



# The history of science as the progress of the human spirit: The historiography of astronomy in the eighteenth century



Daniel Špelda

Department of Philosophy, Faculty of Arts, Masaryk University, Arna Nováka 1, Brno 602 02, Czech Republic

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## ABSTRACT

In the eighteenth century, the historiography of astronomy was part of a wider discussion concerning the history of the human spirit. The concept of the human spirit was very popular among Enlightenment authors because it gave the history of human knowledge continuity, unity and meaning. Using this concept, scientists and historians of science such as Montucla, Lalande, Bailly and Laplace could present the history of astronomy in terms of a progress towards contemporary science that was slow and could be interrupted at times, but was still constant, regular, and necessary. In my paper I intend to explain how the originally philosophical concept of the human spirit was transferred to the history of astronomy. I also introduce the basic principles to which the development of the spirit is subject in astronomy, according to historians of astronomy. The third part of the paper describes how historians of astronomy took into account the effect of social and natural factors on the history of astronomy.

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## 1. Introduction

In the sixteenth and seventeenth centuries, accounts of the history of astronomy used to be published as part of the introductions to astronomical treatises. These came mostly in the form of brief overviews. The first monographs focusing exclusively on the history of astronomy, or including a particular section dedicated to it, were not published until the eighteenth century. Until then, surveys of the history of astronomy had appeared mainly in prefaces to writings on astronomy and in celebratory orations.<sup>1</sup> In this paper, I intend to focus on a set of historical works on astronomy and science that is not complete, but which I hope will provide at least a representative sample. These works may be categorised in three groups.

The first group of texts epitomise a doxographical exposition of the history of astronomy presenting mainly biographical and bibliographical data. Typical examples of such works are the books of Weidler, Heilbronner, the entry “Astronomie” in the French Encyclopedia and the work of the author C. F. G. from the end of the eighteenth century.<sup>2</sup> These texts endeavour to present mere lists of astronomers and their works, and they do not contain any

explications of astronomical theories or discoveries. Works that contain a historical overview of astronomical facts also belong here. A typical example of this approach is Flamsteed's preface to the third volume of his *Historia coelestis britannica* (1725), which summarises extant and important astronomical observations from classical times to the present.<sup>3</sup>

The second group comprises texts presenting the history of astronomy as the history of the human spirit. The aim of these texts is to introduce astronomical theories, to trace the origins of their discoveries and their subsequent development and, in so doing, to shed light on the laws of scientific knowledge. Typical examples of these texts are the work of Estève, Montucla, Savérien, Costard, Lalande, Bailly and Laplace.<sup>4</sup>

The publications in the third group may be called philosophical texts. These texts were not intended primarily to chronicle the history of astronomy. They deal with the history, the laws, and the progress of science (or sciences) in philosophical terms. The history of astronomy appears here for the most part in the context of descriptions of the development of other sciences or the development of the human spirit. They are important for the purposes of this paper because they enable a

E-mail address: [spelda@phil.muni.cz](mailto:spelda@phil.muni.cz).

<sup>1</sup> Cf. Goulding (2010); Byrne (2006).

<sup>2</sup> Keill (1739); Weidler (1741); Heilbronner (1742); Anonymous (1751); C. F. G. (1792).

<sup>3</sup> Flamsteed (1725).

<sup>4</sup> Estève (1755); Montucla (1758); Savérien (1766); Costard (1767); Lalande (1771); Bailly (1781), (1787a), (1778b), (1778–1783), (1779); Laplace (1796). I have consulted several prefaces as well: Cassini (1740); Le Monnier (1746); Fontaine des Crutes (1746).

better understanding of the texts of the second group, which sometimes refer to philosophical works.<sup>5</sup> Works by Hume, Smith, Goguet, Turgot, D'Alembert, Voltaire and Irwing belong to this group.<sup>6</sup> In this paper, I will above all deal with the works of the second group, which consider the history of astronomy as part of the history of the human spirit. The category of the human spirit on which they were based made it possible to express a new understanding of science. In the eighteenth century, in place of the traditional metaphysical conviction that true knowledge is static and definitive, a dynamic concept established itself, according to which science submits itself to development and progress. With the category of the evolving human spirit, time enters natural philosophy and the mathematical sciences as a condition of knowledge, and the idea of a gradual development of knowledge that necessarily runs in successive phases is born.

The historiography of astronomy in the eighteenth century perfectly illustrates this change in the understanding of science. Astronomy was considered the oldest science, and its long history provided enough material for the magnificent story of its rise. Its successes in the sixteenth and seventeenth centuries provided enough examples for emphasizing its accelerating progress, which transferred itself to contemporary science in general, but also to the whole epoch – the Enlightenment itself. The triumph of astronomy documented the victory of reason over superstition. Astronomy was no longer considered to be the revelation of the hidden mathematical order of the world authorised by God, as Kepler and Newton still supposed. The successes of astronomy were explained exclusively as the outcome of human reason and industry, whose gradual shaping could be reconstructed historically to a relatively precise extent because it was a work of the human spirit, which is always the same and universal and thus links people of all countries and all times. The historiography of astronomy therefore did not serve merely for the presentation of the history of astronomy, but also as a celebration of human inventiveness: the man of the age of Enlightenment found in the history of astronomy the image of his progress up to his current perfection. In this, paper I do not want to deal with the historical details described by historians of astronomy of the eighteenth century, nor do I want to assess the historical reliability of their texts. Instead, I would like to present the main concepts, categories and regularities with whose help they tried to interpret the course of the history of astronomy. Unlike other scholars<sup>7</sup> I do not intend to interpret the Enlightenment historiography of astronomy as an early phase of our own historiography. My purpose is rather to affirm that the historiography of astronomy in the eighteenth century perfectly corresponds to the intellectual discourse of the Enlightenment, and that it is only in this context that it can be appropriately understood.

