1. Introduction

* The story of Lucretius’ philosophy is first and foremost a story of translation and appropriation of Greek thought: itself a general feature of Rome’s relationship to the Greek world. His great work ‘De rerum natura’ (On the Nature of Things, On the Nature of the Universe) – written in the form of a philosophical poem – is a work with almost no conceptual originality of its own: rather, it in fact presents a direct adaptation, and, at times, a literal translation of the philosophical writings of Epicurus – a Greek atomist philosopher from the so-called Hellenistic Era – but also, more broadly, of the Greek philosophy of atomism – the idea that the world is composed of indivisible elements, the atoms (Gr. ἄτομος – in-divisible), as initially formulated by the pre-Socratic philosophers Democritus and Leucippus.

* Despite its deficit of originality, ‘De rerum natura’, nevertheless is a work of considerable influence and importance in the history of thought: precisely because of further translations and transmutations to which it is exposed – starting from its ‘rediscovery’ in a German monastery in 1497, after which it would be employed as a source of inspiration in the struggle against Medieval Scholastic thought and the philosophy of Aristotle – thus paving the way for the development of modern science (e.g. in the work of Pierre Gassendi in the seventeenth century, as well as in the subsequent formulation of a mechanical understanding of matter and movement).

2. The Beginnings of the Atomist Doctrine: Democritus (c. 460 BC – c. 370 BC)

* The story of the doctrine of atomism, however, is not only a story of translations and transmissions, but also a story of fundamental mistranslations and misapprehensions. These start with some of the first ‘sources’ through which this doctrine was propagated and received: most famously, in the doxography of the early Atomists presented in Aristotle’s work, especially with his famous reputations of atomistic concepts in his Metaphysics and his Physics. According to Aristotle, the idea that the world is composed of fundamental elements, the atoms, moving in the void, is an inconsistent and self-contradictory doctrine, starting from its central idea of indivisibility (Aristotle: what is it that can persuade us to stop dividing matter?) to the fundamental category of the void or empty space (Aristotle: if we postulate the existence of empty space, movement would be impossible, as this would overturn the fundamental necessities in physics: e.g. the idea that each local movement has to be determined and that it thus requires a measure, whereas the void, as infinite or measureless cannot provide this; or, moreover, that since there is no resistance in an empty space, things would move at infinite speeds, which would violate the very consistency of the idea of a place, which is necessary to determine movement).

* However, alongside a refutation, Aristotle in fact performs a transmutation of the atomistic doctrine of Democritus: in his account of the early Greek atomists, he does
not simply offer an interpretation but a fundamental recasting of the fundamental concepts an ideas developed by Democritus.

* Example: the description of the fundamental traits of atoms. Aristotle, in his reconstruction, claims that Democritus outlines three fundamental characteristics: a) figure/form (shema σχῆμα/morphe μορφή), b) position (thesis θέσις), c) order/arrangement (taxis τάξις).

* This account by Aristotle represents, in fact, a static translation of terms which for Democritus were originally dynamic – moreover, an adaptation of speculative and abstract concepts for a physicalist conception rooted in empirical realities – first and foremost in the observable physical nature of the cosmos as such – with the atom being designated as a body (infinitely small). However influential it proved to be, especially as it had allowed modern science to develop the fundamental ideas of its materialist and mechanistic physics, Aristotle’s translation is in fact erroneous.

* Democritus’ original doctrine of the atom is not static – and it can not be represented in purely spatial terms – as it describes a certain pre-physical reality: or, in fact, the very origins of physical matter and its laws from something prior – something attainable by speculative thought alone. For Democritus, the atoms was originally not a body, but an idea (which is why Plato famously stated that he wanted to burn all of Democritus’ books): atomos idea = something non-corporeal or rather, pre-corporeal. A dynamic speculative conception: which overturns the usual association of atomism with an idea of small bodies moving in an empty space, and which, moreover, escapes all spatial representations (including emptiness and fullness) as it is invested in the very generation of physical and spatial realities (the generation of bodies and things) from a dynamic interrelation of forces and pulsations in a primordial chaos.

* Democritus’ original terms (before Aristotle’s translation) for the characteristics of atoms: a) rhythm (Gr. ῥυθμός), b) turn (Gr. τροπή), c) touching by traversing (Gr. διαθιγή). The atoms here do not resemble points or bodies in space (arranged according to shape, order and position), but lines which expand in infinite directions and which intersect and agglomerate into compounds. Democritus uses weaving metaphors: the atoms combine in order to make clusters of threads of lines, like a hank of yarn. This conception, in fact, is closer to today’s quantum physics (e.g. string theory) than to classical modern physics of particles of matter exposed to mechanical laws.

