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In Praise of the Terrestrial Condition

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The irruption of totalitarian regimes in the first half of the 20th century was the major event that marked the life and work of Hannah Arendt (1906-1975). It led her to study the traditional hierarchy between *vita contemplativa* and *vita activa*, and to affirm that plurality and natality are basic conditions of human life. The second set of events was the atomic bomb, the Cold War between the United States and the Soviet Union, and the threat of a nuclear holocaust. They made her rethink the role of modern technoscience in the process of «world alienation» and defend the «love of the world» and the earthly condition of human beings. She addressed these matters in *The Human Condition* (1958), but the latter has not received as much attention as the former. This article aims to show the relevance of Arendt's reflections on modern technoscience in the Anthropocene epoch. To do so I will consider Arendt in a trajectory that connects her with Koyré, Husserl, Lovelock, Margulis and Latour.

1. From the closed world to the infinite universe

In 1957, Alexandre Koyré[2] published *From the closed world to the infinite universe*, which would become a reference work on the astronomical revolution of the sixteenth and seventeenth centuries. The title sums up his main argument very well, as stated in the introduction:

> This scientific and philosophical revolution —it is indeed impossible to separate the philosophical from the purely scientific aspects of this process: they are interdependent and closely linked together— can be described roughly as

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2 Alexandré Koyré (1892-1964) was born into a wealthy Russian-Jewish family. At the age of fifteen he was arrested for socialist activism. In prison he read Edmund Husserl's *Logische Untersuchungen*, published in 1900 and 1901, after which he went into exile in Germany and in 1908-1909 attended Husserl and Hilbert's lectures. He wanted to do his thesis with Husserl, but Husserl did not accept it, so he went to Paris in 1912, followed Bergson's courses and did his doctoral thesis on the idea of God in Saint Anselm (1923) and his state thesis on the philosophy of Jakob Böhme (1929). In 1922 he began to teach at the École Pratique des Hautes Études (EPHE). In 1929, on his initiative, Husserl gave some lectures in Paris that would be published in French under the title *Méditations cartésiennes* (1931), under the supervision of Koyré himself, and this led the two of them to meet again. In 1934 he translated Copernicus's *De revolutionibus orbium coelestium* (1543) into French, with an introductory study. From then on he devoted himself to the history of science. At the outbreak of World War II, he went into exile in the United States. He founded the École libre des Hautes Études in New York and published «Réflexions sur le mensonge» (1943) in its journal *Renaissance*. It was republished in *Contemporary Jewish Record* under the title «The Political Function of the Modern Lie» (1945), an essay that anticipates Arendt's reflections on the same subject. After the war, he lived between France and the United States. Two books consecrate him as a great historian of philosophy and science: *Études galiléennes* (1939) and *From the closed world to the infinite universe* (1957) (Zambelli, 2021).

> bringing forth the destruction of the Cosmos, that is, the disappearance, from philosophically and scientifically valid concepts, of the conception of the world as a finite, closed, and hierarchically ordered whole (a whole in which the hierarchy of value determined the hierarchy and structure of being, rising from the dark, heavy and imperfect earth to the higher and higher perfection of the star and heavenly spheres), and its replacement by an indefinite and even infinite universe which is bound together by the identity of its fundamental components and laws, and in which all these components are placed on the same level of being. This, in turn, implies the discarding by scientific thought of all considerations based upon value-concepts, such as perfection, harmony, meaning and aim, and finally the utter devalorization of being, the divorce of the world of value and the world of facts (Koyré, 1957, 2).

As he himself recalls in the foreword to the book, «I have endeavored in my *Galilean Studies* to define the structural patterns of the old and the new world-views and to determine the changes brought forth by the revolution of the seventeenth century.» He summarised these changes in two closely related processes: «the destruction of the cosmos and the geometrization of space.» In his 1957 work, Koyré describes this scientific and philosophical revolution in much more detail, indicating a series of theoretical turns that accumulated and combined with each other.

The first relevant change is the Copernican shift from geocentrism to heliocentrism: the Earth ceases to be the centre of the cosmos and becomes one of the planets revolving around the Sun. However, Copernicus did not question the closed, circular shape of the cosmos, nor the fixity of the stars that constitute its ultimate sphere.

The second important change is the rupture of the sphere of the fixed stars. Giordano Bruno denies the Christian dogma of creation and affirms that the universe is infinite in time and space; that the stars are dispersed in it in a homogeneous and unlimited manner; that the Sun is another of those innumerable stars that float in infinite space; that each star, in turn, is a sun around which several planets orbit; finally, that these planets can be inhabited by living beings and even by conscious beings such as humans, meaning that the number of «worlds» or solar systems would also be infinite. Moreover, Bruno rejects Aristotle's distinction between the *sublunar* or terrestrial *world*, composed of the four elements of Empedocles (earth, water, air and fire) and inhabited by humans and other living beings, and the *supralunar* or celestial *world*, comprising the ether or fifth element and populated only by the eternal stars. For Bruno, the universe is not only infinite but also homogeneous since it has four terrestrial elements and is governed by the same physical laws. He therefore denies any hierarchy between the celestial and the terrestrial.

Kepler proposes a third change. Although he does not support the Brunian thesis of an infinite universe in space and time, he breaks with the old assumption that the celestial orbits are perfect circles, a cosmological principle shared by the geocentrism of Aristotle

and Ptolemy, the heliocentrism of Copernicus, the infinite «worlds» of Bruno and the Pythagorean, Christian and Copernican convictions of Kepler himself. The astronomical observations of his teacher Tycho Brahe lead him to formulate in *Astronomia Nova (*1609) his three laws on the motion of the planets, the first of which states that «all planets move in ellipses, with the Sun at one focus.»

