

PHYSICS

# Professor Albert Einstein Announces a New Theory

## Seeks to Weld Relativity and Quantum Theories Into Single, More Powerful Tool for Scientific Research

**P**ROF. Albert Einstein, Nobel prize winning scientist of the Institute for Advanced Study, has just announced a new theory which should profoundly affect the whole structure of physical science.

Continuing his world-recognized role as scientific "coordinator," Prof. Einstein offers the first mathematical "signposts" which may point the way to a welding of his own famous relativity theory and the new quantum theory into a single, more powerful tool for science.

Both relativity theory and quantum theory have been of such fundamental importance that the men who devised them have won the highest award in science—the Nobel prize.

Here are the outstanding, startling concepts in Prof. Einstein's new and yet-unnamed theory:

1. Space is pictured as two sheets.
2. Particles in space are envisioned as "bridges" linking the two sheets.
3. The most elementary particle in nature is one without gravitating mass, i. e., without weight.
4. Electricity and mass are not related but appear as independent constants in the equations.

In a report to the *Physical Review*, (July) official publication of the American Physical Society, Prof. Einstein, with Dr. N. Rosen, as collaborator, describes how his own general relativity theory accounts for the large-scale happenings of nature but fails when attempting to explain the atomic structure of matter.

### Both Theories Incomplete

At the same time, he adds, quantum theory, while highly successful in describing the interactions of atoms and their still smaller parts, fails to explain phenomena in the field of relativity.

At present, depending on the job at hand, science chooses either one or the other theory as a "tool." In analogy science is now working like a carpenter who uses a saw to cut wood and a hammer to drive nails.

Prof. Einstein, in trying to combine

the two theories, would like to have science (as a carpenter) have one tool which both cuts wood and drives nails.

Sufficiently complex in its mathematical details to tax the ingenuity of the legendary twelve men who were originally said to understand Einstein, the new theory of the distinguished professor pictures space as represented by two sheets. The presence of an elementary particle without electrical charge in this space is represented as a "bridge" connecting the two sheets.

### Aids Understanding

With the help of this "sheet-space and bridge" picture, "one is able to understand the atomistic character of matter as well as the fact that there can be no particle of negative mass," Prof. Einstein reports.

An important and unusual outcome of the new theory is that the "most

natural electrical particle in the theory is one without gravitating mass," to use Prof. Einstein's own words.

A particle without gravitating mass would be one which weighs nothing. This state of zero mass is represented by one "bridge" between the two sheets of space. (Turn to Page 20)

ENGINEERING

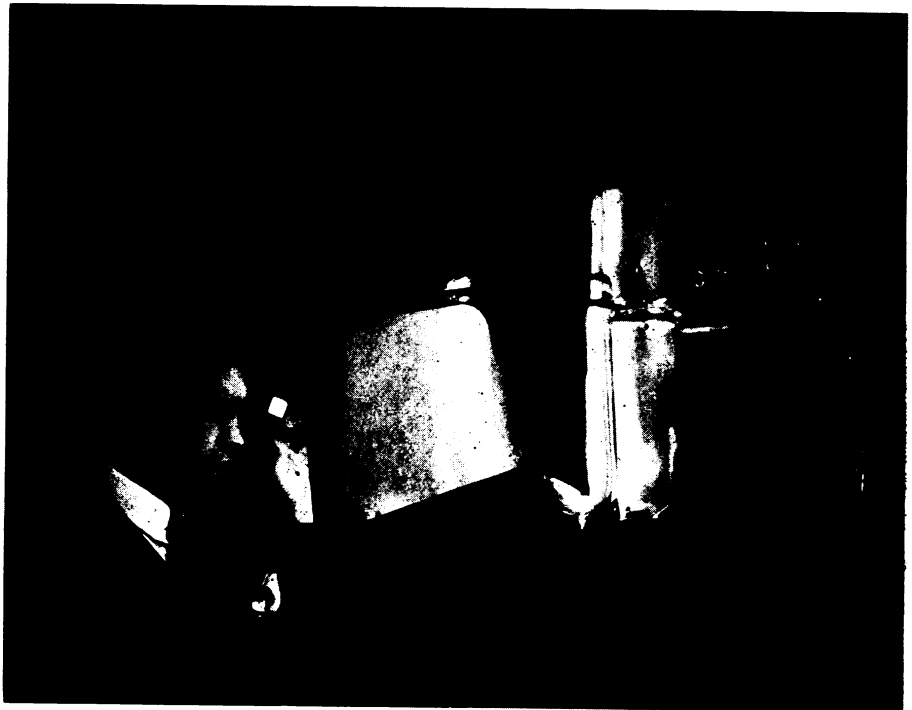
## New "Butterfly" Lamp Reflectors Stop Glare

**T**HE annoying gleam of street lights which enters the bedroom windows of city dwellers and interferes with their sleep should be a thing of the past if the new type of "Butterfly" reflectors invented by engineers of the Westinghouse Electric and Manufacturing Company are generally adopted.

Designed of polished aluminum in a shape resembling a great metallic butterfly, the new type reflector is being used in connection with sodium lighting for highways.

