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***THE TITANIC ATOM:
EDGAR ALLAN POE'S ROMANTIC
COSMOLOGY IN EUREKA***

Keywords: *Titanic atom; primitive atom; atoms of perception; Eureka effect; Big Bang; Big Crunch; finite infinity; Newtonian model; evolving Universe; finite matter, infinite space; parallel universes; chaos theory; butterfly effect; symmetry breaks; theory of relativity; M-theory; phantom Universe*

Abstract: *In the present study we explore the romantic elements in Edgar Allan Poe's cosmology as elaborated in Eureka, a major work which is representative for Poe's thought system. The major point made here is that the primordial material particle – postulated by Poe as being the first germinal manifestation of the the physical Universe – can be seen as being the "Titanic Atom" of Titanic atoms, since the American poet-cosmologist uses the term "Titanic atom" in Eureka in the plural to designate planetary systems like ours (he also calls these "colossal atoms" or "system-atoms") which are evolving just as the Universe in its entirety is evolving. The most recent criticism (see Alberto Cappi's important article published in 1994) called Poe's cosmological hypothesis a Newtonian model of the Universe. We wish to hereby show that this model is romantic in nature essentially by its assumption of a reality which is "interfinite" in nature, i.e. simultaneously finite (as matter) and infinite (as space and as spirit); and that it anticipates fascinating developments in Western thought such as, among others, Georges Lemaître's model of the "primitive atom" which became the foundation for what we now know as the Big Bang theory.*

In *Eureka: A Prose Poem – An Essay on the Material and Spiritual Universe* (George P. Putnam, New York, 1848), dedicated by Edgar Allan Poe (19 Jan. 1809; Boston, Massachusetts – 7 Oct. 1849; Baltimore, Maryland) to Alexander von Humboldt – one of the founders of cosmographic thought, we are dealing with a scientific-aesthetic-poetic attempt to describe what Poe called a "Book of Truths", containing "the Beauty that abounds in its Truth"¹. A foundation is thus set to his writing which reminds one of John Keats's famous truth-beauty equation which is the basis of Keatsian onto-aesthetics. In the present paper we will explore the nature of the cosmology that Poe proposed in

¹ Cf. Edgar Allan Poe, *Eureka*, 1848, in Edgar Allan Poe, *Poetry, Tales, and Selected Essays*, 1996. All the quotations taken from the poem *Eureka* which we refer to in this study are extracted from this edition.

Eureka with a view to pointing out that the foundation of this cosmology is romantic and that it anticipates crucial evolutions in modern thought.

Poe announced in *Eureka* his sublime theme as the physical, metaphysical and mathematical Universe, both the material and the spiritual; its essence, its origin, its creation, its condition in the present, its destiny: what we today would call, in Ken Wilber's terms, a "brief history of everything" or, as in Alberto Cappelletti's observations, a "theory of everything". This "poem" is thus a cosmological treatise in which we are offered Poe's final revelation about the origin and future of reality.

In short, Poe's Universe is one that was created by an initial explosion of a unique primordial material particle, followed by the collapse of the matter thus dispersed through infinite space back to its initial unity, in this process of collapse all the galaxies and other celestial bodies being formed. It is significant in this sense to notice that in William Blake's cosmological system the material universe is formed also during a process of collapse: namely the falling of vast spiritual entities from Spirit into matter, the latter being formed by the condensation of the vast spiritual energies inside those spiritual entities. As Alberto Cappelletti pointed out, Poe envisaged a Universe in which matter is finite, but cosmic space is infinite. Galaxies and planets were formed in the period of the collapse of the Universe back to its initial condition of unity by the action of small fluctuations in the density of matter, these fluctuations being generated owing to the different forms of the atoms initially dispersed uniformly through infinite space. This is the scientific framework in which Poe embedded his cosmological model, which, according to Cappelletti, represents a scientifically plausible Newtonian model in which the Universe is represented as perpetually evolving.

Two assertions strike us from the very inception of Poe's "Titanic" project of describing reality *ab ovo*.

Firstly, Poe states in a Blakean echo that "there is, in this world at least, *no such thing* as demonstration". We are reminded of the arch-romantic William Blake's view that the Newtonian "demonstration" of materialistic mechanism, that is that the cold philosophy of the five senses, cannot demonstrate life, which in essence is indeterminate Spirit in conjunction with the determined material form.

Secondly, Poe asserts that "[i]n the Original Unity of the First Thing lies the Secondary Cause of All Things, with the Germ of their Inevitable Annihilation". That is to say, everything is created in an invincible harmony of the beginning and end, which are the terminal points of the infinite primordial unity. Here, in other words, limitation and the unlimited paradoxically co-exist, as in Philolaos's old equation of the union between the limit and the unlimited, the *peras* and the *apeiron*.

This is the first romantic foundation set by Poe for his scientific theory (the notion of the "unlimited limit", or "interfinitude", or "finite infinity" in Emily Dickinson's terminology, cf. poem 1695, *There is a solitude of space*).