Galileo perfected the telescope (*perspicillum*) and offered it to the Republic of Venice as a military instrument, but he also used it as a scientific instrument for astronomical observation. He discovered the craters of the Moon, the four satellites of Jupiter, the phases of Venus, sunspots and the agglomeration of stars known as the Milky Way. He uses this information in an attempt to confirm the ideas of Copernicus and Bruno, and, above all, he tries to erase the difference between the celestial and terrestrial worlds. He does something else, however, and this is the fourth change in the scientific revolution: in Aristotelian cosmology, the celestial world was the realm of perfect and incorruptible beings because it was governed by the inexorable necessity of mathematical laws, while the terrestrial world was the realm of imperfect and corruptible beings because it was subject to the contingencies of life, to the succession of birth and death, to random and unpredictable movements. Galileo tries to apply the same mathematical laws that govern the celestial world to the beings and movements of the terrestrial world. Picking up on the tradition of Pythagoras, Plato, Euclid and Archimedes, according to whom mathematics is the essence of the world, he sets out to explain and quantify in mathematical terms physical phenomena such as the trajectory of projectiles or the resistance of materials upon impact. These are two important issues in the wars between the nascent European states following the «military revolution» caused by firearms (Campillo, 2008). We need only recall the famous passage from *Il Saggiatore:*

> Philosophy is written in this grand book, the universe, which stands continually open to our gaze. But the book cannot be understood unless one first learns to comprehend the language and read the letters in which it is composed. It is written in the language of mathematics, and its characters are triangles, circles, and other geometric figures without which it is humanly impossible to understand a single word of it; without these, one wanders about in a dark labyrinth (Galilei, 1933, 232).

Newton brought about the fifth change. Not only did he take up Copernicus's heliocentrism, Bruno's infinite and homogeneous universe, Kepler's elliptical orbits and Galileo's unification of the celestial and terrestrial under the same physical and mathematical laws, but he also formulated the law of universal gravitation or law of attraction – as a force resulting from the direct relation between their masses, divided by the square of the distance between them – and three other laws: Newton's first law (law of inertia), already highlighted by Galileo (everybody remains at rest or in motion as long as an external force does not modify it); Newton's second law of motion (variation in the motion of a body according to the driving force that pushes it); Newton's third law, on the action and reaction of opposing forces. This information helped him to bring astronomy

and physics together, since the same laws governed both the elliptical motion of the stars studied by Kepler and the parabolic motion of projectiles studied by Galileo, and even the motion of the machines made by craftsmen: ships, cannons, clocks, mills, looms, etc. There is no longer any difference between the sublunar and the supralunar world, neither is there any difference between the natural and the artificial or between the living organism and the lifeless machine: all bodies are governed by the same eternal and inexorable mechanical laws. There are no qualitative differences between one being and another (celestial or terrestrial, living or inert, natural or artificial), instead everything real – including the various forms of terrestrial life (plants, animals and humans) – is reduced to inert matter, spatial extension and universal physical forces.

The universe as a whole begins to be conceived as a great machine made by God the creator, the sovereign Artificer of the three Abrahamic religions. As Leibniz will say to Clarke, the world is a machine so well made that it works like a perpetual clock. A century later, the hypothesis of a God the creator will be unnecessary, as Laplace will tell Napoleon. The world of modern science is therefore a universe infinite in space and time, in which bodies move mechanically, without any purpose, governed by eternal and necessary laws. This mechanistic and deterministic view of the world would be hegemonic in the West for more than two centuries, at least until the emergence of thermodynamics, the theory of the evolution of species, the theory of relativity, quantum mechanics, and, more recently, the theory of the expanding universe, the Gaia theory and Earth system science.

In modern cosmology, the Earth not only ceases to be the centre of the world but becomes a star like any other, moving in the midst of the infinite universe. At that point it too begins to be compared to a machine, but in this case to one of the artefacts created and governed by humans: the ship. Bruno and Galileo were the first to use the metaphor of the ship to respond to the critics of heliocentrism and to formulate the principle of the relativity of motion, by virtue of which the Earth's motion is compatible with the fact that a terrestrial body thrown from the top of a tower falls parallel to it and not diagonally. The same occurs with a stone thrown from the top of the mast of a moving ship. Bruno affirms this in the third dialogue of *La Cena de le Ceneri* (1584) and Galileo in the second day of his *Dialogo sopra i due massimi sistemi del mondo (*1632). The Earth sails in infinite space like a ship on the immense ocean.

Described by Koyré as «the utter devalorization of being, the divorce of the world of value and the world of facts», the sixth major change in modern cosmology was formulated by Descartes when he postulated the great ontological dichotomy between *res extensa* and *res cogitans*, nature and spirit, physical order and human order, facts and values, science and politics in his *Metaphysical Meditations* (1641). For Descartes, the human body is no different from the body of a machine and is governed by the same physical laws that regulate the movement of the stars or the functioning of a mechanical clock, whereas the human mind is inextensive, immaterial and immortal and, therefore, free to think, feel and want. Along with the ontological division between the great cosmic

clock and the artisan God who made it – and the ensuing debate about whether the *Deus ex machina* should keep winding the clock (as Clarke says) or not (as Leibniz says). Descartes also postulates an anthropological division between the mechanical body and the governing free consciousness from which it suffers. Consequently, he has great difficulty in explaining how the one and the other are connected and affect each other.

In this anthropological dualism between the corporeal machine and the incorporeal spirit, the Aristotelian vision of the human being as *zôion politikón* (*political animal*) and as *zôion lógon échon* (*animal endowed with language*), that is, a living, political and earthly being, linked to other living beings of the sublunar world, with whom he shares vegetative life (inherent to plants), the sentient life (inherent to animals) and even the social skills and voice (*phōné*) of birds and mammals.

2. The Man in the Moon

From Descartes onwards, the human being begins to be simultaneously thought of as an earthling (a physical body) and as an extraterrestrial (a thinking spirit). Modern man sees himself as completely alone in the universe, as if other earthly beings to whom he is related do not exist. However, he experiences this solitude with an ambivalent feeling of orphanhood and omnipotence. As Blaise Pascal says, he is a «thinking reed» that can be broken by a simple blow of air and yet rises above the universe that «does not think». In *Critique of Practical Reason* (1788), Kant expresses with extreme precision the ontological dualism of modernity: «Two things fill my mind with growing admiration and respect as I think and deepen in them: the starry sky above me and the moral law within me.»

This is the great paradox of the modern era: Europe abandons the spherical view of the cosmos when it begins to conceive of the Earth as a unified globe, mapped and dominated by it (Moore, 2015; Sloterdijk, 2005). With the great overseas expansion and the onset of modern capitalism, Euro-Atlantic elites begin to think and act as if they were aliens, as if their native Earth were just a star like any other, to be known, appropriated, dominated and steered like a ship, that is, as if they could situate themselves as rational and free beings in an unlimited universal space. In an eternal and boundless universe, in which the Earth loses its "centrality", European conquerors believe that they are transient earthlings, i.e., occasional passengers of the ship Earth, since they could travel to other stars and move freely through interstellar space, like astronauts without origin or destination.

