

POE: A SCIENTIST AT HEART

THE HISTORY OF SCIENCE FICTION

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When we talk about the origins of science fiction and literature, the names Herbert G. Wells or Jules Verne immediately come to mind, indeed these prolific late nineteenth-century authors inspired later generations. However, few take account of Edgar Allan Poe, an author from the beginning of that century who inspired the aforementioned authors. In fact, if Verne and Wells were the fathers of science fiction, then Poe was undoubtedly the grandfather.

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■ SCIENCE IN LITERATURE

It is impossible to understand Edgar Allan Poe's work without first understanding his passion for science, and how it influenced much of his literary production. This passion for science, astronomy in particular, was encouraged by his foster parents, John and Frances Allan. When Edgar was twelve, John Allan gave him a small refractory telescope (nowadays it can be seen in Poe House and Museum in Baltimore) with which little Edgar spent nights observing the sky from his home porch and learning the basics of astronomy. This penchant for astronomical observation never left him. Later, during his time at university in Charlottesville, besides his obvious talent in humanities, young Poe showed a remarkable aptitude for physics and mathematics. This foundation defines the nature of his literature.

Edgar Allan Poe frequently uses scientific language as a discursive device to enhance the credibility of the text, proving himself to be well-informed with a good level of scientific and technical knowledge. This enabled him to achieve such a level of credibility that sometimes some of Poe's invented facts would be considered to be real. An example is «The balloon hoax», which tells the story of the first alleged transoceanic crossing by airship, and which

got cast as a real story in the *New York Sun*, on 13 April 1844. The following excerpt describes the drive mechanism of this alleged airship, *Victoria* (Poe, 2009):

The screw consists of an axis of hollow brass tube, 18 inches in length, through which, upon a semi-spiral inclined at 15 degrees, pass a series of steel-wire radii, 2 feet long, and thus projecting a foot on either side. These radii are connected at the outer extremities by 2 bands of flattened wire; the whole in this manner forming the

framework of the screw, which is completed by a covering of oiled silk cut into gores, and tightened so as to present a tolerably uniform surface. At each end of its axis this screw is supported by pillars of hollow brass tube descending from the hoop. In the lower ends of these tubes are holes in which the pivots of the axis revolve. From the end of the axis, which is next the car, proceeds a shaft of steel, connecting the screw with the pinion of a piece of spring machinery fixed in the car. By the operation of this spring, the screw is made to revolve with great rapidity, communicating a

progressive motion to the whole. By means of the rudder, the machine was readily turned in any direction.

The description not only seems realistic: it is fully functional; this false story has a scientifically impeccable text. This is argued by the withdrawal note (attributed to Poe himself) that the *New York Sun* had to issue two days later (Mabbott,2000):

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The mails from the South last Saturday night not having brought a confirmation of the arrival of the Balloon from England, the particulars of which from our correspondent we detailed in our Extra, we are inclined to believe that the intelligence is erroneous. The description of the Balloon and the voyage was written with a minuteness and scientific ability calculated to obtain credit everywhere, and was read with great pleasure and satisfaction. We by no means think such a project impossible.

Both in this text and in many others, Poe is unlike other contemporary writers because instead of making use of fantastic or supernatural elements, the surprising and wonderful parts of his stories have scientific explanations. Thus his writings were often presages, foretelling the future. It is not surprising that 75 years later, in 1919, the *R34* airship, similar in appearance to the *Victoria* illustration that accompanied the article in the *Sun*, became the first airship to cross the Atlantic.

An earlier story with another balloon ride as the main theme, along with a surprising dose of science, is «*The Unparalleled Adventure of One Hans Pfaall*», 1835, initially written as a hoax (Walsh, 2006). The story tells how Hans Pfaall flees the debts that burden him and escapes in a hot air balloon until he reaches the Moon. Today the feat can seem laughable, but in 1835 little was known about how far the Earth's atmosphere extended, perhaps it stretched as far as the Moon, meaning that both worlds would share the same atmosphere. If this had been so, there would have been no problem for a balloon to reach the height of the Moon, although the high speed at which it orbited around the Earth would have involved an extremely tricky landing. This idea was a direct inspiration for the novel *The Ragged Astronauts* (Shaw, 1988), in which the nearby twin worlds of Land and Overland share the same atmosphere and all travel between the two worlds is by balloon.

