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CONTRIBUTIONS TO THE CONSTRUCTION OF A NON-ABSOLUTIST
PHILOSOPHY OF MATHEMATICS

Abstract

“Empiricist” philosophies of mathematics can be traced back to the epistemological movement which was developed by some scientists-philosophers after the ‘non-euclidean revolution’ (Gauss, Lobacevskij, Riemann, Helmholtz, Clifford, Enriques, Einstein, ..., and also, till a certain point, Mach and Poincaré). Geometry is an empirical science, because its principles have an empirical base (so fallibilism enters in geometry); but it is also a system of abstract theories. More recently Lakatos proposed a ‘quasi-empiricist’ philosophy of mathematics, and this trend is today particularly active.

This paper aims at pointing out some typical (sometimes implicit) aspects of these non-absolutist philosophies of mathematics, in past times and now (they can be named ‘non-absolutist’ because they refuse to be monolithic systems):

- the immersion of philosophy of mathematics in the area of philosophy of science;
- the interest for all levels of mathematics (let us think to the important role that Lakatos’ quasi-empiricism gives to informal theories; but also to the educational interest connected with such philosophies);
- the interest for the history of mathematics (some philosophers, such as Enriques, Bachelard, Lakatos, have indeed developed genuine ‘philosophies of history of science’);
- the attention for the genesis of ideas (Enriques, Ernest): some cognitive psychologists (Piaget) are sympathetic with these epistemologies.

We point out some ideas aiming at developing these epistemologies. Their link with mathematics (or more generally with science) can be considered ‘quasi-empirical’, because new results and trends in science can ‘falsify’ an epistemology; from another point of view, these philosophies must be open to changes. In particular, the development of mathematics can be interpreted in terms of ‘revolutions’ (which are normally less showy than revolutions in experimental sciences, but can nevertheless cause deep changes in our way of thinking), and of ‘scientific research programmes’. We give some instances, that can be useful in order to clarify some ‘implicit philosophies’ in the mathematical practice.

Finally, we point out some ethical values connected to scientific knowledge, that such epistemologies can promote: for instance, they discourage an acritical confidence in science (which is still part of implicit phil-

osophies of science of many people, as a heritage of classical positivism); but also they avoid agnosticism, that can be an implicit consequence of conventionalism and of instrumentalism.