PHYSICS

Fifth Dimension Is New Realm Entered by Professor Einstein

Celebrating Sixtieth Birthday, Scientist Wants New Dimension To Account for Electro-Magnetic Effects

PROF. Albert Einstein has entered the *fifth* dimension in his mathematical calculations seeking to link gravitation and electricity into one unified theory which would explain all physical happenings in one broad concept.

Thus the man who puzzled millions of people when he introduced the fourth dimension in his famous theory of relativity has gone one step further.

Announcing on his recent sixtieth birthday that he was making progress in his long-sought goal of connecting the force of gravity with the electric fields which make possible such things as light and radio waves, Prof. Einstein left undisclosed his method of attack on this toughest of all physics problems.

Securely buried in the technical literature of mathematics until now, may perhaps be found the hint of what Prof. Einstein is now doing.

In the *Annals of Mathematics* (July 1938) is a complex paper by Prof. Einstein and Peter G. Bergmann, assistant at the Institute for Advanced Study, entitled "On a Generalization of Kaluza's Theory of Electricity."

Prof. Theodor Kaluza of Göttingen University, Germany, reports Prof. Einstein's important paper, introduced the fifth dimension into conceptions relating gravitation and electricity but used this fifth dimension only as a mathematical idea without physical meaning.

Prof. Einstein's new approach ascribes a physical reality to this fifth dimension. But with this step the distinguished mathematician finds himself in a kind of space which is truly puzzling.

"There have been many attempts," reports the Einstein paper, "to retain the essential formal results obtained by Kaluza without sacrificing the four dimensional character of the physical space. This shows distinctly how vividly our physical intuition resists the introduction of the fifth dimension. But by considering and comparing all these attempts one must come to the conclusion that all these endeavors did not improve the situation. It seems impossible to formulate Kaluza's idea in a simple way without introducing the fifth dimension.

"We have, therefore, to take the fifth dimension seriously although we are not encouraged to do so by plain experience," explains Prof. Einstein.

Thus reluctantly, the distinguished mathematician states, he is entering into still more complex mathematical theories.

In his five-dimensional theory, space is closed along a vector indicating the fifth coordinate. This, he says, is the essential difference between his new work and that of Prof. Kaluza.

"By making this change," Prof. Einstein says, "the basic assumptions of the theory are considerably simplified. Furthermore it is much more satisfactory to introduce the fifth dimension not only formally, but to assign to it some physical meaning. Nevertheless there is no contradiction with the empirical four-dimensional character of physical space."

Like his previous theories, the new Einstein five-dimensional world has its own paradoxes.

For example a single point P in physical space is represented by an infinity of points in the five-dimensional space.

Ordinary space, as most people envision it, consists of the three dimensions of Euclidean space which we call height, breadth, and thickness, in speaking about an object like a box. To these Prof. Einstein linked time as a fourth dimension in his relativity theories.

The fifth dimension introduced now accounts for properties of the electromagnetic field which previously have not appeared in relativity. Instead they were accounted for by other theories not linked with gravitation.

As would be expected, the new theory is enormously complex. For example, it is necessary to introduce a special coordinate system in which space is described by 14 different functions.

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ARCHAEOLOGY

Find Sacred Kitten in Bronze Cat Coffin

A SACRED kitten in a bronze cat coffin. This unexpected discovery

CAT COFFIN

is reported by two metallurgical experts, who regard it as new light on Egypt's cat worship, 3,000 years ago.

The find was made by Dr. Colin G. Fink, Columbia University's professor of electrochemistry, and Arthur H. Kopp, late of the Metropolitan Museum of Art technical staff, while giving chemical treatment to a bronze cat suffering from what is popularly called "bronze disease." Cleaning out cemented sand filling the image, they found embedded small bones. Zoologists consulted say these are bones of a fetal cat.

"All indications trace the presence of these bones to ancient times," says a report by Prof. Fink and Mr. Kopp, in Technical Studies.

Whether Egyptians regularly put sacred cats inside hollow bronze cat images, is still to be learned. A good many bronze cat images are known, but others have been empty when found. The images are usually regarded as idols, venerated by worshippers of the cat-headed goddess Bastet, personifying the sun.

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