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Geopraxis

A Concept for the Anthropocene

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A Concept for the Anthropocene *

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This essay deals with the most urgent political-epistemological question in the Anthropocene debate, namely the identification of the subject of the ongoing planetary transformation. It presents philosophical perspectives, concepts and historiographical approaches that can help bring into focus humans' transformative action. It proposes geopraxis as a viable concept, which connects the geological agency of today's societies with the political problem of collective action, in line with the Gramscian concept of praxis. A historical and open conception of humanity, as a de-essentialized process of decision-taking and self-determination, is here defended as the theoretical basis for geoanthropology, as the emergent cross-disciplinary Anthropocene paradigm.

1. Who is the Subject of the Anthropocene?

Identifying who or what is the subject of the ongoing planetary transformation is an apparently simple but still very open question. The ἄνθρωπος of the recently coined geological term 'Anthropocene' is too generic to provide an answer and requires further specification. In this article, I intend to address the matter of the subject of the Anthropocene by means of the novel concept of

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geopraxis.[1] The idea of praxis, of Gramscian derivation, is revisited here to define humanity's relationship with the environment, or rather with planet Earth (geo-).[2] Geo-environmental considerations, today focused on the question of the Anthropocene, require a broadening of political theory, which all too often has ignored natural science or relegated it to the margins, conceiving of the sphere of human action as though it were disconnected from the natural one.[3] On the other hand, the geological neologism 'Anthropocene' has prompted a broad debate on the meaning of the presumed 'age of man' currently under consideration by stratigraphers (see Bonneuil and Fressoz 2017; Horn and Bergthaller 2019; Pellizzoni 2022; see also Omodeo 2022). Many have wondered about the implications of using the Greek term ἄνθρωπος. Several critics have denounced its vagueness, which obfuscates the technological, scientific and economic factors in the planet's transformation. Others have worried that the abstract universality of the idea of 'man' might erase differences and responsibilities with respect to the ecological and planetary crisis, in a global society with profound economic, gender and racial inequalities (Haraway 2016; Moore 2016; Yusoff 2018).

Thus, who is the *anthropos* of the Anthropocene? Will he be the usual European white man erected as the standard measure of all humanity? The concept of geopraxis I propose orients the question of man in an anti-essentialist direction in line with the original meaning of 15th-century humanism, misunderstood

[1] This concept is central to the above-mentioned FARE project "Positioned Cosmology in Early Modernity: The Geo-Praxis of Water-and-Land Management in Venice" (*EarlyGeoPraxis*.

[2] Here I mainly follow Labriola's and Gramsci's use of the term 'praxis', centered on a praxeological interpretation of Marx's philosophy, the epistemological impact of which I discuss in Omodeo 2020a. For a different yet similar perspective, see Feenberg 2014.

[3] For the discussion of some significant examples of the political approach to the environmental issue from a geoanthropological perspective, see Malm 2016 and Fraser 2021. The standard reference for questions of environmental Marxism is Foster 2000.

in today's perfunctory polemics on anthropocentrism and animalism. I do not intend to examine the appropriateness of 'Anthropocene' as a term. While the lexical debates are centered on the critique of ideology, also in its post-modern variant of the construction of narratives, I intend to focus on the ontological level of the transformation of the world.[1] In the first place, the Anthropocene identifies a material problem, that of the environmental crisis and its rootedbess in historical and geological processes. It is an objective problem that, as such, dictates the agenda of public debates and research, since it requires an adequate response in order to escape from the trap into which we have fallen: a trap consisting of global warming, the disappearance of glaciers and ice caps, rising sea levels, microplastics and countless types of pollution, nuclear proliferation and mass extinction (to mention only some of the issues most widely discussed in public debate). Therefore, far from being a technical question, or the exclusive prerogative of an isolated community of scientists, the Anthropocene is a still unsolved dilemma requiring adequate philosophical tools to orient us on both the epistemological and the ontological level.[2] There is also an urgent need to rethink historical epistemology (i.e. the reflection on the genesis, conditions and functions of science) in view of a new geoanthropological paradigm suitable for the present time.[3] This paradigm—this is my thesis—can only be geopraxeolog-

[1] The ontological question arises in discussions on science, particularly socio-epistemological ones, to control the relativistic and post-truth straying of social constructivism, re-functionalized by the populist right wing. It is a matter of once again showing the value of the material component of science (alongside the social and historical one) from a perspective that considers the relationship between subject and object in terms of interaction and not only of mirror representation. Useful reflections on this topic can be found in Pellizzoni 2019. Regarding theories of social constructivism, see, among others, Golinski 1998 and Hacking 1999.

[2] The necessary starting point remains the community of stratigraphers who, within the framework of the Anthropocene Working Group, are presently considering whether to endorse the concept. For an introduction to their work, see Zalasiewicz et al. 2019.

[3] In other words, it is a matter of developing the material and political implications of historical epistemology. For an overview, see Rheinberger 2007 and Badino, Ienna, and Omodeo 2022. Geoanthropology is a new interdisciplinary field of study focusing on the relationship between mankind and the Earth system, now institutionalized through the creation of the Max-Planck-Institut für Geoanthropologie in Jena. The most prominent advocate of this new field and first director of the Institute, Jürgen Renn, has a background in historical epistemology, the main area of the research carried out at the Max-Planck-Institut für Wissenschaftsgeschichte in Berlin since its establishment in the 1990s.

ical.

2. Nature and Agency in the Anthropocene Debate

Let us begin with the *status quaestionis*. The debate on the Anthropocene has encouraged new encounters between the so-called "two cultures", the scientific-natural and the humanistic, since natural history and human history converge within the framework of the anthropic transformation of the Earth system.[1] The problem is at the same time epistemological and ontological. Firstly, it involves finding adequate methodologies and theoretical principles so as understand the ongoing environmental transformation without lapsing into the reduction of culture to scientistic objectivity or, conversely, into the contrary spiritualization of the world. These risks are inherent in the facile infatuations with the flat ontologies of the new materialism or with the new pagan theologies of Gaia.[2] Secondly, the methodological and theoretical-cognitive problem (the epistemological question) does not completely deal with the challenge of the Anthropocene, because we must also address the material (ontological) question. The latter regards the human transformation of the world. Far from being a direct relationship between a Promethean incendiary humanity endowed with techne

[1] A landmark work on the distinction between the two cultures—strongly questioned today—remains Snow (1959).

[2] The spirit animating the book that inspired these trends, namely Lovelock's *Gaia: A New Look at Life on Earth* (Lovelock 1979), was certainly more restrained than the theologizing variants found today. Lovelock originally devoted himself to the cybernetic study of the interaction of the biosphere as a whole with the atmosphere and he used animistic or anthropic images only metaphorically, even if metaphors are never without consequences. The name 'Gaia' was suggested to him by the writer William Golding. See the criticism of Latour's cultural anthropology Latour and of the new materialism by Henning 2019, and Moir and Wolfe 2022.

and logos, the transformation of the planetary system is made possible by the use of science and technology, the result of historical and cultural processes that have elevated them—in Marxian terms—to the rank of 'productive forces' within the framework of advanced and global capitalism.

Much has been written about the intertwining of natural and human history. The ideas of Dipesh Chakrabarty in the historiographical field and Amitav Ghosh in the literary field are well known, at least in the environmental humanities. The former has underlined that history cannot and must not continue to consider the environment a background to history, as if it were a neutral scenario with respect to the human actions and interactions occurring within it. Indeed, the 'framework' itself becomes part of the ongoing development (Chakrabarty 2009 and 2021). For his part, Ghosh has pointed out the paradox of literature having waited so long before dealing with environmental themes, even though they constitute the most pressing issue of our time (Ghosh 2016, 7). In the case of both authors, the Anthropocene and the environmental problem have inspired self-criticism, prompting them to renew their specific areas of cultural action (cf. Omodeo 2022a). Yet, from the point of view of the integration of different perspectives and the overcoming of disciplinary incommensurabilities, I believe that the ideas put forth by Marxist environmental sociologists and political thinkers are more fruitful.[1]

In a 2014 article, "The Geology of Mankind? A Critique of the Anthropocene Narrative", Andreas Malm and Alf Hornborg argued that capitalism must be considered a central critical theme for the elucidation of the economic and social logic underlying the devastating tendencies of contemporary societies (Malm

[1] For Thomas Kuhn, the problem of incommensurability is closely linked to the stabilization of science in a paradigm, within which research activity and knowledge itself are normalized. In that sense, the question of the Anthropocene is intrinsically epistemological, since it requires us to make commensurable the parameters (we might say the a priori) of disciplines that have long taken different directions. This distance became established during the nineteenth century, in the context of neo-Kantianism, as a distinction between the comprehension (*Verstehen*) of the sciences of the spirit (*Geisteswissenschaften*) and the explanation of the natural sciences (*Naturwissenschaften*). While for the theory of paradigms the reader can still refer to the classic book by Kuhn, *The Structure of Scientific Revolutions* (see Kuhn 1962), for a historicization of preconceptions more informed by the history of the philosophy of science it is best to turn to Friedman 2001 and Minazzi 2021. For an introduction to the various topics and currents within neo-Kantianism, see Ferrari 1997. I have already referred to Snow's popularization of similar ideas.

and Hornborg 2016). Methodologically, in their opinion, the inextricable bond between nature and human society requires a greater use of instruments derived from the social sciences and from cultural studies. In other words, the *anthropos* of the Anthropocene must be analyzed through interpretative tools prepared by specific disciplines not reducible to physics, biology, or other natural sciences.[1] In accordance with this intellectual and political position, Nancy Fraser has recently suggested a counter-hegemonic operation to construct an eco-socialist vision based on the fusion of outlooks between scientific research on climate change and historical-social investigation (Fraser 2021, 96). Fraser's position is particularly commendable since it combines a Gramscian awareness of the importance of cultural practice (embodied in the post-Gramscian concept of counter-hegemony) with trust in the emancipatory potential of science and technology, once detached from the interests and objectives of capitalism.[2]

Although linked to the epistemological, methodological and political question, the issue I intend to address more specifically here is the subject of the planetary transformation of the Anthropocene. While *anthropos* is central to this geological term, geologists have not attributed the anthropization factor to humanity in general, but rather to technology. Hence, the question of the transformation of the Earth is also linked to that of the relationship between humans and technology. Unfortunately, this question has not been adequately posed by geologist Peter Haff, a member of the Anthropocene Working Group. He deems

[1] In *Fossil Capital* (2016), Malm presented his argument concerning the responsibilities of the capitalist economic and social system with respect to current climate change. The equivalence drawn between capitalism and industrialism, although correct as regards certain phases in the development of capitalism, is incorrect on a more general level. Among the many attempts to historicize capitalism, I wish to mention two as particularly influential, albeit different in terms of their methods and conclusions: Fernand Braudel's *Capitalism and Material Life, 1400-1800* (1973) and Giovanni Arrighi's *The Long Twentieth Century: Money, Power and The Origins of Our Times* (2010). These discussions deserve to be revisited and considered thoroughly in relation to the question of the Anthropocene. Another limitation of Malm's diagnosis is the exclusion of the information technology component in the organization of global production. In this regard, I refer the reader to Pasquinelli 2017.