One need only think of the texts that gave rise to modern science fiction: *Somnium* (1608), by the German astronomer Kepler; *The Man in the Moone* (1638), by the Welsh bishop Francis Godwin; and the two books of *L'autre monde (*1657 and 1662), by the French writer Cyrano de Bergerac. From then on, science fiction developed in parallel with modern astronomy. But not until after the Second World War and the beginning of the Cold War, the nuclear era and the space race between the United States and the Soviet

Union would modern ultra-terrestrial utopianism invade popular culture through literature, cinema, television, video games, etc. (Martorell, 2019 and 2021).

On 4 October 1957, the same year that Koyré published *From the closed world to the infinite universe,* the Soviet Union launched Sputnik 1 (Russian for *satellite*) into space. It was the first artificial satellite in history and the start of the space race. It was followed by Sputnik 2, the first to carry an animal on board, the dog Laika, who died on that flight. The first human to travel into space was the Soviet Yuri Gagarin, who orbited the Earth in the Vostok spacecraft on 12 April 1961. Faced with the success of the Soviets, the United States launched the Apollo space programme, aiming to reach the moon before the Russians and become supreme in the «space race». On 24 December 1968, as Apollo 8 circled the moon, the American William Anders photographed the Earth from lunar orbit. That image, now familiar, gave humans their first glimpse of the Earth from the outside, a dream that had been nurtured by every modern scientist since Copernicus. On 20 July 1969, Apollo 11 landed on the Moon and Neil Armstrong and Edwin "Buzz" Aldrin were the first humans to set foot on it. The event was broadcast on television and watched live by 600 million viewers around the world. In the 1980s, the United States launched the permanent International Space Station programme, which today involves sixteen countries in Europe and America. Add to this the space programmes of China, India and the Arab countries, the numerous astronomical observation centres, the telescopes sent into space, the unmanned missions to Mars and other planets, and the thousands of artificial satellites orbiting the Earth, some active and some abandoned. There is already a dense layer of space junk, fragments of which sometimes fall to the Earth's surface.

Today, the promoters of the «conquest of space» are not only the great geopolitical powers but also multinational corporations whose business is based on the accelerated plundering of nature and the digitalised domination of society. Funded by these companies, «transhumanism» is the most radical heir of modern science fiction. It mixes science and fiction, and puts them at the service of a political and ultramodern goal: to turn human beings – or rather, a select minority – into a new artificially manufactured "superhuman" species, with immortal life, superior intelligence and space technology that would allow them to colonise and inhabit other stars, especially when the Earth becomes uninhabitable for all or most of humanity (Riechmann, 2014; Diéguez, 2017; Herrero, 2021).

3. The Earth does not move

German-Jewish philosopher and mathematician Edmund Husserl (1859-1938), the founder of phenomenology, was the first to attempt an «Overthrow of the Copernican theory» and postulate that «the originary ark, earth, does not move» in a text written in 1934, published posthumously by Marvin Farber under the title *Grundlegende Untersuchungen zum phänomenologischen Ursprung der Räumlichkeit der Natur (*1940) and translated into Spanish by Agustín Serrano de Haro under the title *La Tierra no se mueve (*1995).

Husserl starts from the phenomenological perspective of the «world» (*Welt*) – which he contrasts with the naturalist or positivist view, but also with the historicist or culturalist view – as the «open horizon» of what can be humanly experienced. The human being is therefore not only a «physical body» (*Körper*) objectively perceived by others and subject to the same natural laws as other bodies, but also and above all a subjectively lived body, a «body of flesh» (*Leib*) that feels, thinks and acts i.e., a «body that serves as the ground» (*Bodenkörper*) for every possible experience: of oneself, of other humans, of other living beings, of the Earth's space and even of the countless luminous stars that we can see in the night sky. The subjectively experienced body is the «ground» (*Boden*), the «centre» (*Zentrum*), the «zero point» (*Nullpunkt)* of the experience of the world, whatever its state of rest or movement, and even if that body is inside a vehicle (train, ship, plane) that moves spatially, for all bodies are at rest or in motion relative to the earth.

The Copernican turn consists in turning the Earth into a star like any other, that is, into a spherical physical body that moves with respect to the Sun, just as the ship moves with respect to the Earth and the stone thrown from the top of the mast moves with respect to the ship. However, according to Husserl, the Earth is «a whole that "consists" of corporeal parts without being a physical body» (1940, 313). From the phenomenological point of view, the Earth is the «ark» (*Arche*) or «original dwelling» (*Urheimat*) where all human beings move and have their «ground» (*Boden*), but it itself does not move, or more precisely: it is neither at rest nor in relative motion.

For the Earth to become a physical body in motion, a new «ground» of experience outside of it would be required, but not from the "infinite universe" of modern cosmology, which is only an abstract construct of thought and does not derive from lived experience. «In order to be able to apprehend them [the stars] indirectly as physical bodies of which one has “experience”, I must first have myself as a man on earth, as the ground from which I originally came» (1940, 317). In short, from the phenomenological point of view, we are constitutively anthropocentric and geocentric for we could not have experience of ourselves, of other beings and of the surrounding world, including the stars in the sky, if we were not grounded in our «body of flesh» and the «original dwelling» of the Earth.

Husserl considers the flight of the bird and an aeroplane pilot. Before the beginning of space flight, he also considers this possibility:

> A physical body in motion - a vehicle - on it my body; an aircraft. I could," I say to myself, "fly so high that the earth would appear to me as a sphere. "Or: "The earth could be so small that I could fly all over it and indirectly make myself a representation of the sphere. "I discover, in any case, that the earth is a large spherical body. But this is precisely the question: whether and how I have access to its corporeality, in the sense that the earth is precisely, in the "astronomical" sense, a physical body among others, including celestial bodies (Husserl, 1940, 317).

