

# INTRODUCTION

**A**fter submitting the final version of his general theory of relativity in November 1915, Einstein began to write a comprehensive summary of the theory for the scientific community. At that time he was already thinking about writing a popular book on relativity—both the special and the general—as he indicated in a letter to his close friend Michele Besso, quoted in the epigraph. Einstein completed the manuscript in December, and the booklet (as he referred to it) *Relativity: The Special and the General Theory (A Popular Account)* was published in German in the spring of 1917.

Einstein believed that the laws of nature could be formulated in a number of simple basic principles, and this quest for simplicity characterized his scientific activities. He also believed that it was his duty to explain these principles in simple terms to the general public and to convey the happiness and satisfaction that understanding them can generate. As Einstein stated in the short introduction to his booklet, he “spared himself no pains in his endeavour to present the main ideas in the simplest and most

intelligible form,” (p. 10) yet the book is not popular in the usual sense. It may be popular in its format, in its dialogue with the reader, in its examples from daily life, and in the lack of mathematical formulas, but it does not compromise on scientific rigor. The reader soon discovers that an intellectual effort is required to follow the flow of Einstein’s thoughts and arguments.

In his brief introduction, Einstein also said that in the interest of clarity, he repeated himself frequently “without paying the slightest attention to the elegance of the presentation.” To justify this approach, Einstein referred to the brilliant physicist Ludwig Boltzmann, “according to whom, matters of elegance ought to be left to the tailor and to the cobbler.” Despite this assertion, the booklet is written with sophistication and elegance. The path from Newtonian mechanics to special relativity and then to general relativity—followed by its immediate consequences—emerges as an exciting intellectual odyssey. There is hardly any trace of Einstein’s own bumpy road or of the difficulties he encountered on the way to this achievement.

However, Einstein was not happy with the result. In a letter to Besso he wrote: “The description has turned out quite wooden. In the future, I shall leave writing to someone else whose speech comes more easily than mine and whose body is more in order.”<sup>1</sup> Jokingly, he later remarked that the description *Gemeinverständlich* (generally understandable), on the cover of the booklet, should read *Gemeinunverständlich* (generally not understandable).<sup>2</sup>

1 Einstein to Michele Besso, March 9, 1917, CPAE vol. 8, Doc 306, p. 293.

2 Pais, Abraham. *Subtle Is the Lord: The Science and the Life of Albert Einstein* (Oxford: Oxford University Press, 1982), p. 272.

Despite Einstein's self-criticism the booklet was a great success: 14 German editions appeared between 1917 and 1922, and a total of 15 were published in German during his lifetime. Strangely, though, the 15th edition, which appeared in 1954, was called the 16th instead. After the confirmation of the bending of light, the booklet was also published in many foreign languages.

In 1947, shortly after World War II and 30 years after publication of the first German edition, Einstein was approached by the publishing company Vieweg, which held the publication rights to the first edition, with a proposal to publish a new edition in German.<sup>3</sup> His response contained only two sentences in which he categorically rejected this proposal: "After the mass-murder of my Jewish brethren by the Germans, I do not wish any of my publications to be issued in Germany." Einstein's attitude softened over the years, and he approved the 1954 German edition, the last to appear in his lifetime.

Einstein's booklet is a unique document in the history of science writing. It is an attempt to enable the general reader with no background in physics to grasp and appreciate the grandeur of one of the most sophisticated intellectual achievements of the human mind and thereby to grant him or her, as Einstein puts it, "a few happy hours of suggestive thought." This goal may have been achieved in at least one case (see the letter from Walter Rathenau in the appended documents). Einstein appeals to the reader's intuition and does not assume that he or she has any previous knowledge of the subject matter. Familiar metaphors include train carriages and embankments. Einstein often poses a question to the reader—which he then answers

3 Einstein to Vieweg, March 25, 1947, unpublished, Vieweg Archive VIE: 18.

himself or in the name of the reader, taking both sides of a Platonic dialogue—which invites the reader to actively participate in the thought process.

Einstein maintained a close interest in the publication process and corresponded extensively with the publisher about the consecutive editions, translations into other languages, and granting rights to foreign publishers. He made stylistic and textual changes from one edition to the next, occasionally adding whole chapters and new appendixes. Thus, part III of the present version of the booklet—comprising sections 30–32, which deal with the universe as a whole—was added to the third edition in 1918. To the same edition Einstein also added the first two appendixes: “Simple Derivation of the Lorentz Transformation” (as a supplement to section 11) and “Minkowski’s Four-Dimensional Space (‘World’)” (as a supplement to section 17).

The appendix “The Experimental Confirmation of the General Theory of Relativity” was written for the first English edition (1920) at the request of the translator. It discusses the three classical experimental tests of general relativity: the precession of the perihelion (the point of closest approach to the sun) of the planet Mercury, the deflection of light by the gravitational field, and the increased wavelength of spectral lines in a gravitational field (the *gravitational redshift*). This appendix was also included in the 10th German edition in 1920. The fourth appendix, “The Structure of Space according to the General Theory of Relativity,” appeared first in the 14th English edition (1946) and was later included in the 1954 German edition. It is a supplement to section 32 and deals with the cosmological question of the nature of the universe. The term *space* here refers to the whole universe.

Of special character and significance is the long appendix “Relativity and the Problem of Space.” It appeared first in the 15th English edition in 1954 and was then added to the 16th German edition in the same year. This appendix is very different from the others in that it reflects the development of Einstein’s perception of the concept of space and is of a more philosophical character.

The text of Einstein’s booklet, reprinted in the present volume, is the translation by Robert Lawson included in *The Collected Papers of Albert Einstein*, vol. 6, Doc. 42.<sup>4</sup>

The original text is accompanied by a “reading companion,” which is a series of commentaries on the basic ideas, concepts, and methods that are the building blocks of the theory of relativity—the special and the general.

Following the reading companion is a chapter on the foreign-language editions, where we explore the history of and the stories behind the translations into foreign languages in the 1920s. We present this history in the context of the attitudes toward Einstein and his theories of relativity in the respective countries.

In line with Einstein’s style and the nature of this book, our text contains only a few footnotes and references. Instead, we refer the reader to the most relevant sources and to a number of major works.

<sup>4</sup> The authoritative edition of Einstein’s papers is *The Collected Papers of Albert Einstein*, vols. 1–14 (Princeton, NJ: Princeton University Press, 1987–). This edition contains numerous invaluable introductions to the various aspects of Einstein’s biography and work. The English translation volumes are referred to throughout. The published volumes of the *Collected Papers* are freely available online at [einsteinpapers.press.princeton.edu](http://einsteinpapers.press.princeton.edu). A substantial part of the Einstein Archives is made available online at [www.alberteinstein.info](http://www.alberteinstein.info) by the Hebrew University of Jerusalem.