[2] The issue of the liberation of science for an emancipated society was addressed long time ago by Herbert Marcuse, for example in the essay "Industrialisierung und Kapitalismus" ([1956] 1965). There have been recent re-evaluations of Marcuse's positions in STS (*Science and Technology Studies*). See Feenberg 2017. The origin of the concept of counter-hegemony is the postmodern Gramscianism of Ernesto Laclau and Chantal Mouffe, to which I will return shortly.

it appropriate to introduce a new sphere of the Earth system related to the technological factor. He has called it the 'technosphere', based on fundamental concepts in the Earth sciences such as the lithosphere, atmosphere, biosphere and noosphere (a term found in the most visionary early twentieth-century discussions of the Earth's spheres).[1] What is most striking about Haff's technosphere is that he envisages it as an autonomous mechanism, without drawing any considerations from history (particularly that of technology) or from the analysis of the relationship between social organization, the economy and technology. From his proposed objectivist perspective, humans are merely instrumental first to the emergence and then to the maintenance of the technosphere. The following quotation from a recent publication clearly illustrates this depersonalizing perspective:

> The technosphere is the autonomous global system that drives the Anthropocene. It comprises the world's humans and its technological systems, including transportation, communication, power transmission and financial networks; governments and their associated bureaucracies; military, educational and scientific establishments; religious institutions and political parties; and artistic, political, environmental, cultural and other social movements.
> The technosphere, a geologically young global system, is Earth's newest 'sphere', joining the four classical spheres of air (atmosphere), water (hydrosphere), rock (lithosphere) and life (biosphere) (…)
> The aim is a nonanthropocentric description of the technosphere, built upon properties common to any dynamic system.
> Amongst those system properties is agency – the capacity to pursue a purpose (…) including channelisation of the intentional behaviour of humans towards support of technospheric functionality. (Haff 2019, 138)

In this definition, the economy is part of the technosphere, so the relationship between society and technology is reduced to the inclusion of the former within the latter.[2] This vision turns upside down the classic instrumental relationship between the forces of production and the means of production, in-

[1] The pioneering article was Haff 2014. For a historical perspective on the emergence of the spheres of the Earth system, I refer the reader to the studies by Giulia Rispoli, especially: Rispoli 2014; Rispoli and Olšáková, 2020; Rispoli 2022.

[2] For a critical discussion of the concept, see Rosol, Nelson and Renn (2017).

sofar as it is the latter that are seen to encompass the human sphere. However, Haff goes much further, by including all institutions and cultural forms in the technosphere. One could say that the horizon of human action is delimited by technological possibilities. A non-anthropocentric and objectifying perspective is advanced here as a guarantee of scientificity. The philosophical implications (or consequences) are serious, since agency is ascribed to a depersonalized mechanism. Ethics and politics are eclipsed, together with all forms of non-instrumental rationality because, at least theoretically, only a sort of immanent technological transcendence would make it possible to take the initiative and establish goals (in an autotelic way, coinciding with the maintenance of the system).[1] From an ideological point of view—that is, in terms of the political function of ideas—the technosphere fulfills an anesthetizing and depoliticizing task similar to that performed in other contexts by religion.[2]

Therefore, Haff addresses and in his own way answers the question posed in this article: what is the transforming subjectivity of the Anthropocene? He attributes agency to machines rather than humans. This is connected to a simplistic behaviorist psychology, according to which human actions are automatic responses to certain stimuli, in this case induced not by the physiological 'first nature' but by the 'second nature', which is technological.[3] Faced with such a

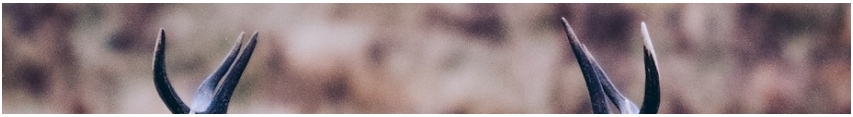
[1] I say 'immanent' because, unlike forms of theological alienation, in which action is projected into the transcendent subjectivity of a providential divinity, technological logic is placed above human intentions but at the same time functionally made to depend on them. I addressed this issue in Omodeo 2017.

[2] Apart from Marx's well-known judgment on religion, a detailed analysis of the functioning of religion as an ideology was developed only later, particularly by Antonio Gramsci in his *Prison Notebooks*, in which he devoted great attention to the educational element in the light of cultural policies and construction of hegemonies, and by Louis Althusser in *Ideology and Ideological State Apparatuses* in which he dealt above all with the internalization of the social norm through the engineering of the unconscious. Ideological issues aside, the question of the technosphere suggests that we should also look at the material dimension of technological alienation, a question paradigmatically addressed by Karl Marx in the economic manuscripts of 1844, by Gramsci in his notes on Americanism and Fordism, and by Raniero Panzieri at the dawn of Italian *operaismo*. I will return to this shortly.

[3] The question of 'second nature' has clear Baconian roots. In the first aphorism of the second book of *Novum Organum* we read: "What human power does and is intended for is this: For a given body, to create and give to it a new nature (or new natures)". Francis Bacon, *Novum Organum* Book 2:1. See Bacon 2000, 102.

simplistic outlook—which perhaps can find sophisticated expression only in Marshal McLuhan's vision of men as machine-pollinating bees[1]—there is an urgent need for further research on technology, particularly the historical intersection of economics and machines.

In a recent book on *The Evolution of Knowledge*, the historian of science Jürgen Renn has tried to surmount the theoretical and scientific impasse by proposing to integrate, if not replace, the concept of technosphere with that of 'ergosphere'. The latter term restores labor to a central place, as a privileged human activity at the crossroads between culture and the environment (Renn 2020). This is an important idea because it invites us to reconsider human practices, in their historical and social aspects, as the keystone of the Anthropocene. On this basis we can legitimately speak of geoanthropology rather than geotechnology, since the secret of machines remains humanity. But this humanity requires specifications. Before coming to geopraxis, I wish to consider some other terms with similar connotations that are circulating in the semiosphere.[2]



3. On Cosmopoiesis, Cosmopolitics and Cosmotechnics

[1] Cf. McLuhan 1964, 46: "By continuously embracing technologies, we relate ourselves to them as servo-mechanisms. That is why we must, to use them at all, serve these objects, these extensions of ourselves, as gods or minor religions. (…) Physiologically, man in the normal use of technology (or his variously extended body) is perpetually modified by it and in turn finds ever new ways of modifying his technology. Man becomes, as it were, the sex organs of the machine world, as the bee of the plant world, enabling it to fecundate and to evolve ever new forms. The machine world reciprocates man's love by expediting his wishes and desires, namely, in providing him with wealth".

[2] 'Semiosphere' is a concept proposed by Juri Lotman. I am using it here in a generic sense to refer to the horizon of the thinkable on the basis of concepts present in the *discourse* on the relationship between culture, technique and planet Earth. See Lotman and Clark 2005, and as well Lotman 1979.

Various philosophical concepts with geoanthropological connotations are candidates for explaining the transformative relationship between humans and their environment, although they throw both light and shadow on it. Here I will consider only three of them: cosmopoiesis, cosmopolitics and cosmotechnics.[1] While cosmopoiesis has rather antiquarian character, the other two concepts have actually been circulating in recent debates of relevance for the Anthropocene. However, regardless of their more or less noticeable presence in current debates, I will consider them here in order to assess their potential value and limitations as far as the conceptualization of the Anthropocene problem of the human-environment relation is concerned.

Cosmopoiesis is a Hellenistic term, composed of two words rich in philosophical implications. The first, *cosmos* (κόσμος), refers to the order governing everything and is generally translated into Latin as *mundus*. In its ancient philosophical meaning, it refers in particular to the beauty of an organized whole ('cosmos' originally meant 'ornamentation'). According to the myth of the *Timaeus*, Plato's cosmological dialogue, the *cosmos* results from the intervention of a higher divinity, a Demiurge who brings order to indistinct matter and primeval space, or *chora* (χώρα), whose existence preceded the cosmogonic action. The world would be the product of an intelligence that has structured and organized reality, introducing its own ends into a materiality that passively receives them.[2] *Poiesis* (ποίησις) instead refers to one of the main dimensions of human life according to a dual distinction, established by Aristotle, between theory (θεωρία) (or speculative knowledge as an end in itself) and activity, which in turn is divided into political activity or πρᾶξις and creativity/cragrsmaship, i.e. ποίησις.[3] Far from being limited to artistic or indeed literary and 'poetic' activity, *poiesis* originally referred to the creative act by which a work comes to light. It is linked to τέχνη, technique, that is the ability to find and apply means

[1] Perhaps the concept of geopolitics, with its controversial Schmittian legacy, would merit discussion, but for the moment I prefer to leave it aside.

[2] Cf. Plato, *Timaeus* 52 D.

[3] There is some confusion between the two concepts in Koyré 1943. In recent studies on the history of science, the concept of practical knowledge has emerged, which however has a higher affinity with the ancient concept of *poiesis* than that of *praxis*, as can be seen from the greater attention paid to production compared to politics. A good example is Smith 2004. Also see Long 2011 and Valleriani 2017.

commensurate with given purposes. The correspondent Latin term is *ars*: it encompassed the two poles of creative activity before its modern differentiation between art and craftsmanship. In establishing an analogy between nature and technology in their productivity, the ancient philosophers could explain one by means of the other. The motto in which this analogy found topical expression in medieval scholasticism is *ars imitatur naturam* (art imitates nature), which was appropriated by Renaissance engineers in a phase of rapid social ascent to ennoble their skills and practical knowledge. For example, in *Delle fortificazioni* (On Fortifications) (1596) Bonaiuto Lorini highlighted the affinity between human work and nature:

> Having repeatedly wondered about the marvelous order of Nature, and having clearly seen that no imperfect thing has been created—for indeed everything (with a form of its own) is very perfect, and such as to bring convenience and utility to man, who is the product and image of God and, so to speak, the brother of Nature and father of Art—I have come to believe that man is completely obliged to imitate Nature, and with art to do all his good works, first of all for the honor of our Lord God and then for the benefit of our neighbors. Because by dominating all other earthly things, man must surpass them in perfection, so his nobility, as a reasonable creature, may be seen to be greater and he may be compared to a small world by philosophers (Lorini 1595, f. A3r)[1]

The idea of a 'small world' places human activity on a cosmic level, whereby technological, artistic and productive activity becomes a component even of astronomical processes. The Greek equivalent is that the notion of 'microcosm'.[2] Human work and the practical skills of artists and engineers can in turn help man to understand the internal workings of nature. In the natural-philosophical theses of his *Comoeracensis Acrotismus* (Theses of Cambrai) (1588), the heretical panentheist philosopher Giordano Bruno defined nature as a force inherent in things that generates from its own bosom all forms and entities as a draftsman constructs figures in his own mind.[3] *Poiesis* can be rendered in Latin as *creatio*.

[1] Lorini was one of the artist-engineers scrutinized by Lefèvre 1978.

[2] With regard to this concept, the reader can still refer to the studies on the history of Renaissance cosmology by Ernst Cassirer (1927).

