

MEDICINE—PSYCHOLOGY

"Men in White" Are Now Serving the Men With Wings

New Field of Aviation Medicine Guards the Health And Physical Fitness of Airline Pilots For Safety

WHITE-COATED surgeons, doctors, laboratory workers have taken over a new life-saving job. They are safeguarding the health of the men with wings who pilot the ships of the nation's airways. Indirectly, they are safeguarding your life on your vacation or business flights by making sure that the men who speed you through the air, day and night, are always mentally alert, keen-eyed and in such perfect physical condition that those human machines, their bodies, run as smoothly and perfectly as the engines that drive the plane.

The men and women of the white-coated army that serves the men with wings are following the newest of medical specialties, aviation medicine. Their duties are many. They make sure that the water supply used at all points is the best. They investigate conditions aloft, to learn how these may affect the health of pilots and passengers, and how harmful conditions can be overcome or prevented. They are leading the war on disease-carrying flies and mosquitoes that might stow away on intercontinental planes. Their keyword is prevention. Their first and foremost assignment, when serving in the medical department of an airline, is to maintain perfect health for the line's pilots.

Pilots join an airline physically fit in every respect. But the entrance examination which determines this fact is only the beginning. To maintain a physically alert condition, each pilot must undergo an equally exacting examination, complete in every detail, every 90 days.

Quarterly Examinations

Twice annually the pilots must appear before physicians of the Civil Aeronautics Authority who apply the federal yardstick to determine their physical fitness for flying. Then at semi-yearly intervals, halfway between the federal examination times, the pilots are given an even more comprehensive overhauling by the medical examiners of their own airlines.

In between, whenever they may miss only one scheduled flight because of illness or injury, they must come under the

searching eye of the company examiner and obtain a clearance before they are again permitted to fly a plane.

Fine Clinic

The facilities for exacting and painstaking medical examinations of pilots by airlines are exemplified in the new 12-room laboratory and clinic United Air Lines has established in its general offices in Chicago. This clinic represents an investment of \$15,000 in medical equipment alone. At least once a year each pilot on the United system is routed into Chicago for a personal examination by Colonel A. D. Tuttle, formerly commandant of the U. S. Army School of Aviation Medicine at Randolph Field, Tex., who is director of United's medical department. This super overhaul by Colonel Tuttle, personally, is in addition to the regular examinations taken locally.

A typical test for a pilot takes more

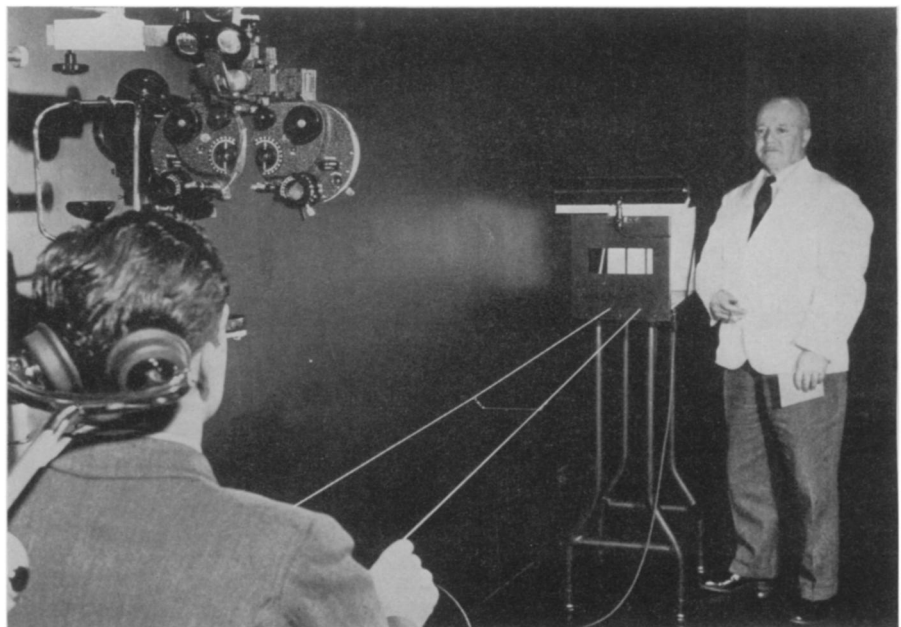
than two hours to complete. The data on their examinations, when completed, fill a 12-page worksheet on which there are 94 general and specific points, plus subheadings. In the eye examination, for example, there are 23 distinct steps, and 63 separate tests are made.

There are some "related" questions, too. For instance, what about the flier's diet? An insufficiency of Vitamin A affects the vision; makes for "night blindness."

For all practical purposes 20-20 is considered the "perfect" eye rating. All United pilots have to have at least 20-20 ratings, but a surprising number have better than "perfect" ratings and few wear glasses.

