EDITORIAL

Fragments of the history of science education: Homage to Francis Halbwachs

My first contact with the work of Francis Halbwachs was in the early 1990s when I was searching for literature in the context of my dissertation on the teaching of the concept of energy. His works "History of mechanical energy" and "History of heat" opened the way for me towards an anti-positivist epistemological approach to the subject, while at the same time they served as a first guide to a deeper understanding of the constructivist approach of science teaching and learning, which until then had been for me an interesting but non-practical theoretical schema. This became possible because Halbwachs' work highlights with the greatest possible clarity the two poles on which the modern research current of Francophone version of Science Education was built: that is, the ontogeny and the phylogeny of scientific knowledge.

By good fortune, after many years, I had the opportunity to come into contact with Halbwachs' rich archive and to get to know better the pioneering route of his work from Physics to Physics Education through his entirely creative collaboration with Jean Piaget and the other colleagues at the Centre International d' Épistémologie Génétique. It is precisely this intermediate link between scientific research and educational research relating to the subject in question that I think satisfactorily explains the nature and characteristics of the Francophone version of Science Education and, in part, its differences from the Anglo-Saxon version which developed in almost the same historical period. For my encounter with Halbwachs' archive, I would like to express my sincere thanks to Anne Torunczyk, daughter of Francis Halbwachs, who gave me full access to it and the freedom to work with it.

This special issue is divided into two parts: the first part presents three texts on Halbwachs' work. The introductory text was written by Piaget and presented as a preface to Halbwachs' text "La pensée physique chez l'enfant et le savant". In this text Piaget gives an excellent summary of Halbwachs' research activities in the fields of Physics, History and Philosophy of Physics, Genetic Epistemology and Pedagogy, while at the same time, he highlights his main epistemological positions as a synthesis of elements derived from this multifaceted activity. Professor Jean Jacques Dupin's text is valuable because, as a collaborator and member of the group of researchers Halbwachs formed at the Aix-Marseille Université (at the time Université de Provence), he describes Halbwachs' basic ideas about the possibility of making science teaching (particularly at the secondary school level) compatible with the spontaneous mechanisms of students' thinking. This is done through the analysis of an emblematic Halbwachs' text "La phy-

sique du maître entre la physique du physicien et la physique de l'élève", highlighting his pioneering work at the time in which the French educational system decides to follow the major educational reforms that are taking place worldwide.

The next two texts belong to the editor of the special issue. In the first of these, Halbwachs' epistemological ideas about the different types of explanation that have appeared historically in the field of Physics are described, and in particular about causal explanation which, according to him, appears to be the par excellence explanatory scheme that students use to describe natural phenomena. The paper also argues that these ideas remain relevant and are particularly important for research conducted in the context of Science Education and gives examples of their reception in Greece. The second text presents the most complete, to our knowledge, annotated bibliographical presentation of Halbwachs' work, divided into the three different periods that make up the diverse and multidimensional nature of this work.

In the second part we have chosen to publish two texts by Halbwachs which we have retrieved from his archive and which, it seems, have not been published elsewhere. These texts are presented here more as historical documents. They are draft papers, written in "oral language" since they were to be announced at educational conferences in 1973 and 1977. The common element of the two papers is Halbwachs' attempt to communicate in an Anglo-Saxon research environment information on the nature and characteristics of the proposed changes in the French Physics curriculum which concern the conceptual content of two specific teaching subjects (mechanics and heat models). In these concise but comprehensive texts Halbwachs manages to demonstrate the important role that both the epistemological analysis of the subject of teaching (which is carried out with recourse to the History of Physics) and the use of the findings of Cognitive Psychology (which is carried out with recourse to the basic principles of Genetic Epistemology) play as interrelated research fields of reference in the design of the Physics curriculum. At the same time, in this context, he tries to highlight, through specific examples, a different approach of the methodological dimension of scientific knowledge compared to the classical scheme of "observation, hypothesis, experimentation", where qualitative explanations of physical situations precede their quantitative representation, while the introduction of different levels of generalization of scientific knowledge is made possible (or even required) depending on the age level and consequently the cognitive abilities of students. It is particularly interesting to note that in this context Halbwachs promotes the idea of the positive use in teaching at a particular age level even of 'alternative' conceptions of pupils, such as the conception of heat as a fluid, since, as he claims, this idea is linked to a qualitative version of the principle of heat conservation, and therefore of greater importance for the constitution of scientific knowledge at this level.

I believe that the present special issue, as the title suggests, is a small contribution

to the historical investigation of the phenomenon of the Francophone tradition of Science Education by highlighting elements of the work of a pioneering researcher in this field. I would like to thank the editor of the journal, Professor Kostas Ravanis, a colleague and researcher also involved in the Francophone tradition of Science Education, for inviting me to edit this special issue. I am sure he would not have done so if he did not believe, as I do, that this research tradition remains relevant and productive, that is, according to Lakatos, progressive.

The majority of the texts are written in English. We have chosen to keep the texts by J. Piaget and J. J. Dupin in French to prevent possible alterations during translation. Besides, there are now reliable AI translation tools that allow the reader to easily translate them. I wish you an enjoyable and constructive reading.

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