[3] Bruno 1962, 1, 80: "DE NATURA: (…) Ipsa est ars viva et quaedam intellectualis animae potestas, non alienam sed propriam, non extrinsecus sed intrinsecus, non electione tali, sed essentia tali, materia perpetuo figurans: utpote non sicut statuaris externe, cum discursu, et instrumento oper-

And κοσμοποίησις is indeed translated as *mundi creatio* in the seventeenth-century edition of a work by the sixth-century Christian commentator on Aristotle Johannes Philoponus, a work also known by the title *De opificio mundi* (World Factory). This is a cosmogonic narrative focusing on *Genesis*, in which—among other things—it is argued that the myth of Plato's Demiurge is derived from the book of Moses.[1] Hence, theological ideas have shaped the concept of cosmopoiesis; however, if subjected to a Feuerbachian critique of religious alienation, it allows us to identify in transcendence the creative relationship between working humanity and the world. From a religious perspective, the ideal of cosmopoiesis exceeds the realm of what is possible for humans, who are merely asked to abandon themselves with trust (and passivity) to a Providence that takes care of them in mysterious ways. The political impasse is the one already described with regard to the technosphere: a narcotization of consciences and a barrier to action.[2] Initiative, i.e. *poiesis*, lies somewhere else, in a sphere that looms over the world of men yet directs, guides and shapes it. Its unfathomableness is enshrined in the concept of *creatio ex nihilo*, which establishes an insurmountable alterity between divine subjectivity and earthly objectivity. Thus, this concept is able to explain the planetary action of humanity in the Anthropocene only in mythological terms. The geoanthropological perspective must rid itself of the theological legacy and assume instead an immanent perspective. In the history of modern philosophy it finds its first expression in the celebration of the technical-creative abilities of Renaissance man and, in the same period, in the naturalization of the divine as *natura naturans*, following the path leading philosophical thought from Bernardino Telesio's *natura iuxta propria principia* (nature considered according to its own principles) to Spinoza's crowning of an ontology without transcendence and then to Marx's praxeolog-

atur, sed perinde ut Geometra, dum vehementer quodam affectu figuras imaginatur, spiritum eius intimum imaginatione movet atque figurat".

[1] Philoponus 1630, I, 2: "Quod etiam Plato in expositione mundi reationis, Moysem imitatus sit". For an original discussion of the mathematical construction of nature on an ontological rather than epistemological level in the early modern period, I refer the reader to Gal and Chen-Morris 2013, chap. 4 and 5.

[2] Precisely because of this function, in his critique of Hegel's philosophy of law Marx speaks of religion as the opium of the people and maintains that every critique must begin with a criticism of religion.

ical immanence.[1] Only in such perspective might we apply the concept of cosmopoiesis to the Anthropocene. To do so, I will later retain the conceptual pair of *cosmos* and *poiesis* but transfer it—through the concept of geopraxis—from the loftiness of the cosmos to the Earth as the setting for geological action (by privileging the prefix 'geo-' over 'cosmos-'), while pointing to political action (*praxis*) rather than disinterested creativity (evoked by the term *poiesis*).

Cosmopolitics is used, in the plural, by Isabelle Stengers as the common theme of her studies on the history and philosophy of modern science. Her seven-volume *Cosmopolitiques* (1996-1997) focuses on the contiguity but also the difference between the hybrid practices and materials of science and technology, on the one hand, and those of politics as the management of power, on the other. Stengers considers cosmopolitics to be an "ecology of practices" which deals not so much with the *politics of the cosmos,* in the sense of the material transformation of the world in the Anthropocene, as with the *inscribing of our practices in an order with universal aspirations* (Stengers 1997, 73-75). For Stengers, this re-inscription of our practices, including technoscientific ones, in a cosmos involves a decentralization of the political, i.e. a demolition of city walls (the walls of the πόλις as the classical space of politics), to create an ecological continuum with what surrounds them. Thus, she proposes to transcend the human sphere as the exclusive setting for politics, in the name of a broadened *democracy*. From the cultural anthropologist of science Bruno Latour (and Michel Serres) she borrows the idea of a 'Parliament of things' which, despite its egalitarian and inclusive guise, ends up curtailing humans' possibility to act by delegating it to a reified objectivity:

The Parliament of things corresponds to a delocalization of politics that can be placed under the sign of a statement of Leibnizian derivation: 'Not everything is political, but the political is everywhere'. And wherever there is politics, it is a question of explicitly abandoning the foundational reference of our politics, referring to the 'will of human beings considered pre-existent to the tie that holds them together', and of openly stating that we are bound together by hybrid ties that we manufacture and that make us what we are (Stengers 1997,

[1] The concept of the philosophy of *praxis*, known especially in its Gramscian sense, has its roots in Labriola's work. For a reconstruction of the genesis of historical materialism starting from scholastic and Brunian immanent cosmologies and ontologies, see Bloch 1952.

78-79).[1]

Passages like this suggest an environmental awareness of the fact that human politics cannot be limited to a normativity that fails to take into account the material conditions and the ecological consequences of our actions. Yet, this approach gives rise to the serious misunderstanding, namely the idea that such an awareness must translate into a decentralization of the political sphere as well as the human one. 'Things' do not speak nor is it possible to establish a social pact, a *jus gentium*, that includes the non-human or the divine. Aristotle's definition of *anthropos* as πολιτικὸν ζῷον (political animal) highlights the human specificity of the political (*Pol.* I, 2; 1253a3). For Aristotle, the human being is continuous with nature (φύσις) but remains specific in his relationship with other humans within a community (πόλις). Stengers' operation is instead aimed at the reabsorption of the human community within the sphere of things. In this sense, the ecological subjectivity we are seeking is transformed into a form of material objectivity in the context of a flat ontology similar to that of Latour's so-called Actor-Network Theory, according to which humans, technical tools and entities of the physical and biological world operate on the same level of interrelation.[2] However, as the origin of each form of alienation remains essentially theological, it is not surprising that both Stengers and Latour soon went on to transpose subjectivity from the human to the divine, through the rediscovery and celebration of a pagan divinity: Gaia.[3] Although Latour correctly indicated agency as a central theme of the Anthropocene, he did not address the

[1] "Le Parlement des choses correspond à une délocalisation de la politique qui peut être mise sous le signe d'un énoncé d'ascendance leibnizienne: 'Tout n'est pas politique, mais il y a du politique partout.' Et, partout où il y a du politique, il s'agit d'abandonner explicitement la référence fondatrice de notre politique, qui la renvoie à la 'volonté d'humains réputés préexister au lien qui les tient ensemble', et d'affirmer hautement que nous tenons ensemble par des liens et des hybrides que nous fabriquons et qui nous fabriquent". The concept of reification that I apply to the parliament of things is derived from Lukács. For a Lukácsian critique of Latour, see the aforementioned Henning 2019.

[2] Roger Cooter denounced the "de-centralisation of humans and their actions" and the strengthening of "passivity and amorality" at the expense of "self-reflexivity and political passion" induced by the epistemology of Latour's Actor-Network Theory, in Cooter and Stein 2013, chap. 10; in particular see 210.

[3] In 2012, Stengers opened her lecture on *Cosmopolitics: Learning to Think with Sciences, Peoples and Natures* at Saint Mary's University in Halifax (Canada) with a long tirade on Gaia, as the protagonist of the current planetary processes: `https://youtu.be/1I0ipr61SI8` (accessed 20 July 2022).

topic of political practice or the so-to-speak 'immanent' responsibilities of our societies. Instead, he made Gaia's transcendence the center of all expectations:

> Through a complete reversal of Western philosophy's most cherished trope, human societies have resigned themselves to playing the role of the dumb object, while nature has unexpectedly taken on that of the active subject! (Latour 2014, 11)

In this perspective, we must resign ourselves to the fatalistic expectation that a transcendent divinity will providentially solve the problems created by the economic, industrial and scientific development of our societies; or that this divinity *will punish us*. The cosmopolitics of Gaia compels us to return to the question of ideology, specifically to that of the social function of scientific and philosophical concepts. Indeed, we are again confronted with the opiate-like effects of depoliticization.

The third concept I wish to consider here, 'cosmotechnics', is also characterized by a strong incentive towards the alienation of human action in a transcendent sphere. In this case we are dealing with a metaphysical version of Heideggerian origin. The title of Yuk Hui's book, from which I have borrowed the term, *The Question Concerning Technology in China: An Essay in Cosmotechnics* (2016), mirrors that of Martin Heidegger's essay *The Question Concerning Technology* (*Die Frage nach der Technik*, 1955). In both cases, the question of techne is regarded as a metaphysical one, concerning the ultimate horizon of meaning or fundamental vision of the world. For Heidegger, the rationality of technology is reductively conceived of as "instrumental reason", thus as a kind of utilitarian reason which is unable to set goals that go beyond what is given: its basic assumption is the availability of reality to be exploited. It is also universalizing, since it seeks to reduce everything to its discrete quantification. In the history of Western metaphysics, techne would be a nihilistic culmination of the question of being. On the basis of these assumptions, Hui can both accept and reject Heidegger's vision. The described outcomes merely represent the result of the inscription of technique in a culturally specific order, cosmos, the 'Western' one.[1] Insofar as it draws upon different mythical and cultural roots, e.g. Confucianism and Taoism, China has the possibility to develop or exploit

[1] This inverts the hypostatization of geographical coordinates criticized by Edward W. Said in *Orientalism*. See Said 1978.

technology from a different basis and assign it a different connotation. With its inclination toward domination and implicit separation of the human and the natural, Western Prometheanism lies at the root of a Western metaphysics, which could be set in contrast to the naturalistic and harmonic vision typical of Chinese thought. Hence, far from being a concept referring to the transformation of the world, cosmotechnics seems to be a vision of the world in which technology assumes variable, yet always abstract, meanings depending on the culture. A first limitation of this conception regards the idea that there is a strictly instrumental technological rationality[1] that leaves no room for the possibility of technological-scientific creativity or for an adequate understanding of the historicity of science—since the latter is made to coincide with a certain fixed and timeless image, the result of positivism.[2] The question of its emancipatory potential, or the question of how a liberated technological culture should be configured, is posed in terms of visions of the world, indeed of being. Thus the political meaning is imposed from above—*esse ex machina*—and Hui attaches no consequences to political and cultural practices.[3] Another limit concerns the conflation of 1. techne (corresponding to *tecnica* in Italian, *technique* in French and *Technik* in German) and 2. technology, whereby 1. is identified with the ability to develop means and to use tools, a sort of basic anthropological datum, and 2. with the development of a complex science based on machines and media in industrial societies. The anthropological universalism of technique is trans-

[1] This is Weber's accepted definition of *Zweckrationalität* (the rationality of the means) aimed at identifying the means but not the ends, and thus impervious to rationales related to values and ideals.

[2] This is also the mistake made by Edmund Husserl ([1936] 1970), who understands the philosophical significance of modern science, yet fails to evaluate it in terms different from the meaning of modern science as empirical, quantitative, reductive and philosophically anti-philosophical. The result is a caricatural portrayal of Galileo Galilei, as a metaphysician, rather than experimenter, who stripped reality of all meaning by reducing it to mere appearance.