However, before starting the description of the treatise proper, Poe introduces an ingenious and unexpected digression: the poet-astronomer quotes a few fragments from a letter allegedly found in a corked bottle floating in the waters of the ocean called *Mare Tenebrarum* and marked with a date that testifies it comes from the future, one thousand

years in the future to be exact: the year 2848 AD. This digression-epistle is an abridgement and revision of the short story entitled “Mellonta Tauta” (in Greek, *mellonta tauta* means “these things are in the future”).

Poe’s *Mare Tenebrarum* seems to allude to William Blake’s cosmological idea of the “Sea of Time and Space” (time here being finite, while space is infinite: the two form a “finitely infinite” unity), by which a matrix is meant which is unfathomably deep, reminding one of the Germanic concept of *ginnunga gap*, the primordial abyss out of which the entire cosmos emerged – a concept crucial for Jakob Böhme’s entire system of thought (the latter is one of the acknowledged spiritual “fathers” of the romantic movement).

By this message allegedly coming from the future Poe underlines the distorting nature of time: the world in this view is similar to a palimpsest, on which the names of peoples are wiped away slowly, but surely, in a process similar to what happens to all of historical/temporal knowledge: some elements are lost with no possibility of being recovered whatsoever, while other elements are gained, in an irreversible process, in which cosmic entropy seems to be the absolute queen.

For instance, the name Aristotel – “filtered” through the mist of time / history – becomes “Aries Tottle”; Francis Bacon is mistaken for the poet James Hogg and so becomes “Hog”; Euclid becomes “Tuclid”; J. S. Mill becomes “Miller”, etc. (In “Mellonta Tauta”, Euclid becomes “Neuclid”, Mädler becomes Mudler, Americans become “Amriccans”, Canadians become “Kanawdians”, Europe becomes “Yurope”, Africa becomes “Africia”, Asia becomes “Ayesher”, etc.).

This phenomenon of “palimpsestization” of reality reminds us of Ilya Prigogine’s notion of “symmetry breaks”: entropy, in open systems, introduces errors, information being lost increasingly more as the causal chains, that is the temporal lines, become increasingly longer, and so increasingly more complex (information being added) or increasingly simpler (information being lost); symmetry breaks occur when a critical intensity of unbalance is reached – then structures break down and reemerge in new, more complex patterns, which are better fitted to face the disruptive factors troubling their holistic balance. In other words, in these critical moments when the structures approach the more the maximal points of systemic disequilibrium (with a maximum of errors introduced), the structures move on to “orbits” of superior structural energy, and so “symmetry breaks” do occur in the causal structural chains, the result being the formation of new structures, in which errors have been assimilated or corrected holistically and integrated structurally in the new systemic configuration.

Poe synthesized this idea of loss of information with the increase of distance when he affirmed that “all certitude becomes lost in the remote”. So he referred here to spatial distancing, but it is obvious that the same principle is applicable also for temporal distancing. In the cosmos the vast distances, be they spatial or temporal, create the possibility for mystery to emerge always and be perpetuated in this way.

By laying stress on both distances, the historical and the spatial, Poe places his writing in a deeply romantic setting, since it is well known that most romantics nourished a cult of vast distances, exotic remote places, remote in space as well as in time, with a

view to create a remoteness from matter *per se*, and so to engage in an embrace of Spirit, the vastest of realities intuited by man.

In the year 2848 – that is in a time chosen as a point of reference in the future distanced from Poe’s own present by 1000 years (1848, the year of the publication of *Eureka*, of his cosmological revelation, but also of the great European revolutions) – mankind no longer believes in self-evident truths (or axioms) and deplors the repression of imagination which could never be compensated for, not even by absolute certainty.

Poe thus offers us here, under a satiric cover, a prophecy according to which, in the thousand years passed-by up to his potential future, mankind had been blinded by “detail”, by the request that the entire knowledge should consist in “facts”, while at the same time mankind often having had no clue whatsoever regarding the significance of the term “fact”. In other words, Poe prophesies here a victory of materialistic positivism in the coming millenium, by which man gives up emotion, and so loses the vast picture of the universe, abandoning himself into the hands of physical perception and reason only.

By promoting only Baconian empiricism and Cartesian rationalism, i.e. the two great and conflicting doctrines of Enlightenment (Beardsley, *Aesthetics* 369-444), Poe suggested, by using his epistle mysteriously coming from the future, that mankind retarded “the progress of true Science, which makes its most important advances – as all History will show – by seemingly intuitive *leaps*”.

What Poe here announced is not to be neglected: namely the perspective of what Colin Wilson called the “Eureka effect,” what Arthur Koestler called the “Eureka act,” or what is popularly known as the “aha” moment of unique privilege, when man finds a solution after sustained effort to cope with some intricate question in the labyrinth of reality. In such exemplary moments the solution emerges into consciousness almost miraculously, as if arriving from “nowhere,” ready formed, from the unseen deep labyrinths of spirit. Obviously, such “Eureka effects” have been explained in psychology as the work of the human psyche, of the human imagination, of the subconscious or unconscious mind, all of which never in fact stop working.