The historiography of astronomy did not have as its aim a mere description of the past. It was part of a more comprehensive discourse about the history and progress of the human spirit and, as such, it shared its agenda and aim. The concept of the human spirit made it possible to incorporate astronomy into the great story of the progress of science, emancipation, and the overthrow of superstitions. The philosophers of the Enlightenment often referred

to the history of astronomy, to document their conviction about the development of human knowledge with its help. Some philosophers, such as D'Alembert, judged that the history of science actually presents the best and most shining model of progress of the human spirit, and that it perfectly illustrates the logic of its development.<sup>8</sup> Historians of astronomy shared his opinion. Thanks to the concept of the human spirit, the historians of astronomy could surmount the merely technical and empirical dimensions of astronomy and emphasise its civilizational and emancipational task in the history of mankind. According to them, the history of astronomy embodied the gradual history of mankind's emancipation from prejudice and superstitions, the insatiability of human curiosity, the mastery of nature, technological development, and the gradual creation of social and political conditions appropriate for the development of knowledge. In this way they helped to create a picture of modern European culture as a culture built on human science rather than on religion.

## 2. The human spirit and astronomy

The origin of the concept of the human spirit and its progress is usually traced back to the works of Bernard de Fontenelle in the late seventeenth century.<sup>9</sup> In the early eighteenth century, the concept of the human spirit fast permeated French, English and German philosophy of the age of the Enlightenment. No later than by the mid-eighteenth century, it had also been adopted by historians of science and astronomy. Like historians of philosophy,<sup>10</sup> they too started to identify the history of science with the progress of the human spirit. Montucla states that his work should “represent history and the progressions of human spirit”.<sup>11</sup> Lalande characterizes the aim of his work thus: “The method of this work aims to show the progressions of spirit.”<sup>12</sup> The first sentence of Bailly's *Histoire de l'astronomie ancienne* (1775) reads: “The history of astronomy is an important part of the history of human spirit.”<sup>13</sup> Other historians and astronomers similarly identify the history of the mathematical disciplines, including astronomy, with *les progrès de l'esprit humain*.<sup>14</sup> In his work, Goguet identified all human learning with the history of the progress of the human spirit, and thus made it plain that astronomy was also a part of it.<sup>15</sup>

Bailly defines the human spirit as “the sum of ideas of all educated men that genius added to genius from the beginning of things.”<sup>16</sup> The human spirit was perceived as an aggregation of human knowledge passing through history while constantly being cultivated and perfected. The agents of this progress are individuals and generations of mankind, whose work and diligence makes the spirit grow and improve. The concept of the human spirit was so popular mainly because it eliminated the factor of chance and meaninglessness, typical of political history. The historians of astronomy drew attention to the fact that the history of astronomy understood as the history of the spirit represents a development with meaning and aim, unlike political history, which is a display of

<sup>5</sup> Montucla puts explicit stress on D'Alembert's *Discours préliminaire* (Montucla, 1758, p. 31) and writes about Goguet's work: “in general I agree with its author” (Montucla, 1758, p. xxv).

<sup>6</sup> Hume (1994); Smith (1980); Turgot (1913); D'Alembert (1821a); Goguet (1758); Voltaire (1963); Irwing (1781).

<sup>7</sup> Cf. Swerdlow (1993); Laudan (1993).

<sup>8</sup> D'Alembert (1821a), p. 27; cf. Irwing (1781), p. 69; Estève (1755), vol. I, p. 5.

<sup>9</sup> Dagen (1980), p. 18; Gusdorf (1977), p. 56f.

<sup>10</sup> Piaia & Santinello (2011), Israel (2004).

<sup>11</sup> Montucla (1758), vol. I, p. 8 (Unless otherwise attributed, all translations are my own).

<sup>12</sup> Lalande (1771), vol. I, p. v.

<sup>13</sup> Bailly (1781), p. iii. cf. Bailly (1778–1783), vol. I, pp. vi, xiv.

<sup>14</sup> Estève (1755), vol. I, pp. v, xviii, vol. II, p. 129; Savérien (1766), p. 12; Laplace (1796), vol. I, 8, vol. II, p. 199.

<sup>15</sup> Goguet (1758), vol. I, p. v. Cf. on Goguet's historiography see Zedelmaier (2003), pp. 193–215; Wolloch (2007).

<sup>16</sup> Bailly (1778–1783), vol. I, p. xiv.

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