EINSTEIN EXPOUNDS HIS NEW THEORY

It Discards Absolute Time and Space, Recognizing Them Only as Related to Moving Systems.

IMPROVES ON NEWTON

Whose Approximations Hold for Most Motions, but Not Those of the Highest Velocity.

INSPIRED AS NEWTON WAS

But by the Fall of a Man from a Roof Instead of the Fall of an Apple.

Special Cable to THE NEW YORK TIMES.

BERLIN, Dec. 2.—Now that the Royal Society, at its meeting in London on Nov. 6, has put the stamp of its official authority on Dr. Albert Einstein's much-debated new "theory of relativity," man's conception of the universe seems likely to undergo radical changes. Indeed, there are German savants who believe that since the promulgation of Newton's theory of gravitation no discovery of such importance has been made in the world of science.

When THE NEW YORK TIMES correspondent called at his home to gather from his own lips an interpretation of what to laymen must appear the book with the seven seals, Dr. Einstein himself modestly put aside the suggestion that his theory might have the same revolutionary effect on the human mind as Newton's theses. The doctor lives on the top floor of a fashionable apartment house on one of the few elevated spots in Berlin—so to say, close to the stars which he studies, not with a telescope, but rather with the mental eye, and so far only as they come within the range of his mathematical formulae; for he is not an astronomer but a physicist.

It was from his lofty library, in which this conversation took place, that he observed years ago a man dropping from a neighboring roof—luckily on a pile of soft rubbish—and escaping almost without injury. This man told Dr. Einstein that in falling he experienced no sensation commonly considered as the effect of gravity, which, according to Newton's theory, would pull him down violently toward the earth. This incident, followed by further researches along the same line, started in his mind a complicated chain of thoughts leading finally, as he expressed it, "not to a disavowal of Newton's theory of gravitation, but to a sublimation or supplement of it."

When he read in the message from THE TIMES requesting the interview a reference to Dr. Einstein's statement to his publishers on the submission of his last book that not more than twelve persons in all the world could understand it, coupled with the editor's request that Dr. Einstein put his theory in terms comprehensible to a larger number than twelve, the doctor laughed good-naturedly, but still insisted on the difficulty of making himself understood by laymen.

"However," he said, "I am trying to talk as plainly as possible. To begin with the difference between my conception and Newton's law of gravitation: Please imagine the earth removed, and in its place suspended a box as big as a room or a whole house, and inside a man naturally floating in the centre, there being no force whatever pulling him. Imagine, further, this box being, by a rope or other contrivance, suddenly jerked to one side, which is scientifically termed 'difform motion,' as opposed to 'uniform motion.' The person would then naturally reach bottom on the opposite side. The result would consequently be the same as if he obeyed Newton's law of gravitation, while, in fact, there is no gravitation exerted whatever, which proves that difform motion will in every case produce the same effects as gravitation.

"I have applied this new idea to every kind of difform motion and have thus developed mathematical formulas which I am convinced give more precise results than those based on Newton's theory. Newton's formulas, however, are such close approximations that it was difficult to find by observation any obvious disagreement with experience.

"One such case, however, was presented by the motion of the planet Mercury, which for a long time baffled astronomers. This is now completely cleared up by my formulas, as the Astronomer Royal, Sir Frank Dyson, stated at the meeting of the Royal Society.

"Another case was the deflection of rays of light when passing through the field of gravitation. No such deflections are explicable by Newton's theory of gravitation.

"According to my theory of difform motion, such deflections must take place when rays pass close to any gravitating mass, difform motion then coming into activity.

"The crucial test was supplied by the last total solar eclipse, when observations proved that the rays of fixed stars, having to pass close to the sun to reach the earth, were deflected the exact amount demanded by my formulas, confirming my idea that what so far has been regarded as the effect of gravitation is really the effect of difform motion. Elaborate apparatus and the closest and most indefatigable attention to the difficult task enabled that English expedition, composed of the most talented scientists, to reach those conclusions."

"Why is your idea termed 'the theory of relativity?'" asked the correspondent.

"The term relativity refers to time and space," Dr. Einstein replied. "According to Galileo and Newton, time and space were absolute entities, and the moving systems of the universe were dependent on this absolute time and space. On this conception was built the science of mechanics. The resulting formulas sufficed for all motions of a slow nature; it was found, however, that they would not conform to the rapid motions apparent in electrodynamics.

"This led the Dutch professor, Lorenz, and myself to develop the theory of special relativity. Briefly, it discards absolute time and space and makes them in every instance relative to moving systems. By this theory all phenomena in electrodynamics, as well as mechanics, hitherto irreducible by the old formulae—and there are multitudes—were satisfactorily explained.

"Till now it was believed that time and space existed by themselves, even if there was nothing else—no sun, no earth, no stars—while now we know that time and space are not the vessel for the universe, but could not exist at all if there were no contents, namely, no sun, earth, and other celestial bodies.

"This special relativity, forming the first part of my theory, relates to all systems moving with uniform motion; that is, moving in a straight line with equal velocity.

"Gradually I was led to the idea, seeming a very paradox in science, that it might apply equally to all moving systems, even of difform motion, and thus I developed the conception of general relativity which forms the second part of my theory.

"It was during the development of the formulas for difform motions that the incident of the man falling from the roof gave me the idea that gravitation might be explained by difform motion."

"If there is no absolute time or space, supposedly forming the vessel of the universe," the correspondent asked, "what becomes of the ether?"

"There is no ether, as hitherto conceived by science, which is proved by the well known experiment of the celebrated American savant, Michelson, showing that no influence by the motion of the earth on the ether is perceptible through change in velocity of light, such as ought to be produced if the old conception were true."

"Are you yourself absolutely convinced of the correctness of this revolutionary theory of relativity, or are there still any reservations?"

"Yes, I am," Dr. Einstein answered. "My theory is confirmed by the two crucial cases mentioned before. But there is still one test outstanding, namely, the spectroscopic. According to my theory, the lines of the spectra of fixed stars must be slightly shifted through the influence of gravitation exerted by the very stars from which they emanate. So far, however, the results of the examinations have been contradictory; but I have no doubt of final confirmation, even through this test."

Just then an old grandfather's clock in the library chimed the mid-day hour, reminding Dr. Einstein of some appointment in another part of Berlin, and old-fashioned time and space enforced their wonted absolute tyranny over him who had spoken so contemptuously of their existence, thus terminating the interview.

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