In point of fact, this is how historical evolution itself operates, by macro-structural leaps by which the function creates the organs which will exert that function – just as the fundamental thesis of Lamarckism announced and just as Ervin Laszlo, Ilya Prigogine and Ken Wilber kept on asserting in their well known thesis of symmetry breaks which represent sudden and holistical leaps in evolution.

Erich Jantsch, similar to Ilya Prigogine, postulated in this sense that the history of the universe is in fact a succession of symmetry breaks, each symmetry break unfolding a new space-time *continuum* as a medium for the self-organization of structures. For Jantsch a “symmetry break” was a tendency of structures towards self-organization (or *autopoiesis*), while what he called “time binding” and “space binding” were forces exerted in the direction of reestablishing the symmetry. Obviously, to simplify, we in fact come back to the notion that history is a process of continuous pulsation of two forces: the force of simplicity and that of complexity, of individuation by breaking free and of conglomeration by being bound, all of which Poe decrypted by and large as the two universal vectors, that of attraction (identifiable as Newtonian Gravity) and that of repulsion (identifiable as heat, magnetism and electricity).

Poe warned, however, that the “ancient ideas,” that is the traditional dogmas like the British baconianism/empiricism, have limited the scientific investigation, reducing it to a “confined investigation to crawling,” by which, that is, only “facts” are searched for. But Poe added ironically that although “crawling” is fundamental as a means of locomotion – for instance for the snails - this fact must not determine us to abandon imagination: “because the snail is sure of foot, for this reason must we clip the wings of the eagles?”

By invoking this example, Poe in fact resumed an argument made by John Keats, who in a letter “To J. H. Reynolds, 3 February 1818” wondered: “Why should we be owls, when we can be Eagles?” (Cf. Walter Jackson Bate, *John Keats*). Of course, this was for Keats, as for Poe, an argument for the human imagination (against cold and dry reason), by which life itself becomes possible, and progress – a certainty.

Poe thus unsurprisingly pleaded for the freedom of the imagination – against any dogma whatsoever, especially against an empiricist materialism such as Baconianism: “For many centuries, so great was the infatuation, about Hog especially, that a virtual stop was put to all thinking, properly so called.”

In other words, Poe evidences here that the Pendulum of thinking, and so that of history, can freeze when it encounters in its path a dogma which represses the energies of imagination, that is precisely the “engine” of what we call the Pendulum of History. Poe calls this state of affairs “mental slavery,” of the kind an anthropologist such as Franz Boas later attempted to explode in his vast scientific-cultural projects having undisguised romantic features.

The American poet shows in this context that this freezing of thought might take place when nobody anymore dares express anything for which they are indebted to nobody else but their own soul: “No man dared utter a truth for which he felt himself indebted to his soul alone”. Why this is so, Poe explains: “the Soul [...] loves nothing so well as to soar in those regions of illimitable intuition which are utterly incognizant of ‘path’.”

In other words, when man stops to school himself at the School of his own heart (in the sense of a John Keats and a Friedrich Hölderlin, for example) and his own imagination which is virtually infinite (as all romantics asserted), then his end as a thinking, imaginative, creative being is near.

Poe concluded that “the repression of imagination was an evil not to be counterbalanced even by *absolute* certainty in the snail processes. But their certainty was very far from absolute.” Imagination is thus the one which led even Johannes Kepler to the discovery of the famous planetary laws, from which Isaac Newton derived the universal law of gravity.

Even so, Poe is skeptical when it comes to absolute (spiritual) truth, which cannot be reached easily, and in any case not only by empirical or rational means: intuition/imagination is the pathless way, the unbounded power which bursts out of the human spirit and operates the conjunction with the divine Spirit from which it receives the absolute truth.

In connection with this Poe pointed out his request for “distinctness – intelligibility, at all points” as “a primary feature in my general design.” This request might seem strange for one who is considered one of the founders of what is known as “dark romanticism.” But we have to remember that one similar request had been made with good purpose by William Blake: the wirey line, the virile and vigorous line, was the only conceivable as exerting the role of Creation. In fact, it seems that this intelligible transparency was searched by Poe precisely by creating the temporal distance – the millenium loop separating the present from the message from the future (1848-2848). Otherwise, this requirement is in keeping with Poe’s strategy of the detective in presenting the topic of *Eureka*. In this sense, John T. Irwin suggested that in *Eureka* Poe created an “aesthetic cosmology” (Irwin, *American Hieroglyphics*), a “mystical-mathematical treatise on cosmology” (Irwin, 2006) structured like a detective story whose main hero is nobody else but Auguste Dupin, who this time tries to find out a solution for the enigma and mystery of the Universe, which must be mathematically correct, but also aesthetically satisfactory: it must be true and beautiful – such a solution, which needs to be a play between simplicity and complexity, can be accessible only to someone who is simultaneously a mathematician and a poet, just like Dupin, who was defined by Poe as being “a double Dupin – the creative and the resolvent” (Irwin, *A Platonic Dialogue* 47, 61).

