

PSYCHOLOGY

Tests for Spotters

Anti-aircraft gun crews require good perception of depth and distance as they watch stream of tracer bullets to observe hits or misses.

► THE JOB of spotter in an anti-aircraft crew, which requires him to watch the stream of tracer bullets and observe how close they come to hitting the target enemy plane, is a task that makes unusual demands on eyesight.

Special vision tests for selecting men for this job and for the job of anti-aircraft gunner are described (*Military Surgeon*, April) by Captain Erwin E. Grossmann, of the U. S. Army Medical Corps. He also described a new range-finder device to improve the distance perception of anti-aircraft spotters.

The purpose of most of the tests is to measure the various factors entering into the ability to judge distances and depths or heights, and particularly the ability to judge which is the farther of two distant objects such as an airplane and the tracer bullets shot at it.

The distance of an airplane or other object is usually judged by the two eyes working together. Each eye sees a somewhat different image of the object, and the two views are somehow blended by the brain so that, unless you are greatly fatigued or drunk, you actually see one airplane, not two. The amount of pull on your eye muscles to produce this fusion into one image is immediately translated by you into an estimate of distance, without your even being aware of how you do it. If you should cover up one eye, however, you would realize how much more difficult it is to see depth and distance.

Difficult at Distance

But with both your eyes unaided, you cannot see any difference in distance between two airplanes or other objects, if they are more than 500 yards away from you, Capt. Grossmann points out. To judge relative distances farther away than that, it is necessary to do two things. First, you must, in effect, put your eyes farther apart than Nature has. Second, you must magnify the image by using a telescope.

This, Capt. Grossmann says, is the principle in back of the height finder, the instrument used by the anti-aircraft to sight and locate the target and to

establish the proximity between projectile and target.

The great body of soldiers assigned to the shorter range guns in the anti-aircraft units do not use such special optical instruments, however. They have had to rely on the accuracy of their unaided eyes.

Col. Maurice Morgan, of the Camp Hulen Anti-Aircraft Training Center, Texas, found that some of the men badly underestimated the relationship of the tracer bullet to the target sometimes, while their accuracy was phenomenal at other times. He decided that this breakdown in accuracy might be due to an increased distance of the target, and so he started looking for an optical device that could be provided for these men and which would not have the prohibitive cost of the height finder. He wanted a gadget that would increase the effective range of his spotters to about 1,500 yards, or between 4,000 and 5,000 feet.

Col. Morgan has now completed this device and is gratified with the results in actual training practice, Capt. Grossmann reports.

The eye tests adopted for use at Camp Hulen consist, Capt. Grossmann says, of a combined selection of tests taken from those of the Height Finders School and the Air Corps, with a few minor modifications. The stress is laid mainly on depth perception and the factors contributing to it. These factors are:

1. External eye pathology, especially of the lids. This has no direct effect on depth perception, but it does contribute to eye fatigue. "A watery, injected, (bloodshot) itching eye is not a good prerequisite for the full and satisfactory functioning of the fusion faculty," Capt. Grossmann said. "Nor is such an eye the ideal to be desired in those required to minutely observe the approach of an enemy plane. Those who have an abnormal sensitivity to glare should also be eliminated."

2. Inequality of vision. Since depth perception is a function of the binocular vision, it is evident, Capt. Grossmann points out, that inequality of vision will seriously interfere with its efficiency.

3. Inequality of refractive error. If the refractive error is different in one eye from what it is in the other, you will be tricked into a false impression of distance.

4. Color vision. This is ordinarily not involved in distance perception, but it is necessary for the gun crew to be able to distinguish the American colors from the Japanese, for example. And tracer bullets, Capt. Grossmann points out, are either phosphorescent red or blue in color and change their hues according to the distances at which they are viewed.

5. Muscle imbalance between the two eyes.

6. Internal ocular pathology.

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PHYSICS

Einstein Sends Message To Puebla Conference

► PROFESSOR Albert Einstein in a message to the First National Conference on Physics in Puebla, Mexico, conveyed his thanks to Mexico for offering European intellectuals a new home and an opportunity for new and fruitful work.

The message of the founder of relativity was read to the conference by Dr. Harlow Shapley, leader of the American delegation and director of Harvard College Observatory, when he responded to the official welcome extended by Governor Gonzalo Bautista of Puebla.

"In this time of brutal lust of power and barbaric persecution which have debased the continent of Europe, Mexico is performing an important work of salvage," Dr. Einstein's message read. "We are grateful to her for offering to European intellectuals a new home and an opportunity for new and fruitful work. In addition, Mexico has more than any other country opened her doors to the Spanish soldiers of freedom and rescued many from a shocking end.

"Mexico, preserving her complete independence and her free traditions, has associated herself with the United Nations in their struggle against Fascist oppression. May your country, which also we have to thank for a new flowering of the art of painting, experience all the blessings its courage and humanity so richly deserve and may the newcomers you have welcomed among you enrich the intellectual and economic life of your beautiful country."

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