PSYCHOLOGY

Picking Flyers

Army scientists in the Air Surgeon's Office devise psychological tests to choose cadets likely to succeed as navigators, bombardiers and pilots.

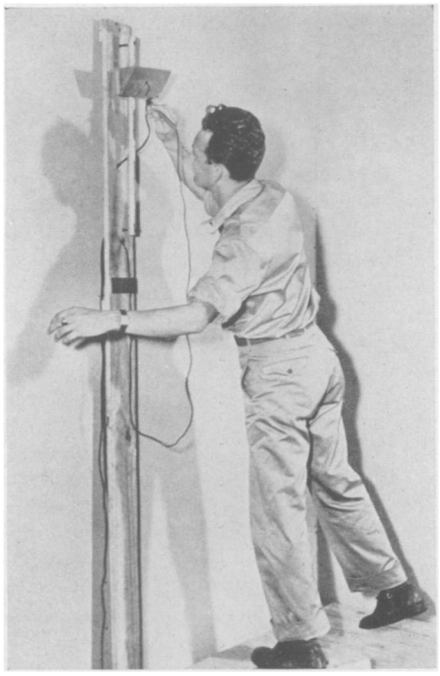
By MARJORIE VAN DE WATER

➤ THE BIG MOMENT has arrived for a U. S. aviation cadet. He is not about to take off on his first solo. He is not about to have his silver wings pinned on his breast.

He is standing high above the ground, balanced precariously on one foot on a moving plank while, high above his head, he tries to hold the point of a pin-sized stylus steadily in a nail-sized hole without once allowing it to touch the hole's edges. If he thinks now of the danger of a fall from this uncertain perch—if his hand trembles ever so slightly, he will fail.

Yet this test may decide whether he will ever wear a pilot's wings in the U. S. Army.

The job is hard. It taxes all his nerve and self-control. If you don't think so, just try sticking a needle into the ceiling and then balancing on the top of a teetering ladder while you try to thread it. But just don't break your neck doing it.



TEETERING on a loose board, this cadet is being tested for hand steadiness and fear of heights. Official photograph of U. S. Army Air Forces.

This beam balancing test is one of the new psychological tests being developed by Army scientists in the Air Surgeon's Office. All aviation cadets must take these classification tests before they go into training to master the controls of a plane, or to operate the new secret bombsight or to plan and direct long flights from Shangri La to Tokio or Berlin.

Each man is allowed to choose the type of training he would like, as soon as he has passed the initial qualifying examination and receives his appointment in the Army Air Forces. But before he can enter that training he must prove his ability for it.

He must show how quick and accurate he is with his hands and arms by reaching for small pegs and fitting them rapidly and without fumbling into small holes. He has to prove that he can pick up pegs with one hand and turn them dextrously and replace them without clumsiness.

Speed of Decision

He must show how quickly he can make a decision and act on it by moving control levers in the correct way in response to different combinations of signals flashed to him from an "instrument board."

Another steadiness test—this one looks easy. He is seated comfortably and the metal plate with the nailsized hole is within easy reach before him. All he has to do is to hold that pin-sized metal point in the hole without allowing his hand to shake.

But all of a sudden bedlam breaks loose. Bang! Whee-e-e-e! Horns and gongs may blare out with ear-splitting shrillness. Does his hand shake?

Now a voice bellows from behind him, "IF YOU ARE RATTLED NOW, what will you do when you are in COMBAT!"

It is all a part of the test—this heckling from the sergeant kibitzing behind his chair. But the aviation cadet doesn't know this. So if he is the type who can't stand this sort of distraction, he may become flustered. He may lose his temper and forget all about the test. Or he may become so harried that he can't hold his hand steady, try as he will.

But not all the tests are so trying on the patience and self-control. Another looks like something at the amusement park or penny arcade. It reminds the men of the pinball machine that used to provide fun in many a corner store. But it is operated by manipulating two levers—one in each hand. If you work your hands in perfect unison and do it just right, you can make a metal pin travel in a straight course around a triangular groove. The edges of the groove are notched to snare the pin at the slightest faulty movement.

Simulated Controls

A favorite test of the boy who has wanted all his life to be an airplane pilot is the test that makes him feel that he has already stepped into the cockpit of a trainer. Here is a joystick and a rudder bar. He gets his hand and feet on them at last. It is up to him to show that he can work these controls. Before him is a signal board of flashing lights. He must so operate the controls that the red and green lights are brought into straight lines.

What this test really measures is the ability of the cadet to move his hands and feet in perfect coordination. Actually coordination is necessary for the bombardier as well as for the pilot.

He spends many hours on such tests and others that show how good he is at mathematics, reasoning, map reading, comprehension of written material, dial reading, table reading, and speed of identification.