Whether it is the body of the bird, the pilot flying in an aeroplane or the astronaut in a spaceship, all three are living bodies that have departed from the Earth and must return to it as to the «ground from which they originally came» (*Stammboden*). Husserl goes further and asks: could the spaceship not become the original and constitutive «ground» of my experience, if I had been born and lived from my origin in an artificial ship or «ark», and would I be an extraterrestrial because of this origin? His answer is very clear: the spaceship is still an extension of the terrestrial «soil» and those born in it are still genealogically terrestrial humans. It is worth quoting his words at length:

> Only «the» ground of the earth, with its surrounding space of bodies, can be originally constituted. This presupposes the constitution of my body of flesh, and that of other known subjects and that of an open horizon of other subjects, distributed by the order of space which, as an open field of proximity-far from bodies, surrounds the earth and gives them the sense of terrestrial bodies and space the sense of terrestrial space. The totality of us, of men, of *animalia*, is in this sense terrestrial - and lacks in the first place the opposite of the non-terrestrial. The sense of «the terrestrial» is rooted and finds its centre of orientation in me and in the more restricted «we» of those of us who live together. But it is also possible that the terrestrial ground expands; that, for example, I come to know that there exist in the space of my first terrestrial ground large airships that have been flying over it for a long time; that in one of them I was born and my family lives, and that it was the ground of my being until I learned that we were only navigators on the wider Earth, etc. It is thus possible for a plurality of ground-spheres, of spheres in which one dwells, to be unified in a ground-sphere. [...]
>
> If the Earth is constituted with corporeality and corporeality, then also the «sky», as a field of what I still arrive, we still come to experience spatially in the extreme, is necessarily constituted from the ground of the Earth [...]. These «airships» have departed from the Earth and return to it, they are occupied and piloted by men, who, in their last generative origin, for them historical origin, inhabit the soil of the Earth as their ark [...] And all this is relative to the ark which is the soil of the Earth and the «terrestrial sphere», and it is relative to us, the terrestrial men; and objectivity is referred to the global whole of Humanity (Husserl, 1940, 317-320).

For Husserl, the «world» can only be thought of on the basis of the biological and historical «we» that is each human community and the whole of humanity as a result of the interaction between all people. In turn, that «we» cannot be thought of without the intersubjective relation between all the singular «I»s as «bodies of flesh», as singular subjects of experience. Conversely, the «I» as a subject of experience cannot be thought of without the «we» as a historically constituted human community, nor can the «we» be

thought of without the «world» it inhabits, which for it is none other than the Earth as the «ark» or «original dwelling».

4. Amor Mundi

Like Koyré and Husserl, Hannah Arendt (1906-1975) was born into a Jewish family. She spent most of her childhood and adolescence in Königsberg, Kant's hometown. In 1924 she began her university studies in Marburg, where Heidegger became her first teacher and her first love. The following year she spent a semester with Husserl in Freiburg, then she moved to Heidelberg where in 1928 she presented her thesis *Love and Saint Augustine* under the tutelage of Jaspers, her second teacher and since then one of her great friends. She takes some crucial ideas from Augustine of Hippo for her later thought, including «love of the world», although Arendt gives it an affirmative ontological meaning and a historical-political scope that the Christian bishop did not give to it (Campillo, 2019).

As for Husserl, it is most likely that Arendt was unaware of his 1934 text, perhaps because it was published in 1940, the year that she was detained in the Gurs internment camp (France) and only in May 1941 did she manage to reach New York with her mother and husband, and in the following decade she focused all her attention on the war, Nazism, the extermination camps, the creation of the State of Israel and the writing of *The Origins of Totalitarianism* (1951). Husserl's text is not to be found in her personal library at Bard College in New York, nor is it mentioned in her reflections in the 1950s and 1960s on «world alienation» caused by modern technoscience. In any case, Arendt takes up Husserl's phenomenological approach, but reworks it from the new historical-political horizon which she experienced.

As can be seen in *Die Krisis der Europäischen Wissenschaften (*1936), Husserl maintained until the end of his days – even after the Great War, Hitler's rise to power and the persecution of the Jews – an evolutionary and Eurocentric view of the history of the West and a conception of philosophy as a «science of the sciences». Arendt would question this *epistemocentrism* as the «professional deformation» of philosophers, which runs through the history of Western thought from Plato to Heidegger (Campillo, 2018). Husserl understands the *Krisis* as a late divorce between science and humanism, facts and values, positivism and historicism, and assigns to phenomenology the task of restoring the unity lost under the guidance of the philosopher as «functionary of humanity». This evolutionary, Eurocentric and epistemocentric approach prevented him from writing a historical and political critique of Western modernity and techno-scientific knowledge as later German-language thinkers such as Horkheimer, Adorno, Benjamin, Marcuse, Heidegger, Jaspers, Anders, Jonas and Arendt herself did. Except Benjamin, they all witnessed terrible events that Husserl did not experience including Auschwitz and the Gulag, the atomic bombings of Hiroshima and Nagasaki, the Cold War between the United States and the Soviet Union, the threat of a nuclear Holocaust and the race to the

moon, the launching of artificial satellites into orbit and the geopolitical control of outer space.

Arendt had met Koyré in the 1930s during her exile in Paris, and again in New York. They met several times and maintained an epistolary relationship (1951-1963; Koyré, 1997; Zambelli, 1997 y 2021, 188-193), because Arendt greatly valued his studies in the history of science. She was familiar with the works of Edwin A. Burtt and Alfred N. Whitehead, but was particularly inspired by *From the closed world to the infinite universe* as it described what she called modern «world alienation». When she was writing *The Human Condition* (1958), she read the pioneering works of the modern scientific revolution, in particular Copernicus' *De revolutionibus orbium coelestium (*1543), Kepler's *Astronomia nova (*1609) and Galileo's *Sidereus nuncius* (1610). She also read works by the scientists who had revolutionised contemporary physics, such as Einstein, Planck, Bohr, Schrödinger and Heisenberg, who she writes about in particular in the article «The Conquest of Space and the Stature of Man» (1963) and in the lecture «The Archimedean Point» (1969) (Yaqoob, 2014).

It is often thought that Arendt was only a political theorist, and this has led to her critical reflections on modern technoscience, developed in the 1950s and 1960s, i.e., in the context of the nuclear age, being undervalued. As I have already stated, this historical *novum* was the subject of important philosophical reflections by thinkers close to Arendt, such as Jaspers, Heidegger, Anders and Jonas. These same kinds of reflections feature prominently in her own diagnosis of modernity, in her affirmation of the «terrestrial» character of the human condition and in her praise of the «love of the world» as the foundation of political coexistence. In fact, she had planned to give *The Human Condition* the title *Amor Mundi (*Campillo, 2019).