In using a temporal “loop” by which a necessary detachment from his own present time becomes possible, Poe has the attitude of the romantic visionary who in the midst of his Koestlerian “Eureka act” receives punctual access to key moments in the future, especially moments defining cosmic macro-events. (Here we must be reminded that the role of romantic irony was precisely enabling detachment: one that was supposed to create the necessary transparency in order for the romantic quester to learn again to see in time and space, through matter into the eternal). Poe literally suggests a temporal-historical loop, a portal, a threshold opened between his own present and the future a thousand years later. In this perspective, John Tresch’s naming *Eureka* a “conceptual time machine” is justified (cf. John Tresch, *Extra!* 119 f.).

The American poet stresses here that in the process of cognition by “ascent” (from the Earth to the stars), with the increase of spatial distance certainty decreases – a fact that reminds us about Ilya Prigogine saying that an event loses, with the passage of time, any visible connection with other events, so that it becomes irrelevant for those remote events.

Also, when he refers to the “Infinity of Space”, Poe does not mean the concept of “absolute infinity”, but the “utmost conceivable expanse” of space – a shadowy and fluctuating domain, now shrinking, now swelling, with the vacillating energies of the imagination.”

This infinity, therefore, is a reference point of imagination proper, around which imagination pulsates, generating a “cognitive pendulum,” by which the life of thought becomes possible. As in Blake’s older vision, human imagination has for Poe the power to dilate and contract, with that motion the very spaces of the cosmos being modified to dilate and, respectively, to contract. Thus, Poe believes that thinking itself has a “nebular” structure forming an unfathomable enigma: “in the intellectual firmament [...] lies a nebula never to be solved.”

Poe is thus a precursor of the modern theory of the archetypal fields, with the archetypes being like the knots of maximum psychic energy around which the fields of psychic force unfold similar to stellar nebulae.

It is this very nebular structure in the psyche that makes possible the practically infinite complex of degrees of freedom of thought and emotion.

Essentially, Poe accepted a Pascalian "Universe of space": "a sphere of which the centre is everywhere, the circumference nowhere".

This has been created by a God that is assumed by Poe to be Spirit, who initially created Matter by his Will – out of Spirit or *Nihility*. The Matter Poe talks about here is that in its maximum conceivable state, that is Matter in *Simplicity*. In fact, this assertion is declared by Poe to be "the sole absolute *assumption* of my Discourse."

Simplicity in its absolute extreme refers to "one particle," of a single kind, a single nature, a single measure, a single form: a particle "without form and void," a particle in all its points, absolutely unique, individual, undivided, but not indivisible – God can divide it. Poe thus postulated "Oneness" about this primordial Matter, by which he explained the creation of the Universe, the existence of phenomena and the final inevitable annihilation of the material world. Poe uses here for his fundamental theory yet another quintessential romantic idea: that about the unity of being (for details about this foundation of romanticism, see Preda, *English Romantic* 44 ff).

He explains that the "primordial Particle" was created out of nothing by God's act of the Will, or *conception*, which obviously corresponds to the *ex nihilo* biblical creation. The One thus entered the "abnormal" state of the *Many*. The American poet defined this prime particle as the "Absolute Irrelation" ("My *Particle Proper* is but *Absolute Irrelation*"). This means that "the Beginning had nothing behind it or before it." In other words, the "Titanic Atom of Titanic atoms" (Poe does not use this term for the primordial Particle, but as we will see there is some justification in calling it just that) is the pure beginning, the pure action, which causes the generation of a *réaction* – an idea probably stemming from Jean D'Alembert's principle.

Poe finds in this state of affairs the explanation for the irresistible tendency of creation by diffusion out of Unity to return to Unity. In this sense, this crucial notion in modern terms is to be translated in chaos theory by the action of punctual attractors, by whose attractional force the structural energies gravitate towards a central point.

There is here a remarkable concordance of systems: the activation of chaotic attractors (equivalent to the force of diffusion out of Unity) leads to a reaction by which punctual attractors are activated: they make possible the return to the Centre/to Unity.

Poe stresses that the act of creation was punctual; after it, there was a discontinuity in the creative activity: "There could have been no *réaction* had the act been infinitely continued".

In the "Titanic" Atom of Titanic atoms there was thus "absolute Unity" and simultaneously "infinite divisibility." By asserting this, Poe practically states that in the Titanic Atom we witness the first manifestation of "finite infinity." This is one reason why the Particle has not been completely exhausted by diffusion in Space.

Here is the fragment where Poe practically postulated what we now know as the “Big Bang” cosmological hypothesis (later postulated by Georges Lemaître in his model of the “primitive atom”):

From the one Particle, as a centre, let us suppose to be radiated spherically – in all directions – to immeasurable but still to definite distances in the previously vacant Space – a certain inexpressibly great yet limited number of unimaginably yet not infinitely minute atoms.

So, Poe marks off the cosmic instant, the instant explosion, the instant modification of the state of prime Matter from simplicity to complexity, from homogeneity to heterogeneity, from identity to diversity, from unity to multiplicity.² Moreover, in a revised edition of *Eureka*, Poe explicitly says in a note: “Here describe the whole process as one instantaneous flash”.

