

Imprisoned Light

Physics

By EDWIN E. SLOSSON

Can you conceive of a thing moving perpetually towards a particular point with the greatest possible speed and yet never being able to reach the point because the nearer it gets the slower its approach?

Well, whether you can conceive of it or not, this is what you are expected to accept among the other curious consequences of Einstein's theory of relativity. If a mass of matter, say a stray stone or a shooting star, travelling through space, passes close to the sun, it will be pulled a bit out of its straight course and, unless it is going by too fast to be stopped, it will come around the sun in a spiral, getting closer and closer each time around until it finally falls in. Or, if it is going a little too fast to fall, it will continue to revolve forever around the sun like a miniature planet.

All this about the behavior of falling bodies has been known since the time of Newton. But Einstein first surmised, what eclipse observation subsequently proved, that a ray of light behaves in the same way. If a ray of light from a star passes close to the sun it is pulled a bit out of its straight course, and would fall into

the sun or become its satellite if the light did not travel at too high a speed, in fact at the highest possible speed. But the sun is too big and bulky to lasso a ray of light as it flies by at the rate of 186,000 miles a second. If the sun were solid, if it were as small as one of the minor planets with its present weight, it might capture light and hold it in perpetual captivity.

Now, according to modern notion, all matter is made up of atoms and each atom is constructed like the solar system but with this difference, that nearly all of the mass of the entire atom is concentrated in the central nucleus which serves as the sun of this atomic system. Here matter is intensely condensed into an almost inconceivably small sphere. If we regard it for convenience in calculations as a mere mathematical point, we shall reach the remarkable result that a ray of light headed toward it would never reach it. It would circle around the nucleus forever in an unending spiral, continually coming closer but never getting to the central point in all eternity. For, as it figures out, the nearer the light gets to the center the longer it takes to make the next to the inner circle though its velocity remains the same.

It may aid you to get a conception of this Einstein idea of space and matter if you try this simple experiment. Stretch a sheet of thin rubber like that of a toy balloon over a ring frame such as the ladies use for embroidery. The smooth, flat surface represents empty space, and a little worm making his way across it in a straight line could serve as a ray of light. Push your finger up on the underside and make a hump. This slows up the progress and diverts the direction of the travelling worm as he crawls up its slope. Such humps and hillocks stand for the particles of matter which impede and pervert the passage of light by causing curves in the surrounding space. Now stick a pin up from below, pulling up the rubber by the head like a mountain peak with sides increasing in steepness toward the top till they become perpendicular. To a worm such a mountain peak would be as high as heaven, and if he attempted to climb it he would find it harder and harder to ascend the farther up he got.

Do you get the idea? Perhaps you don't. Perhaps nobody can. But it may be true. The universe is not limited by our imagination.

Science News-Letter, October 13, 1928

Mound Yields 100 Skeletons

Anthropology

The excavation of an Indian mound located in the Oakwood Cemetery at Joliet, Illinois, has yielded 100 skeletons, in addition to various weapons, implements, and ornaments. The work was part of an archaeological survey of Illinois, under the direction of Dr. Fay-Cooper Cole of the University of Chicago, and W. M. Krogman, director in charge of field work.

An unusual feature of the exploration was the discovery of five cases in which mother and child had been buried together, the child clasped in the mother's arms in an eternal embrace. In each instance the age of the child was one year or less.

Of the 100 skeletons found, 22 were of persons under 2 years of age, 22 aged 2 to 16 years, 4 aged 16 to 60 years, and 10 over 60 years of age, while three were too fragmentary to classify. The preponderance of females among the adults was also noteworthy. There were 36 women, as

against 12 men, a ratio of 3 to 1. The only explanation of this situation may be found in the fact that apparently no personage of great importance was buried in the mound, for the funeral gifts buried with the dead were very scant.

Almost without exception the young individuals were buried in an extended position, arms to side, and legs straight out. On the other hand, the adults were all buried in a flexed position, with arms drawn up to the face or chest, and legs drawn up so that the knees were upon the abdomen or chest.

The age of the mound is probably in the neighborhood of 500 to 1000 years. It is known that as soon as the white man came into contact with the Indian the trade material of the whites became objects of value and pride to the Indian and were buried with him. No objects of European manufacture were found in

the mound, a fact which argues for the pre-historicity of the mound and its contents.

Associated with several burials of adult women were found ornaments of perforated shell serving as pendants. Around the neck of a child were found two "buttons" of shell, which had evidently been strung on a thong, as a necklace.

The presence of these ornaments, together with bone implements made of the foreleg of the deer, links this mound with the mounds and village material excavated at Channahon, some 12 miles to the west of Joliet, by George Langford of Joliet.

Mr. Krogman was assisted in the field by Robert Engberg, George Neumann, Robert Jones, Henri Denninger, Fred Eggan, all graduates of the University of Chicago, and Thorne Deuel, a graduate of Columbia University of New York.

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