

## **CFP for ICHME7**

### **Friedrich Fröbel's geometry and German Idealism at the beginning of the 19<sup>th</sup> century**

Michael Friedman

Cohn Institute, Tel Aviv University

[friedmanm@tauex.tau.ac.il](mailto:friedmanm@tauex.tau.ac.il)

Friedrich Fröbel was a trained crystallographer and a self-trained pedagogue. He is famous today for developing an extensive program for the education of preschool children, announced in his 1826 *die Menschenerziehung* (The Education of Man). During the development of this program, Fröbel created his so-called *Gifts* and *Occupations*, being sets of playful objects. While there is an extensive literature on Fröbel's geometrical ideas, their development and reception, these various accounts hardly consider one of the early sources of influence on Fröbel's thought: German Idealism of the end of the 18<sup>th</sup> century and the beginning of the 19<sup>th</sup> century. The aim of the talk is to present how this philosophical tradition influenced Fröbel's conception of mathematics and the geometrical playful objects.

Fröbel, after spending few years (1808–1810) as a tutor in Pestalozzi's institute in Iferten (Yverdon), turned to study the natural sciences, mathematics and later crystallography, working with Christian Samuel Weiß, one of the leading crystallographers in early 19<sup>th</sup> century Germany. Fröbel's education in crystallography was influenced from two main approaches to the research of materials at the beginning of the 19<sup>th</sup> century: the "atomic" approach and "dynamic" one (Friedman/Muñoz Alvis 2021a,b). As Heuser-Keßler (1992) and Wiederkehr (1988) note, Weiß and generally German crystallographers endorsed a "dynamic" approach to the study of crystals; More importantly, Weiß was influenced from German Idealism, and particularly from the German philosopher Schelling, who himself had mathematical education (cf. Morel 2013). By looking closely at the various stations of Fröbel's life, it becomes clear that he was in Jena when Hegel arrived there and just before Fichte left to Berlin. Fröbel was also personally acquainted with Schelling and was familiar with his texts on the philosophy of nature. As an example, one can note that Schelling (1799) stresses that nature is determined by a dynamic system of the combination of opposite forces characterized by an "attractive and repelling" interaction, a conception also found in Weiß's crystal theory (1804) and implicitly also in Fröbel's. Moreover, Giel (1959) and Rinke (1935) stress a strong affinity between Fröbel's, Fichte's and Schelling's ideas whereas Scholz (1989) argues that this "dynamic" way of thinking goes back to Leibniz, Boscovich and Kant.

In this talk I will try to delineate how did the writings of Hegel, Schelling, Fichte and Kant shape Fröbel's pedagogical conception of mathematics and especially of geometry. The explication of this transfer of knowledge and the sources of influence will help to discern how Fröbel's conception of the crystalline world and of geometrical objects for children were influenced by the philosophical writings of German philosophers.

### **References**

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