

PHYSICS

"Fingerprinted" Light Gives Clue to Upper Atmosphere

Searchlights Shooting Beams, Interrupted at Given Frequency, Used to Explore Regions 20 to 50 Miles Up

A NEW method of discovering what exists in the unexplored upper air beyond the reach of balloons, some 20 to 50 miles above the earth, has been developed by three Washington physicists connected with the Carnegie Institution's Department of Terrestrial Magnetism and the U. S. Department of Agriculture's Bureau of Chemistry and Soils.

Searchlights will be used to shoot light into the night sky, light that is "fingerprinted" by being interrupted at a given frequency using a "light-chopper" so that when it is scattered by the upper air and picked up by large mirrors it can be recognized by tuning the observing instruments.

From what happens to the light in the upper air's greatest unknown region

will come the answer to some questions that science is eagerly asking.

How the thinning air's density varies with height some thirty miles above the stratosphere, in the region known as the "ozonosphere" and the "altotroposphere," will become known. This is important basic information now lacking.

The research team that has taken the first steps toward conquest of the region between where the stratosphere leaves off and the aurora begins to be born, consists of Dr. M. A. Tuve and Dr. E. A. Johnson of the Carnegie Institution of Washington and Dr. Oliver R. Wulf of the U. S. Department of Agriculture. They gave the first hint of their researches in a short letter published in the current issue of the *Physical Review*.

So far tests have been confined to an artificial light in the laboratory but field tests are being organized, probably with the aid of large Army-type searchlights of great brilliance. Just one large searchlight is expected to furnish enough light for the experiment, thanks to the device of using "chopped" light.

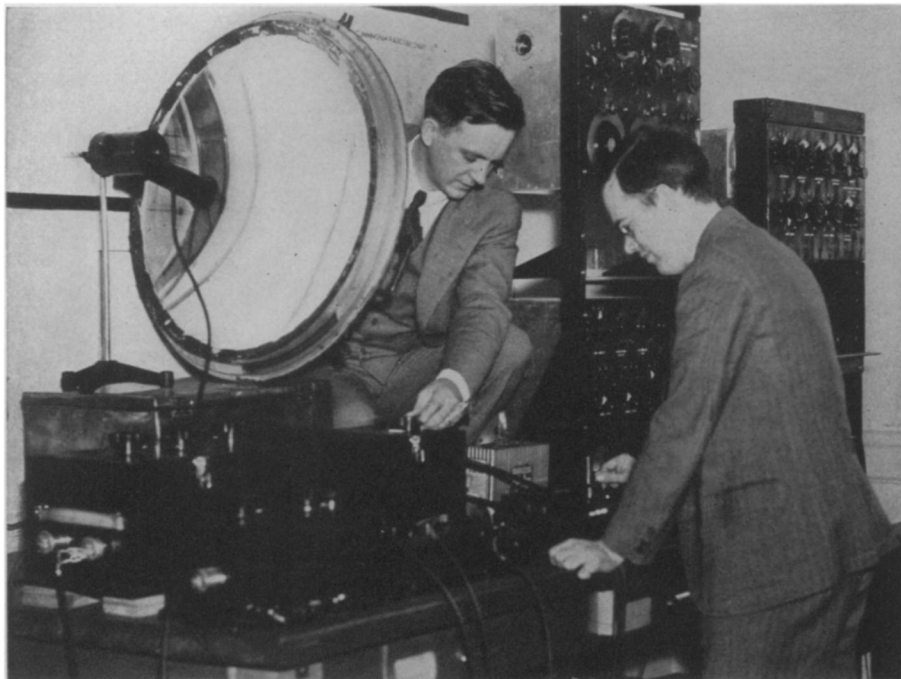
Once the delicate instruments are put into use analyzing the scattered "fingerprinted" light gathered by the mirror, the scientists expect to solve other numerous problems, connected with water vapor, turbulence, winds and dust, as well as the chemical state of the rarefied atmosphere that allows it to shine with fluorescent light at times.

Too High for Man

In no other way can science adequately probe the region 20 to 50 miles above the earth. Man-carrying balloons' "highest up" is the 14 miles of the recent stratosphere flight. Unmanned balloons can reach only about 20 miles altitude, the top of the stratosphere. At about 60 miles above the earth there is found the base of the auroral displays and the first of the ionized or electrical layers that reflect radio waves. The region between stratosphere and the altostratosphere, which begins at about 60 miles, can be probed with no means so far suggested except the modulated Tuve-Johnson-Wulf light.

Using light as a probe was originally suggested about five years ago by an English scientist, Dr. E. H. Synge, who wanted the Army and Navy to assemble several hundred searchlights and shine them on one place in the upper air. The tests made by the Washington scientists, however, indicate that by using "fingerprinted" light even better information should be obtained with a single searchlight aimed at the sky.

Science News Letter, December 14, 1935



TO EXPLORE BEYOND STRATOSPHERE WITH LIGHT

Dr. M. A. Tuve, left, and Dr. E. A. Johnson setting up light and electrical apparatus that will be used to detect searchlight illumination scattered from 20 to 50 miles high above the earth. By use of "fingerprinted" light, these Carnegie Institution of Washington scientists, with the help of Dr. Oliver R. Wulf of U. S. Department of Agriculture, expect to discover just what exists in the unexplored region of the upper air. The large mirror will gather up the light from the sky.

PHYSIOLOGY

Stuttering Stopped By Walking on All Fours

WALKING on all fours as a remedy for stuttering sounds like a fantastic, Alice-in-Wonderland dream. But it actually worked in the case of stutterers studied at the University of Michigan laboratory of biophysics, Hazle Geniesse reports. (*Science*, Nov. 29)

Miss Geniesse does not suggest that stutterers immediately drop on all fours when they want to speak. But she believes the studies indicate a new approach to the problem and suggest new methods of treating the condition.

"A marked improvement, even to