[3] It should be noted that, while shying away from metaphysical or ontological considerations, even Jürgen Habermas—the author of famous 1968-inspired critiques of technoscience such as *Technik und Wissenschaft als 'Ideologie'* and *Erkenntnis und Interesse*—does not distance himself from the condemnation of technique, science and even work as the bearers of an unavoidable instrumental rationality. Therefore, Habermas perpetuates the idea that there is a rift between technoscience and democracy (the problem of technocracy) resolvable only through a division of work between normative discourse (a task for philosophy and the human sciences) and descriptive/explanatory discourse (the insurmountable limit of the natural sciences).

muted into a sort of mythological specificity that precludes any understanding of the practical and transformative character of technology. Hui's blindness with regard to socio-economic structures means that technoscientific universalism is condemned as a metaphysical misunderstanding (due to the hegemony of Western nihilism), rather than as the outcome of the capitalist unification of the world, first colonial and then global. He proposes cosmotechnics as a spiritual question—indeed, a question for a spirit deprived of any capacity for action. Although we must agree with Hui that technology (like science) is positioned and inscribed in cultural perspectives, we must turn to historical materiality, not the abstract and impersonal level of being, to find the instruments to analyze and solve the problems raised by the Anthropocene.[1] Cosmotechnics is incapable of addressing the central question of the transformative subjectivity of the world; at best, it can provide an idealistic and deformed image of the present.

4. The Concept of Geopraxis

The concept of geopraxis is meant to be a historicist and immanentist concept, a clear alternative to speculative or theoretical approaches that project human technoscientific intervention in planetary processes into an imaginative and anesthetizing transcendence. It expresses a dual need: on the one hand, to anchor anthropological discourse in the concreteness of the terrestrial environment we are now inhabiting and transforming on a planetary scale; on the other hand, to de-essentialize the active subject of the environmental transformation,

[1] Hui explicitly presents cosmotechnics as a response to the challenge of the Anthropocene (Hui 2016, 7). An essential author for a cultural, historical and material understanding of science and technique is Ludwik Fleck, whose *Entstehung und Entwicklung einer wissenschaftlichen Tatsache* (1935) remains an important historical-epistemological model. Cf. Fleck 1979.

by underlining its autotelic potency without spiritualizing it. In other words, the subject of the Anthropocene is not an essence from which to deduce anything, but a concrete historical reality in progress. Rather than a (philosophical or biological) datum, humanity is something to be constructed with a large degree of contingency and freedom. Science itself is the result of past contingencies and choices. To understand and have an adequate awareness of this, against any hypostatization of humanity and of our knowledge, we will need an epistemology that accepts the historicity inherent in the systems of knowledge and the practical roots (ecological, social, economic and political) underlying scientific developments.[1]

The roots of the philosophy of praxis can be identified in Karl Marx's *Theses on Feuerbach*, provided it is interpreted in an ecological rather than an exclusively social perspective. The connection between praxis and the environment can be dealt with by considering the third thesis on Feuerbach in the translation produced by Antonio Gramsci in his prison notebooks:

> La dottrina materialistica che gli uomini sono il prodotto dell'ambiente e dell'educazione e che pertanto i cambiamenti degli uomini sono il prodotto di altro ambiente e di una mutata educazione, dimentica che appunto l'ambiente è modificato dagli uomini e che l'educatore stesso deve essere educato. (…) Il ((convergere)) del mutarsi dell'ambiente e dell'attività umana può solo essere concepito e compreso razionalmente solo come rovesciamento della praxis. (Gramsci 2007a, 2356)[2]

A philosophy of praxis understood in this way views objectivity as a product of the intervention of the subject who acts even before having awareness.[3] It also envisages the relationship between subject and object as a relationship

[1] On the varied range of historical-epistemological approaches, I refer the reader to Badino, Ienna, and Omodeo 2022.

[2] Cf. Marx and Engels 1975, 4: "The materialist doctrine concerning the changing of circumstances and upbringing forgets that circumstances are changed by men and that the educator must himself be educated. This doctrine must, therefore, divide society into two parts, one of which is superior to society. The coincidence of the changing of circumstances and of human activity or self-change can be conceived and rationally understood only as *revolutionary practice*".

[3] The notion of an epistemology of intervention rather than of representation has its roots in Marx's thought even before than in American pragmatism; it was then systematized in works such as Hacking 1983.

between humans and the environment in which both evolve and are transformed in a mutual dynamic exchange. This action emerges from a context that is retroactively changed. Hence, awareness, human goals, labor and collective choices are materially inscribed in the world. Humans and the environment are never expressed in the mythological terms of an original Adamic or Promethean encounter, but rather in a culturally and scientifically structured manner, in the sense that this relationship is seen as always being mediated by socio-cultural factors and codified knowledge.[1]

The Anthropocene records the inscription of humanity in the geological sediments, atoms, molecules and cycles of the Earth system (Rosol and Rispoli 2022). Yet, since this inscription is historical, it is necessarily political, since the future remains open.[2] The possibility of theoretically understanding the transformation of the frame of reference is rendered by Gramsci as an "overturning of praxis" (*rovesciamento della praxis*). Indeed, theory describes the process, ideally inverting the agency. However, if we wish to come back down to earth, this 'transformative praxis' is what Friedrich Engels, when first publishing Marx's third thesis on Feuerbach, called *umwälzende Praxis*.[3] Here Gramsci misunderstands Marx's words, yet not the spirit of his reference to revolutionary praxis. Just as in the history of science Nicolaus Copernicus's hypothesis of the planetary Earth triggered a revolution by establishing a new frame of reference in natural philosophy, so in political history the French Revolution highlighted how the 'overturning of praxis' redefines the institutional framework of politics.[4]

[1] Peter Damerow has written some enlightening pages on the abstractive historical process of science. I refer the reader in particular to his *Abstraction and Representation: Essays on the Cultural Evolution of Thinking* (1996). Within the same line of research, but with a greater focus on the conceptual sphere than the socio-political and material one, see also Schemmel (2016). Regarding Fleck's epistemological-cultural heritage, see Zittel 2010.

[2] Here I am reconsidering in an ecological sense the famous integration of Gramsci with Croce's historicism: if history is always contemporary, because it springs from the interests of the present, it is also always and necessarily political. Gramsci 2007a, Notebook 10, 1241-1242.

[3] A brief note on *umwälzende Praxis*: this expression comes from the first edition, edited by Engels (see Marx and Engels 1975, 4-8). Marx's original text unequivocally reads *revolutionaire Praxis* ($MEGA_2$ IV 3, 20). Regarding the difficulty of translating this expression and the theses on Feuerbach into Italian, see Gramsci 2007b, 814, n. 11.

[4] Kuhn 1957; 2010. See also Omodeo 2016a. A fusion of perspectives between the epistemology of scientific paradigms and Marxist political theory was advanced by Ciccotti et al. 1977.

In reality, the environmental transformation mentioned above does not correspond to the letter of Marx's text, since he speaks of a *Veränderung der Umstände und der Erziehung*: a change of conditions, or circumstances, and of education. Although the German explicitly only refers to the social milieu and not to the natural environment, the spirit of Marx's words can well be expressed in Gramsci's terms—a further fruitful misunderstanding on the Italian thinker's part. Human action (which is always social, collective and historical) emerges from an eco-social milieu which in turn changes over time. To overcome the fatalism surrounding the unpredictability of its undesirable consequences—the focus of so much literature when it comes to the Anthropocene's environmental crisis—we must once again look at praxis. In contrast to the apocalyptic pessimism marking most reflections on the Anthropocene, the philosophy of praxis responds with the optimism of the will. Against the passivity induced by cultural forms of alienation (cosmopoietics, cosmopolitics and cosmotechnics), praxis constitutes an urgent reminder of the potential of political action.

The importance of a praxeological perspective for a correct understanding of humanity as a cultural subject of an open process emerged long ago from the Anglo-Saxon New Left. In an article of great methodological importance, *Cultural Studies: Two Paradigms* (1980), Stuart Hall described a bifurcation in the field of cultural studies (Hall 1980). On the one hand, structuralism emerged as a legacy of Levi-Strauss, while on the other hand there was the need, of Gramscian origin, to understand society and humanity in their free and active, emancipatory and political expressions. The split Hall identified between historicism and structuralism, as well as between the philosophy of the subject and that of the concept, was frequently made a focus during the twentieth century, both through the opposition between Althusser's structural Marxism and Gramsci's Marxism, centered on historical-cultural praxis, and through the opposition between dialectical existentialism à la Sartre and anti-humanism in twentieth-century French philosophy.[1] In his interpretation of Gramsci, Hall translated

[1] Peter Thomas considers the split between Gramsci's historicist humanism and Althusser's scientific structuralism to be the most important theoretical question to have emerged in the field of (Western) Marxism in the twentieth century. Cf. Thomas 2009, chap. 1. In France, Michel Foucault focused on the contrast between the philosophy of the subject and that of the object as a fundamental philosophical rupture. On the one side we find thinkers such as Jean-Paul Sartre and Merleau-Ponty; on the other, Gaston Bachelard, Jean Cavaillès, George Canguilhem, Alexandre Koyré and Foucault

the concept of 'prassi' (praxis) as agency, a term that has become ubiquitous in environmental discussions, to the point of being over-used, since it is now indistinctly attributed to humans' conscious political actions, the faculties of living beings, the most elementary physical and environmental forces, and even quasi-transcendent and quasi-divine subjects (e.g. Gaia, cf. Latour 2014).

The primarily methodological, yet also ontological, separation between structural objectivities and acting subjectivities risks reproducing the old split between (efficient) causes and values underlying the canonical division between natural and spiritual sciences in classic German philosophy—whose unwitting heir is the Frankfurt School's *kritische Theorie*. Instead, the Anthropocene requires that the split be mended. Thus it will be necessary to think about the productive and dynamic (dialectical) meeting point between structures and praxis. Praxis transforms structures (as *umwälzende Praxis*), by which it is in turn conditioned—but not already necessarily determined, although there are ineluctable material, physical and historical constraints. I believe that this is Gramsci's idea, notwithstanding postmodern and quasi-idealistic interpretations of his philosophy, and the fact that the objective structures to which he refers are of a social nature.[1] What does not clearly emerge from the *Prison Notebooks*, but needs to be made a focus of discussion today, also in relation to the resumption of praxeology, is the question of the objectivity of the ecological basis and outcome of action.[2]

Translating the *anthropos* of the Anthropocene in terms of praxis means deessentializing it. Indeed, this perspective is faithful to the line drawn by humanism since its origins in the Italian fifteenth century.[3] Pico della Mirandola's discourse on the dignity of man, far from considering humanity as a datum, makes it the result of a choice. Devoid of predetermined essences, human beings can be self-determinate and independently construct themselves and their

himself. See Foucault 1978.

[1] Particularly in the post-modern interpretation by Laclau and Mouffe (1985). In the sociological field, Pierre Bourdieu has adopted views closer to the Gramscian ones, at least regarding the conceptualization of the relationship between subjective conscious action and objective social structures. In this regard, see Ienna 2013.

[2] The reference text in this regard is Guattari 1989.

[3] Eugenio Garin's studies remain an essential reference point on this topic: see Garin 1990 and 1994.

world. This perspective fully emphasizes the subject's responsibility and capabilities, far from any form of alienation. In this sense, Pico's critique of astral determinism is no mere polemic against the dominant astrological science of his time: it is a declaration of the subject's autonomy to act and create his/her future without his/her prospects being in any way predetermined by an objective datum.[1] The spirit of a humanity which in order to act must free itself from ideological prejudices of a scientistic nature accompanies a line of anti-essentialist humanistic-historicist thinking that is the opposite of essentialist anthropocentrism, i.e. that perspective which—out of sheer ignorance—humanism has often been accused of adopting.[2]

5. Geopraxeological Perspectives on Historical Epistemology

[1] From this point of view, historians of Renaissance astronomy have often overlooked the fundamental philosophical importance of Pico's *Disputationes adversus astrologiam divinatricem* (1496). Molinari 2012 stresses the significance of Pico's work in the context of twentieth-century cultural approaches to the history of ideas and philosophy.