In Hans Pfaall's story we can find another example of presage. Pfaall's balloon is filled with an extremely lightweight gas, the making of which he tells in the story (Beaver, 1976):

I then took opportunities of conveying by night, to a retired situation east of Rotterdam, five iron-bound casks, to contain about fifty gallons each, and one of a larger size; six tin tubes, three inches in diameter,

properly shaped, and ten feet in length; a quantity of a particular metallic substance, or semi-metal, which I shall not name, and a dozen demijohns of a very common acid. The gas to be formed from these latter materials is a gas never yet generated by any other person than myself – or at least never applied to any similar purpose. I can only venture to say here, that it is a constituent of azote, so long considered irreducible, and that its density is about 37.4 times less than that of hydrogen.

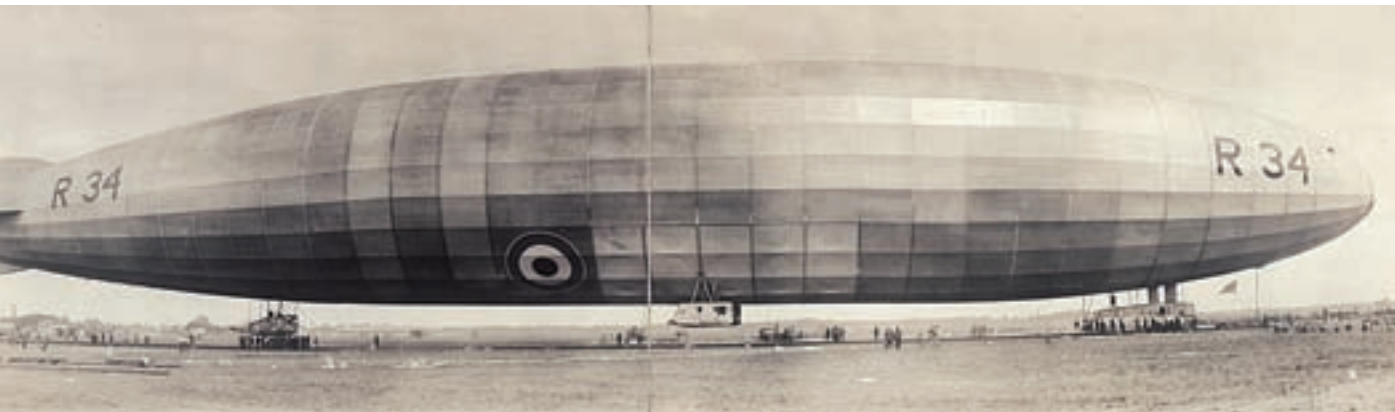
Sixty years later, the Scottish chemist William Ramsay discovered helium, an unknown chemical element on Earth, the presence of which had been inferred in the solar spectrum three decades before, with remarkable similarities to Pfaall's gas. Firstly, it is an extremely light gas (only hydrogen is lighter), and Ramsey's preparation method is strongly reminiscent of that used by Pfaall. It consists in pouring sulphuric acid (a very common acid) over cleveite mineral (a particular metallic substance).

The above texts are examples in which science is used explicitly. This is a background that permeates Poe's entire work. And so, sometimes we find science in the most unexpected passages, like in the poem «*Ulalume*», published in December 1847, of which we selected the following excerpts and where we have highlighted some phrases in italics (Poe, 2009)

The skies they were ashen and sober;
 The leaves they were crisped and sere -
 The leaves they were withering and sere;
 It was night in the lonesome October [...]
 And now, as the night was senescent
 And star-dials pointed to morn -
 As the star-dials hinted of morn -
 At the end of our path a liquescent
 And nebulous lustre was born,
*Out of which a miraculous crescent
 Arose with a duplicate horn -
 Astarte's bediamonded crescent
 Distinct with its duplicate horn.*
 And I said: «*She is warmer than Dian;*
 She rolls through an ether of sighs -
 She revels in a region of sighs:
 She has seen that the tears are not dry on
 These cheeks, where the worm never dies,
And has come past the stars of the Lion.
 To point us the path to the skies -
 To the Lethean peace of the skies -
 Come up, in despite of the Lion,