For Arendt, a fundamental aspect of the «love of the world» is the love of the Earth as the natural abode that humanity has been given and inhabited since its origin. Recognition of our earthly condition entails gratitude towards the earth and the enjoyment of its gifts, but also involves a duty to care and look after it for the humans who come after us and for other living beings. Arendt defends this love of the Earth as the shared home of plants, animals and human generations, not just vis-a-vis the old religions that scorned earthly life and aspired to a supernatural one, but also vis-a-vis modern techno-scientific knowledge which, since Copernicus, adopted the «Archimedean point of view», i.e. they called into question the geocentrism and anthropocentrism inherent in our condition as earthly beings and adopted the point of view of the «universe».

Archimedes of Syracuse (3rd century BC) was one of the greatest scientists of the ancient world. His many achievements include the first physical explanation of the principle of the lever. According to Pappus of Alexandria (*Synagoge*, lib. VIII), he was so proud of the power of his science that he even stated: «Give me a lever and I will move the world.» Logically, this «lever» would have to be located outside the Earth. It is this claim to be situated outside the Earth that has characterised modern science from Copernicus to

Einstein. This is why Arendt believes that modern science imaginatively relies on the «Archimedean Point», from the moment it erases the distance between the terrestrial and the celestial, physics and astronomy, and adopts the point of view of the «universe» as opposed to the geocentric and anthropocentric experience that we continue to have in our daily lives and which we cannot dispense with in any way.

However, much we humans may travel as astronauts, view the Earth from spacecraft or from other stars in the solar system, and even extend the «territory» technologically available to us to outer space,

> ...the new world view that may conceivably grow out of it is likely to be once more geocentric and anthropomorphic, although not in the old sense of the Earth being the center of the universe and of man being the highest being there is. It would be geocentric in the sense that the Earth, and not the universe, is the center and the home of mortal men, and it would be anthropomorphic in the sense that man would count his own factual mortality among the elementary conditions under which his scientific efforts are possible at all (Arendt, 2007, 53).

Husserl had already defended this new type of geocentrism and anthropocentrism, however Arendt does not quote Husserl but a sentence from Kafka, with which she opens the last chapter of *The Human Condition*: «He found the Archimedean Point, but he used it against himself; it seems that he was permitted to find it only under this condition.» (Arendt, 1998, 248). In this last chapter, devoted to the «Modern Age», Arendt analyses the three events that gave rise to modernity and conditioned its entire development, which she interprets as a process «world alienation». The first event was the European conquest of America and the exploration of the whole Earth: «all earthly space has become small and close at hand», what we now call the process of globalisation, above all due to new mechanical means of transport (railways, ships and aeroplanes), but «only at the price of putting a decisive distance between man and earth, of alienating man from his immediate earthly surroundings.»

The second event was the Protestant Reformation and the expropriation of church property, which not only brought about the separation of state and church, but also the withdrawal of the common world into the interiority of consciousness, an «innerworldly alienation» that was pointed out by Max Weber and represented by Descartes' *cogito ergo sum*. But more importantly, according to Arendt, the expropriation of church property was the starting point for a much more general process of «expropriation of the peasantry», described by Karl Marx as «the original accumulation of capital». This process of expropriation of local communities and their accumulation in the form of capital made possible the birth of modern capitalism. After several centuries of colonialism, this process has globalised, accelerated and brought about «world alienation» in a double sense: it has made the whole earth a mere material substrate for the production and consumption of increasingly ephemeral and disposable goods; and it

has given rise to «expropriation, the deprivation for certain groups of their place in the world and their naked exposure to the exigencies of life», i.e. «the eclipse of a common public world» for a large part of humanity.

The third inaugural event of modernity is «the development of a new science that considers the nature of the earth from the viewpoint of the universe» and not from the terrestrial condition of human beings. To explain this, Arendt says: «I follow the excellent recent exposition» of Koyré. The «Earth alienation», initiated by modern science from the 16th and 17th centuries onwards, has become in the 20th century the most extreme form of modern «world alienation» and can destroy our «love of the world»: «This love of the world was the first to fall victim to the modern age's triumphal world alienation.» Arendt considers that its consequences for humanity may be more serious than the interconnectedness of the globe and capitalist expropriation. The adoption of the «Archimedean Point» has not only devalued our loving relationship with nature on Earth, but has also given rise to techno-scientific innovations (nuclear energy, colonisation of outer space, artificial intelligence, genetic engineering, synthetic chemicals, etc.) that may jeopardise the continuity of human life on Earth. She therefore distinguishes between the «Modern Age», which began in 1492, and the «Modern World», which began in 1945 when nuclear bombs were dropped on Hiroshima and Nagasaki:

> Only we, and we only for hardly more than a few decades, have come to live in a world thoroughly determined by a science and a technology whose objective truth and practical know-how are derived from cosmic and universal, as distinguished from terrestrial and «natural,» laws, and in which a knowledge acquired by selecting a point of reference outside the earth is applied to earthly nature and the human artifice [...] If one wishes to draw a distinctive line between the modern age and the world we have come to live in, he may well find it in the difference between a science which looks upon nature from a universal standpoint and thus acquires complete mastery over her, on one hand, and a truly «universal» science, on the other, which imports cosmic processes into nature even at the obvious risk of destroying her and, with her, man's mastership over her (Arendt, 1998, 268).

After warning of this danger, Arendt expressly refers to the twofold power acquired by human beings in the second half of the twentieth century, which had been considered the exclusive prerogative of divinity until then: the «power of creating» new forms of life and the «power of destroying» all life on Earth, or at least human life.

