

Images of the Sky (A Chronicle)

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Does living on Earth not also for human beings mean being open to the sky?¹ Watching day alternate with night, relying on the seasonal cycle, finding their way according to the position of the stars, humans have always been aware of their dependence on the sky and tried to understand the origin of life in relation to it. And it is up to the sky again that their imagination and thoughts fly whenever they feel cramped in their earthly habitat. Following the axis of their own vertical position, the earth that is the floor for humans is seen as a 'down here' by opposition to an 'up there', the sky, towards which they turn their heads and raise their eyes. Up there is the origin of the metaphorical figure and/or dream image of the flight up into the high heavens, or the journey to other stars, or to a spiritual land beyond.

Now, thanks to science and technology, the image of cosmic flight has become a project that is already in the process of being realized: although it is in its infancy, space travel is one of the most remarkable human feats. It is true that this change, which makes it possible to leave Earth physically, not for the 'sky' but for a journey in space and for time spent away from Earth, does not exhaust all the meanings of this symbolic image, the sky. And yet, even if it cannot fill the spiritual dimension of the sky's attraction, it nevertheless achieves something resembling a material realization of one of humanity's most constant aspirations.

And this is not all. Since research instruments have been transported and placed in orbit where Earth's atmosphere is no longer an obstacle, space travel has been expanding considerably our ability to observe the cosmos. It has become crucial for astronomy and astrophysics. And there is no doubt that, because of the achievement that it represents and the collection of data that it makes possible, and because it fires the imagination, it helps attract the interest of an increasingly huge public to astrophysics and cosmology. The literature in this field is growing significantly. The most serious scholars are no longer happy to write scientific papers destined to be read only by their peers. They are keen to help non-specialists share in their passion, to communicate their knowledge of the cosmos and equally their questions, their doubts, the gaps in their knowledge. For what is perhaps new is that astronomers and astrophysicists are increasingly aware that their scientific research is part of humanity's long quest for its origins and the origins of the world. Are they not suggesting by this that science teaching would be much more attractive if it contained a narrative element?

Stories about the origins and representations of the sky and its inhabitants existed long before science was able to approach from a different angle the questions they were trying to answer. Since they no longer have to contest them or see them as 'ideological' obstacles that could compromise scientific research, scholars are no longer afraid of examining

these myths and marvelling at these images, while at the same time recognizing that they came before the adventure of science and that they too are evidence of this questioning dimension that is an essential element of humankind, the species that views existence and its own existence as an enigma, a mystery.

At last the conflict between myth and science is dying away, since we have realized that myth is not on the same level as science. For science aims to accumulate knowledge about the physical reality of the world, including humankind as a product of nature, but cannot claim, without extrapolating unjustifiably, to provide humans with the full meaning of their existence.

The example of Marcelo Gleiser,² an astrophysicist of Brazilian origin, professor of physics and astronomy at Dartmouth College (New Hampshire), is especially interesting. He has no hesitation in beginning a book devoted to the history of cosmology and physics – whose most significant periods he describes with a teacher's attention to detail, from pre-Socratic theories to the most up-to-date debates on relativity and quantum theory – with a chapter offering a categorization of cosmogonic myths which either answer the question 'Is there a beginning?' (myths *with* a creation), or else deny any beginning (myths *without* a creation). Indeed this dichotomy can still be observed today among the most highly qualified astrophysicists: a theory such as Big Bang is not unanimously subscribed to, even if it is the most widely accepted of all cosmological theories.

In any case it is probably true that, underlying the fierce resistance the scientific community first put up to it and the motives of the minority who still oppose it, there is a suspicion that it could be appropriated for apologetic purposes. Nevertheless, there was no intention by the physicist Georges Lemaître (who was also a priest and the forerunner of the theory) to mingle science with faith. We were not supposed to behave as if there was no difference between the theory of the physical start of the universe as we know it and the theological notion of creation. All the same, this new theory had a similar suggestive power to the Genesis story, which shows the world being created in stages, each symbolized by a day of the week: the 'heptameron' (a title taken over for one of the chapters of the book *Figures du ciel*³).

It is evident that there is no question of confusing myth and science, any more than philosophical thought and scientific theory. No one, least of all the physicist, is unaware of the fact that the dawn of modern science brought with it a necessary and definitive epistemological break with the then traditional view of nature and thus the difference between the earthly and the heavenly, which was thought of as ontological. Indeed the physics of Galileo and Kepler, which reached its high point with Newton, unified nature and the laws governing it. And for this very reason it abolished the difference – which had been thought essential and seemed self-evident – between the sublunar world, subject to change and corruption, and the supralunar world, which was seen as eternal and incorruptible.

