better than radar for locating the enemy. A radar-hunting operator could locate an enemy radar station long before the radar could locate him.

During the latter part of the war, United States planes and surface vessels often knew by use of these direction-finding receivers when they were being hunted by enemy radar, and they often detected and pounced on the hunters before the enemy radar discovered them. German submarines, they said, eventually stopped using radar to avoid detection by these receivers.

Science News Letter, December 8, 1945

ELECTRONICS

Anti-Radar Station

Powerful land-based jammer in England blinded German planes following English bombers homeward. Key of device is American special vacuum tube.

➤ IN ADDITION to aluminum foil and air-borne electronic devices to blind or jam enemy radar searching for Allied air and surface warcraft, there was also the ingenious land-base radar countermeasure device known as "Tuba." Information concerning it has been released by the Joint Board on Scientific Information Policy for the Office of Scientific Research and Development and the War and Navy departments.

Tuba was a tremendously powerful jamming transmitter developed for use against German night fighters. In 1942 the Germans were taking a heavy toll of British night bombers, using an airborne interception radar known as "Lichtenstein" for close-range location of their targets.

Against them, the report states, the British found it impractical to use jammers carried in their bombers, because the jammer itself provided a signal which German fighters could use to locate the bomber. A radio signal, including a jamming one, betrays the direction from which it comes, and even though a jammer might blot out a German scope, making it impossible to find the range, the German could find the bomber simply by following the signal.

To meet this problem the idea was conceived of developing a very highpowered jammer in England to blind the German fighters' radar as they flew toward it in pursuit of the homeward-bound bombers. A jammer of this sort obviously would require power a thousand times greater than any previously attained in the frequency range of operations involved, which in itself was 10 times higher than that used for frequency modulation and television.

The problem was solved by the development of a very remarkable vacuum tube developed in the United States, known as the "resnatron." It was necessary to build a resnatron that would be tunable over a wide frequency range because the Germans could change the frequency of their radars by slight modifications. Also it was necessary to find a way to modulate the resnatron's output with the random "noise" necessary for jamming. Both objectives were accomplished, and by January, 1944, a workable instrument had passed its tests.

By June, 1944, the complete jamming system was in operation against the enemy. Its power was comparable with the most powerful United States broadcasting station (50,000 watts), yet the frequency of operation was 500 times as high.

Science News Letter, December 8, 1945

AERONAUTICS

Transoceanic Flying Failures Greatly Reduced

➤ TRANSOCEANIC flying has now advanced to the point where commercial operations may be conducted with flight failures approaching zero, declared Frank R. Canney of Boeing Aircraft Company at the national air transport engineering meeting of the Society of Automotive Engineers in Chicago. He estimated the probable frequency of emergency landings, or "ditchings," on the New York-London flight currently as about one in 16,576 flights.

Mr. Canney cited wartime flying records to prove his point. He reported that total AAF B-29 operations during the war, including combat flying, resulted in only one "ditching" for each 750,000 miles flown.

Increased cruising speeds, improved engine performance, and the operating policy of adopting alternate flight plans whenever trouble begins to develop, make the chances of emergency landings low, he said. Transoceanic flying safety is enhanced, he continued, by use of weatherproofed aircraft equipped with pressured cabins, four supercharged engines, and radio communication.

Flying altitudes of 15,000 to 35,000 feet, he added, enable planes to take advantage of the most favorable winds. Flying speeds of 200 to 400 miles an hour make crossings so brief as to minimize chances of mechanical failures. Engineering requirements for overwater flying differ little, Mr. Canney stated, from those of overland routes.

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