This note (printed in Beaver’s edition as such), frequently quoted as evidence for Poe’s being the first to have postulated the Big Bang, appears immediately after the following paragraph:

We have now the sphere filled, through means of radiation, with atoms equably diffused. The two necessary conditions – those of radiation and of equable diffusion – are satisfied; and by the *sole* process in which the possibility of their simultaneous satisfaction is conceivable (Cf. Harold Beaver, *The Science Fiction* 246).

Harold Beaver compared this fragment (Beaver: 407, n. 27) with another in *The Expanding Universe* (1933) by Arthur Eddington: “In the beginning all the matter created was projected with a radial motion so as to disperse even faster than the present rate of dispersal of the galaxies [...]” (Cf. Eddington, *The Expanding Universe* 80).

The end of time/history is thus identified as the time when the “inevitable réunion at the end” takes place under the indomitable force of the primordial Unity inside the initial Titanic Atom. From an astronomical point of view it is significant to observe that Poe’s “absolute Unity” inside the Titanic Atom has strong affinities with what in astro-physics could be called the “singularity of singularities,” the initial point out of which physical reality erupted.

The “ultimate design” of the creation of the Universe is according to Poe to unfold the “utmost possible Relation,” i.e. “the utmost possible multiplicity of *relation* out of the emphatically irrelative *One*.” The universal purpose is, in other words, to generate the maximum network of unique connexions between all the unique parts of the created totality emerging from the singularity of singularities, the absolute primordial Particle which, as suggested, we could call Poe’s Titanic Atom of Titanic atoms.

It is significant to observe that in mathematics this network is rendered by the idea of mathematical *continuum*, the total number of relations between the infinitely numerous members of the set of natural numbers (see Georg Cantor). From a mathematical perspective, for Poe the ultimate plan of the Universe is the manifestation of the unfathomable and infinitely stratified plenitude of the mathematical Continuum.

² “[T]he design of multiplicity out of unity – diversity out of sameness – heterogeneity out of homogeneity – complexity out of simplicity”.

In this sense, Poe explained the existence of repulsion as the only act of interference by God: repulsion is founded in a spiritual unfathomable principle, to be found in the *Spirit in itself*. Without this phenomenon giving coherence to the parts, Poe realized that no structure could exist as a whole:

we thus see the necessity for a repulsion of limited capacity – a separate *something* which, on withdrawal of the diffusive Volition, shall at the same time allow the approach, and forbid the junction, of the atoms; suffering them infinitely to approximate, while denying them positive contact.

This in fact is a fundamental romantic principle stating that the romantic purpose/ideal is an object of infinite aspiration, its reaching being ever closer, but a total reaching being infinitely postponed. Poe rendered this principle by the idea of *coalescence* without *coalition* – which can be understood as “unity without unity,” which again has affinities with John Wheeler’s concept of “law without law.” (“[P]reventing their *coalition*, but no ability to interfere with their *coalescence* in any respect *or degree*”).

So the poet identified the two principles operating in the universe: gravity (*Attraction*) and electricity (*Repulsion*), further identified as the *body* and the *soul*, *matter* and *spirit*, respectively. But Poe spoke of these principles as always being together: “the two Principles Proper, *Attraction* and *Repulsion* – the Material and the Spiritual – accompany each other, in the strictest fellowship, forever. Thus *The Body and The Soul walk hand in hand*.”

These two can readily be identified as the two Blakean human types: the Devourer (Poe’s attraction) and the Prolific (Poe’s repulsion), the material and the spiritual. Obviously, in an astro-physical context, Blake’s “Devourers” can be interpreted as being the black holes, the most powerful generators of gravity – Poe’s material principle.

These two are the only really existing principles according to Poe, all other phenomena refer to them. So Newtonian Gravity is defined as the force that compels matter to search for matter, hence, since matter is to be found everywhere in the universe, gravity is not a tendency towards unity, but a tendency of all bodies to move in all directions, a tendency to diffusion.

Poe observed the consequence of Newtonian gravity: “Every atom, of every body, attracts every other atom, both of its own and of every other body, with a force which varies inversely as the squares of the distances between the attracting and attracted atom.” He also stated: “That each atom attracts – sympathizes with the most delicate movements of every other atom, and with each and with all at the same time, and forever, and according to a determinate law of which the complexity, even considered by itself solely, is utterly beyond the grasp of the imagination.”

In this state of affairs, if there had been an infinity of matter in the universe, Poe argued, no movement would have been possible, because every little atom would have been attracted equally in all directions. So, matter had to be finite, while space – infinite.

From this chain of ideas Poe reached a remarkable conclusion, namely that the influence exerted by a particle inside a ray of light upon the neighbouring particle can

never be known without measuring, i.e. counting and weighing, all the atoms in the Universe and without specifying their precise positions at a certain moment.

The consequence Poe derived here is crucial, since he anticipated what we today in chaos theory call “the butterfly effect” which appears in non-linear systems:

If I venture to displace, by even the billionth part of an inch, the microscopical speck of dust which lies now on the point of my finger, what is the character of that act upon which I have adventured? I have done a deed which shakes the Moon in her path, which causes the Sun to be no longer the Sun, and which alters forever the destiny of the multitudinous myriads of stars that roll and glow in the majestic presence of their Creator.