However, even though there was a genuine epistemological break, it was not by any means the general break claimed by some eighteenth-century thinkers, who set themselves up as the defenders of reason and reason alone, a reason they thought was bound to oppose the beliefs of the past, including religious faith.

In fact, although Renaissance scholars rejected Aristotelianism and Ptolemy's geocentrism, they did so while following Plato and other ancient authorities. In other words, epistemological discontinuity took place against the background of a different

continuity (a sense of the mathematical structure of the cosmos) or a return to . . . Plato and Pythagoras, in spite of what that 'return to' might contain that was genuinely new.

The truth is that the more we think about the history of physics and physicists' conceptual worlds, the more clearly we can understand that pure reason never existed in the sense of a 'purely' scientific reason. The most creative scholars, the ones who invented physical science (as mechanics), had teeming imaginations and often shared their contemporaries' beliefs, prejudices and dreams. This is still the case with scholars today.

The topic of changes in the midst of continuity resurfaces in *Figures du ciel*, the book which was also the catalogue for the exhibition of the same name mounted at the Bibliothèque Nationale de Paris. Astrophysicists Marc Lachièze-Rey and Jean-Pierre Luminet help us to share the pleasure they obviously drew from commenting on and explaining some of the most significant representations human beings have created of the sky throughout the ages. And here 'representation' must be understood in all its many senses, which of course include artworks. From medieval illuminations to present-day scientific photographs, the catalogue contains some remarkable illustrations.

In order to cover the many different points of view from which 'images' of the sky can be considered and the demands of an exhibition in which the image had to have pride of place, the book is organized around four main themes: the harmony of the world; uranometry; the heptameron; the denizens of the sky.

We can compare what we were saying earlier about Big Bang as a scientific theory with the authors' reflections, which are quite relevant to this, on the difference of level between mythical and scientific cosmogonies; they manage not only to point out the differences but also to detect antecedents and uncover what I would be tempted to call cases of 'intuitive convergence' between the two levels. Is it not the same creative imagination that works through science, myth and art, in spite of all the differences of approach and function? Like Marcelo Gleiser, the two French astrophysicists have also realized this when, for example, after highlighting the historical oppositions and methodological constraints specific to science, they state (p. 129) that 'this does not prevent scientific imagination from making use of mythical images that more or less obscurely lend themselves to a particular avenue of research'.

But it is the last part of *Figures du ciel*, entitled 'The Denizens of the Sky', that will be my focus here, not only because it deals with some of the aspects, by way of their historical antecedents, of the topic of the sky that is also, with its corollary the Earth,⁴ the theme of the exhibition *Cosmos – Du Romantisme à l'avant-garde* organized in 1999 by the Montreal Musée des Beaux-Arts,⁵ but also because the subject 'Denizens of the Sky' has some points in common with my contribution to the collection on 'Christianity and the conquest of space' (see note 1).

What in fact is this chapter about? It is about the ways in which, throughout the ages, and especially in the West, we have portrayed the ascent from the Earth into the sky and the inhabitants of the heavens (the heaven of religions or those who 'inhabited' the other stars). Noting the very many representations of Jacob's ladder in the Middle Ages, the authors rightly highlight the fact (p. 177) that in the West 'the spiritual tradition of the ascent to heaven has its roots in the biblical story of Jacob's Dream'. However, Greco-Roman antiquity, the other source for extraterrestrial travel or the journey into the cosmos, has been somewhat neglected here. This is probably because we do not have as many iconographic examples as for the Christian or Islamic Middle Ages. Still, we should

bear in mind the place and significance that flight above the Earth had for ancient philosophers and authors.⁶

For Plato, as for the Epicurean and Stoic philosophers (both Greek and Latin), the flight of thought above the globe is intended to give the soul a serenity it is utterly unable to find down here on Earth and should allow it to judge earthly things at their true value. As P. Hadot writes, for these philosophers 'contemplation of the world and cosmic space had primarily a moral purpose'. In other words the 'conquest' here is the conquest of wisdom. But the intellectual exercise involved in seeing the Earth from above can also take a satirical turn, as we see in the dialogue *Icaromenippus*, or *the Man who rises above the Clouds*, by the Latin satirist Lucian. When he arrives on the Moon, Menippus observes what is happening in the different countries and even what is going on in each human house. The spectacle is ridiculous because human beings are so absurd!

In the eighteenth century some authors such as Voltaire (*Micromégas*), Lesage (*Le diable boiteux*) and others took up this satirical style again. But the Copernican revolution had taken place, the Industrial Revolution was beginning and the Earth was now just one planet among many others. The Earth was on the point of being ignored, dismissed, and there would soon be quite different consequences to those which the Ancients' wise neglect heaped upon it.