This critique of the power of modern technoscience is not only set out in the last chapter of *The Human Condition*, but also in the prologue. It begins with the news of the first artificial satellite launched into space in 1957 and concludes with a condemnation of «the modern world alienation, its twofold flight from the earth into the universe and from the world into the self.» It is worth quoting an excerpt from this short foreword, where

Arendt highlights the political dimension of modern technoscience and defends the «love of the world» as love of the Earth and the earthly condition of humanity:

> Should the emancipation and secularization of the modern age, which began with a turning-away, not necessarily from God, but from a god who was the Father of men in heaven, end with an even more fateful repudiation of an Earth who was the Mother of all living creatures under the sky?
>
> The earth is the very quintessence of the human condition, and earthly nature, for all we know, may be unique in the universe in providing human beings with a habitat in which they can move and breathe without effort and without artifice. The human artifice of the world separates human existence from all mere animal environment, but life itself is outside this artificial world, and through life man remains related to all other living organisms [...] It is the same desire to escape from imprisonment to the earth that is manifest in the attempt to create life in the test tube [...]; and the wish to escape the human condition, I suspect, also underlies the hope to extend man's life-span far beyond the hundred-year limit.
>
> This future man, whom the scientists tell us they will produce in no more than a hundred years, seems to be possessed by a rebellion against human existence as it has been given, a free gift from nowhere (secularly speaking), which he wishes to exchange, as it were, for something he has made himself. There is no reason to doubt our abilities to accomplish such an exchange, just as there is no reason to doubt our present ability to destroy all organic life on earth. The question is only whether we wish to use our new scientific and technical knowledge in this direction, and this question cannot be decided by scientific means; it is a political question of the first order and therefore can hardly be left to the decision of professional scientists or professional politicians (Arendt, 1998, 2-3).

The main originality behind Arendt's approach lies in the claim that transcending our terrestrial condition is not a mere techno-scientific problem that can be solved in the more or less near future, as modern science fiction has dreamed, as the promoters of the «conquest of space» announced with great fanfare, and as the «transhumanists» and the big technology companies continue to promise today. Nor is it a mere ontological and anthropological impossibility that can never be overcome, as Husserl pointed out in 1934 and as Heidegger (1953) also thought in his reflection on technology. The crucial issue is that the modern delirium of transcending our earthly condition, no longer by means of the old theological religions but by means of the new technological religion, has become «a political question of the first order», because the survival of humanity as a biological species and as a historical-political community depends on it, and for this very reason it is a problem that «can hardly be left to the decision of professional scientists or professional politicians.»

In recent years, Arendt's critique of the «universal» logic of modern technoscience and her defence of the constitutively «terrestrial» condition of human life have been reinterpreted and defended from the new geological and historical horizon of the Anthropocene (Whiteside, 1994 and 1998; Ott, 2009; Weißpflug, 2018). We shall now turn to this new horizon, which we humans of the 21st century inhabit.

5. The Ages of Gaia

Arendt died in 1975, so she was hardly aware of two major historical transformations that began in those years that profoundly renewed the philosophical debate on the human being's place in the world: the eruption of the global environmental crisis and anthropogenic climate change, i.e. the degradation of the natural bases of human existence on Earth; and the paradigm shift brought about not by the astrophysical sciences, which had dominated the history of modern science from Copernicus to Einstein, but by life sciences, Earth system science, and especially by the Gaia hypothesis, which promoted a new vision of the Earth and life's role on it. The confluence of these two transformations gave rise to the theory of Anthropocene as a new geohistorical epoch and led to great debates among geologists, historians and philosophers.

Arendt (1958), Jaspers (1961) and Anders (1972) had pointed to 1945 as the beginning of an unprecedented epoch, because the human species had for the first time acquired sufficient power to unleash a global nuclear war and destroy itself, disappearing from the face of the Earth forever. In the 1970s, as geopolitical «détente» between the communist East and the capitalist West reduced the threat of nuclear war, the risk of global environmental collapse began to emerge, threatening the survival of humanity.

At the same time as the eruption of the environmental crisis in global public debate, a scientific paradigm shift that reveals the uniqueness of the Earth also begins and implies a new «Overthrow of the Copernican Theory». This time it is formulated not by philosophers but by scientists. I refer to the Gaia hypothesis (Lovelock, 1979 and 1988; Castro, 2019), proposed by the British scientist James E. Lovelock (1919-). In 1965, Lovelock took part in the first research undertaken by NASA to find out if there is life on Mars. He was surprised that the atmospheres of Mars and Venus were so different from the Earth's atmosphere, and an attempt to explain the peculiar characteristics of our planet's gaseous envelope led him to postulate the Gaia hypothesis. The percentage of CO_2 on Venus (98%) and Mars (95%) is close to chemical equilibrium and is congruent with the position of these two planets in the solar system, but differs completely from that on Earth (0.03%). The opposite is true for the percentage of O_2: it is almost non-existent on Venus (a few traces) and Mars (0.13%), while on Earth (21%) it is at the optimum level for life, because if it exceeded 25%, the fires of the plant mass would multiply, given the combustion power of oxygen. According to Lovelock, we only need to know the chemical composition of the atmospheres of Venus and Mars to conclude that there is no life on those planets, so NASA could have saved itself the costly space missions sent to those planets.

Another peculiarity of the Earth is that the average air temperature on its surface (15°C) is much higher than would be expected given its distance from the Sun (-15°C and even lower). Moreover, despite the cooling of the Earth's crust over the last 4.5 billion years, the air temperature should have increased gradually, as solar radiation has increased by 30% in that time. However, not only is the Earth's air more than 30 degrees above what it would be if there were no life in it, but after the last Ice Age and for the last 12,000 years, in the so-called Holocene, its average temperature has remained within a relatively constant range, despite the alternation between warm and cold periods, which have had significant effects on the history of mankind.

According to Lovelock, it is the emergence of living things that would explain, at least in part, these chemical and thermal peculiarities of the earth's atmosphere. It is living things, from the first cyanobacteria to today's algae and plants, that absorb CO_2 and release O_2 into the atmosphere. The air's chemical composition has made the development and diversification of life possible. And life, in turn, maintains this air composition, through a new form of symbiosis or complementarity between plants and animals: plant photosynthesis fixes carbon in the soil and releases oxygen into the air, while animal respiration absorbs oxygen from the air and releases carbon dioxide. Moreover, the atmosphere's chemical composition allows it to produce a natural greenhouse effect, which is also optimal for the development and diversification of living species.

