Foreword to the French edition

Pierre Guiraldenq's *Émile Borel* offers the portrait of a mathematician who had a considerable influence on the development of twentieth-century mathematics, and, in addition, the discovery of his lifelong contribution to the awareness of this science's cultural significance.

Borel's 1894 doctoral thesis contained the basis of a new theory of measure that he would expand in his *Leçons sur la théorie des fonctions* – an essential tool for the development of analysis – published in 1898; a theory that would completely revitalise the field and pave the way to the Lebesgue integral. This work also contained the first statement of the Borel–Lebesgue theorem, which would lead to one of the fundamental concepts of general topology, that of compactness. It is worth mentioning that in his proof of the theorem Borel used the notion of *transfinite* formulated by Cantor, demonstrating for the first time the practical application of Cantor's hierarchy of infinities, which would later allow Baire to elaborate his famous classification of discontinuous functions.

One of Borel's defining traits was his desire, very early in his career, to devote his scientific knowledge, his prodigious intelligence, and his force of character to the service of his country. Ten years after his thesis, when he was at the summit of his scientific career and fame, he embarked in a new direction, favouring what seemed to him to possess a "practical value", foremost the calculus of probability, until then considered a minor discipline, and for which he would develop the theory. He was the author of "the article" that in 1909 gave a new dimension to the field; but also, and especially, to all its applications, from statistical physics –

which had been reborn with the flourishing of molecular theories – to every human activity that involves statistics, including games of political and military strategies, of which he was a pioneer.

It is impossible to understand this radical change of direction without considering Borel the man in his entirety and his deep attachment to his origins. In this sense, Pierre Guiraldenq's book is unique. One cannot envision Borel without a land, a root, an anchoring point whose solidity rests on centuries of wisdom and human values.

The author tells us a great deal about Borel, the man, the teacher, the scientist, the administrator, the politician. We discover, among other things, his foretelling vision of the necessity to build Europe, and his pledge for a greater representation of the "feminine element" in public administration. His involvement in the creation of the Institut Henri Poincaré in Paris, which he headed until his death, was decisive. Pierre Guiraldenq's book will be of particular value to all those interested in the history of science and culture; the science and culture that Émile Borel so eminently represented.

Paris — Bernard Bru and Pierre Dugac[†]