$$g_{ik;s} \underset{+-}{=} 0, \qquad T_i = 0$$

$$R_{ik} \underset{-}{=} 0, \qquad R_{ik,l} + R_{kl,i} + R_{li,k} = 0$$

EINSTEIN'S LATEST EQUATIONS — The most recent revision of Einstein's concepts about the universe are shown above. The equations reconcile, he believes, previous conflicts in his goal of a unified theory.

PHYSICS

Einstein Revises Theory

After three years of study, Einstein has issued an up-to-date version of his equations aimed at completely describing the physical universe in a single theory.

➤ PROF. ALBERT EINSTEIN has revised his generalized theory of gravitation. This may be a major step forward toward the goal of complete description of the physical universe—gravitational, electrical and nuclear forces—by a single theory.

His improved theory is based on a new method which compares the "strength" of different systems of equations. In the earlier version of his theory, published in 1950, a choice of several sets of equations was possible. Now the method which allows choosing a particular set of equations is set forth.

Einstein's earlier doubts concerning the choice of field equations have been dispelled by his new method, although mathematical difficulties have so far prevented checking the theory against known experimental facts.

"Nevertheless, I consider it unjustified to assert, a priori, without examination," Einstein asserts, "that such a theory is unable to arrive at the atomistic character of energy."

The new development takes a large stride toward one of the great aims of theoretical physics, to find a single theory that will describe both gravitation and electromagnetism. It is presented as an appendix to the fourth edition of Einstein's book, "The Meaning of Relativity," published by Princeton University Press. (See p. 236.)

Einstein shows how an "approximation" of his generalized gravitation equations leads to two other sets of equations, one of which is a generalization of Maxwell's famous electromagnetic equations.

This, Einstein states, "makes it understandable why the electromagnetic and gravitational fields seemed so independent of one another in the previous development of our knowledge about the behavior of weak fields. In the more rigorous theory this independence no longer holds."

The new theory runs directly against the main current of modern physical thought. It is a "field theory" rather than a "particle theory" such as is favored by most other physicists.

In a discussion of modern physics, Einstein expresses his belief that attempts "to give a complete description of the real situation with the formalism of the present quantum (particle) theory" must fail.

He explains he has gone to so much trouble to arrive at this result because the contemporary physicist is "convinced, as a result of the successes of the probability-based quantum mechanics, that one must abandon the goal of complete descriptions of real situations in a physical theory."

Einstein, however, sees "in the present situation no possible way other than a pure field theory, which then, however, has before it the gigantic task of deriving the atomic character of energy."

It was in 1905 that Einstein suggested that the laws of physics as we observe them may be in no way dependent upon how fast we are moving through space. He proposed that it is only how fast an object is moving relative to us that can affect the way things on this object appear to act.

Scientists found that changes in the properties of objects moving at high speeds could be accounted for by this theory. This theory also stated the equivalence of mass and energy, $E=mc^2$, basic to the atom bomb.

The idea of developing a generalized field theory has been a major goal of physicists since about 1920. A vast store of knowledge has been gained from experiments, but no single theory has previously been able to explain and describe it all.

The world will have to wait to see if the new theory will influence the next half of the century as profoundly as Einstein's theory of relativity did the first half.

Einstein, now at the Institute for Advanced Study in Princeton, was awarded the Nobel Prize for Physics in 1921.

Science News Letter, April 11, 1953

MEDICINE

Cancer Immunity in Siamese Twin Mice

➤ IMMUNITY TO transplanted cancer has been given to mice in experiments by Drs. Arthur Kirschbaum and Nancy Falls of the University of Illinois College of Medicine, Chicago, the American Cancer Society has announced.

The experiments do "not indicate that humans cured of cancer develop immunity to that type of cancer," the society states.

In the experiments a fatal cancer of lymphatic tissue was transplanted to susceptible mice. Then it was destroyed by X-rays. The treated mice were joined surgically to other, susceptible mice, making them into synthetic Siamese twins.

The cancer was then transplanted to the susceptible twin. Both twins were then able to destroy the cancer. This showed that the immunity produced by one animal could be transferred by continuous cross-blood transfusion to the other.

The immunity was strong for 30 days, present up to 120 days and could be transferred up to 120 days.

Science News Letter, April 11, 1953

NUTRITION

Cathode Rays Preserve Hamburgers for 60 Days

➤ OLD SALTS can feast on good hamburgers even after 60 days at sea on a ship without a deep freeze. A one-second cathode ray treatment of the hamburgers before sailing will preserve them for 60 days in a refrigerator instead of the usual six.

Fresh spinach and pink (nearly ripened) tomatoes can be preserved by the same method worked out by Massachusetts Institute of Technology scientists for the U. S. Navy. Off-flavors and off-odors caused by irradiation have been eliminated as well as danger of spoilage.

For the future, sterilization of the food so it will keep at room temperature, without refrigeration, is seen possible.

Science News Letter, April 11, 1953

GENERAL SCIENCE

Scientists Honor Dripolator Inventor

➤ MORE THAN 15 leading scientists gathered in Boston for the bicentennial of the birth of the inventor of the coffee dripolator and the kitchen range.

This pioneer in technical revolution, also known for his studies on heat as motion of matter particles, is Benjamin Thompson, Count Rumford of the Holy Roman Empire, although American born.

Those who have received Rumford medals during the past 35 years attended the celebration of the American Academy of Arts and Sciences in Boston.

Science News Letter, April 11, 1953

Science Service, Inc. is collaborating with JSTOR to digitize, preserve, and extend access to *The Science News-Letter.* www.jstor.org