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FROM THE DISCUSSION ON THE THEORY OF RE-
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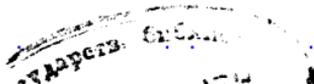
BY

SIR OLIVER LODGE, F.R.S.



FROM THE DISCUSSION ON THE THEORY OF RELATIVITY, 1919 DECEMBER 12.

SIR OLIVER LODGE.—May I thank you, sir, for your welcome? To save time, I may say that I have expressed myself on this relativity theory in one or two places which are very accessible, so that I will try not to repeat anything that I have there said: one is in this month's *Nineteenth Century*; another is in next month's *Fortnightly Review*; and a third is in next Sunday's *Observer*. May I say also that I heartily accept the Astronomer Royal's and the other Astronomers' verdict of the result, and congratulate everyone who has had to do with it? But I am not prepared to accept or to swallow the whole of the theory of time and space which has been put before us this afternoon with so much brilliancy. And one of the things which astonishes me is that Professor Eddington thinks he understands it all, or, I prefer to say, does understand it all. To dispense with a straight line as the shortest distance between two points, and to be satisfied with a crazy geodesic that is the longest distance between two points, is very puzzling. The only analogy I have thought of is the very simple one of the way in which water runs downhill. Anybody would think that a watercourse would take the steepest path; but



it does not. A watercourse takes the most leisurely way, and is always to be found where the contour-lines are farthest apart. (This is only a matter of common sense really, because a river is, after all, a flowing lake, and the water is found where it longest remains.)

The whole relativity trouble arises from giving up the ether as the standard of reference—ignoring absolute motion through the ether,—rejecting the ether as our standard of reference, and replacing it by the observer. By putting the observer in the fore-front and taking him as the standard of reference you get complexity. If you describe a landscape in terms of a man in a train looking out of the window, the description is necessarily complicated. The surprising thing is that this theory has arrived at verifiable results; it is marvellous, and it represents very brilliant mathematical work. It has been done by using an out-of-the-way calculus developed by pure mathematicians—a ponderous kind of tool which only a few people can use. I do not pretend to be able to use it; I only with difficulty follow it; but the principle must coincide with some kind of reality, for by writing down equations on that principle you can get results. The theory is not dynamical. There is no apparent aim at real truth. It is regarded as a convenient mode of expression. Relativists seem just as ready to say you are rising up and hitting the apple as that the apple is falling on you. It is not common sense, but equations can be worked that way.

There was one thing which Mr. Jeans said, or seemed to say, with which I want in a friendly way to disagree. He appeared to say that you can adjust the velocity of light by changing your units. As here stated, that is not true. Changing the units does not affect the velocity of light. Whether you say light travels 186,000 miles a second or whether you say it is so many inches an hour, makes no difference to the velocity. An algebraic symbol ought to represent the thing itself, not a mere number of units. Altering the numerical specification—which is what you do by altering units—makes no difference to the thing itself. Further, I want to ask how can Mr. Jeans say that a sphere of light is concentric with the observer! Consider a source of light and a wave front which it emitted some time ago. Follow that wave front. It is advancing in all directions absolutely concentric with the centre from which it originally emanated. It does not care what the source has done since. The source may have gone away; so may the observer; but that does not matter to the wave front. The light is swimming in stationary ether, like a man who has jumped overboard from a ship and is now swimming through the water. The ship might disappear: it does not matter. Light is concentric with its original source. Now, consider an observer who is going to catch that light, or one who has caught that light. How can the sphere be concentric with either observer? I am surprised that the observer comes in, or that it matters what he is doing. The wave front is quite independent of him. I know that the observer is considered