* Democritus’ question: the generation of the universe – how are things formed out of elementary principles? The atoms, for him, thus precede the physical universe and its laws: they represent an elementary indeterminacy and heterogeneity which is only consequently stabilized into matter, bodies, space and laws. Instead of bodies in empty space, we need to imagine them as expansions of erratic movements in an infinite pre-cosmic great void (Gr. μέγα κενόν), a universe with an infinity of dimensions, which would only later transmute into our three-dimensional empty space (Gr. μικρό κενόν). Or, in other words: the world is only formed with the stabilization of the primordial chaotic pulsations of the atoms – when the lines formed by the rhythmical movements and turns of the atoms intersect, form
compounds and agglomerates, which slowly turn into stable bodies endowed with density, measure, etc. Space and time as such are only the result of a fixation on an initial chaotic and indeterminate range of movements.

* The radicality of Democritus: at the origin of the universe we do not find necessity but indeterminacy – instead of a stable principle (whether of a physical substance, such as matter, body, etc., or of an ideational one, such as spirit or Idea), the world originates from something radically instable: which also means, from something which can disturb the consistency of any order, overturn all received dogmas – whether of religion or of science. The world, moreover, instead of being one and eternal is exposed to relativity: there exists and there will exist an infinite multiplicity of worlds.

3. Atomism after Aristotle: Epicurus (Samos 341 BC – Athens 270 BC)

* Epicurus: a continuation of atomism after Aristotle, within the horizon of the understanding of the universe constituted by Aristotle’s philosophy (although with the purpose of exploding this universe from within). Epicurus’ atoms, unlike Democritus’, are not ideas anymore, but bodies – moreover they are bodies moving in space, due to the pull of their weight, a natural fall downwards – akin to Aristotle’s movements of things towards their natural places (in the latter’s spherical universe, for instance, all heavy things naturally tend to move downwards towards the centre): Lucretius ‘like raindrops falling into the unfathomable void’.

* Difference to Aristotle: the spherical world is not limited, but limitless and indeterminate, with its centre being displaced, rendering each fall of every atom parallel to every other. The fundamental ideas of Epicurus: one begins with a physical universe, but a universe infinite in scope and size, as well as duration – a universe, moreover, populated by an infinity of bodies, corresponding to the limitless extension of the void.

* Movement in this abstract world is not a question of a determinate and limited motion, but is precisely infinite and absolute: the movement of the atoms – which has no beginning, and is never interrupted, for they endlessly lose themselves in the immensity of the void which offers them no resistance – such a movement is infinite: the atoms move at infinite speed (Epicurus: “they move at the speed of thought”). Moreover, this infinite movement and its élan is conserved even during collisions (during vertical or oblique rebounds), as well as during the process of interlocking of atoms (their combination into compounds, aggregates or composita), where this limitless movement is transformed into an infinite oscillation or vibration.

* Epicurus’ explanation of the origin of the physical universe and of sensible matter: the material world originates from the combinations of atoms – from the interlocking of primary or elementary bodies into compound bodies, where the atoms become grouped and their movements combined, forming a certain core of movements or rotations and oscillations, as well as a certain periphery, which sees a gradual increase of density until we have sensible matter appearing. The appearance of matter and material laws corresponds with the appearance of measure: where the infinite movement of the atoms is (at least temporarily) ‘slowed down’ into a measurable movement.
However, a question is left unanswered: how does one get from a motion of the parallel fall (the atoms being exposed simply to the ‘law’ of weight, that is to a downward fall, where all move, again, at the same (infinite) speed), to collisions, rebounds, repulsions and agglomerations? A radical answer: which in fact presents a transformation of Democritus’ pre-physical indeterminacy at the very heart of a physicalist doctrine (where it becomes an exception to the laws of bodies): the atoms collide not due to a specific physical necessity, not due to a specific physical law (e.g. the law of attraction), but due to pure chance and contingency: the literal description is that they swerve or deviate slightly from their straight fall, but for no actual cause, ‘at indeterminate times and indeterminate places’ (Lucretius) – and it is this minute but indeterminate and contingent deviation that causes them to collide, rebound and to become entangled and interwoven, thus resulting in atomic compounds, which are the source of all physical things. This is, in short, the famous story of the concept of the clinamen – the swerve of atoms – central in Lucretius’ ‘De rerum natura’, and strangely absent from the existent fragments that we have of Epicurus’ work.

Again a radical proposition: chance or contingency stands at the origin of things. Or, even more radically: the necessity of physical laws (but also of social or moral or religious laws) is only a posterior result of a fundamental contingency of the world – and thus of a chance. Physical laws are not the expression of some internal necessity to nature – nor of a perfect and eternal divine order, but are a result of chance – and thus might also be suspended (not by free-will – Epicurus and Lucretius are, in fact, at pains to dissociate the idea of the declination of the atoms from subjective arbitrariness) by a real, material principle of contingency: i.e. of something materially appearing in the world which breaks its consistency.

Thus it is not surprising that this conception would influence certain radical political thinkers – such as Marx or Nietzsche – who sought to detect a similar movement of radical contingency in history, where revolutionary political practice, in its deviant exception, becomes capable of breaking the laws of the social world into two.