***SPEED OF DECISION** is tested when the cadet must operate the correct control in response to flashing light combinations as shown in this official photograph from the U. S. Army Air Forces.*

If a man does well on all the tests, he is then assigned to the type of training that he prefers. But if he is particularly good at some of the tests and does less well on others, he is assigned to the type of work for which he is best fitted.

Careful selection of the right man for the right job makes it possible to speed up training and get the men into the air over the war area in the shortest possible time.

If a man were trained to be a navigator just because he wanted to do that sort of work, although his talents really fit him for piloting or bombing the chances are he would never complete the course creditably. He would have to drop out eventually and be replaced by a better qualified man. The U. S. Army Air Forces would be delayed in getting a good navigator. At the same time he would be using the precious time of instructor and equipment for which some other man is waiting.

The Army does not want failures in training. They want to put each man where he will make good and will make good fast.

The famous team of pilot-navigator-bombardier who are writing history in the skies over Germany, the Aleutians, or the South Sea Islands are not all alike in their personalities or talents. They supplement each other. They dovetail.

Precision bombing requires speed and accuracy. When you drop a bomb from a very high altitude, even a tiny error will make the bomb fall far wide of its mark. That means precious ammunition wasted. It means prolonging the war.

But when you are bombing from very low altitudes, the target zips past your field of view at such a tremendous speed that great speed and accuracy of timing are essential.

The bombardier must use the secret bomb sight. This is an instrument which can be set and automatically performs all the computations and adjustments necessary to put the bomb on the target. The bombardier must be able to operate over a score of switches, and watch numerous instruments estimating drift, wind, altitude, and speed.

If he fails in doing all this with precision, in spite of all the breath-taking distractions and hazards of combat above the earth's firm ground, the entire bombing mission will be for nothing.

The pilot must control a plane traveling at speeds that he has never before encountered. He must know what to do if a part of his plane is disabled. He must be able to fight off enemy attacks or to evade them. He must be able to take upon himself a tremendous amount of responsibility when he takes off in a large bomber worth thousands of dollars and heavily loaded with high explosives. A misjudgment might cost many lives.

The navigator must be able to find the target and guide the plane safely home. How many planes fail to find their targets is a military secret, but it is recognized that the job of the navigator is an extremely important one.

Must Do Without Radio

He must know many types of navigation and know what to do when one fails. He must be able to use the radio beacon, the radio direction finder, and radio bearings. But when there is radio silence he must find his way without radio aids.

He must know how to determine his position and his course by the stars. But on a cloudy night or in "pea soup" he must know which way to turn.

He must know dead reckoning, which is the method of finding your position from a record of the distances traveled after each change in direction beginning with the last known position. And he must know how to find his way by observing landmarks and following a map.

All these flying officers must have certain qualities which are measured by the qualifying examination taken when the would-be aviation cadet first applies at one of the several hundred Aviation Cadet Examining Boards that are dotted over the United States. They must be able to read understandingly all the difficult material (*Turn to page 238*)

From Page 236

that they must master in their profession. They must be good at elementary mathematics and at understanding mechanical devices and diagrams. They must be able to read maps and weather reports. They must be good leaders.

Finally, they must have good judgment. The navigator who had poor judgment would never be able to find the objective. The bombardier who had poor judgment would not be able to place the deadly missiles accurately on the target. The pilot who had poor judgment might take all hands crashing to their death.

The qualifying examination which picks men who can meet these demands and screens out those who would waste training time and eventually wash out is not exactly an easy test. Only about half the men who have taken it so far have passed and been appointed.

But this qualifying examination is one of the most important of the Army's war weapons. For it is because of this test and the classification tests taken later that the Army is able to make the most effective use of our most precious of all resources—manpower.

Science News Letter, October 10, 1942

***FORETASTE OF FLIGHT** is given aviation cadets by new psychological tests being developed by Army scientists. This picture shows a cadet working joy stick and rudder bar in response to flashing light signals to determine his coordination of the movements of his hands and feet. Official photograph of U. S. Army Air Forces.*

PHYSICS

Power From Sunbeams

The post-war world may get its energy by snatching it from the sun's rays. Main obstacle is that power produced depends on area over which light is gathered.

➤ MAN IS harnessing the sun to supply power for his home, factories, and vehicles. Long a dream, present research indicates that the future world may be powered by energy snatched from a sunbeam. But practical application awaits results of the long range research program now being conducted.

Many such glimpses of happenings in science are presented in the annual report of the Smithsonian Institution.

Utilization of scientific advances in post-war reconstruction, however, will require sources of power not dependent on dwindling resources.

Energy equal to 21,000,000,000 tons of coal which the sun showers on the surface of our globe every hour, offers fascinating possibilities.

There is one major obstacle to harnessing this power: economics. Power produced, the report indicates, depends directly on the area over which solar energy is gathered. This would need to be large and the cost consequently high. Solution of this problem has been a foremost objective at Smithsonian.

Dr. Charles G. Abbot, secretary of the Institution, has built highly efficient solar engines which have come close to eco-