throughout the country. Radio links may be used, perhaps entirely, perhaps in conjunction with coaxial trunk lines.

The General Electric Co., early in 1940, began to use such a link. At a receiver 1700 feet above sea level in the Helderberg Mountains near Schenectady, 129 miles from the Empire State Building, the N. B. C. television signals are received, then relayed by radio a mile and a half to the G. E. transmitter, W2XB. Half a million persons in the Albany-Schenectady area can receive these on home receivers, which would be incapable of catching the direct signals from New York.

The Radio Corporation of America has made similar developments. At the recent display of theater television, for instance, the views from Camp Upton on Long Island, 68 miles from New York, were relayed in three radio jumps. The N. B. C. mobile transmitter, contained in two large trucks, sent the signals to Hauppauge, Long Island, 17 miles away. Here they were automatically received and sent 23 miles to another station at Bellmore. This retransmitted them 28 miles more to a receiver on the 62nd floor of the R. C. A. building in New York City. Telephone wires carried them to the theater.

Engineers emphasize that in no case did the power of the intermediate stations exceed 5 watts, an accomplishment which they attribute in part to the highly directional horn antennas used. These point directly to the transmitter. From their 4 x 6 foot openings, they taper along their 8 foot length to an apex about a foot and a half square, where a small two-pole antenna is located.

With such developments, and with corresponding improvements in the home receivers that have also been made, it seems that television is now much more ready to appear around that corner than it has ever been since the pioneering days of 1927. Soon, perhaps, it will do so.

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● RADIO

Dr. Sanford V. Larkey, librarian of the William H. Welch Medical Library will tell how medical science is being mobilized through the National Research Council and national medical societies as guest scientist with Watson Davis, director of Science Service, on "Adventures in Science," over the coast to coast network of the Columbia Broadcasting System, Thursday, March 13, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST. Listen in on your local station. Listen in each Thursday.

PSYCHOLOGY—PHYSIOLOGY

Spinning of Fliers May Help To Train Their Sense of Balance

Experiments With Pigeons Indicates Reduced Nystagmus Is an Aid in Keeping Equilibrium Under Difficulty

A METHOD for preliminary aviation training by spinning students in a rotating chair or pleasure park device may be developed as a result of recent experiments showing that spinning increases ability to keep one's balance.

The difficulty of flying a course parallel to the earth's surface is increased for the pilot flying at high altitudes. Objects on the earth appear small and flattened. Vision no longer gives a clear clew to up and down. The pilot who wants to keep his plane in balance or to judge the angle of his bank or climb must depend to a greater extent on his own equilibrium.

The importance of equilibrium to the airplane pilot was recognized during the World War when selection tests included spinning the recruit in a revolving chair and then measuring the length of time over which involuntary movement of the eyes persisted. If the time were unusually short, this was considered a sign of some abnormality and the applicant was rejected. Later, however, it was discovered that some of the aviators who had been active fliers had a shorter duration of this involuntary eye movement known as nystagmus than some of the rejected candidates.

Drs. G. K. Yacorzynski, Ward Halstead, and Franklin Fearing, working at Dr. Fearing's laboratory at Northwestern University, decided to explore the possibility that, instead of being a handicap, reduced nystagmus might actually aid the pilot in maintaining his equilibrium. It has been previously noticed that toe dancers who whirl about in dances that would make the ordinary individual sick with dizziness are able to maintain their balance perfectly. They show a reduced nystagmus. This is also the case with figure skaters.

Their laboratory test was made on pigeons, the ear labyrinth of these birds being similar to that of man. One group of 24 birds had their nystagmus reduced by rotation on a turntable. Another group of 24 did not.

Then the birds were tested for ability to keep their balance on a rotating perch. Results of the experiment are published in the *Journal of Psychology*. (January)

The birds who had been spun to reduce their nystagmus were superior in keeping their balance.

The investigators suggest that perhaps it is not the reduced eye movement itself that improves the equilibrium. Perhaps it is a reduction of other effects such as nausea, dizziness, and a sense of falling that commonly accompany nystagmus. These reactions, if they came when the bird (or the aviator) was trying to balance himself, would disrupt his ability to hold to his position.

Should these results be shown to be true for human beings, it might prove advisable to reduce the nystagmus of the prospective flier before he takes to the air. The feeling of dizziness which accompanies rapid movements of the body in space, such as, for example, when the airplane banks, would then be absent. The functional use of the labyrinth would be intact, but the secondary sensations which disrupt equilibrium would not be present.

It would be possible to duplicate the plane's maneuvers in a ground instrument that would give the student the "feel" of flying.

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