In other words, Poe had a brilliant intuition that in a non-linear system the slightest modification may have catastrophic consequences, out of proportion with the initial infinitesimal event, such as the beat of the wings of a butterfly.

M. H. F. Wilkinson explained the phenomenon in his “Nonlinear Dynamics, Chaos-theory, and the «Sciences of Complexity»”:

“Another hallmark [of seemingly random, yet fully deterministic behaviour of chaotic systems, i.e. non-linear systems] is the so called “butterfly effect”: change the initial conditions of wind speed in the global weather by an amount corresponding to the beat of a wing of a butterfly in Peking, and the path of a Caribbean hurricane is altered, because the change introduced increases exponentially. In chaotic systems, infinitesimal changes in initial conditions propagate exponentially in time, resulting in drastically different outcomes from infinitesimally different initial conditions. This means that future and past cannot be deduced with arbitrary precision or for arbitrary periods in time from measured data, which always contain some finite error. It is possible to determine a degree of chaos: the Lyapunov exponent. This is a number which determines the doubling rate of the error in the prediction. If it is low the system is not very chaotic, and medium to long term predictions remain accurate over considerable periods of time. If it is high, errors increase rapidly, and only very short term prediction is possible. Other measures of degree of chaos exist, most notably the *fractal dimension* of the attractor, which is a measure of the complexity of the shape of the attractor. The more complicated the attractor, the higher the degree of chaos”. (Cf. M. H. F. Wilkinson, *Nonlinear Dynamics* 111-130)

Poe’s “marvellous complexity of Attraction”, the awesome “brotherhood among the atoms” and the fact that “they are inconceivably divided and unutterably complex,” all ideas propounded by Poe, come very close to the terms of chaos theory.

The American poet also conceived of the atoms as having been in the past “even *more than together*” – they formed an unconditional, absolute, non-relative Unity. This Unity is the atoms’ “lost parent,” whom they are looking for in every direction, simultaneously. This is how all atoms are directed towards all other atoms. The result is the tendency of all to “a general centre.”

Poe derived thus the following “great Truth”: “the truth of Original Unity as the source – as the principle of the Universal Phaenomena”; namely that “All Things and All Thoughts of Things, with all their ineffable Multiplicity of Relation, sprang at once into being from the primordial and irrelative One”. Here the adverb “at once” undeniably suggests the Big Bang yet again.

In this sense, in order to reach the “all-important” principle of the mode of operation of Newtonian gravity, Poe imagined the universe of space like a sphere having in its center the diffusive power, i.e. the Divine Will, out of which cosmic matter burst through radiation. It is therefore remarkable that when Poe postulated the idea of emergence of cosmic matter through radiation, he touched a crucial point in the theory of relativity: in 1905, by his well known formula $E = mc^2$, Albert Einstein showed that light itself transports matter, by radiation the universe being populated not only with energy, but also with matter – as a form of energy.

Poe thus stated that the first act was the “Radiation from Unity”, followed by the creation of the “absolute material Particle”, a creation which was a *conception* not an act. The “absolute material Particle” is what we can call, as already suggested, the Titanic atom of “Titanic atoms”.

In this notion of an “absolute material Particle” Poe united two incommensurables, namely finitude (matter) and infinitude (the absolute, Spirit), the making of the cosmos being the birth of a unity between Matter and Spirit. So, this absolute Particle contains in itself the whole of cosmic life, past, present and future, in an abyssal germinal form. A similar notion about the nature of time was embraced by many romantics, among them Blake and Schelling stating that past, present and future are contained in the present moment in a germinal form. In connection to this, Poe also believed that all natural laws depend on all the others, tending to become condensed into a single Law: “*each law of Nature is dependent at all points upon all other laws*”. “[T]he condensation of *laws* into *Law*”. It is suggested that the History of the universe is written in each moment with a multi-dimensional pen, having an extremely elastic tip (the future and the present), but whose traces on paper (the past) are extremely rigid, even irreversible, although capable of being annihilated by the irresistible force of the tip of the pen, i.e. of the future and the present. The tip can at all times draw new traces that can wipe away more and more the contents of the past – as in a veritable palimpsest.

Thus, the nomic state of the cosmos has an inter-communicating nature, which allows unexpected degrees of freedom, but also degrees of limitation proportionate to the freedoms. Each part of the whole therefore communicates with all the other parts: the cosmos in this view resembles a living system of channels forming a united organism in which law and freedom paradoxically meet.

In this sense, it seems ironic that one of the major consequences of the theory of relativity was precisely that the universe is interspersed with numberless intercommunicating channels: the Einstein-Rosen bridges or “worm holes”.

Poe also imagined our planetary system as being in fact an atom, all similar systems being nothing but “colossal atoms” or “Titanic atoms” or “system-atoms”, endowed with the tendency towards Unity, i.e. towards the “absolute Particle of matter” initially created (i.e. the Titanic Atom of all “Titanic atoms”).