[2] This anti-essentialist humanism ranges from Pico and Giambattista Vico's *verum ipsum factum* to Gramsci's philosophy of praxis and Ernesto De Martino's critical ethnocentrism. The critique of Eurocentrism and essentialism now finds a less refined yet still influential formulation in Rosi Braidotti's works—(e.g. Braidotti 2013). Neglecting the history and meaning of humanism, Braidotti reduces it to a fetish of certain twentieth-century polemics, particularly the French structuralists' (and post-structuralists') polemic against Sartre's existentialism and the post-colonial polemic against the excessive celebration of classical and European culture in non-European contexts, especially among US elites in the first half of the twentieth century. The fact that European cultural hegemony is a finished chapter in world history, which makes further arguments less compelling, is shown by the manner in which works such as Chakrabarty 2000 were received as non-controversial. He in fact burst open doors. Indeed, provincializing the United States would be more difficult today.

Let us now consider the epistemological and scientific insights provided by some of the points just made. The historical-material perspective on the planetary geopraxis of the Anthropocene should rest on three foundations: 1. the study of natural bases, seen not in themselves but rather as the origin and context of human transformative action; 2. a critical understanding of socio-economic structures which, by means of techno-scientific mediations, mark the planetary metabolism of present-day global society; and 3. the political sphere, especially regarding the setting of goals, their negotiation and decisions concerning individual communities.

I see this as a revival and integration, from a geo-transformative perspective, of an intuition by the material historian Fernand Braudel, from the *Annales* school, regarding the three temporalities (and the three corresponding spheres of reality) intertwined in history: the apparently immutable one of geomorphology, the long duration of the developments of societies and, ultimately, the *événementielle* dimension of human events and politics. In Braudel's formulation, as expressed in *La Mediterranée* (first edition, 1949), specific attention to the territory as a social and historical factor is an important aspect of Marxist theory, which all too often is reduced to the relationship between economic structures and cultural superstructures.[1] In light of geopraxis, I would now speak of 'political eco-epistemology', since this approach aims to hold together the various threads linking the historical epistemology of the Anthropocene to political epistemology as a reflection on the functions and goals of science.

In *Political Epistemology: The Problem of Ideology in Science Studies* (Omodeo 2019), I proposed a definition of political epistemology as the merging of political-economic analysis and the political-cultural critique of science. I specifically addressed the ideological functions and actions of meta-science—of reflection on the phenomenon of science in the disciplines of history, philosophy and so-

[1] Braudel [1949] 1972, 20-21: "This book is divided into three parts (…). The first part is devoted to a history whose passage is almost imperceptible, that of man in his relationship to the environment (…) the history of man's contact with the inanimate (…). On a different level from the first there can be distinguished another history, this time with slow but perceptible rhythms (…) the history of groups (…) Lastly, the third part gives a hearing to traditional history (…) of individual men (…) of events: surface disturbance, crests of foam that the tides of history carry on their strong backs". In the Anthropocene, all three dimensions of the historical-temporal stratigraphy are set in motion, including the environment, which thus loses the static character ascribed to it by Braudel in 1949.

ciology of science, without excluding adjacent fields such as the philosophy of technology, history of ideas, cultural studies and cultural anthropology of science. Rather than separating science and ideology as has often been done in the Marxist field, I opt for a Gramscian understanding of ideology as a question of cultural hegemony and consciousness, or rather of the practical anchoring of all thought and theory in the material processes of history. In this sense, Marxism itself and science are ideologies.[1] In the same book, I brought forward the thesis that the meta-discourse on science represented a privileged gateway to the identification of the epistemic values that mark scientific understanding and policies, albeit at a sublimated level of ideological direction or, if you will, of cultural hegemony.[2] Yet the Anthropocene and the ecological question in general require that political epistemology not be exhausted at the level of consciousness, values, world views and theory. It is necessary instead to strengthen its anchoring in ontology at all levels of the understanding of science, with regard to its origin, validity and above all goals.[3]

I need not go into historiographic details here. The question of the material, socio-economic and technological origins of modern science is perhaps one of the most thoroughly investigated ones in the past, at least in a Marxist and ex-

[1] Gramsci can be put forward as the champion of an expanded conception of ideology that includes all spheres of the 'spirit', from common sense to religion, arts, philosophy and science. However, something similar can be found where one would least expect it: for example, in the critical target of the *Notebooks* on scientific facts, Nikolai Bukharin—who, in his London communication of 1931 aimed to introduce the Soviet Marxist perspective on the history of science—affirmed that it was necessary to overcome epistemology to arrive at praxeology, thus underlining the close dependence of knowledge, in all its forms, on human praxis. See Bukharin 1931, 14: "There is 'epistemology'. But no learned men have yet thought of inventing some special 'praxeology'. Yet one passes into the other, and Bacon himself quite justifiably spoke of the coincidence of knowledge and power, and of the interdependence of the laws of nature and the norms of practice".

[2] Much has been written about the Gramscian and post-Gramscian concept of hegemony. See, among others, the studies by Fabio Frosini and Giuseppe Cospito. Frosini 2003 provides a general introduction to Gramsci's thought. See also Cospito 2021. Regarding the broader development of this concept, see also Brandist 2015. Concerning epistemic values, feminist epistemologies have particularly focused on their examination and critique. See, for example Longino 1990.

[3] In a certain sense, the Anthropocene requires that historical epistemology follow a similar path to that of the development of Lukács's thought from the neo-Kantian dichotomy of history and nature (historiography and natural sciences) of *History and Class Consciousness* to the praxeological reconciliation (focused on labor) in *Ontology of Social Being*.

ternalist context.[1] Since the 1930s, the idea has emerged that modern science, rather than being the outcome of brilliant intuitions and solitary speculation, was linked to collective social and economic roots, i.e. the super-individual result of a society in which knowledge has always played a vital role. In particular, the tumultuous developments of the early modern period and the driving force of the capitalist bourgeoisie created a climate in which the economic, mercantile and productive needs of an expanding global market encouraged technological solutions which, in turn, required adequate theoretical analyses.[2] The economic impulse was felt in the most varied fields, including oceanic navigation, the channelization of waterways for agriculture, transport and industry, mining and metallurgy and military technologies, particularly fortifications, architecture and ballistics.[3] This is the world of economic and political interests, of scientific techniques and practices, that saw the birth of modern mathematical physics, with a strict dependence on and adherence to technology.[4]

The cultural turn in the history of science in the 1980s created some confusion about the relationship governing the socio-economic, technological and spiritual conditions of the 'thought collectives' of modern science. This turn coincided with the prevalence of research focusing on microcontexts and a sociology of individual interactions between 'actors'. The latter were understood in a

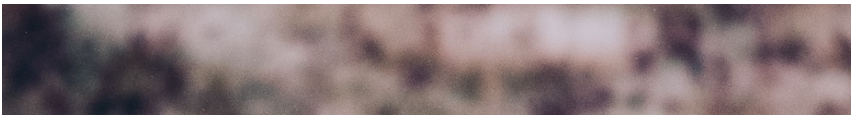
[1] I have dealt with this topic elsewhere, for example in Omodeo 2018a. Much has been written about the question of the alternative between externalism and internalism, between a contextual understanding of science and one exclusively attentive to the sphere of ideas. The historiographical context, in which the choice between the two approaches—crystallized in the opposing sides of the Cold War—became more visible is probably the Scientific Revolution, variously interpreted by liberal and anti-Marxist spiritualists such as Alexandre Koyré and materialist sociologists such as Edgar Zilsel. See, as canonical texts, Zilsel [1942] 2000 and Koyré 1943. For an overview of the historiography of the Scientific Revolution, see Floris Cohen 1994; for a succinct overview of the topic, see Omodeo 2020b.

[2] The author most responsible for this historiographical approach is the Soviet Marxist Boris Hessen, thanks to his speech at the Second International Congress of Science and Technology in London in 1931. See the introduction by Ienna and Rispoli 2017 to the recent Italian edition of Hessen's famous Newton essay. Important ideas on the social function of science may be found in Bernal 1939.

[3] Hessen's typewritten textbook on modern science provides a broad historical-economic, historical-technological, scientific, philosophical and ideological overview of modern science that goes beyond the myth of English scientific and capitalist modernity. It was first reported by Winkler 2007. Now see Hessen 2022.

[4] More recent studies on the practices underlying modern science are the aforementioned works by Smith 2004 and Long 2011. See also Klein 2016.

neo-liberal sense as individuals who move freely within spaces and institutions that are, if not neutral, at least instrumental and exploitable for their personal goals and purposes.[1] While this perspective has allowed the emergence of the subalterns of modern science from historiographical oblivion, e.g. the 'invisible' technicians and experimenters who made the work of the famous scientists of the Scientific Revolution possible (Shapin 1989), the political dimension of both the historical investigation and the initiatives of the persons studied was strongly diminished, even reduced to mere opportunistic career and social climbing strategies, through a retrojection of the most irksome aspects of the regime of competition of present-day capitalism.[2] Many micro-historians of the cultural turn of 40 years ago believed it was possible to overcome the dichotomy between externalism and internalism by employing a Goffmanian approach to social reality.[3] They were encouraged to embrace this line by the twilight of the ideological contrast between the two opposing blocks in the Cold War which found expression, in the history of science, in the contrast between externalist and internalist positions on the two sides of the Iron Curtain.[4] However, they resolved this contrast at the cost of renouncing the analysis of both the social structures (typical of Marxist externalists) and the technical aspects of science (typical of Anglo-American scientistic historians). Ultimately these scholars abandoned precisely what has become most urgent in our predicament: the synthesis of structural and technical-scientific analysis in a political sense. Moreover, exclusive attention to the social construction of science unjustifiably excludes an ecological extension of thinking on science.



[1] The text marking this turning point in research on the science of the early modern period is Shapin and Schaffer [1985] 2011.

[2] An example of this is the careerist interpretation of Galileo by Biagioli 1993.

[3] However, the original critical and political potential of Ervin Goffman's work should be highlighted, as Franco and Franca Basaglia did in the preface to Goffman 1971, vii-xiv.

[4] See, among others, Werskey 1971; Young 1996; Shapin 1992; Omodeo 2106b.

Another important aspect to consider so as not to yield to simplistic cosmopoietic, cosmotechnic and cosmopolitical mythologies is the fact that the geoanthropological relationship is not a mere relationship between Man and World mediated by Technique (with a capital letter since it is hypostatized and mythologized); rather, it is a dynamic, subjective-objective and transformative relationship shaped by historical factors of mediation that require thorough historical, social and political examination. Few have been clearer than Ludwik Fleck, in *Genesis and Development of a Scientific Fact* (1935), in underlining the fundamental importance of cultural mediation in the constitution of both the facts of science and the theories and mentalities (the *Denkstil* corresponding to the *mentalité* of Lucien Lévy-Bruhl's cultural anthropology) widespread among the elites of experts and in civil society.[1] Although the central problem for Fleck was to understand the historical and cultural, psychological, social, institutional, educational and communicative constraints of science, the tools he provided can be applied to geoanthropological studies in general, given that science is a pillar of global transformation in the Anthropocene.[2] In turn, far from being a phenomenon to be idealized or a cultural product in an abstract sense (a sort of chimerical *science pour la science* analogous to *art pour l'art*),[3] science is an-

[1] A bridge between Fleck's theory of thought collectives and Gramsci's theory of cultural hegemony was created by Nieto-Galan 2016.