Moreover, life would explain not only the chemical composition and average temperature of the atmosphere, but also the surface salinity and alkalinity of the oceans, and even some features of the Earth's crust such as sedimentary rocks, underwater mud and underground fossil fuel deposits (coal, gas and oil). These rocks, muds and deposits store carbon, as they are the result of the fossilisation of ancient living things, and consequently CO_2 in the atmosphere has been kept at extraordinarily low levels for the last 800,000 years: between about 180 parts per million (ppm) in the Ice Ages and about 280 ppm in the interglacial period. Therefore, the mass fossil fuel extraction and burning, with the consequent emission of CO_2 and other greenhouse gases, is a major anthropogenic alteration of the terrestrial biosphere's homeostatic cycles. On 14 June 2021, a frightening 418.72 ppm was reached, more than double the average of the last 800,000 years, and in 2020 global warming of the Earth's surface increased by an average 1.2 degrees above pre-industrial levels.

As Russian geochemist Vladimir I. Vernadsky (1998) stated in 1926, life is a «geological force» that never ceases to interact with the physico-chemical processes of the biosphere, and the human species is no exception. According to the Gaia hypothesis, this interaction between living beings and their natural environment is one of the factors that explain the Earth's uniqueness in the solar system and the great mutations it has undergone in the course of its history. Life did not appear on a planet that was optimal for it, as physicists, chemists and geologists believed, but rather it was the evolution of living things itself that transformed the Earth's physical, chemical and geological processes.

Therefore, life has not evolved by mere «adaptation» to a previously given terrestrial environment that selects the «fittest» individuals, as the Darwinian theory of the evolution of species defended, but rather it was the living beings themselves that transformed the Earth and made it optimal for life.

The Gaia hypothesis was supported from the outset by a small group of heterodox scientists (Thomson, 1987), but it was also scorned by a large part of the scientific community. One of the scientists who worked with Lovelock and fully supported him was the American biologist Lynn Margulis (1938-2011), who contributed her own research on early life forms to the Gaia hypothesis. Margulis (1970 and 1998) formulated the «serial endosymbiosis theory»: the original living world, which is the basis of all present-day multicellular organisms, is divided into two groups: *bacteria* or *prokaryotes,* cells without nuclei that appeared 3.5 billion years ago as the first forms of life in an atmosphere still without oxygen, which diversify the way they obtain energy and nutrients to adapt to different physical environments and which today still play a decisive role in multicellular organisms; and the *eukaryotes* or cells with nuclei and other specialised organelles, which were formed 1.5 billion years ago, through the symbiotic union of various types of prokaryotic cells, and which are the basis of all multicellular organisms. They emerged in the Cambrian period, 500 million years ago. Thus, the chloroplasts of plant cells, which make photosynthesis possible in algae and plants, were originally cyanobacteria that obtained carbon from CO_2 and released O_2; and the mitochondria of animal cells, which make respiration possible, come from another type of aerobic bacteria that absorbed O_2 and released CO_2 . This is why Margulis and Schwartz (1982) divided the living world into five kingdoms (bacteria, eukaryotes, fungi, plants and animals), as opposed to the traditional division between plants and animals, inherited from Linnaeus and maintained during the 19th and 20th centuries.

In summary, the formation of the terrestrial biosphere is the result of a biogeochemical process that has been going on for more than 4 billion years. It has given rise to the Earth's homeostatic self-regulation process, albeit with oscillations between warm and cold periods, which were more extreme in the early geological epochs, when the Earth was still very warm, and less marked in the most recent geological epoch, known as the Holocene, which began around 12,000 years ago, after the last Ice Age. In this long history of the biosphere, the geological phenomena of the Earth's crust, the water of the oceans, the air of the atmosphere, the radiation of the Sun and the metabolic functions allowing living things to exchange chemicals with their environment have fed back into one another, from the simplest and most archaic anaerobic and aerobic bacteria to the most complex interactions between photosynthesis in plants and respiration in animals.

Despite resistance to Lovelock's Gaia hypothesis and Margulis' endosymbiotic theory, both proposals are now recognised by most of the scientific community. In 2001, scientists from more than 100 countries linked to major international research programmes on global environmental change signed *The Amsterdam Declaration on*

Global Change. The declaration states that the research conducted in the previous decade has led to a broad scientific consensus on five points. The first point is as follows:

> The Earth System behaves as a single, self-regulating system comprised of physical, chemical, biological and human components. The interactions and feedbacks between the component parts are complex and exhibit multi-scale temporal and spatial variability. The understanding of the natural dynamics of the Earth System has advanced greatly in recent years and provides a sound basis for evaluating the effects and consequences of human-driven change (Moore III, Underdal, Lemke y Loreau, 2002).

This new scientific paradigm, which sees the Earth as a unique, complex and self-regulating system, clearly breaks with the old paradigm of Copernican and Newtonian astronomy, which turned the Earth into a star like any other, as if it were not the singular original home of humans and other living beings. We are therefore facing a new cosmological revolution, which is being jointly promoted not only by so-called Earth system science, but also by the life sciences and the sociohistorical science.

As I mentioned earlier, the 1970s saw the beginning of two major intertwined changes: public awareness of the global environmental crisis and the new scientific paradigm promoted by the Gaia hypothesis, which gave rise to a new vision of the Earth and the role of life and humans on it. The confluence of these two changes led to the thesis of the Anthropocene as a new geohistorical epoch (Crutzen and Stoermer, 2000; Steffen et al., 2015): the Anthropocene succeeds the Holocene as the human species – or rather, the most powerful and predatory minority – becomes a geological force capable of altering the Earth's natural cycles and endangering the future of humanity itself. In the last two decades, this thesis has engendered much debate in all fields of knowledge: natural science, sociohistorical science, the humanities and philosophy.

6. The war between terrestrials and modern humans

One of the thinkers who has most coherently tried to understand the novelty of all these phenomena – the environmental crisis, climate change, Gaia theory and the beginning of the Anthropocene – is the French philosopher, sociologist and anthropologist Bruno Latour (1947-), who is currently a professor emeritus at the Institut d'études politiques in Paris, known as Sciences Po. Heir to French historical epistemology, influenced by Michel Serres and linked to science, technology and society studies, Latour began doing fieldwork in 1979, with Steve Woolgar, on the actual practice of scientists at the Salk Institute for Biological Studies (La Jolla, California). This fieldwork led him to question the assumptions of positivist epistemology, based on the great modern dichotomies: *res extensa* and *res cogitans*, nature and society, object and subject, facts and values, science and politics. Subsequently, he set about problematising the other pole of this modern dualism: the contractualist theory of politics, which sought

to explain and regulate interactions between humans without taking into account their relations with other beings in the world, both natural and artificial.