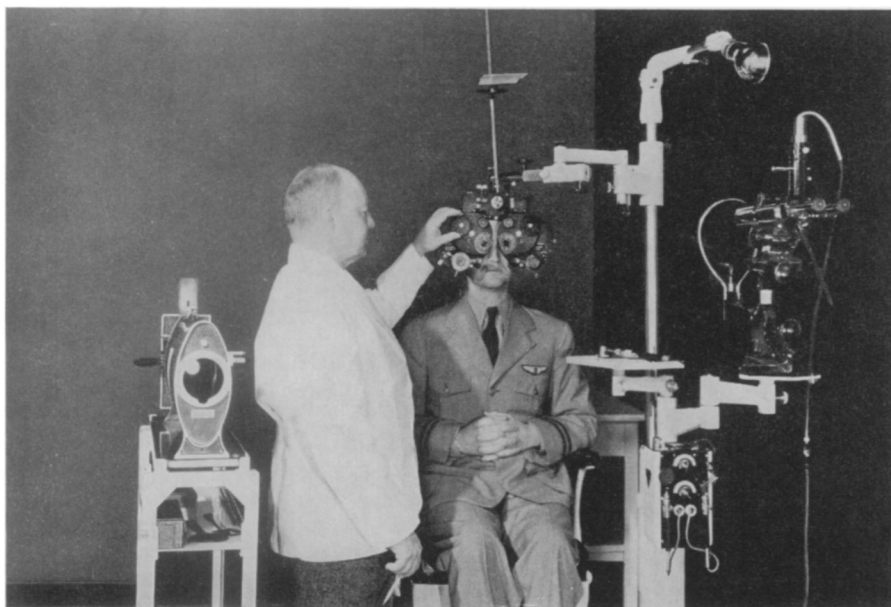
Eye Exercise

Among the numerous instruments necessary to check the vision is an ingenious device containing among other features a Phorometer hookup of Risley prisms and Maddox Rods, and a Rotoscope, which check the condition of the six pairs of tiny muscles controlling the movements of the eyeballs. When it is shown that any of the eye muscles lack tone and need exercise, the Rotoscope can be set to give the proper amount of stimulation. The fixing object is rotated in one direction for 30 seconds, then reverses itself and goes for 30 seconds in the other direction. As the eyes follow it throughout each rotary excursion, they,



DEPTH PERCEPTION

The pilot's ability to estimate distances from a third dimension standpoint is determined by depth perception tests. Col. A. D. Tuttle, medical director of United Air Lines, is shown (right) making such a test of a pilot's eyes.



NIGHT BLINDNESS TEST

The pilot's ability to see at night is determined by special tests in the medical department of the airlines. This shows the first step in such a test, in which the visual purple of the eye is bleached by three-minute exposure to bright light.

too, have to roll, thus getting the necessary exercise.

Another instrument will detect the amount, if any, of night blindness in the pilot's eyes. He is instructed to stare at a special light for three minutes to bleach the "visual purple" from his eyes. This exhaustion of "visual purple" is what happens to automobile drivers at night when they are blinded by glare from the lights of approaching cars. After the "visual purple" is bleached, all lights except a small one of very low luminosity are extinguished. The pilot then sits in the dark and watches for the small dim light to return and he is required to distinguish the axis on which it is set. A stop watch is used to determine whether he can correctly identify the position of the test object in not more than three minutes.

Judging Relative Distance

The pilot also is examined for depth perception, or stereoscopic vision, into which a third dimension factor enters. The ability of a pilot to perceive objects in relief and correctly estimate their relationship to and distance from one another is especially important in taking off or landing a plane. In this test, from a distance of 20 feet, the pilot is required to align side by side, by manipulating the long cords attached to them, two small upright black rods, one of which is stationary and the other movable, lo-

cated in a brightly illuminated box free of any shadows. The allowable margin of error averaged in a series of five trials is only 25 millimeters.

Hearing Test

An audiometer, or hearing, test booth is soundproof. Through the earpiece attached to the audiometer, the pilot is given a check on his ability to hear all sound frequency tones from 128 to 11,584 cycles within a normal decibel range. If the hearing is normal in every respect this test does not take longer than a minute to perform. But if the hearing seems defective, additional tests are conducted by the use of a microphone and phonograph records, which transmit signals and tones similar to those heard aloft. In the phonograph test some static is injected, too, in order to simulate the worst possible conditions aloft.

Sinuses, nose, throat, mouth and ears are looked into. The chest is examined under a fluoroscope and an X-ray film made for record purposes. An electrocardiogram is taken and the results filed and blood counts, hemoglobin estimations and Kahn tests taken. Even the lung capacity is tested by exhaling air into a spirometer and a basal metabolism test is made when the necessity for it is indicated.

The high point of a pilot's examination, though, probably is the Schneider Index, a circulatory efficiency test peculiar

to aviation medicine. The Schneider Index seeks out borderline unfitness that may be reflected in the behavior of the cardiovascular system under rest and exertion. The pilot to be examined rests for five minutes after which a pulse count and blood pressure reading is taken. Then the pulse and blood pressure standing is taken. Then he exercises by stepping up and down on a bench 18 inches high five times in 15 seconds, at the end of which the pulse is counted and the elapsed time, in terms of seconds, for a return of the pulse rate to the standing rate also is recorded. His score is computed by a point system, ranging from a maximum of plus 18 to a minimum of minus four for the six steps which comprise the test. Athletes will average about 14, the average man 12, women about two points less than men, and psychoneurotics or the emotionally unstable eight or less. Most pilots score between 12 and 16; some of them 18.

Home Stations

Along United's transcontinental airways system there are nine domiciliary stations where pilots and plane crews make their homes, Newark, Chicago, Denver, Cheyenne, Salt Lake City, Seattle, Portland, Oakland and Los Angeles. Physicians at these points look after the physical welfare of these employes, and when anything special shows up a report is dispatched to Colonel Tuttle's medical center in Chicago where it is decided whether to bring the case in for checking and observation or to direct appropriate remedial action at the home station. Thus the more than 250 pilots of United Air Lines are constantly kept in topnotch physical condition throughout their flying careers.

Other airlines also have their own armies of men and women in white whose chief job is to safeguard the pilots' health, although often the medical departments of the various airlines cooperate with other medical men in research on the problems of aviation medicine.

Science News Letter, January 27, 1940

● Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by the U. S. Coast and Geodetic Survey of the following preliminary epicenter:

Tuesday, January 16, 8:14.7 p. m. EST

About 350 miles off Guam in the Pacific. Latitude, 17 degrees north. Longitude, 148 degrees east. Severe shock.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see SNL, Oct. 28.