[2] See the aforementioned Renn 2020. Cf. Engler, Renn, and Schemmel 2018.

[3] Walter Benjamin defined the ideal of art for art's sake as a theology of art. By analogy we can conceive of pure science or science for science's sake as an abstract ideal linked to the corporate interests of specific elites or to the implementation of technocratic policies. The reference text is Benjamin's classic study *Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit* (1936). I refer the reader to the Italian edition (Benjamin 2017), because it gives us the possibility to appreciate the genetic stratification of the writing of a work in which intuitions and radical theses are at times more explicit in the intermediary versions than in the definitive one published by the author. A critique of the corporate spirit of the pure science myth was foreshadowed in Fleck and fully developed in Bernal 1939. An acute critique of disinterested science was developed by Umberto Eco in his semiotics studies (see for example his *Trattato di semiotica generale*, 1975), with specific reference to the human sciences. Eco observed that theories and knowledge in the field of cultural studies transform their object of research because of a reflective feedback effect. According to what he called a "semiotic principle of uncertainty" (the effect of the observer on the object observed), any investigation into human reality affects and transforms it. Neglecting the position of the observer can lead to a sort of "ideological fallacy", i.e. to assuming the objective neutrality of the human and social sciences, as if the politics and motivations informing their specific form of knowledge could be separated from their content, almost as if one could postulate a form of pure

chored in research and educational institutions, as well as increasingly in private research and communication centers, whose development is closely linked to the neoliberal transformation of our societies in general.[1] Seventeenth-century scientific institutions, particularly the Parisian Académie des Sciences and the Royal Society of London, became centers of science but, despite the apparent extraneousness of the theories that emerged from them, from Newton's physics to the analytical studies of mechanics culminating in Giuseppe Luigi Lagrange's work, they responded to concrete economic and political needs.[2] This is especially clear from the support the French Academy gave to scientific programs aimed at the mapping of resources—geographical, mineral, botanical, animal and human—in view of their effective management and exploitation both in Europe and in the colonies.[3] Finally, the Humboldtian research university consolidated the integration between educational and research systems, creating a successful model that has only been weakened by recent neo-liberal turns toward the privatization of research.[4]

knowledge for knowledge's sake, on the basis of which the knower does not intend to undertake anything and wishes to leave reality intact as it appears *sub specie aeternitatis*. I discuss the inclusion of these considerations in the context of the extraction of data on the geoanthroposphere in Trevisani and Omodeo 2021.

[1] Ciccotti et al. 1977 offers a scathing criticism of apparently disinterested basic research, highlighting instead—beyond the ideological aura of science as neutral—how, in the second half of the twentieth century, research funding (from the study of subatomic particles to the aerospace sector) was inextricably linked to geopolitical, technological, and military interests. Opposite statements by politicians, scientists, journalists, and various intellectuals are denounced as misleading.

[2] Hessen 2022 (posthumous) is very clear in this regard in *Manuscripts and Documents on the History of Physics*. On the scientific academies of the seventeenth century see, among others, Giannini and Feingold 2020. On the 'discursive' connection between scientific theories and political theories of the early modern period, see Keller 2015.

[3] Chandra Mukerji has published a thoughtful study on Colbert and the transformation of the French territory in the early modern period, in which the complex historical interweaving of political, symbolic, technological and scientific components is considered. See Mukerji 2009.

[4] The history of modern universities culminating in the Humboldtian system is the subject of Clark 2006. The author discusses the sociology of modern universities but does not undertake a broader examination of the ideological and political-cultural functions of these institutions from their origins in medieval times. An important part of the history of scientific education also involves medieval guilds. The social, especially mercantile, roots of modern mathematics and algebra have been studied, among others, by Jens Høyrup and Roy Wagner in numerous publications. I will cite only Høyrup 2022 and Wagner 2010.

Some clarification is necessary to avoid exposing externalism to facile criticism. A material-historical investigation of science must not err in terms of determinism, a defect often attributed to Marxist economism; instead, it should emphasize the role of past decisions in influencing the trajectories that have led to the present, in other words 'path dependencies'. It will equally have to accept openness to the future with respect to present-day decisions.[1] I insist on praxeology and on politics to maintain this openness to contingency and freedom.[2] Politics has been one of the crucial factors in the formation of modern scientific culture on all levels. The creation of modern scientific societies in the seventeenth century incontrovertibly attests to this (see Badino and Omodeo 2020). However, the values that mark the 'spirit' of science will be understood in a political sense, closer to that of Montesquieu's *esprit des lois* than the confessional one of Max Weber's *Geist*.

In my studies on the hydrological culture of the Italian sixteenth and seventeenth centuries, I have noted the profound difference between two Renaissance models of science: the refined and elitist model of the 'scientists' (mathematicians and philosophers) at the courts of Signorie like of the Florentine one or the papal curia, in contrast to the complex and dialogic model of the republican scientific institutions of Venice.[3] Court mathematicians and philosophers, from Guidobaldo Del Monte to Galileo Galilei and Benedetto Castelli, were little inclined to deal with the popular classes or even engineers but shared the hierarchical logic of their patrons' politics, also in terms of the top-down technical decision-making (Maffioli 2010). Instead, the *proti* (engineers, hydraulic engineers and technicians) of the nascent Venetian Magistrate for the Waters—responsible for the management of flowing, lagoon and coastal waters—always remained subordinate to a pluralist Senate and constantly dealt with commu-

[1] Science's orientation towards the future also emerges from Kuhn's theory of paradigms: in *Structures*, for example, he underlines how the defense or banning of the heliocentric system in the dispute between Galileo and the Holy Office did not concern so much 'proofs' as the possible paths of science—hence it was a choice and controversy concerning the future, not the present.

[2] On the other hand, the risk of the apoliticalness of exclusive attention to the economy, not only in theory but also in practice, has long been emphasized by Eric Hobsbawm, in his defense of a Gramscian path to Marxism. See, for example, Hobsbawm 2011.

[3] On court science, I refer the reader, in addition to Biagioli 1993, to Omodeo and Renn 2019. I have also devoted an article to Venetian science 'from below' (Omodeo 2022b).

nities within the territory, in particular that of fishermen, whose knowledge of the lagoon and economic interests were considered essential when making technical decisions and assessing their consequences (for example, the diversion of rivers). Far from being a mere case of 'participation' or, as we would say today, 'citizen science' (paradigms that presuppose a passive role on the part of civil society vis-à-vis scientific research), the Venetian science and management of waters in the early modern period was linked to the conception of the lagoon as a 'public domain' or 'commons'.[1] This was not, however, a widespread and homogeneous kind of science, a 'shared knowledge' indistinctly circulating across all classes and social groups, but rather a kind of knowledge diversified on the basis of life experiences and practical and theoretical skills. Against this background of collective yet composite knowledge, we can comprehend past alliances of technical-scientific competences and political settings. Of major relevance is the Magistrate of the Waters, who—with the support of the Senate and acting in defense of fishermen's interests—mapped and created a register of the concessions of protected fishing zones in the lagoon, so as to limit the misappropriation of common spaces and resources by a few individuals and protect free fishing (see Rivoal 2015; Zago 1982). The Republic's concern to exercise sovereignty over the waters of the Venice lagoon, the right to move freely in this area claimed by the popular class of fishermen, and the presence of a magistracy tasked with safeguarding the most important resource for the city's life can jointly be regarded as an important example—from the early modern period—of how limits could be placed on the alienation of the commons. In this case, science and technique were actively involved in a progressive sense.[2] Such historical examples should be kept in mind in order to appreciate the emancipatory potential of science when put to the service of the common good rather than of the economic and political interests of some elites or the ruling classes.

Venice more generally is an exemplary case of historical geoanthropology. Its natural and artificial constitution makes it a living historical artifact, in which anthropic and environmental elements are melded, even at the level of

[1] I am referring to the problem of the commons, particularly the so-called tragedy of the commons, which was set out in reactionary and neo-liberal terms by Hardin 1968, and then subjected to a sharp critique by Ostrom 1994.

[2] The case of enclosures has been regarded as paradigmatic of the early accumulation of capital and the alienation of commons by authors ranging from Marx to Silvia Federici (2004).

landscape architecture and geomorphology.[1] The Venetian archeosphere has its roots in antiquity, but is connected to the medieval and modern development of the area, providing a glimpse of long-lasting eco-anthropic processes (Canal 2015; Ammerman, et al. 1999). The rich archival documentation on the technical and political initiatives that have marked the lagoon and the surrounding territory makes it possible not merely to conduct an objectivistic investigation of its history, but also to reconstruct the decision-making processes and practices that link the present to the past. Scientific, administrative, political and social controversies about the use, redistribution and conversion of resources are widely attested over several centuries. For example, fishing regulations aimed at the protection of aquatic species and their breeding for the collective good date from the fourteenth century.[2] Instead, fifteenth-century discussions on the conditions of the waterways and assessments of the appropriateness of diverting the Brenta River outside the lagoon reveal concrete social problems and conflicts. In the fifteenth century, it became quite clear that, while this diversion would prevent the lagoon from being silted up by sediments carried by the muddy river, thereby protecting Venice and its trade, this would create problems of another kind, since the Brenta provided a means of aquatic transportation and communication with the city of Padua and was an important source of drinking water for an island city lacking this essential resource. Moreover, any changes to the waterways were bound to create alterations in the lagoon currents, with unpredictable impacts on fishing, and also raised problems of fairness in the supply of water for agriculture and for mills.[3] It follows that any decision to alter the watercourses and territory had to take a polyphony of voices, perspectives and interests into account.

Hence, the long and contemporaneous processes of geoanthropological, historical and natural transformation found support in science, technology and their development. It can never be stressed enough that understanding the logic

[1] Cf. Iovino and Beggiora 2021, 8: Venice is defined as a "hybrid artificial organism of land and water" and a kaleidoscope for the Anthropocene. See also Iovino 2016, chap. 2, and De Capitani 2022.

[2] I discuss this in a forthcoming article (Omodeo [In press]).