Through these critical studies, Latour sought to demonstrate that «we have never been modern» (1991), that is, that we do not live in two opposing worlds, Nature or the world of inanimate and inert objects (which would be addressed by Science) and Society or the world of animate and active subjects (which would be addressed by Politics), but that we live in the Middle Kingdom, that is, in a hybrid world in which there is a plurality of human and non-human actors weaving complex webs of interactions between them. This Actor-Network Theory led him to develop a new ontology in which he postulates a «multiplicity of modes of existence» (2012), beyond the ontological dualism that has prevailed in the Western metaphysical tradition. In this intellectual evolution, he has aligned himself with authors such as Alfred N. Whitehead, Philippe Descola, Isabelle Stengers, Donna Haraway and Eduardo Viveiros de Castro. In recent years, he has become one of the most original thinkers on the Anthropocene. His book *Face à Gaïa. Huit conférences sur le nouveau régime climatique (*2015) is already a philosophical reference work for understanding this new geohistorical epoch.

The origins of *Face à Gaia* lie in the *Gifford Lectures* on «natural religion», a series of six lectures that Latour gave in 2013 at the University of Edinburgh, joining the list of great thinkers who had preceded him: William James, Alfred N. Whitehead, John Dewey, Henry Bergson, Hannah Arendt and many others. In the introduction he explains the meaning of the expression New Climate Regime:

> This term sums up the current situation, in which the physical framework that the Moderns had taken for granted, the ground on which their story had always unfolded, has become unstable. It is as if the set has moved onto the stage to share the plot with the actors. From that moment on, everything changes in the way stories are told, to the point of bringing into politics everything that until recently belonged to nature - a figure that, as a consequence, becomes an increasingly indecipherable enigma (Latour, 2015, 11).

Latour shows that all the debates, conflicts and concepts brought into play by the environmental crisis, climate change and the new life and Earth science (Anthropocene, Great Acceleration, «planetary boundaries», «geohistory», «*tipping points*», «critical zones», etc.) reveal an inseparable intertwining of nature and society, science and politics, biophysical agents and human agents. This is why he focuses his attention on Gaia and the Anthropocene. On Gaia, because it involves «the return to Earth» and the struggle of «earthlings» to inhabit it and take charge of it, versus the «humans» who still consider themselves «modern», i.e., free, rational, incorporeal, celestial or extraterrestrial subjects. And on the Anthropocene, because it is a geological and historical epoch, in which human actions and Gaia's reactions are mixed, giving rise to a process of geohistorical interactions that requires the combination of the sciences and the humanities.

In the third lecture, devoted to Gaia, Latour draws a historical parallel between Galileo and Lovelock. While the former uses the telescope to look at the Moon, Venus, Jupiter, the Sun and the Milky Way and concludes that the Earth is a planet like any other that revolves around the Sun, Lovelock also uses the telescopic observation of the atmosphere of Mars, which is in a state of chemical equilibrium, to conclude that there is no life there, that it is not necessary to send expensive space missions to prove it, and that the Earth is not a planet like any other, because its peculiar atmosphere has been shaped by living beings:

> You have to admit that the symmetry is really too beautiful: while the first scientist discovers how to go from the narrow view he has from his window overlooking the Grand Canal [of Venice] to the infinite universe, the second discovers how to go from the infinite universe to the narrow limits of the blue planet. [...]
>
> It is difficult not to be surprised by the symmetry between the gestures of Galileo and Lovelock raising modest instruments towards the sky to make radically opposite discoveries there. [...]
>
> While Galileo, by raising his eyes from the horizon to the sky, reinforces the similarity between the Earth and the other bodies in free fall, Lovelock, by lowering his eyes from Mars in our direction, diminishes the similarity between the other planets and this very particular Earth that is ours. He takes the "Sirius point of view" to show why there is no "nowhere point of view"! [...] Lovelock brings his reader back to what should be considered, again, as a *sublunar world* (Latour, 2015, 101-105).

Latour specifically quotes Koyré to point out that that Galileo leads us «from the closed world to the infinite universe», while Lovelock brings us back «from the infinite universe to the narrow limits of the blue planet» and thus to the idea that we terrestrial creatures inhabit the «sublunar world» and cannot adopt the «point of view of nowhere». This is exactly what Husserl in 1934 and Arendt in 1958 had already advocated. However, Latour does not quote either of them, even though they undoubtedly anticipated Lovelock and his idea that the Earth is not a star like any other.

A year before *Face à Gaia*, French philosopher Émilie Hache compiled and presented a collective volume whose title *De l'univers clos au monde infini (*2014) echoes Latour's passage on Galileo and Lovelock, and is a deliberate inversion of the title of Koyré's classic 1957 work. Its introduction is entitled «Retour sur Terre» and the first text is the fourth lecture in Latour's book, devoted to the Anthropocene. Three years later, Latour himself published *Où atterrir? Comment s'orienter en politique (*2017).

In this essay, Latour argues that politics equal to the Anthropocene has to question the spatiotemporal dialectic that has organised all modern political thought. Since the French

Revolution, the conflict between Right and Left has corresponded to the temporal division between past and future, tradition and progress, reaction and revolution; and to the spatial division between the local and the global, the isolated and immobile rural terroir and the planetary orb open to all kinds of interconnections and innovations. This old political disjuncture is incapable of responding to the Anthropocene's new situation and the need to guarantee that the Earth is inhabitable for all human beings and for other living beings. This is why Latour considers that since the 1970s we have been facing a new conflict: on the one hand, the «modern humans» who remain trapped in this unsustainable dialectic and have taken it to paroxysm by fleeing «outside the terrestrial soil», not only denying the biophysical limits of the Earth and the «new climatic regime», but erecting border walls and refusing solidarity with other humans; and on the other hand, the «terrestrial» ones who assume the limits and complexity of Gaia, and who recognise interdependence among humans and eco-dependence upon other living things and all other non-human stakeholders in the biosphere. I will end with Latour's own words:

> Let us say, dramatising to the point of extravagance, that it is a conflict between modern humans, who believe themselves to be alone in the Holocene, fleeing towards the Global or in exodus towards the Local, and terrestrials, who know themselves to be in the Anthropocene and who seek to inhabit with other terrestrials under the authority of a power still without an affirmed political institution. And this war, at once civil and moral, divides each and every one of us (2017, 128).

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