signal was sent out. That was surprising, for one would have expected that the observer would catch up to some extent with signals sent out in the direction in which the earth was moving, so that the speed would appear slower in this direction, while the observer would move away from the signal sent out in the opposite direction, so that the speed would then appear faster. The situation is easily understood if we imagine the extreme case that we are moving in the direction of the signal exactly at the speed of light. Light would appear to remain in a fixed position, its speed being zero, while of course at the same time a signal sent out in the opposite direction would move away from us at twice the speed of light.

The experiment is supposed to have shown no trace of such an effect due to terrestrial motion, and so—the textbook story goes on—Einstein undertook to account for this by a new conception of space and time, according to which we could expect invariably to observe the same value for the speed of light, whether we are at rest or in motion. So Newtonian space, which is 'necessarily at rest without reference to any external object', and the corresponding distinction between bodies in absolute motion and bodies at absolute rest, were abandoned and a framework set up in which only the relative motion of bodies could be expressed.

But the historical facts are different. Einstein had speculated already as a schoolboy, at the age of sixteen, on the curious consequences that would occur if an observer pursued and kept pace with a light signal sent out by him. His autobiography reveals that he discovered relativity

> after ten years' reflection . . . from a paradox upon which I had already hit at the age of sixteen: If I pursue a beam of light with the velocity *c* (velocity of light in a vacuum), I should observe such a beam of light as a spatially oscillatory electromagnetic field at rest. However, there seems to be no such thing, whether on the basis of experience or according to Maxwell's equations. From the very beginning it appeared to me intuitively clear that, judged from the standpoint of such an observer, everything would have to happen according to the same laws as for an observer who, relative to the earth, was at rest.[1]

There is no mention here of the Michelson-Morley experiment. Its findings were, on the basis of pure speculation, rationally intuited by Einstein before he had ever heard about it. To make sure of this, I addressed an enquiry to the late Professor Einstein, who confirmed the fact that 'the Michelson-Morley experiment had a negligible effect on the discovery of relativity'.[2]

[1] *Albert Einstein: Philosopher-Scientist*, Evanston, 1949, p. 53.

[2] This statement was approved for publication by Einstein early in 1954. Dr. N. Balazs, who was working with Einstein in Princeton in Summer 1953, introduced my questions to him and reported his replies. The result of his first interview with Einstein was described by Mr. Balazs in a letter of July 8th, 1953, as follows:

'Today I discussed with Einstein the basic ideas which have led to the foundation of the special theory of relativity.

The result is about the following:

There were basically two problems whose contemplation was of fundamental im-