«IT IS IMPOSSIBLE TO
 UNDERSTAND EDGAR ALLAN
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In 1919, the airship R34 was the first to cross the Atlantic. Seventy-five years before, Poe had written a story about an airship, *Victoria*, capable of crossing the ocean, and had managed to publish it as a real story in the *New York Sun*. Poe's airship design bore a certain resemblance to the one that finally achieved the feat.

*To shine on us with her bright eyes -
Come up through the lair of the Lion,
With love in her luminous eyes.*

Arthur Hobson Quinn, Poe's famous biographer who knew about his role as an amateur astronomer, already asked himself in 1941 if the above passage hid any real astronomical reference (Quinn and Rosenheim, 1941). In this case, «*the stars of the Lion*» would be a reference to the Leo constellation. The text also mentions the appearance of «*a miraculous crescent*», which is usually interpreted as a reference to the Moon. But in the text it is identified with the Phoenician goddess Astarte (associated with planet Venus) and sometime later he contrasts and compares it with Dian (the Roman goddess of the Moon), which therefore seems to invalidate identification with the Moon.

Everything fits if we realize that Venus has phases like the Moon, easily visible through a small telescope. Poe would have observed them countless times. It would therefore be a crescent Venus, not a crescent Moon. The text also says that Astarte «*has come past the stars of the Lion*», meaning that Venus would have crossed the Leo constellation. References to the «double horn» suggest that both Venus and the Moon were in a crescent phase.

Was there any night in October, prior to the publication of the poem (December 1847), in which the Moon and Venus were in crescent phase, the latter having crossed the Leo constellation? The answer is yes: only two months before the publication of the poem, just before dawn on October 31, 1847. This would date the composition of the poem «*Ulalume*».

