Workshop

USING HISTORICAL TEXTS IN AN INTERDISCIPLINARY PERSPECTIVE: TWO EXAMPLES OF THE INTERRELATION BETWEEN MATHEMATICS AND NATURAL SCIENCES

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In this workshop two sets of historical texts will be studied with the aim of providing the participant with examples of effective interrelations between mathematics and natural sciences (physics and astronomy) according to the way these two scientific areas are defined today. These two sets of documents will refer to two different times: the Greek and Chinese Ancient World and the Italian Classical Time; they will include the following texts:

First set (Ancient Greek and Chinese cosmology)

- Ho Peng Yoke. (1966). The Astronomical chapters of the Chin shu. Paris: The Hague, Mouton & Co.
- Weir, J. (1931). The method of Eratosthenes. The Journal of the Royal Astronomical Society of Canada, 25, 294-297.

Second set (Galileo's theory of free fall)

• Galilei, G. (1638). Mathematical discourses and demonstrations, relating to Two New Sciences, trans. H. Crew and A. de Salvio (1914). Macmillan. (3rd day, th. II, prop. II).

In the historical texts forming the first set of documents two different cosmological models leaning on the same empirical observation are described and used. The participants will be introduced to the specificities of the experimental procedures (and the associated measuring instruments) and their relationships with the mathematical tools involved. A pedagogical use of the two texts will be proposed with the aim of providing students with elements of understanding what a "model" is (from an epistemological point of view).

The second set of documents concerns Galileo's discovery of the law of free fall and its implication to inclined planes. They will be used in order to explore the manner in which purely mathematical considerations entered into Galileo's working on movement. Starting from Aristotelian's philosophy of movement, the participants will access Galileo's intellectual procedure where the conceptualization process is intrinsically connected to a mathematical processing.

The general objective of the workshop is to illustrate the intrinsic links connecting mathematics and natural science for the modelling process of the natural phenomena that forms an essential step for a rational comprehension of the world. Using

historical grounds in the classroom could be a fruitful way of making students (and teachers) aware of aspects of the science enterprise (in terms of measuring, modelling, conceptualizing, etc.). In this regard, the math/science complex as revealed by some discovery processes has a promising part to play.