Because of the special shape, all the light is reflected downward and none laterally to bother sleepers along the roadside. Moreover, the reflectors are an aid to motorists because road glare from the overhead lamps is greatly reduced.

*Science News Letter, July 13, 1935*



### "BUTTERFLY LIGHTS"

*Samuel G. Hibben, Westinghouse lighting expert, is checking the wavelength of light from a sodium vapor lamp as it operates in one of the new "Butterfly" fixtures which throws the light downward, preventing glare in windows and motorists' eyes.*

An electron or proton, according to the theory, would be a "two-bridge" problem.

Still another conclusion reached by the new theory is that the mass of a particle like an electron is not related to its electric charge. The charge ( $e$ ) and the mass ( $m$ ) are independent constants of integration, to use the mathematician's term.

In his analysis of his own new theory, Prof. Einstein gives as points in its favor:

1. It explains the atomistic character of matter.
2. It explains the circumstance that no neutral particles of negative mass exist.
3. It uses no other variables in the equations than those of the gravitational field and the electromagnetic field.

"On the other hand," Prof. Einstein concludes, "one cannot see *a priori* whether the theory contains the quantum phenomena. Nevertheless one should not exclude *a priori* the possibility that the theory may contain them."

Which, in effect, means:

While the new theory does not, at present, explain atomic happenings as does quantum theory, one should not jump at the conclusion that there is no possibility that it may do so.

One can be sure that Prof. Einstein and Dr. Rosen are hard at work right now trying to make the "possibility" much nearer a certainty.

#### The Authors' Words

The following is the description of the new theory in the words of Prof. Einstein and Dr. Rosen:

"The writers investigate the possibility of an atomistic theory of matter and electricity which, while excluding singularities of the field, makes use of no other variables than the gravitational field variable of the general relativity theory and the electromagnetic field variable of the Maxwell theory. By the consideration of a simple example they are led to modify slightly the gravitational equations which then admit regular solutions for the static spherically symmetric case. These solutions involve the mathematical representation of physical space by a space of two identical sheets, a particle being represented by a "bridge" connecting these sheets. One is able to understand why no neutral particles of negative mass are to be found. The combined system of gravitational and electromagnetic equations are treated similarly and lead to a similar interpretation. The most natural elementary charged particle is found to

be one of zero mass. The many-particle system is expected to be represented by a regular solution of the field equations corresponding to a space of two identical sheets joined by many bridges. In this case, because of the absence of

singularities, the field equations determine both the field and the motion of the particles. The many-particle problem, which would decide the value of the theory, has not yet been treated."

*Science News Letter, July 13, 1935*

#### GENERAL SCIENCE

## Bill Provides \$1,000,000 For Research in Agriculture

**S**CIENTIFIC research that will benefit future generations, as well as the present, is contemplated by a bill introduced in the House by Rep. Marvin Jones, of Texas. The measure has passed both House and Senate.

According to the terms of the bill, the Secretary of Agriculture "is authorized and directed to conduct research into laws and principles underlying basic problems of agriculture in its broadest aspects," and also to carry on investigations looking to improvements in handling and marketing, as well as "research relating to the conservation, development of land and water resources for agricultural purposes."

The research thus contemplated is to supplement, not to replace, other researches now going on under the aegis of the Department of Agriculture; but both activities are to be coordinated so far as practicable, and "shall be conducted by such agencies of the Department of Agriculture as the Secretary may designate or establish."

The initial funds for this work will

amount to \$1,000,000. This sum will be increased by an additional \$1,000,000 each year until the total reaches \$5,000,000, and thereafter the special research fund will be maintained at the latter sum each year. Forty per cent. of the total in any year is to be expended under the direct supervision of the Secretary of Agriculture, in any places and for any research purposes he may approve within the frame of the act. The remaining sixty per cent. will be prorated among state agricultural experiment stations according to the size of their respective rural populations. Funds thus allocated must be matched dollar for dollar by the states receiving them.

The establishment of new laboratories is within the authorizations of the act, since it is provided that funds may be used for the erection of buildings and the purchase or rental of land needed for the purpose. These laboratories might be set up in the major agricultural regions of the United States, in places designated by the Secretary of Agriculture.

*Science News Letter, July 13, 1935*

#### AVIATION

## England Develops High-Speed Radio Operated Robot Plane

**PILOTLESS**, full-sized and radio-controlled airplanes capable of exceeding 100 miles an hour and reaching altitudes as high as 10,000 feet have been developed for anti-aircraft target practice by the Air Ministry in London.

The robot planes have the flight characteristics of the familiar Tiger and Moth types. Equipped with 130 horsepower motors, they can take off either from an airport or by catapult from an airplane carrier at sea.

In flight the planes sweep in great circles, with a maximum radius of ten miles, at all times under radio control from staff officers on the ground.

The search for better types of anti-aircraft targets has long been a pressing problem among the great powers of the world. The U.S.S.R., with its current emphasis on gliders and parachute jumping, has been reported by its news agency Tass to have developed a system whereby a train of gliders are towed