In this sense, it is important to be reminded that Poe nowhere in *Eureka* called the “absolute Particle of matter” the “Titanic atom,” probably because an “atom” proper etymologically means the “indivisible”: contrariwise, the “absolute Particle of matter” was precisely infinitely divisible, so a better term for it would have been maybe the “Titanic an-atom,” but this terminology again would deny the nature of this particle as fundamentally defined by its Oneness and uniqueness.

In view of the above, Poe clearly anticipated the idea of a “Big Crunch,” the big return of matter to the initial center, the implosion after the explosion, when matter falls upon itself and so leaves a giant black hole – the implosion becoming another explosion, this time on the other side of reality, as it were. The paradox in such a theory is obvious: nobody could know whether the Big Bang is an explosion or an implosion, so much so that the two movements are interchangeable: the Big Bang could be a Big Crunch, and vice versa.

Poe’s system therefore entails a cosmological model in which one Universe collapsing can finally get out of this physical dimension and enter a different, “interior” dimension, the Universe in this way behaving like a substance that is transferred and transformed through communicating vessels/dimensions, the great transformation happening at the “end,” when the Universe enters again the initial singularity out of which it emerged. The Big Bang and the Big Crunch therefore presuppose each other, and what is more is that there is only a small step from here to the cosmological view of the multiple, parallel universes, predicted in M-theory as created by Edward Witten by unifying the five different string theories.

In fact, in *Eureka* Poe clearly stated that “I myself feel impelled to the *fancy* – without daring to call it more – that there *does* exist a *limitless* succession of Universes, more or less similar to that of which we have cognizance.” Poe thus accepted here a variant of the hypothesis of parallel Universes, since he also strictly pointed out that these Universes have nothing in common with each other: “Each exists, apart and independently, *in the bosom of its proper and particular God.*”

This statement was used by Poe’s enemies to accuse him of the heresy of polytheism. In this sense, John Henry Hopkins was outraged when he read *Eureka*: “look at the system of Pantheism which is more or less interwoven into the texture of the whole book, but displays itself most broadly at the end” (Hopkins in Walker, *Edgar Allan Poe* 284). Of course, Hopkins referred precisely to the quotation above.

In this perspective, the implosion/collapse of a star can be redefined as the exit of the matter of the star, through a black hole, from our universe; the star does not disappear, but it enters, through a white hole, a parallel universe, connected to ours by the worm holes. Poe, however, thought that the matter making up the physical substance of our universe simply vanishes at the end.

To be exact, the Big Crunch in Poe’s version is the following: “final, universal agglomeration”:

That the stellar bodies would finally be merged in one – that, at last, all would be drawn into the substance of *one stupendous central orb already existing* – is an idea which, for some time past, seems, vaguely and indeterminately, to have held possession of the fancy of mankind.

Poe calls the Big Crunch “the still more awful Future,” when satellites collapse into the planets, the planets – into the stars, stars – into the nucleus of the cluster, forming infinitely superior spheres, which eventually will embrace in the final embrace, the Universe becoming a supreme “globe of globes,” a “sphere of spheres.”

Here is Poe’s more detailed description:

Of the still more awful Future a not irrational analogy may guide us in framing an hypothesis. The equilibrium between the centripetal and centrifugal forces of each system, being necessarily destroyed on attainment of a certain proximity to the nucleus of the cluster to which it belongs, there must occur, at once, a chaotic or seemingly chaotic precipitation, of the moons upon the planets, of the planets upon the suns, and of the suns upon the nuclei; and the general result of this precipitation must be the gathering of the myriad now-existing stars of the firmament into an almost infinitely less number of almost infinitely superior spheres. In being immeasurably fewer, the worlds of that day will be immeasurably greater than our own. Then, indeed, amid unfathomable abysses, will be glaring unimagined suns. But all this will be merely a climactic magnificence foreboding the great End. Of this End the new genesis described can be but a very partial postponement. While undergoing consolidation, the clusters themselves, with a speed prodigiously accumulative, have been rushing towards their own general centre – and now, with a million-fold electric velocity, commensurate only with their material grandeur and with their spiritual passion for oneness, the majestic remnants of the tribe of Stars flash, at length, into a common embrace. The inevitable catastrophe is at hand. But this catastrophe – what is it? We have seen accomplished the ingathering of the orbs. Henceforward, are we not to understand *one material globe of globes* as comprehending and constituting the Universe?

About the speed of light Poe made some conjectures, coming close to Mihai Eminescu. He stated that

since the light by which we recognize the nebulæ now, must be merely that which left their surfaces a vast number of years ago, the processes at present observed, or supposed to be observed, are, in fact, *not* processes now actually going on, but the phantoms of processes completed long in the Past.

Seen from this perspective, astronomy studies not the present Universe, but the “phantom” of a Universe long gone-by, the remote history of the Universe, whose image travelled through space a long way and is inter-dynamic, systemically inter-connected, inter-dependent, as in a system of communicating vessels of light: thus, not only the past of the Universe will be visible to us, but also our past will be visible to other solar systems in the entire Universe only in the future, our energetic image of the past being a pattern of waves travelling through space in all directions. In fact Poe did believe in the power of written and spoken words as vibrations in the spiritual ether (the material ether

did not exist according to him) which would propagate forever, infinitely, there being no possibility for these vibrations to ever be extinguished (cf. Poe's short story *The Power of Words*).