Despite the Copernican revolution and Newtonian physics, at that time astronomical, cosmological and even biological knowledge had not yet made great progress, so much so that a great thinker such as Kant⁷ could believe there was life on other planets of our solar system. If the Earth is just one planet among many others, why should the other planets not harbour beings like us, or rather better than us? Continuing from Locke, Fontenelle and defenders of the 'plurality of worlds', as M. Lachière-Rey and J.-P. Luminet also remind us, Kant, in his *Treatise on the Sky*, goes as far as to imagine that creatures living on other planets are better in relation to the distance of their home from the sun. He was not in a position to understand what seems obvious to us, which is that the existence of life on Earth was possible only because of its correct distance from the sun.

The scientific knowledge we now possess has made us abandon such 'fantasies', which were still exercising some thinkers in the nineteenth century and even into the early twentieth century; one has only to think, for example, of Camille Flammarion's 'Terres du ciel' (1884). But if they persisted a long time, at the same time they fed the imagination of a number of artists, as the *Cosmos* exhibition in Montreal demonstrates. The Earth, at the start of the Romantic era was again revealing itself to determined explorers, who ventured into the almost unknown parts of the globe: virgin forests, mountain peaks, the poles. Likewise the sky, because of what it awoke in the human imagination and the representations it gave rise to.

Some articles in the rich catalogue for this exhibition help us to understand clearly how the images around cosmic flight prepared the ground for the real space adventure, which began with the first satellites launched by the Russians.

But, whatever the motives may have been for this adventure (which was at first an episode in the ideological war the planet's two great powers were waging against each other after the Second World War), it is having an unexpected consequence. It is showing us that, even if Earth is only a little planet in a universe whose immensity exceeds everything our predecessors could have imagined, nevertheless it is very precious, because it is a living planet, in other words a planet part of which is connected to life, that

life that in human beings is conscious of itself. So from the planet among many others, we have come to an awareness of what scholars now call the 'earth-as-system'.

However, and even if they search furiously in the furthest corners of the universe (relative to Earth) for other planets that might also harbour life, astrophysicists agree that it is not as common throughout the universe as we might have thought. So space travel is taking on a role that initially it did not have: helping us to understand that even the blue of the sky is created by Earth's atmospheric envelope. But at the same time as they bear witness to Earth's remarkable nature, astronauts also in a way speak of its vulnerability. When they turn their eyes from the heavens towards the Earth, do they not point to the scale of the destruction affecting our environment? Was it necessary for us (in the scientific-technological age) to leave the Earth's surface and go up into extraterrestrial space in order to start – at least that is what we hope – to listen to the call of the sky with a view to living less thoughtlessly on this Earth?

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(translated from French by Jean Burrell)

Notes

1. This account relates to the following works: Marc Lachièze-Rey and Jean-Pierre Luminet (1998), *Figures du ciel: de l'harmonie des sphères à la conquête spatiale* (Paris: Seuil/Bibliothèque Nationale de France); *Cosmos: Du Romantisme à l'Avant-Garde*, directed by Jean Clair (Gallimard/Musée des Beaux-Arts de Montréal), 1999; Marcelo Gleiser (1998), *The Dancing Universe: From Creation to the Big Bang* (Plume); *Christianisme et conquête spatiale*, directed by Alexandre Vigne (forthcoming).
2. In 1994 in the USA he received the 'Presidential Faculty Fellows Award' for his work in cosmology and his excellence as a teacher. Gleiser's vocation was fostered by family stories about Albert Einstein's visit to Rio de Janeiro in 1925. Two principal hosts had been appointed by the Jewish community: the Ashkenazi representative was Jacob Schneider, Gleiser's maternal grandfather, and the Sephardic representative was Isidoro Kohn, whose niece became his father's second wife.
3. *Op. cit.*, 128 et seq.
4. Another exhibition entitled *Couleurs de la Terre* continued the theme of *Figures du ciel*.
5. This exhibition was mounted again at the Barcelona Centro de Cultura Contemporànea from 23 November 1999 to 20 February 2000.
6. All this has been remarkably well demonstrated by that great connoisseur of ancient thought Pierre Hadot. See 'La Terre vue d'en-haut et le voyage cosmique: le point de vue du poète, du philosophe et de l'historien' in Jean Schneider & Monique Léger-Orine (eds, 1988), *Frontiers and Space Conquest/ Frontières et Conquête Spatiale: La philosophie à l'épreuve* (Kluwer Academic Press), 31–39.
7. Einstein himself acknowledged that he was inspired by a passage in the *Critique of Pure Reason* where Kant speaks about light.