PHYSICS

Radio Waves Absorbed

Water and oxygen in the atmosphere absorb very short radio waves and the propagation of radar signals is affected as a result.

➤ VERY SHORT radio waves are absorbed in the atmosphere by water vapor or oxygen and the propagation of radar signals is affected as a result.

This war discovery, made at the Radiation Laboratory of the Massachusetts Institute of Technology, was announced to the American Physical Society at its first postwar radar meeting in Cambridge, Mass.

Molecules of water in the atmosphere and the oxygen in the atmosphere both absorb and radiate what might be thought of as spectral lines in the microwave region. Light that we see and the invisible light that can be photographed is all caused by the way in which the atoms themselves vibrate or resonate.

The bright yellow line of sodium vapor in the lamps that are sometimes used to light highways is a good example of the kind of light that is given out by atomic resonance of one kind of atom, that of sodium. The water vapor and the oxygen molecules in a very similar way absorb and emit certain wavelengths of radiation in the range of the very short radio waves.

This is not too surprising since light, whether infra-red, visible, ultraviolet or X-rays, is the same kind of radiation as the radio waves except that they are much shorter in wavelength, that is, higher in frequency.

In the case of water and oxygen molecules, they are whirling around and they are made to whirl faster when the radio waves are being absorbed. This is what is called resonance. The amount of energy involved is very small indeed.

Water vapor molecules absorb a wavelength of one and a quarter centimeters, while the oxygen molecules absorb a wavelength of half a centimeter. These waves are mere fractions of an inch and much, much shorter than the waves used in ordinary broadcasts. These studies are important in radio transmission because the water and the oxygen in the air do absorb a considerable amount of the energy, and that affects the transmission.

Among the physicists presenting papers on these researches were Dr. L. A. DuBridge, of the University of Rochester and during the war director of the Radiation Laboratory, Dr. J. H. Van Vleck of Harvard, Dr. Robert Beringer, now of Yale, Dr. R. L. Kyhl, of the Radiation Laboratory, Dr. R. H. Dicke, now of Princeton, and Drs. Stanley H. Autler, Gordon E. Becker and J. M. B. Kellogg of Columbia University's Radiation Laboratory.

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AERONAUTICS

Flying Wing Bomber Looks Like Giant Boomerang

➤ THE NEW GIANT Flying Wing bomber and cargo plane, that looks like a gigantic boomerang, is ready to fly. It is all wings; no tail and no familiar fish-shaped body.

Two broad wings, joined at their bases, form a widespread V. Four pusher propellers are within the angle of the wings. A few "bubbles" on the upper surface house defensive armament in the bomber version.

The nose of the plane is the front junction of the wings. The four engines are carried toward the rear of the wings in submerged housings which do not protrude from the surface. Crew and cargo are carried within the broad thick wings themselves.

The Flying Wing is the nearest approach to an airplane consisting only of a pure supporting surface. Almost every portion of it contributes to lift in return for the drag it causes. Lift, the raising force on the wings of an airplane, enables it to fly, and the more lift it has, the better able it is to carry loads. The aim of aircraft designers has always been to obtain more lift and less drag. In the conventional plane only the wings contribute to lift; the fuselage, tail, and all other extraneous parts create drag.

This new plane, the successor of several experimental models, will be known as the Northrop Flying Wing or the Army XB-35. It was built by Northrop Aircraft, Inc., for the Army as a giant bomber. However, it can be easily converted into a cargo ship, and some day may become a familiar commercial cargo-carrier.

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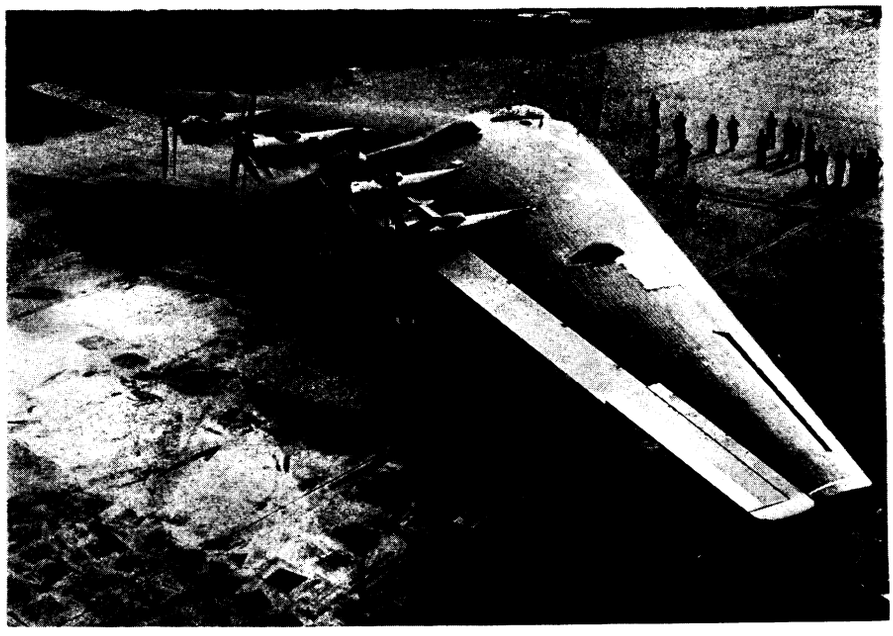

ALL WINGS—Four eight-bladed co-axial propellers, driven by four Pratt and Whitney Wasp Major engines, are expected to push this Northrop Flying Wing XB-35 long-range bomber along at high speed. Wing tip nearest the camera shows one of the wing slots which aid the Flying Wing's efficiency at slow speeds. At high speeds, where the slots are not needed, automatic doors close over them, "streamlining" the smooth surface.