In strict accordance with Poe's view that the slightest event changes the entire texture of the Universe, it follows that also the smallest word, as vibration, changes entirely the whole structure of the cosmos forever. In this sense, there seems to be here a point of convergence yet again with John Keats's system of thought: the British poet believed that the human soul is the result of imprinting the divine initial spark (or divine intelligence) with the vibrations of all unique events happening to each human being individually: the divine spark, which for Keats was "an atom of perception" ("Intelligences are atoms of perception"), becomes a Soul only when, through experience/sufferance, it has achieved identity: "till they acquire identities, till each one is personally itself." In a short, for Keats, man was forged by *circumstances*, which were nothing but "touchstones of his heart", that is the "proofings of his heart", the "alterers of his nature", its *perfectionings*.³ Souls thus for Keats emerged as unique equations, as "atoms of perception" vibrating eternally, and uniquely influencing the texture of reality. From this perspective opened by Poe and Keats, the past is extinguished, but it remains eternally alive by being propagated through space as energetic wave in the spiritual ether.

In Poe's model, therefore, past, present and future exist in the moment in the absolute particle or the Titanic Atom of Titanic atoms. The consequence is that past, present and future communicate with each other as in a hyper-communicating vessel, in which the past speaks to the present not only through memory, but also energetically, germinally, vibrationally, and in which the future shows itself in prophetic visions, in *deja-vus*, by which the future events reach the present at the level of consciousness, being observed by beings in the future (past, present, future are simultaneous at the level of Spirit).

So for Poe an essential thing about the "Universe of Stars" was its "Titanic scale." The cosmic adventure of maximum magnitude was that the light in the present preserves the present in an eternal state, travelling as vibration through the galaxies for thousands and millions and billions of years, and eternally progressing through the spiritual ether, thereby the universe carrying in itself "ruins" of worlds that once really existed – phantoms of light and energy carrying the energetic/vibrational imprints of the past. Through these imprints the past – history – continues to live on through the vast cosmic titanic spaces, the mythical death of the Titans being capable of being decoded as the process by which the present enters hibernation: in other words, history never really dies (as Blake pointed out in his concept of "Los's Halls") – it is kept intact in the radiation/vibration that spherically unfolds and so diffuses throughout the Universe.

³ See the famous fragment on the "Vale of Soul-Making" in the letter to George and Georgiana Keats, which Keats finished writing on April 30, 1819. Cf. Walter Jackson Bate.

The Universe might as a consequence be fully populated with phantom-images of deep history, the titanic ruins of past worlds, floating indefinitely into the indefinite chain of Big Bangs and Big Crunches, rises and falls of civilizations, and waiting to be decoded by ingenious life forms who would in this way never possibly know boredom, and would engage on a real adventure to know the deep history of reality.

In this sense, Poe remarkably concluded that “*Space and Duration are One*,” thus anticipating somehow the idea of the space-time continuum embraced by Hermann Minkowski and Albert Einstein.

When reality returns to “absolute Unity”, then – Poe tells us – Matter will be “Matter without Attraction and without Repulsion,” “Matter without Matter”, “*Matter no more*” – a paradoxical concept reminding us again of John Wheeler’s “law without law”.

In other words, matter is annihilated at the end. This for a special reason:

In sinking into Unity, it will sink at once into that Nothingness which, to all finite perception, Unity must be – into that Material Nihilism from which alone we can conceive it to have been evoked – to have been *created* by the Volition of God.

Then, at the end, “the final globe of globes will instantaneously disappear, and [...] God will remain all in all”.

The adverb “instantaneously” (i.e. “in a flash”) suggests the Big Crunch. But this, according to Poe, will not be the end:

On the Universal agglomeration and dissolution, we can readily conceive that a new and perhaps totally different series of conditions may ensue – another creation and radiation, returning into itself – another action and réaction of the Divine Will. Big Bangs and Big Crunches and Big Bangs again, forever.

To reinforce this conclusion that the cycles of creation and destruction will be repeated forever, Poe named the “law of periodicity” the “omniprevalent law of laws.” The process of cosmic genesis described in *Eureka* “will be renewed forever, and forever, and forever.” Each time a new phase of expansion of the Universe will be followed by its retreat back into vacuity: “a novel Universe swelling into existence, and then subsiding into nothingness, at every throb of the Heart Divine.”

The “throb of the Heart Divine,” which Poe identified with the throb of the human heart, is precisely the Big Bang followed by the Big Crunch. This is Poe’s Pendulum of the Cosmos.

The American poet concluded that the Cosmos is God in expansion, the living beings being manifestations of God who therefore is infinitely dissipated. With the passage of eras, the living beings will become less and less conscious of themselves as identities, and more and more conscious of their identity with God. The “sense of individual identity” will gradually fuse with the “general consciousness,” to the point where man rebecomes, as it were, a primordial Titan eternized, again and again, “forever, and forever, and forever.”

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