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**Jean Eisenstaedt: The Curious History of Relativity**

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# I N T R O D U C T I O N

## A Difficult Theory

A new scientific theory does not triumph by convincing its opponents and making them see the light, but rather because its opponents die, and a new generation grows up that is familiar with it.

*Max Planck*<sup>1</sup>

GENERAL RELATIVITY, that is, Einstein's theory of gravitation, has long been considered incomprehensible. There are many reasons for that opinion, and if they are certainly not all technical, they are not merely ideological either. Rethinking space-time—accepting that geometry is not the one our senses (and our education) have taught us and that the universe is curved—requires a true intellectual effort.

Things had gotten off to a bad start with special relativity, which was not an easy theory either, to say the least. In 1959, four years after Einstein's death, the distinguished theoretical physicist Max von Laue revealed to Margot Löwenthal, Albert's daughter-in-law, his difficulty in understanding Einstein's 1905 article on special relativity and the forty years it had taken him to succeed: "[S]lowly but steadily a new world opened before me. I had to spend a great deal of effort on it. . . . And epistemological difficulties in particular gave me much trouble. I believe that only since about 1950 have I mastered them."<sup>2</sup>

This admission of Max von Laue, a Nobel physicist familiar with Einstein's work and author of some excellent books on relativity, should help us, as we begin our journey through *The Curious History of Relativity*, to accept our own difficulty in approaching relativity. We are not alone in this situation. Many before us have faced similar obstacles and have resisted relativ-

## INTRODUCTION

ity's ideas, logic, and consequences—and made plenty of mistakes which, I hope, will help us to better understand the theory.

The difficulty in understanding “the” theory of relativity (special and general relativity were often confused) was so widespread at the turn of the century that it gave rise to a story, probably apocryphal but soon reaching mythical proportions, in which only three persons could understand Einstein's theory. But it appears that the myth was based on a true story. . . .

On 6 November 1919, at Carlton House in London, the extraordinary meeting of the Royal Society devoted to the results of the English expeditions and chaired by J. J. Thomson has just ended: general relativity has been “verified.” Eddington, the hero of the day and the center of attention, chats with his colleagues. Ludwik Silberstein, a small, bearded man, well-known relativist, and author of a decent treatise on special relativity, who also had an inclination for debate and heated discussions and was very sure of himself and his quick mind, joins the group and exchanges a few polite words with an amused Eddington. The atmosphere is light, full of jesting remarks. Silberstein then asks Eddington:

Isn't it true, my dear Eddington, that only three persons in the world understand relativity?” Silberstein confidently expects the obvious, polite reply, “But, apart from Einstein, who, my dear Silberstein, who, if not you . . . and I, if you allow me.”

Eddington, however, remains aloof, silent, amused. Silberstein insists: “Professor Eddington, you must be one of the three persons in the world who understand general relativity.” To which Eddington, unruffled, replies, “On the contrary, I am trying to think who the third person is!”<sup>3</sup>

More than two centuries earlier, a student passed Newton on a Cambridge street and observed in a hushed voice: “There goes the man who has written a book that neither he nor anyone else understands.”<sup>4</sup>

Definitely, gravitation does not appear to be an accessible subject. And yet, relativity is not as difficult to understand as public rumor has it, nor is it the only theory to resist comprehension or to make us wonder. By learning about the difficulties experienced by the brightest, we may perhaps more easily accept our

own and come to terms with the limits of our understanding. In short, we may progress.

## NOTES

1. Max Planck, quoted in Feuer, 1982, p. 87.
2. Max von Laue to Margot Einstein, 23 October 1959; quoted in Holton, 1973, p. 198.
3. Quoted in Chandrasekhar, 1979, p. 216.
4. From Christianson, 1984, p. 291.