

## **Federigo Enriques between popularization and scientific criticism**

Arcangelo Rossi - Dipartimento di Matematica e Fisica “Ennio De Giorgi”,  
Università del Salento, Lecce, Italy - arcangelo.rossi@unisalento.it

*Abstract:* The voices of mathematics, physics and history of science written by Federigo Enriques (1871-1946) for the *Enciclopedia Italiana*, fully reflect the dynamical and creative character of other writings published by him in Italy and France in the same years. These voices point out the institutional and pedagogical character of those writings, always cultivated by him during his prolonged scientific and civil engagement. Enriques, animated by a precocious “philosophical lyceum infection”, added at least two other elements besides the institutional and popularization ones by pointing to the development of a basic scientific culture and to the promotion of a wider and deeper historical memory.

*Keywords:* Federigo Enriques, *Enciclopedia Italiana*, popularization and scientific culture in Italy in the early '900.

### **1. The contribution of Federigo Enriques to the *Enciclopedia Italiana***

Federigo Enriques (1871-1946) was director in the 1930s of the entire mathematical section of the *Enciclopedia Italiana* and wrote several voices for it, not only of mathematics but also of physics and history of science.<sup>1</sup> These contributions reflect the dynamical and creative character of other writings published by him in Italy and France in the same years (Enriques 2004). In fact, Enriques's voices point out the institutional and pedagogical character of those writings, always cultivated by him during his prolonged scientific and civil engagement.

To be true, Enriques, who was animated since his early youth by a precocious “philosophical lyceum infection” (Enriques 1958, p. 6), at least added two other elements, besides the institutional and popularization ones, by pointing to the development of a basic (if not mass) scientific culture and to the promotion of a wider and deeper historical memory. Actually, he was supporter of a new attention to the foundations of sciences, and in particular of physics, by deepening as much as possible their main disciplinary elements and notions, and acquiring their most stable aspects, though anyway historically reviewable, as scientifically approximated to a more and more compulsory scientific truth. In fact, one of the main Enriques's aims was developing the critique of principles, which implied a conceptual deepening of the

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<sup>1</sup> During his direction Enriques wrote more than thirty voices.

meaning of mathematical and physical knowledge relatively to the role, range and comprehensibility of mathematical and physical principles and applications. Mainly as a consequence of Enriques's incitements, such critical treatment of mathematical and physical concepts, not limited to peculiar applications but enlarged to the most general ones, became teaching subjects in Italian high schools and universities, to be integrated with more specialized and detailed aspects.

Of particular importance is the voice *Meccanicismo* (Enriques 1934, pp. 663-666), central in the *Enciclopedia* to explain scientific theories as only a consequence of mechanical laws. Significantly, this crucial issue has been critically reconsidered and further developed by G. Israel (1945-2015), eminent mathematician and historian of science, author of the voice *Enriques* (Israel 1993) for the *Dizionario Biografico degli Italiani*, in his last volume (Israel 2015), a sort of intellectual testament. On the other hand, many of Enriques's voices of mathematics, physics and history of science though concerning scientific research subjects, also put in evidence biographic details of more limited amplitude. In fact, his popularization attitude showed itself in the effort of clarifying as more as possible, also in terms of historical placing, the contribution of the scientist biographed, according to his historical and scientific importance.

Therefore, the planning impressed by Enriques before in the volumes of the *Enciclopedia* and, afterwards, limited to Italian scientists, in the *Dizionario Biografico degli Italiani* (at least partially inspired by him), underlined the importance of the scientists biographed in the history of scientific thought and of their possible historical success. In particular, the voice *Castelnuovo* (Enriques 1931, pp. 364-365), discussing the contributions of the illustrious mathematician Guido Castelnuovo (1865-1962), shows the opening to mathematical-physics and realism, which marks the critical epistemology of conventionalism, typical of the Italian algebraic geometry.

Anyway, the function of Enriques's *Enciclopedia* was left in promoting a widespread scientific culture overcoming mere erudition and uncritical popularization through history and philosophy of science. This approach, tending to realize the encyclopedic reflection through the critical epistemology (Enriques 1958), arrived at full maturity in the '30s of the XX century, with Enriques active both in Italy and in France. Actually, Enriques's approach required the development of a historiographical engagement largely dedicated to the study of naturalistic philosophy (not for chance Enriques's voice *Parmenide e la geometria* (Enriques 1935, p. 392) is largely developed as primary expression of the inseparable birth of philosophy and science, enriched by the contribution of the historiographical work steered by the deepest historical-critical enquiry).

Enriques's thirty years of epistemological reflection on the structure of science, combined with his deep historiographical work, effectively contributed in both knowable and didactic forms to create a scientific base (if not of mass) culture through the concrete use of the history and not only of deep epistemological reflections. In this process of formation of a basic scientific culture, the elaboration of the encyclopedic voices availed of such historical-epistemological system, which contributed to their writing. Thus, the function and width of these voices reflect the elaboration of a national culture in terms of science, philosophy and history by pointing out the

universalistic push to such integration in the years of the *Enciclopedia*. This trend to integration, is particularly evident in Enriques's work *The meaning of the history of scientific thought*, a text initially written in French and soon translated into Italian, which shows the strong reciprocal call between historicism and epistemology.

Nonetheless, O. Pompeo Faracovi underlines in the last of her highly clarifying volumes on Enriques (Pompeo Faracovi 2014) that such fundamental contribution was not appreciated then as it deserved, due to the historical hegemony in Italian science and philosophy of idealistic philosophy and of pragmatist and empiricist science, respectively, contrary to Enriques's orientations.

## 2. Conclusions

Anyway, Enriques's epistemological reflections on the structure of science combined with his deep historiographical work contributed to the development of a scientific basic culture. In particular, Enriques's work for the *Enciclopedia Italiana* gave a significant contribution in terms of scientific popularization and epistemological criticism by promoting a more widespread and deeper scientific culture.

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