

# New Picture of Universe Painted

*General Science*

## National Academy Awards Honors at Annual Meeting

A NEW picture of the universe, more modern than those painted by de Sitter and Einstein, was exhibited in the form of mathematical symbols in a report to the National Academy of Sciences by Dr. Richard C. Tolman of the California Institute of Technology, Pasadena.

Dr. Tolman bases his new explanation of the universe on today's idea of the way matter and radiation are distributed in space and time. This leads to an explanation of the mysterious shift of light toward the red that is observed by astronomers in the light from distant nebulae. These great light patches of the sky are now thought to be other universes of stars at great distances from our own Milky Way galaxy in which the sun is a minor star. One such nebula is rushing away from the earth at the rate of 7,200 miles per second if, as some scientists have previously thought, the red shift of the light is due to appalling differences of speed.

Although built on the theory of relativity, Dr. Tolman's idea of the universe differs from that of Einstein in such a way as to conform to the contemporary opinion of astrophysicists that the universe is actually filled with matter changing into radiation. Einstein assumed a static universe permanently filled with a constant distribution of matter. De Sitter's universe was permanently empty. Dr. Tolman's universe is non-static and in it matter is dissipating on the average as astronomers find that it must dissipate in order to account for the luminosity of early type stars that are more vigorously radiating than our sun.

If Dr. Tolman's conception of the way the universe is put together and operating receives further support from later theory and observations, he will have explained a modern scientific puzzle, the reddening of light from the far reaches of the universe. His conceptions also promise to reopen the question of whether the universe is running down or whether the conversion of matter into radiation progressing in the stars is compensated by a rebirth of matter elsewhere in the universe.

*Science News-Letter, May 10, 1930*

RECOGNITION for notable scientific accomplishment was accorded by the National Academy of Sciences at its closing session, through the award of medals to five prominent American and foreign scientists, and the election of fifteen men to membership.

One of the medal awards, the Public Welfare Medal, was given posthumously to the late Stephen T. Mather, organizer of the U. S. National Park Service and its director through the first years of its work. Since Mr. Mather died a short time ago, the Home Secretary of the Academy, Dr. David White of the U. S. Geological Survey, was instructed to present the medal to his legal representatives.

Ernest Thompson Seton, noted naturalist, received the Daniel Giraud Elliot medal and honorarium, which is given for the most meritorious work in zoology or paleontology published each year. Dr. Seton's book, "Lives of Game Animals," was selected as worthy of the prize for 1928. The award of the same medal for 1927 was given to Dr. Erik A. S. Stensio of the Royal State Museum of Natural History of Stockholm, for his work: "The Downtonian and Devonian Vertebrates of Spitzbergen. Part I: Family Cephalaspidae".

The Agassiz Medal for Oceanography was given to Dr. Johannes Schmidt, director of the physiological department of the Carlsberg Laboratory at Copenhagen. Dr. Schmidt some years ago attracted wide attention in the scientific world by his painstaking and brilliant work in solving the age-old riddle of where eels go to breed.

The Mary Clark Thompson Medal, for the most important services to geology and paleontology, was awarded to Prof. William Berryman Scott for distinguished work in paleontological research.

Dr. R. A. Millikan of the California Institute of Technology was re-elected foreign secretary of the Academy for a term of four years. Dr. K. T. Compton of Princeton University was elected member of the governing council, to succeed Dr. George E. Hale, retired. Dr. J. McKeen Cattell, publisher of Science, was re-elected to succeed himself.

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SECRET hiding places of "dud" airplane bombs which had buried themselves deep in the earth when dropped from thousands of feet above Langley Field, Va., have been located by telephone.

For years army aviators have been conducting bombing practice on an area, a part of which was recently picked for a seaplane towing channel, said Dr. Theodore Theodorsen, of the National Advisory Committee for Aeronautics. There are always a few bombs, called "duds," which for some unknown reason do not explode. These buried themselves several feet in the ground.

If jarred and scraped by steam shovels excavating for the channel, they would undoubtedly explode doing great damage. How to locate them was a problem. They had been buried so long that no visible traces of holes were left on the surface.

"The National Advisory Committee for Aeronautics made a careful investigation of the situation and requested information from all organizations which it was believed might be able to render assistance," Dr. Theodorsen explained. "None of the proposed methods proved to be satisfactory and all had to be abandoned."

Profiting by the failure of these suggestions, Dr. Theodorsen designed an apparatus consisting of a pair of headphones and three large coils of wire mounted on a cylindrical wooden frame. Power comes from a little high frequency generator in a nearby truck. When in use, the frame is carried by two men over the ground being tested while the operator stands off to the side with the phones on and "listens for the bombs."

The center coil, supplied with power from the generator, sends a uniform pattern of magnetic lines of force through the other two coils and into the ground as deep as the coil is wide. While this power coil is passing over undisturbed soil its lines of magnetism link the other two coils uniformly, which then exactly balance each other and cause no hum in the phones. But as soon as it passes over a bomb, whose steel distorts the magnetism, the imaginary lines are concentrated around the lower coil and the two coils become unbalanced and produce a distinct hum in the phones.

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