

PHYSICS

Need All-Pervading Ether

Nobelist Dirac concludes that "with the new theory of electrodynamics we are rather forced to have an ether." Idea was abandoned after Einstein's relativity in 1905.

► WE MUST have an ether, after all.

The idea of a universal and all-pervading fluid was abandoned shortly after Einstein's discovery in 1905 of the principle of relativity, into which an ether could not be fitted.

Now a Nobelist in physics who has done much to build the theoretical world of physics as we know it, Dr. P. A. M. Dirac of St. John's College, Cambridge University, England, as the result of his new theory of electrodynamics, concludes that "with the new theory of electrodynamics we are rather forced to have an ether." The new Dirac electrodynamics theory has not yet been published but the Royal Society has it in press.

This rejuvenation of the ether is sure to stir great interest. The theory is set forth in a letter to the British journal, *NATURE* (Nov. 24).

Dr. Dirac has applied quantum mechanics, the mathematical concept of physics that won for him the 1933 Noble prize, to the ether.

In the last century the ether seemed necessary to explain how light and electromagnetic radiation operated. It was supposed to be in perfect vacuum everywhere. The ether at each point in empty space was

supposed to have a velocity less than that of light and the directional effect should have been detected by experiment. Relativity contradicted this, since all directions were required to be equivalent.

Now Dr. Dirac explains that the velocity of the ether, like other physical variables in the new physics, is subject to uncertainty relations. It is possible to set up what is called a wave function which makes all values for the velocity of the ether equally probable. This could represent the perfect vacuum that would fit into relativity.

"We may very well have an ether, subject to quantum mechanics and conforming to relativity, provided we are willing to consider the perfect vacuum as an idealized state, not attainable in practice," Dr. Dirac declares. "From the experimental point of view, there does not seem to be any objection to this. We must make some profound alterations in our theoretical ideas of the vacuum. It is no longer a trivial state, but needs elaborate mathematics for its description."

Dr. Dirac's new electrodynamics theory derives a velocity with which any electric charge must flow. In regions where there is no charge it is the velocity with which

a small charge would have to flow if it were introduced.

This velocity which is the same at all points in space-time plays a fundamental part in electrodynamics, that is, almost the whole physical world around us. Since it is natural to consider this the velocity of some physical thing, the ether, long abandoned, is now reborn.

Science News Letter, December 1, 1951

MEDICINE

Medicine to Double In Next Ten Years

► TWICE AS much medicine will be swallowed in the next 10 years as in the past 10, it appears from a prediction by Harry J. Loynd, president of Parke, Davis and Company, pharmaceutical firm in Detroit.

New products have been largely responsible for the growth of the pharmaceutical industry which doubled its sales in the past 10 years, Mr. Loynd stated.

Results of present and future research on life-saving, health-preserving medicines will double the amount of sales again in the next decade, Mr. Loynd predicts.

Science News Letter, December 1, 1951

PHYSIOLOGY

Device Ends Pilot's Oxygen Lack Worries

► A DEVICE to end a pilot's worries about lack of oxygen has been developed by Dr. Kurt Kramer, physiologist at the U. S. Air Force School of Aviation Medicine, Randolph Field, San Antonio, Tex.

The pilot wears a tiny, earring-like device attached to either ear. Using the tiny button, connected by wire to the plane's instrument panel, he will be warned promptly when his oxygen supply is leaking or if his hose has become disconnected.

Operating on an electric eye principle, the warning device uses the ear lobe as a light filter. It is activated by the slightest change in the oxygen content of the blood, since blood lacking in oxygen changes to dark red. Ordinarily it is difficult or impossible to detect such an oxygen lack.

The photoelectric eye detects the blood's color change and instantly a red light flashes brightly on the instrument panel, warning the pilot of impending danger and of the possibility of passing out.

Dr. Kramer's invention may also prove useful outside the field of aviation. A doctor could thus control the amount of oxygen given to patients, the warning red flash telling him that artificial respiration is necessary. It may even be a boon for those suffering from respiratory paralysis, particularly polio, the German-born doctor states.

Science News Letter, December 1, 1951



OXYGEN-LACK WARNER—When this earring-like device, known as a photoelectric hypoxia warner, is attached to a pilot's ear and connected to the instrument panel via his helmet, he will be warned by a red flashing light if not enough oxygen is coming through his mask.