[3] Exceptional documentation of the social multifunctionality of water and its management is to be found in the fifteenth-century writings of Marco Cornaro, collected in Cornaro 1919. On the use of resources in the Venetian context, see Appuhn 2009.

of scientific and technological progress provides an important key to interpreting the history of the Earth.[1] The materialist and cognitive historian of science Peter Damerow raised the question of the evolution of science as a process of abstraction in a constant dialectical relationship with the material contexts from which it emerges. The latter are characterized by specific political, economic and cultural spheres. The great civilizations of the past and their needs, which could only be met through practices such as land surveying and computation, ensured that new sciences arose, such as geometry and arithmetic in ancient Egypt and the Fertile Crescent.[2] Once practical knowledge was codified and taken up by social groups with specific functions, this provided the conditions for the semi-autonomous development of knowledge systems, with subsequent repercussions on the activities from which they derived (Damerow 1996). Studies on the sociology of science have explored the conflictual and intrinsically social nature of these apparently neutral but actually intrinsically political practices. One historically significant question concerns the creation of measurement standards, involving practical, economic and political factors, as is evident in the case of the introduction and promotion of the metric system during the French Revolution (Kula 1986). Collective and individual processes of abstraction attest to a profound interdependence of cognitive structures from power relations, since the prospects offered by science determine individuals' possibilities and social relationships, establishing historically variable forms of action and alienation.[3] The splitting of mathematical theory and practice in the Indian caste system is perhaps the most striking case of estrangement and domination through science (Babu D. 2022). If, despite the promises of progress, the development of scientific thought and technological capabilities does not automatically correspond to a development in terms of freedom and justice, as it may even cause regression from a civil point of view, the question of how science and technology should be characterized in a liberated society becomes the main issue for political epistemology and geoanthropology.[4] This is perhaps the

[1] I also wish to mention Ellan Fei Spero's works on 'technological landscapes', particularly Spero and Pereira 2016.

[2] See Peter Damerow's studies on ancient science. Cf. Damerow and Lefèvre 1981.

[3] Damerow (1996) has elaborated on these topics by combining Hegel's historicism and Piaget's pedagogy.

[4] It is not a matter of resurrecting a simplistic myth of the noble savage à la Rousseau, of the regres-

most important question for an eco-socialism able to overcome the impasse of the Anthropocene on both the material and the mental level.[1]

In the current situation of global capitalism, ecological thinking must be simultaneously environmental, economic and mental, as Félix Guattari stressed at the time of the sudden transition from the bipolarity of the Cold War to the neoliberal globalization that dominated geopolitics until 2016.[2] Regarding the connection between political economy and the environment, the mid-twentieth-century 'Great Acceleration'—marking the catastrophic march of the Anthropocene toward systemic collapse—is closely linked to the alliance between capital and industrialization.[3] This is what Malm has called 'fossil capitalism', underlining the extractive and devastating aspect of the dominant form of the economy from the point of view of atmospheric pollution (Malm 2016). Moreover, Foster has assessed the gravity of the connection between capitalist dynamics and environmental devastation in terms of a 'metabolic rift' between capitalist societies and their ecosystems (Foster 2022). As for the fossil component, while this is central, the critique of extractivism highlights only one of the two sides of the present-day capitalist system, given the importance of information technology, communication and management infrastructures as the second essential component of the global system. This infosphere is now an essential complement to the industrial technosphere. Only by considering these together, in their functional and social interdependence, can we get an adequate idea of the Earth system in the Anthropocene. Both components, the technical and the informational, are part of the logic of capitalism, thus of the specific *ergospheric*

sion of civilization by means of arts and letters, but rather of asking ourselves—with Marx—why the development of technology does not in itself constitute a factor of liberation for factory workers, or perhaps even—with Marcuse—why the immense technoscientific capacities of the twentieth century did not lead to a more equitable society but rather to the enhancement of dependencies, exploitation and inequity.

[1] On the urgent need to emancipate the imagination, colonized by views that support the status quo, see the passionate pages by Fisher (2009).

[2] Guattari 1989. On the question of the current situation of capitalism from a historical perspective, it may be useful to return to Arrighi 2010. I take 2016 as a reference point, on account of the post-truth populist shift marked by the election of Trump in the United States and the Brexit referendum outcome in Great Britain. The segregation regime of the policies linked to Covid-19 and the brutal aggression in Ukraine in 2022 have accelerated the transition to a new global state, the consequences of which are not yet clear.

[3] On the *Great Acceleration,* see Steffen et al. 2015.

relationship underlying the current planetary metabolism. Matteo Pasquinelli, the first to point to this global interdependence as a symbol of the geological age of humanity, called this two-headed reality "the automaton of the Anthropocene". He then underlined the function of industrial and computer technologies in processes of alienation, as well as of resistance, struggle and liberation today (Pasquinelli 2017)[1]

In this historical, critical, sociological, philosophical and political perspective, we must rethink the ergosphere and its relationship with machines as a key to interpreting the Anthropocene. Labor constitutes its fundamental force: human energy is the true source of value and thus of social wealth, even though at a constant risk of alienation and exploitation. The obliteration of the centrality of labor in favor of the celebration of technology is a crucial political issue. As maintained by Raniero Panzieri in the *Quaderni rossi* (that is, Red Notebooks), it is necessary to report and act on the intimate connection between technoscience as a productive force and the asymmetrical relations of production, which determine its development, in order to revolutionize the two.[2] Yet, the question now acquires a further ecological, planetary and geoanthropological connotation. In this light, it is necessary not only to focus on the question of labor, but also to closely relate this to the more specifically political praxis, which acts both within the given framework and on the framework itself. Indeed, praxis is the fundamental engine of geoanthropology according to the dual meaning of activity as transforming work and revolutionary politics.[3] And the technological-practical conditions of geopraxis are themselves an object of

[1] On the question of intellectual labor, included in the circuit of mechanization of society, see what Pasquinelli himself writes, drawing upon Alquati's hypotheses, in Pasquinelli 2015.

[2] Panzieri 2020, 60: "Faced with the capitalist intertwining of technique and power, the prospect of an alternative (workers') use of machines cannot, evidently, be based on the pure and simple overturning of relationships of production (of property), conceived of as a shell which at a certain degree of expansion of the productive forces is destined to fall away simply because it has become too restricting: the relationships of production are *within* the productive forces, and the latter have been 'shaped' by capital".

[3] From this point of view, the old alternative between Bogdanov's labor (and techno-scientific practices) and Lenin's (revolutionary) political praxis is a false alternative. On the epistemological and political issues of the early twentieth century in Russia, so important for understanding the difficult conciliation of science and revolution, I refer the reader to Steila 1996 and Tagliagambe and Rispoli 2016.

historical transformation.

6. The Subject of Change

We have now returned to the initial question: who is the subject of the planetary transformation of the Anthropocene? We do not yet have an answer, but my long excursus has allowed us to identify a direction as well as a series of risks to be avoided, primarily that of the alienation of the human ability to act and transform reality. The possibility of political decision-making and guidance when it comes to environmental change is at constant risk of being blocked and mystified through semi-theological proxies, or rather its projection into a metaphysical, abstract, hypostatized sphere. To counter any form of opiate transcendence, it is here necessary to reiterate the specifically human and interhuman character of political praxis without falling prey to essentialization. Technology, if understood as a process whose logic transcends and looms over the sphere of individual and collective conscious choices and actions, can acquire the mythological nature of an 'immanent transcendence' (immanent, since it is material and dependent on mankind for its genesis and maintenance, but transcendent as it is established as autonomous).[1] Thus, praxis should be understood as transformative action, mediated materially and culturally by science and technology.

[1] See my discussion in Omodeo 2017. New forms of technological-theological thought can be found in the debates on artificial intelligence and so-called 'singularity', which envisages a domination of machines over humans, including the setting of goals unfathomable to us. In this regard, see Bostrom's alarming writings. That machines dominate humans is a sad fact of industrial exploitation and the mechanization of all forms of human activity (including intellectual activity) in advanced capitalism. While awaiting the release of Pasquinelli's book on the historical epistemology of artificial intelligence, the reader can consult Daston 2018. Regarding the aspect of discipline and control, only one of the consequences of the mechanization of intelligence (of culture in its apparently immaterial spheres), see Zuboff 2019.

Agency (or, as I prefer to call it, praxis) returns to the fore as conscious human subjectivity.[1] This is not only included within epistemic and social structures, the result of cultural processes, but is also the source of interventions able to transform the datum and its frameworks. In short, it is a question of recovering, in addition to regulated and normalized action, also revolutionary action.[2] The two dimensions are closely linked in a historical, material and geological perspective, open to radical innovation and freedom.

Therefore, within the context of thinking on the political epistemology of the Anthropocene, the issue of geopraxis newly raises the vexed theoretical-practical question of the revolutionary subject. Whereas Marx identified this in the proletarian class, subsequent developments have repeatedly compelled us to review his diagnosis and to define revolutionary subjectivity in many ways: as party, avant-garde, the people or the organization capable of unifying the urban proletariat and peasant masses. In view of the uncertainties and difficulties in identifying the engine of radical social change, the question has emerged all the more pressingly of whether this is an ontological matter or an epistemological one, i.e. whether the subjectivity bringing about transformations is deducible from objective circumstances or is the result of self-production. On the one hand, subjectivity would be called to act in a way that is strictly dependent on one's position within given social relationships; on the other hand, it would be self-constituted through symbolic processes, particularly through the antagonistic creation of identity.

Prototypical of the last, purely postmodern approach to political subjectivation is the line adopted by Ernesto Laclau and Chantal Mouffe in *Hegemony and Socialist Strategy* (1985). This book—revealing of the so-called linguistic turn (in which 'linguistic' is a substitute for what was previously defined as

[1] In other words, not only should the idea of humankind as the maker of its own history be revived, but so should the importance of awareness of one's objective position in order to achieve an effective and transformative subjective positioning. Despite its idealistic distortions and epistemological misunderstandings regarding science and its status, Lukács's *History and Class Consciousness* is still worth reading as a milestone in the analysis of the relationship between positions and positionings, later developed in other ways by subaltern studies and feminist epistemologies.

[2] Kuhn's theory of paradigms provides important insights concerning the conditions and modes of transformation of the real, not only of the mental. The metaphor of revolution, even when applied to science, is an interpretation of the progress of political systems, applicable in various directions, independently of Kuhn's own intentions.

'ideological')—established a postmodern path to political theory, according to which struggles emerge not from social materiality (for example as a consequence of objective relationships of class and power), but from discursive practices anticipating collective identities. Political antagonisms would be organized around the latter. The advantage of this approach is to obviate the urgent need to analyze the social and historical-economic bases of our cultural reality. Yet, it risks failing to appreciate *science* as an empirical and rational form of inquiry that relies neither on immediate intuition nor on rhetorical shortcuts. Beyond this, an apparent strong point of Laclau and Mouffe's proposal lies in the Gramscian humanistic legacy, since the latter places strong emphasis on the creative freedom of the political sphere with respect to economic interests or, even more so, with respect to forms of naturalistic determinism. However, this approach risks dematerializing and equalizing identities, paving the way first to relativism and then to populism.

