# EDITORIAL

*René Taton: In memoriam*

Historian of mathematics René Taton (1915-2004), whose name is inextricably linked to the professionalization of the history of mathematics in postwar France, died this summer. We dedicate this issue of the *Revue d'histoire des mathématiques* to his memory. During Taton's lifetime, the history of mathematics changed considerably, displaying now a plurality of approaches and a variety of methods. The papers below — by three young French scholars, two of whom are still doctoral students — testify to this methodological vitality without reflecting a specific school.

Two of the papers published below focus, though in different ways, on writing techniques considered as part of the mathematical production process. Frédéric Graber closely analyzes the differences and similarities between two relatively analogous texts on fluid motion that Navier published in two different types of publication. The differences in presentation studied here concern Navier's way of quoting, of introducing new principles, and of arguing for their correctness as well as the place and treatment of mathematics, the technical instruments used, and, last but not least, the link to applications in Navier's work. The differences found are related to the stages of a work in progress, to rhetorical strategies, to literary genres, or to the supposed audience. Graber studies the confrontation between theory and experiment, which seems problematic in Navier's time. Indeed, on the one hand, Graber finds a series of experiments implemented on specific configurations and, on the other, complex mathematical formulae which can be simplified and calculated in certain cases but which generally do not coincide with actual experimental results. How then do theory and experience confront each other in Navier's work? Such a confrontation is impossible, Graber argues, without the creation of a "common linguistic space"; only there the rhetorical dimension of mathematical discourse can bring it about. The confrontation is thus a purely literary formulation, and this is the very strong conclusion Graber draws from his analysis of Navier's two texts.

For her part, Anne Robadey isolates a writing technique in a 1905 paper on the geodesics of convex surfaces by Henri Poincaré that she would like to see more fully explored within the history of mathematics. This technique involves presenting a general method not in abstract terms — as in the case analyzed by Graber of the complicated, uncalculable formula in Navier's work — but by means of an example called a "paradigm" that does not diminish its generality. This paradigm offers an interpretative framework, the language of which can be used to make the method better understood. Thus, in 1905, Poincaré proved, via the example of the geodesics on convex surfaces, a result the general principles of which were already present in his *Méthodes nouvelles de la mécanique céleste* (1892-1899). This result can be formulated in Robadey's terms as follows: the parity of the number of closed geodesics without double points does not depend on the analytic convex surface chosen. Poincaré employed geometry and the language of geodesics to give, in this simpler framework, a method of celestial mechanics linked to the difficult three-body problem. Moreover, in a key supplement to her historical research — since that is the way she has chosen to present it — Robadey gives a purely mathematical result. Having to cope with the resistance of one of the referees, Robadey succeeds in showing how to make perfectly rigorous the method Poincaré used to prove his 1905 result, a method the rigor of which had previously been called into question. The *Revue d'histoire des mathématiques* is pleased to be able to present this new result to its mathematical readers.

The approach of our third contributor, Sébastien Gandon, is quite different. He focuses on Bertrand Russell's contribution to the debate on the foundations of geometry, from 1898 and the publication of *An Essay on the Foundations of Geometry* to 1903 and that of *The Principles of Mathematics*. For Gandon, Alfred N. Whitehead's *Treatise of Universal Algebra* (1898) inspired Russell's first writings on the question of foundations and served as a source as well for the openly conflicting positions Russell adopted. It was his approach as a philosopher, aimed at characterizing the nature of projective geometry, that led Russell to base this geometry on incidence relations — projection and section — to the exclusion of metric notions and order relations. His mathematical work is dependent on this properly philosophical quest. After having juxtaposed, in an intermediate phase, contradictory developments that took order as both a projective and a non-projective concept, Russell arrived at a compromise in 1903 that presented projective and descriptive geometry as complementary. He reached this new position following his reading of Pieri and the geometers of the Italian school. The geometry of position was identified with pure projective geometry founded on incidence relations alone, while descriptive geometry was founded on order relations. Gandon thus makes sense of the work of the "would-be mathematician Russell", who Jean Dieudonné (quoted by Pierre Dugac, *Histoire de l'analyse*, Paris: Vuibert, 2003, p. 221) characterized as "apparently knowing nothing of the research on the foundations of geometry, from Cayley to the Italian school via Pasch and Klein".

By highlighting the rhetorical and philosophical dimensions of mathematical practice, these three contributions show, each in its own way, that mathematics is far from being closed on itself and that the history of mathematics can profit by varying its methodological approaches.

The Editors-in-chief