspective of positive plasticity as it relentlessly aims at affirming human identity) is rapidly leading to the emergence of a critical point beyond which lies the destruction of the current status quo. A total extinction whose scope and significance we cannot know: it could lead to the extinction of current life forms, but also – as Medhi Parsa points out, taking Malabou as an example – to a radical transformation.

> «As an example of this radical transformation, let us look at what biologists call oxygen catastrophe. Lapham's Quarterly provides the following explanation: The first mass extinction on Earth occurred around 2.5 billion years ago when a photo-synthesising bacterium appeared and released so much oxygen into the atmosphere that anaerobic life was largely wiped out. This is often called the Great Oxygenation Event, the Oxygen Catastrophe, or the Oxygen Holocaust» (PARSA, 2019, pp. 27-28).

The Oxygen Catastrophe can be seen as the material condition for the birth of a new form of life on Earth, of biological forms different from the previous one: a plastic construction that is comprehensible from the perspective of *emergence and* that, starting from negativity, nevertheless proves to be *creative*.

5. Rethinking the human being in the Anthropocene: from the Accident to the Receiving Form of plasticity

So, why could the reference to "plasticity" help us rethink those conceptual categories that underlie the mistaken relationship with Nature that has led us to this critical moment? Humanity (depending on the theoretical positions listed in the first paragraph, understood in its entirety or with reference only to capitalist societies) has placed too much emphasis on giving form to Nature and has neglected the counterpart of this concept of plasticity: receiving

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form from Nature. In other words, it has focused on its ability to transform reality through technology and culture rather than on that feeling of being part of Nature, able to be shaped by it, in a positive or negative way.

> «Malabou reminds us that the Anthropocene indicates that we can drastically change Nature because we are a part of it. Humans are a force of Nature, sometimes a destructive force, like an asteroid that can start an ice age. It is not the case that there is no critical change in Nature, that natural history is slow and monotonous; humans and asteroids are evidence of that. And the oxygen catastrophe demonstrates that Nature evolves also because of its destructive forces» (PARSA, 2019, p. 31).

Philosophical thought must, therefore, endeavour to promote the idea that the human being, today unanimously recognised as the principal agent of transformation of the planet, is entirely internal to the environment: the world is therefore not «*a tabula rasa* on which man must exercise a design faculty, nor a "container" given a priori to which human beings must adapt. Rather, it seems to embody an immense network of activities and contexts of development from which no living being – including the human being – can abstain, since each organism is always actively involved» (BORGNINO, 2022, p. 32). This constatation translates into the realisation that the human being who proposes to adopt a genuinely ecological attitude must not only (and not so much) attempt to argue in favour/defence of other species or of inorganic Nature in its entirety but *to correspond with it* (INGOLD, 2021). To correspond with bacteria, pigeons and bees, and even more so with minerals and plants, is to coexist with them. Coexistence is a form of coexistence, a communication that is upstream of knowledge (PERULLO, 2022, p. 11) and that must not be trivially understood as living alongside one another sharing the same space of existence, but instead as living together *with* other natural entities, *thanks to* other natural entities, *for* other natural entities, because our forms, functions and activities only acquire meaning in a constant interchange with everything that (positively or negatively, continuously or interrupted by an accidental event) contributes to shaping our existence[24].

[24] Perullo introduces the concept of "co-individual", which is increasingly used in the biological sphere. This term suggests that animals and plants are not "individuals" in the traditional sense, but rather a community of smaller units. For instance, the human body is a complex ecosystem, with the intestinal flora alone consisting of trillions of

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In other words, the human being must overturn the idea of the whole of philosophical modernity: the belief that everything other than us is *Gegenstand* (literally what is opposed to the subject) or *objectum* (literally what is posited by the subject). Instead, it is necessary to radically rethink our being, emphasising – as Malabou has pointed out – that the active component of our being always has a passive counterpart as its correlate: we act on everything other than us, but this apparent otherness, in turn, acts on us, in a recursive perspective that squares the idea of any radical opposition to the foundations. Nature is not the absolute "out there": returning to the definition of ecology given by the German zoologist Ernst Haeckel, the eponymous father of the discipline, we must respect a synthetic relationship between human beings and Nature[25]. Already Goethe (poet and amateur scientist appreciated by Haeckel and defined by Malabou as the first to have proposed an idea of *plastic* Nature) was clear that there are no antitheses between Nature and human beings: the latter are two manifestations of the same creative process, two extremes of the same thread and which; just for this reason, they may seem opposed, but they are ontologically all at one. This statement means not going back to the concept of Nature imposed in modernity as a counterpoint to the subject but returning to the Greco-Latin conception of the term, understanding it as the plastic force that "gives birth", as a creative impulse or a vital power that is given to be seen plastically in its concrete manifestations, which become for this reason an instrument of exaltation of life itself.

microorganisms. This concept of "living cohabitation" challenges our conventional understanding of individuality (PERULLO, 2022, pp. 15-16).

[25] See Haeckel, 1866, vol. 2, p. 286. The term ecology was first used by the Jena zoologist Ernst Haeckel (1834-1919) in the second volume of his *Generelle Morphologie der Organismen*, a mighty work in which the naturalist attempts to mediate between Goethean morphological theories and evolutionism. Here, we read that ecology is to be understood as «the whole science of the relations of the organism to the surrounding external world, in which we may include all the conditions of existence in a broader sense. These are partly organic and partly inorganic; both these are of the utmost importance for the form of organisms». Ecology is, therefore, the study of the adaptive interaction of organisms with the environment in which they live, the science of the relationships that allow a given entity (be it a human being, an animal or a plant) to feel part of its surroundings, to feel at home in a certain context, as is evidenced by the very etymology of the suffix "eco" present in the word, derived from the Greek *oikos*, i.e. "home". Ecology is, therefore, the discipline that sets out to study the relationships between living beings and the environment in which they live, both understood as the set of chemical and physical factors that surround living beings (light, type of soil, climate, nutrition, etc.) and as the set of biological factors that can influence the life of these organisms (parasitism, symbiosis, etc.).

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With a suggestion taken from Goethe's *Theory of Colours* (GOETHE, 1810 [1979]), we could say that Nature and human beings can be considered as black and white: extreme manifestations of a chromatic chain that only to an unprepared observer can appear something different from each other, but that are profoundly, intrinsically and ontologically linked since they are expressions of the same vital plasticity that goes far beyond what we traditionally define as "life". They are opposites in the Aristotelian sense of the term, not contradictory. As the English philosopher Ronald Hepburn suggests, «I am both actor and spectator, ingredient in the landscape and lingering upon the sensations of being thus ingredient, rejoicing in their multifariousness, playing actively with nature, and letting nature, as it were, play with me and my sense of myself» (HEPBURN, 1966, p. 290).

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