In this regard, Laclau re-evaluated populism, which he considered ambiguous and thus also open to 'leftist' developments. Laclau's starting point was the belief that the unity of political movements is a never accomplished totality, not external to them, which governs the understanding of groups and prescribes their collective line of action. This is not the artificial outcome of extrinsic manipulations, but rather the result of the internal logic of collective processes, in "the transition from request to claim" Laclau (2005, 73). In this passage, separate democratic demands are unified through what Laclau calls "a chain of equivalences"; hence they erect a front that questions the social sphere as such and transforms the requests into "popular claims". In *On Populist Reason* (2005), the work in question, Laclau brings the line already undertaken in *Hegemony and Socialist Strategy* to its extreme consequences. The basic concept can be summarized as the hypothesis that the real does not come before the symbolic (Laclau 2005, 118). Laclau considers populism a political logic able to establish the symbolic unity of a group, i.e. its identity, from which the ontological unity of a group can be implemented. This is a derivative ontology, in which it is not the being (the onto- of the prefix) but the -logos of the suffix that dictates the line and prevails. The symbolic is, therefore, the constitutive, constitutive factor of the social sphere (Laclau 2005, 117). Cultural hegemony comes to coincide with the problem of the discursive creation of identities rather than with that of the leader in the context of existing relations of power and social structures, un-

derstood and studied by adequate scientific means. Rhetoric explicitly serves as a fundamental tool (at once art and technique) in the construction of the political sphere and its ontologies.[1] Far from being a secondary issue, populism is elevated to the rank of a paradigm of the political sphere. As certain as Laclau was in the progressive potentiality of populism, the post-truth outcomes of postmodernism and the sovereign outcomes of identity politics, the results of the discursive dematerialization of the social sphere cast a sinister light on the illusions of the 1980s and compel us to return to the ontological question after a season in which reality was erased.[2]

These 'populist' outcomes allow us to understand the risks inherent in the renunciation of ontology and the possibility of a dialectic between subjectivity and materiality in a praxeological sense. A first risk, of a purely political nature, is the equivalence of all forms of identity on the level of ideological construction, which disarms criticism in the face of the re-emergence of the symbolic identities of 'right-wing culture', such as nation, religion, race and culture understood in closed and hypostatized terms.[3] The other danger consists in volatilizing the material conditions of social reality, hence in insulating the political realm from ecological considerations. In other words, it is as if ideology and struggles for meaning, which constituted the 'superstructure' of Marxist theory, become fundamental, to the detriment of the 'base', rejected as a mythical and illusory construction. If the socio-economic terrain is already dematerialized as a symbolic projection of identity struggles, it will be even more arduous in this perspective to combine socialism and ecology, emancipation, natural science and technology.

If this proposal of a postmodern left with populist outcomes is overly abstract, an ontological path will be more appropriate. In *Il potere costituente* (Constitu-

[1] Laclau 2005, 12: "Far from being a parasite of ideology, rhetoric would actually be the anatomy of the ideological world". Cf. Laclau 2005, 11: "Rhetorical operations (…) constitute broad popular identities (…). they actually constitute populist subjects (…)".

[2] The question of post-truth, more than anything else, shows us the limits of postmodern epistemology when it is dematerialized and thus subjected to the whim of the force of those able to impose and manipulate the cultural line. In addition to the previous publications, I refer the reader to Omodeo 2018b.

[3] I will overlook the most radical, mystical and esoteric forms of the far right, those denounced in a unique and implacable way by Jesi 1979.

tive Power) (1992), Antonio Negri proposes ontology as the starting point to identify the 'potency' underlying all constituted forms of power. This 'potency' would be the basis of a creative political process linking subject and structure. However, he ambiguously conceives of subjectivity both as revolutionary subjectivity (e.g. the Parisian proletariat fighting for the Commune of 1871) and as a *subjectum* in the pre-modern sense of the term. This is the ὑποκείμενον or *substantia* that still underlies Spinoza's metaphysical objectivity, used by Negri as a term of reference to rethink the trajectory of modern subversive political theories from Niccolò Machiavelli to Marx. For him, the subjectivity of constituent power takes on the semi-theological (i.e., explicitly metaphysical) connotation of an expansive omnipotence (Negri 1992, 28). This, in line with the negative theology of a hidden God, is denied in the institutional forms that it historically assumes (Negri 1992, 38).[1] The political sphere thus conceived has priority over the social sphere (Negri 1992, 34). Hence, Negri inverts the Marxist approach regarding the primacy of the economic sphere—and this frees him from the need to adopt the tools of Marx's political economy and sociological analysis as well as, *a fortiori*, of epistemology and science in general. In his case, this is not a dialectical rethinking of the relationship between structures and superstructures, of political economy and culture, of subjectivity and objectivity, but an (explicitly metaphysical) inversion.[2] The result of this inversion is also the distinction between a teleological level, ascribed to the sphere of identity (Negri envisages it as totalitarian sovereignty and, to a certain extent, as representativeness) and a fundamental—and radically ateleological—ontological level of democratic constituent power (Negri 1992, 27; 45). Negri's constituent power is the child of the modern ateleological mechanism (a legacy of mechanistic philosophy). Therefore, the revival of ontology as an imperative of the political sphere risks being lost in the abysses of a theological foundation more similar to what Ernst Bloch called the immanentism of the medieval "Aristotelian left" than to a materialist-historical philosophy that deals with the complexities of

[1] While Benedetto Croce accused Marxism of identifying its hidden God as the economy and Walter Benjamin believed that messianism represented the theological secret of the philosophy of Marxist history, what we are dealing with here is a theological-rational metaphysical foundation. Although Negri speaks of multitude rather than divinity, it is from Spinoza's rational God that he ultimately derives his conception.

[2] A different, dialectical, interpretation of Marxism and Spinozism in Ilyenkov 2017 and 1975.

structures and praxes of the real world.

Negri's philosophy appears to be a metaphysics of revolt, not of revolution. The latter would require the establishment of a new order, of a higher degree in terms of justice and freedom. It necessitates discipline and education… and science. While the critique of sovereignty and identity politics is fundamental to oppose the various forms of populism and sovereignism of the re-emerging right, rebellion cannot be sufficient. We need to construct a new hegemony that gives shape to the base, to the 'constituent power'. The form which this hegemony must take is neither a negation nor a limitation of the base, but the fulfillment of its possibilities.

In this perspective, I believe that Gramsci's praxeological humanism, with its attention to the question of hegemony and the melding of cultural policies in the social base so as to build new alliances and forms of society, is still the main path for the renewal which the world needs, as long as praxis is expanded to include the geo- of the environmental cause. Who will be the subject, then? It is a matter of reconnecting ourselves to a political-philosophical tradition and marking out a still-germinal direction that is satisfactory on the theoretical level and yet to be developed on the practical level. This is certainly not a path that will lead us to transcendence; it will be characterized in praxeological terms—neither essentialistic nor objectivistic nor scientistic.

The concept of geopraxis points to a new eco-socialist humanism. Humanism, as conceived for example by Ernesto De Martino in the wake of Gramscian historicism, is a form of critical reflection which, based on awareness of one's historical and cultural position, can be open to change. Instead of presuming to escape our roots, it is necessary for us to focus on the material, ideological and psychological structures constituting our historical being, in order to act and go beyond what is given. If this past is not understood, it becomes an insurmountable ideological force. Indeed, such is the force of ideology that when one fails to perceive the cultural space in which one moves, one is unable to move beyond it.[1] In this sense, historical awareness coincides with the acknowledgment

[1] De Martino (1977) called this approach 'critical ethnocentrism'. In his point of view, for example in *La fine del mondo: contributo all'analisi delle apocalissi culturali* (1977), this form of cultural anthropology is the most adequate modern form of the humanistic, historicistic and praxeological legacy.

of one's possibilities—with politics.[1]

Humanism means historical awareness, creative openness to the future and immanence. That is the optimism of reason, trust in the human possibilities to know and transform reality, beginning with ourselves. In this sense—I must reiterate—humanism is neither essentialist nor deterministic. We could refer to Giambattista Vico's motto: *verum ipsum factum*. Truth lies in doing and human action is the broad horizon of our possibilities, which are intrinsically historical. In this sense, truth is not so much a cognitive construction (truth as the determination of the categories or methods of knowledge, i.e. epistemological truth) as the ontological constitution and transformation of the world. In the geopraxeological perspective of the Anthropocene, it will obviously be necessary to overcome Vico's theoretical limitation, which envisaged a break between the *world created by humans*, the sphere of history and culture, and the *natural world*, created by God. In short, we need a historical materialist perspective, in which culture and nature are considered together in terms of subjective-objective becoming.

The emancipatory political question determines the tools by which the world can be understood and shaped. Science and technique are its principal tools. Hence, the question of science and technique vis-à-vis social emancipation must continue to be raised and addressed, as taught, for example and for a long time, by humanistic and anti-scientistic Marxism, the movements of radical scientists of the 1960s and 1970s, the feminist epistemologies of standpoint theory, and the critique of the colonial use of science.[2] Science is not neutral, rather it is

[1] I am referring to Gramsci's political reformulation of Croce's historicism in the *Prison Notebooks*. See Gramsci 2007a, Notebook 10, 1242.

[2] Humanistic Marxism has been the focus of many Italian approaches, for example—in addition to Gramsci's—those of Mondolfo, Concetto Marchesi and Garin. An interesting article on Mondolfo's poposal is Cospito 2020. Regarding radical scientists' movements after 1968, see Ienna 2020. For a broader picture, also including the discussion of feminist epistemologies and environmentalism, see Rose and Rose 1976.

a social and material force, of production and reproduction, closely dependent on relationships of power and production. If this connection is not subjected to criticism, the emancipatory potential of science will remain an empty promise. Indeed, it will turn into its opposite, since it will be co-opted for iniquitous social, economic and political projects, which it will strengthen, increasing dependencies and inequalities. If science is not emancipated—i.e. not included in a project of radical democracy—it will become an instrument of exploitation and violence. A few examples can illustrate this double-edged value of science and technology. In the 1990s, the advent of the internet was celebrated as an opportunity for radical democracy, but this new resource was soon developed as an instrument of control.[1] Other recent examples are vaccines as a cure and a source of income in the context of the Covid-19 pandemic; war as a means of defense or aggression and as a source of profit, as shown by the intertwining of geopolitics in the ongoing Ukrainian conflict; and the ecological transition as a business opportunity or as a basic element in the transition to socialism.[2]

Very briefly, the question of geopraxis introduces a path centered on organized, political and conscious human activity. This is expressed by labor, as a force for the transformation of the Earth system underlying technology and global capitalism. Human and natural emancipation must necessarily occur through the liberation of labor from social structures and technological mechanisms of control and exploitative dependence. This involves an awareness of the specifically political dimension of the Anthropocene as a historical and geological epoch. Humanism means autonomy, immanence, historicity, but also positioning. As we will never be able to adopt a superhistorical perspective, we must increase our critical awareness of the situation we find ourselves in, so as to freely deconstruct and construct our humanity. The geopraxeological perspective reconnects this line of thought with a broader environmental concern, including not only the social milieu but also the economic framework and, beyond the social structure, even its natural basis, as components of a multidimensional process that cannot be understood in a scientistic or reductionist perspective. A historical understanding of the technosphere reveals the historical-epistemological roots of the Earth, from local geomorphologies to the global

[1] See, for example, Malcolm Hyman and Renn 2012.
[2] I attempted a political-epistemological sortie into the debate on Covid in D'Abramo et al. 2022.

setting. The prospect that opens up, the translation of *anthropos* into praxis, avoids the dual risk of essentializing humanity (as a species rather than an autopoietic ideal) and of reifying it (as a natural rather than cultural force). The solution of the planetary environmental crisis can only be reached by means of the correct use of our scientific and philosophical capacities to understand our epoch, its roots and its tendencies.

As the fifteenth-century champion of human dignity, Pico, teaches us, our individual and collective future is never a given fact but always a choice.

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Dominik Mecko, "Deer" (Unsplash, `https://unsplash.com/photos/qMbw8JmdXXI`)