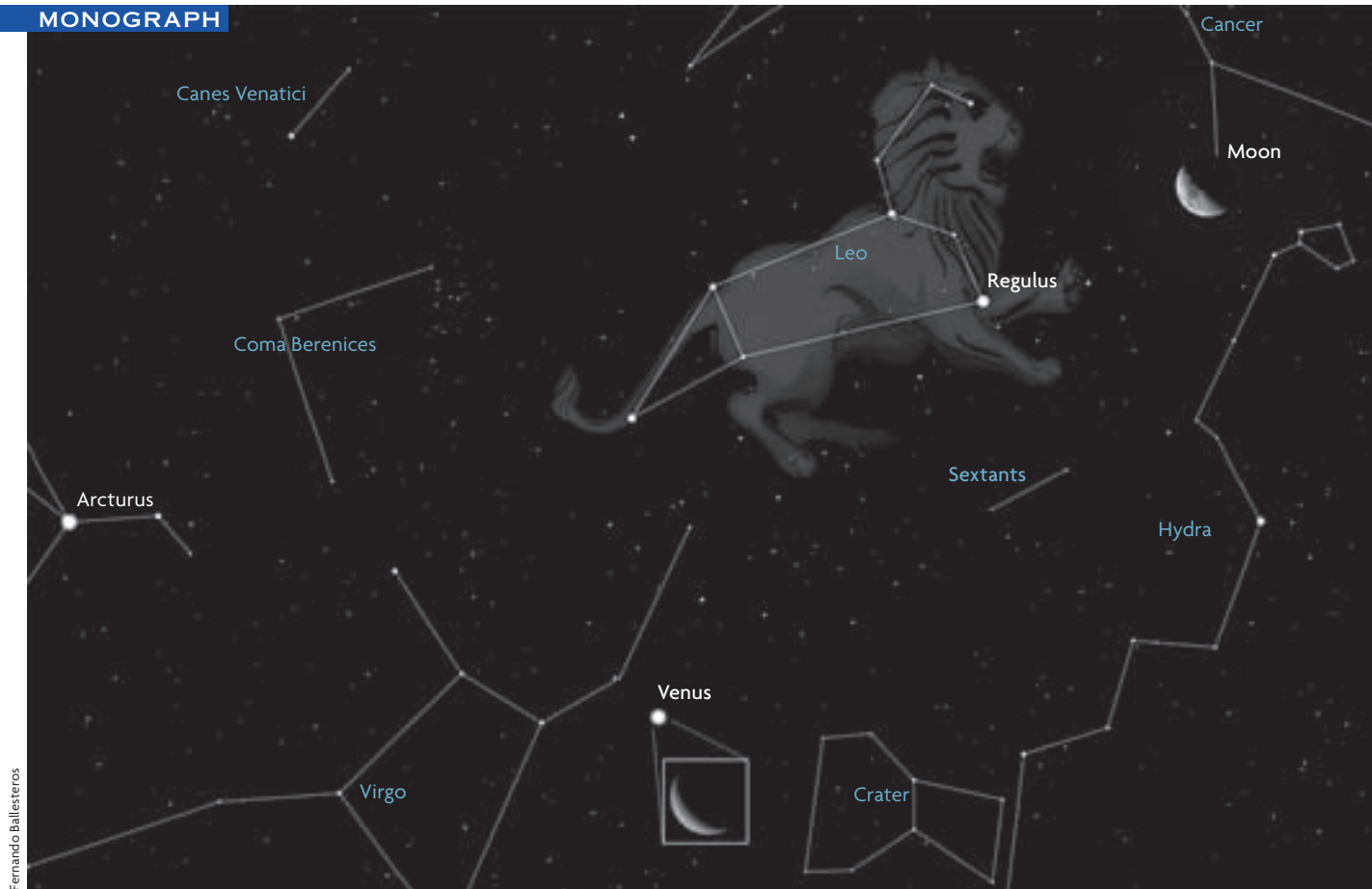


■ LITERATURE IN SCIENCE

In Poe's writing, the relationship between science and literature was two-way and he sometimes tried to use his literary expertise to contribute to scientific knowledge. At the height of inductivism, Poe regrets the overconfidence of science in the inductive-deductive method as if it were a well-oiled machine to extract knowledge from Nature. He doubts the existence of an automatic method to discover new facts and argues for a greater role of intuition and imagination (Poe, 2009):

It cannot be maintained that by the crawling system, exclusively adopted, men would arrive at the maximum amount of truth, even in any long series of ages; for the repression of imagination was an evil not to be counterbalanced even by absolute certainty in the snail processes.

At the turn of the century, inductivism would be subjected to serious criticism by several theorists



Fernando Ballesteros

Real astronomical references hide in the poem «Ulalume». The text refers to the Leo constellation, and the waxing of the Moon and Venus. Thanks to this information and to the fact that the poem refers to the month of October 1847 (though published in December the same year), the poem could be dated exactly: 31 October 1847. That day, as we see in the image, both the Moon and Venus were in their first quarter, the latter having crossed the Leo constellation.

of the scientific method, particularly Ernst Mach and even more so Karl Popper. The emergence of fundamental scientific theories that were not based on inductivism, such as Einstein's relativity (largely a work of pure imagination), brought this philosophical current to a head. Today we know that no method can replace creativity, intelligence or imagination. Science is a creative activity, and the role of imagination in it is imperative, as Poe defended.

But arguably his greatest contribution was the solution to one of cosmology's biggest mysteries: why the night is dark. This simple observation, known as Olbers' paradox, was one of the main scientific enigmas until well into the twentieth century.

Newtonian physics required a literal infinite extension of the universe, full of evenly distributed stars to ensure its gravitational equilibrium; otherwise everything would collapse into its centre of mass. But if everything were uniformly star-studded, in whichever direction we looked in the sky, we should eventually find a star, a spot of light, so the entire sky would shine as much as the Sun's surface. Why was it not like this?

In the early twentieth century science thought it had found a solution: the number of stars in the universe must be finite and be limited to a gigantic discoid structure that they called a galaxy. All the stars we observe would be part of the galaxy and would revolve around a common core; thus, the centrifugal force produced by the rotation would offset the gravitational collapse, ensuring a balanced universe. It was the island-universe solution.

