SCIENCE NEWS

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PSYCHOLOGICAL HAZARDS FOR FLYING FIGHTERS

DR. WALTER R. MILES, professor of psychology at Yale University, in the first of a series of twenty-five Sigma Xi lectures, calls attention to the fact that being ready to fight and then not having a chance at the enemy in the air presents one of the greatest psychological hazards in the air war for our flying fighters.

During long-range photographic reconnaissance, with no active fighting, the "gremlins" first made their appearance. Long stretches of readiness, without combat service, are characteristic of military aviation and may present severe psychological stresses. He pointed out that "Change of schedule in active flying service is also psychologically hazardous, thus the cancellation of a bombing mission exacts an emotional cost which needs to be appraised and appropriately dealt with before the same crew is scheduled for its next operational duty. The practical psychological skill of the flight surgeon in appraising stress, developed either from readiness or combat or from both, makes an important contribution to the efficiency of the air force in all such problems as these. If the psychological elements in the case of a given military flyer can be properly appraised and skillfully directed by a flight surgeon, crew captain or other insightful guide, the chances are multiplied against 'his number coming up.'"

Dr. Miles told how psychologists and many other specialists are conducting research on many phases of military aviation to help the men in our fighting planes to achieve greatest effectiveness. Much of what is being learned and applied with success will be useful in developing air transportation of the post-war era, he predicted.

"In aviation the number of hours of training or flying have in the past served as a measure of learning progress or flight competence," Dr. Miles said in explaining one advance. "But clearly instruction, in terms of basic maneuvers and repetitions of these in practice, is obviously much more fundamental for learning than hours in the air as such, and other contributions to effective progress can come through the reinforcement to the practical experience in the air from prior mental rehearsal in which the whole routine is repeated again and again. Sport has long recognized this principle in the coaching of individuals and teams."

High altitude flying is one of the great problems of the present war and the adjustment of the human body and mind to the reduced pressure of the atmosphere and low temperatures encountered can be studied in a decompression chamber. Vision presents many important psychological problems. One of these is peripheral vision or looking out the side of the eye which is necessary in landing of planes. The dark adaptation of the eyes must be protected from the lighting within the plane in night flying and the study of this problem has influenced selection of pilots and the development of new equipment and training methods.

ITEMS

ZERO octane gasoline, not the much discussed 100-octane aviation fuel, may be used in the future to power the family car. This possibility is advanced by Dr. Carlton H. Schlesman, head of the research laboratories of the Socony-Vacuum Oil Company. He states that a "most radical power plant" is already under development which makes use of radiant energy from low-grade fuels. In this new engine, he said, "Fuel of low or even zero octane number is burned inside a gas mantle. Radiant energy is thus produced at high efficiency. This energy impinges on photo-electric cells which convert it into electrical energy. Such energy drives small electric motors mounted at the wheels." The necessary light-weight, high-powered electric motor, up to now the missing link in the evolution of this new power system, has been developed and is available for use.

BOTH tin plate and zinc-coated steel sheets are produced interchangeably on the same electroplating lines in a new precision unit of the Weirton Steel Company. Three lines of electrically operated equipment, each 400 feet long, turn out electrolytic zinc-coated sheets at the rate of 160 feet a minute. The equipment is the type developed recently for tin-plating that has revolutionized the production. For zinc coating a bath is made with zinc chloride, sodium chloride and aluminum chloride. The electric current carries zinc from pure zinc fixed terminals and deposits it on the moving metal sheets. Low-voltage generators deliver 60,000 amperes of power to the plating unit at all times while in use. Tests of the product show, it is claimed, that there is much tighter bond between the zinc and the steel plate than can be obtained by the older hot-dip method.

ALUMINUM may perhaps be produced from clay or other materials than bauxite at a cost that will compete with its manufacture from bauxite, even without substantial income from by-products. This opinion was expressed by F. R. Archibald and C. F. Jackson, scientific consultants of the Ancor Corporation, speaking at the meeting of the American Institute of Mining and Metallurgical Engineers. They believe, on the basis of research tests, that there are localities where reserves of the needed raw materials occur in large quantities and of high purity within economical radius for bringing them together. If other economic conditions are satisfactory, production of alumina from materials other than bauxite would be profitable. High-alumina clay, limestone and coal are three materials needed in large quantities. Two tons of limestone are required for each ton of clay. Fuels other than coal may be used. A South Carolina kaolin-type clay, as a source of alumina, has been successfully used in a pilot plant demonstration, and a commercial plant is now under construction in that state. Portland cement may be made from by-products.