PHYSICS

Unified Field Theory

A way to describe electromagnetism and gravity by mathematical equations, long a goal of Einstein, is now realized. A gravitational radiation chart may now be constructed.

➤ A SINGLE theory covering the spinning of tiny atoms and the gravitation of star-filled space, the goal of Albert Einstein's life, has now been achieved.

Dr. John A. Wheeler of Princeton University reported that Dr. Charles Misner, also of Princeton, discovered a way to describe both electromagnetism and gravity by mathematical equations. They call it the "Already Unified Field Theory." Using "already" because Einstein himself had accomplished this long ago but did not realize it.

Dr. Misner found that an electromagnetic field leaves "footprints in space" sufficiently detailed so someone measuring the curvature of space can learn everything necessary about that electromagnetic field.

Important as this step is, however, two others have also been taken by Princeton scientists, Dr. Wheeler told the International Conference on the Role of Gravitation in Physics at the University of North Carolina. They are a way to describe mass starting with massless light, and charge without artificially introducing the idea of charge.

Dr. Wheeler said he expected the conference would be able to construct a chart of the gravitational radiation hitting the earth from far-away stars, weak though it is, similar to the spectrum of radiation received by the earth from radio waves to visible light to cosmic rays.

The equations by which Dr. Misner unites the electromagnetic and gravitational fields, previously treated as separate units, mention only the curvature of space. After having done this, he discovered that Dr. G. Y. Rainich of the University of Michigan had once published many of the mathematical equations Dr. Misner used.

The entity used by Dr. Wheeler to describe mass without using mass is the "geon," short for gravitational-electromagnetic entity. Large geons can be considered as lots of light in a ball held together by its own gravitational attraction, much as the earth (a ball of matter) is held together by gravity.

To describe a charge without using charge, Drs. Wheeler and Misner used such concepts as "foam-like" space and "twisting wormholes."

Dr. Wheeler suggested thinking of a wormhole with two openings. An ant with blinders accidentally walking through it would think the hole exactly the same as the ground above. In somewhat this same way, space has three-dimensional wormholes giving it a foam-like character.

The two scientists started out by considering space as completely empty of matter, just an arena in which the electromagnetic field can move. There are, then, Dr. Wheeler said, electromagnetic lines of force trapped in the curvature of space, and their number does not change.

They believe the gravitational field has a quantized character just as light does.

What the Princeton scientists are doing is to reinterpret what is already known, using Einstein's relativity theory as a tool to understanding rather than trying to invent new ideas.

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MEDICINE

Worry Needs to be Treated, Doctors Say

➤ TREATING the emotional aspects of heart disease, infertility, arthritis, and other diseases may heal the sick when medicine cannot, reported specialists in internal medicine to a regional post-graduate medical clinic at the New England Medical Center in Boston.

In arthritic cases, smaller amounts of hormone drugs were needed when combined with tranquilizers to relieve anxiety, Dr. Peter J. Warter of Hahneman Hospital, Philadelphia, reported. Patients who get the combined drug treatment enjoy better sleep, acquire an improved attitude toward their disease, and require a smaller amount of the arthritic drug than they needed before, he said.

In heart disease it is vital to reassure the patient of a normal life expectancy, Dr. Louis A. Selverstone, New England Center Hospital, said. In many of these patients the worry and fear about what they have may be more damaging than the disease itself.

Other fields where emotions play a large role are in gynecology and respiratory diseases, the specialists reported.

Infertility and menstrual disorders may be caused by emotional problems, Dr. Joseph Rogers, New England Center Hospital, said.

Most of the symptoms of menopause are related to anxieties and depressions and are not entirely due to hormonal changes, he said.

Anxiety and fear can also trigger off asthma and other common respiratory ailments, Dr. Robert P. McCombs, Pratt Diagnostic Clinic at the New England Center Hospital, reported.

These emotions can cause shortness of breath, palpitation, and other chest discomforts. This type of over-breathing reduces the oxygen supply to the brain and causes "mental blackouts" and fainting or dizzy spells, he added.

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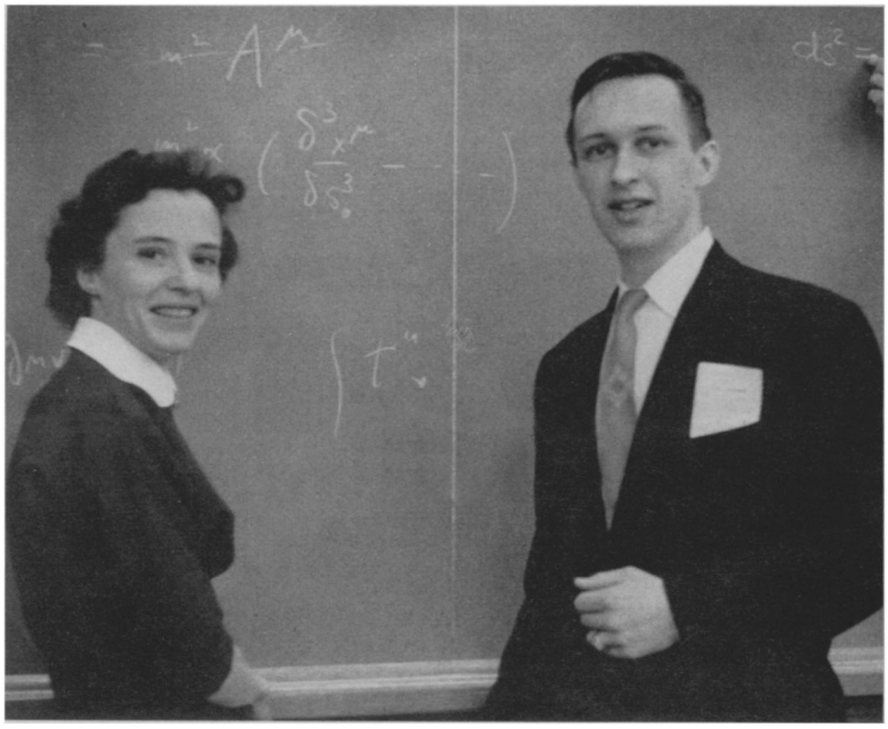

AT GRAVITATION CONFERENCE—Dr. Charles Misner of Princeton University, who has worked out a way to describe electromagnetism and gravity by mathematical equations, is photographed chatting with a French physicist, Mme. Yvonne Foures of Marseilles.