But half a century before, Poe had found another solution that allowed the existence of an infinite universe full of stars. Apparently, the solution came to him in a sudden inspiration (Vincelette, 2008), as happened to Archimedes, and he then recorded his thoughts in an essay, published in 1848, called *Eureka*, a major piece (his biggest nonfiction work), dense and ambitious, full of metaphysics, errors... and amazing scientific successes. In it, Poe proposed his solution to Olbers' paradox:

Were the succession of stars endless, then the background of the sky would present us a uniform luminosity, like that displayed by the Galaxy -since there could be absolutely no point, in all that background, at which would not exist a star. The only

mode, therefore, in which, under such a state of affairs, we could comprehend the voids which our telescopes find in innumerable directions, would be by supposing the distance of the invisible background so immense that no ray from it has yet been able to reach us at all.

In short, the light from the most distant stars would have not yet reached us, implying that the speed of light must be finite and that the universe must have had an origin, an initial instant. As expected, scientists' acceptance of *Eureka* essay was truly cold, despite Poe's high expectations of it being his great contribution to science.

Its reception by the literary community was hardly any better, (and to his dismay, even by some of his friends). This work, following the death of his wife, apparently consumed his last strength, as he wrote to his aunt Maria Clemm: «*I must die. I have no desire to live since I have done Eureka!*

I could accomplish nothing more». *Eureka's* appalling reception made him fall deep into depression, a mood from which he would never recover. One year after the publication of *Eureka*, Poe died under mysterious circumstances.

However, in the early 1920s, astronomer Edwin Hubble discovered that the faint swirls of light observed through his telescope were actually other galaxies, giant discoid structures, similar to our galaxy and incredibly distant; other universe-islands, that appeared in every direction he trained the telescope. Little by little they were accumulating evidence that the universe finally seemed to be infinite in extent, and evenly populated by galaxies, luminous objects that could be seen in any direction. Again, science had been confronted with Olber's paradox, and the comfortable universe-island solution was discarded.

Today we know that Poe's solution was right: only the finiteness of the speed of light (three hundred million meters per second) and the fact that the universe had a beginning can explain why we do not need to wear sunglasses at night. New observations by Hubble during the first half of the twentieth century discovered the growing separation between galaxies, showing that the universe is constantly expanding, which in turn reinforced the assumption that there was an initial moment: the Big Bang. This theory

was confirmed in 1965 after the discovery of cosmic microwave background, the fossil embers of the big explosion that created everything.

Interestingly, the model of the origin of the universe presented by Poe himself in *Eureka*, by irradiation of all matter in the universe from a primordial particle, closely resembles the primitive model of the Big Bang proposed by Georges Lemaître in 1931 (nowadays discarded), in which the explosion of a primeval atom gave rise to all matter, as well as the expansion of the universe. They both seem so alike that one cannot rule out that Lemaître took his initial inspiration from *Eureka*.

Recognition of *Eureka* came posthumously. Noteworthy, among others, are the comments made by the famous British astronomer Sir Arthur Eddington (Quinn and Rosenheim, 1941) about this imaginative work:

Eureka is not a work of dotage or disordered mind. It is, I think, the work of a man trying to reconcile the science of his time with the more philosophical and spiritual cravings of the mind. Poe, besides being fairly well-informed in science and mathematics, seems to have had the mind of a mathematician.

Moreover, after reading *Eureka* Albert Einstein himself wrote in a letter of 1934 that this work was «a beautiful achievement of an unusually independent mind». Thus, almost a century later, Poe's voice was heard by the world of science. ☺

«POE'S GREATEST CONTRIBUTION WAS THE SOLUTION TO ONE OF COSMOLOGY'S GREATEST MYSTERIES: WHY THE NIGHT IS DARK. THIS SIMPLE OBSERVATION, KNOWN AS OLBERS' PARADOX, WAS ONE OF THE MAIN SCIENTIFIC ENIGMAS UNTIL WELL INTO THE TWENTIETH CENTURY»

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