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L'invention du système solaire (XVIe-XVIIIe siècles)

From the Editors

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TEXT

- 1 After the first two exploratory issues of *Nacelles*, one arguing for a social and cultural history of aeronautics, the other questioning the meaning of the conquest of space, followed by a third issue which sought to give substance to this ambition through a comparative approach to French and Italian aviation history, we are pleased to present this fourth issue devoted to new astronomy and the creation of a new scientific object: the solar system, from Copernicus to Laplace. Thus, the thematic balance between the journal's scope of aviation and space is achieved. This also provides us with an opportunity to reflect on a major chapter in the history of science: the revolution in Early Modern times, at the crossroads of knowledge of the ancient world and the great theoretical and empirical advances observed in the West in physics and astronomy. This revolution triggered the first tremors in the foundations of old cosmogonic certainties and the emergence of a new vision of the universe distancing itself from theology, the queen of the sciences in the Middle Ages. Before trying to fly to the heavens, it was indeed necessary to learn to observe them and to conceive of them; in short, to invent new objects for scientific observation, such as the planetary system, of which the solar system was the first theoretical model.
- 2 The articles in this issue result from one of the first events of a research project on the history of the concept of the "planetary system," started by an international multidisciplinary team. Its initiators are two researchers from the University of Toulouse: planetologist Michel Blanc, from the *Institut de recherche en astrophysique et planétologie de l'Observatoire de Midi-Pyrénées* (IRAP, UMR 5277, University Paul Sabatier /CNRS), and Didier Foucault, from the *Laboratoire France, Amériques, Espagne, sociétés, pouvoirs, acteurs* (FRAMESPA, UMR 5136, University of Toulouse-Jean Jaurès/CNRS).
- 3 The main goal of this group is to organize an international symposium by 2020 and to publish the results. Some meetings have

already taken place: on 3 March 2017 in Washington D.C., on 7 March 2017 in Beijing, and on 11 September 2017 in Pasadena, California. The following papers in this issue were presented on 14 December 2017 at a seminar in the "History and Heritage of Aeronautics and Space" master's programme, headed by Jean-Marc Olivier at the University of Toulouse-Jean Jaurès. Broadly speaking, this project approaches planetary systems from a triple point of view: current research in planetology ; the historical roots of the concepts underlying the paradigm of planetary systems in different cultures up to the space age ; and finally the artistic and literary expressions that the concept of planetary system and the various works that this concept have inspired.

- 4 Before Copernicus and the scientists who followed in his footsteps made the heliocentric model triumph, astronomers (at least those in the wake of the Greeks) had certainly identified the planets as 'wandering stars', distinct from the stars, and tried to include them in a Cosmos organized as a structured system. Nevertheless, the geocentric world system that they had adopted was only an imperfect sketch of the notion of planetary system, because it did not distinguish purely stellar phenomena from the ensemble formed by the planets and the Sun.
- 5 Subsequently, while the 'solar system' polarized much cosmological study well into the 20th century, the term 'planetary system', while not absent from scientific texts, was of little interest to scholars. Thanks to Newton, who placed all celestial mechanics under single laws, at most the concept could be applied to systems formed by planets equipped with satellites.
- 6 For less than a quarter of a century, the discovery of exoplanets and many planetary systems, which are increasingly complex and distinct from the solar model, have opened up new avenues of research. The scientific community thus finds itself confronted with epistemological challenges, and thus now cannot avoid an in-depth analysis of the recent and ancient history of this notion. The purpose of Didier Foucault's introductory presentation is to define the scope of this historical investigation, to determine the issues at stake, and to set out the methodological requirements that it implies. This introduc-

tion thus has a broader scope than simply mentioning the articles in this issue.

- 7 During the long maturation of this concept, the "astronomical revolution" occupies a key place. Thus, the purpose of the Theme section is to recall significant elements of continuity, which have sometimes been neglected, and which make it possible to replace this theoretical object of study in the long term. The following papers examine in turn the development of the laws of planetary motion (Jean-Michel Faidit), the reconfiguration of Copernicus' initial heliocentric scheme (Didier Foucault), the totally new conditions for observing and measuring phenomena driven by the Sun (Jérôme Lamy), and debates on the nature of interplanetary space (Jean-Christophe Sanchez). Finally, because this new astronomy greatly influenced the culture of the *Grand Siècle*, Yves Le Pestipon shows how the theme of the plurality of worlds participated in the shift of *belles-lettres* towards modern literature. One of the great richnesses of this issue is in offering perspectives for openness and intersections between the history of science, literary history, and the dissemination of new imaginaries into society. Future issues will also provide further opportunities to address these subjects.

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