

can be used to hold a telephone or a cigarette, to write and to perform a few other functions. Even more useful will be another Army dress hand with movable fingers as well as thumb.

Important advance for the person without hands is the new wrist flexion unit. This allows 22.5 degrees extension and 45 degrees flexion, or bending. With the 45 degree flexion, the hook can be brought right up against the body, which makes shaving and unbuttoning a shirt possible, explained Jerry Leavy, of Los Angeles, one of the testers for the artificial limb program. Mr. Leavy, incidentally, has become so proficient in the use of his two artificial arms that when he applied for a license to drive a station wagon, he finished up with a license for driving a truck.

The wrist flexion unit can be attached to any standard artificial arm. It has been released to the Veterans Administration and will be ready for the market as soon as VA puts through its procedures for releasing it.

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#### ENTOMOLOGY

### Effects of Insecticides Need Study for Best Use

➤ CHEMISTS have been providing deadly insecticides so fast, of late years, that entomologists have not yet been able to find out their most effective uses, Dr. T. Walter Reed of the California Spray-Chemical Corporation, Haddonfield, N. J., told an American Chemical Society meeting in Bristol, Va.

DDT, benzene hexachloride, chlordane, chlorinated camphene and other insect-killing compounds are now being used in mixtures instead of "straight," he stated. A mixture of DDT, benzene hexachloride and sulfur, for instance, has had maximum effect on boll weevil. Locust plagues may be made a thing of the past through airplane use of chlordane, chlorinated camphene and benzene hexachloride.

But above all, field scientists must study the effects of their new weapons beyond the immediate attack on specific pests. There is always some offsetting disadvantage, in the destruction of beneficial insects or other useful life forms, and it will require great knowledge and care to see that the bad does not overbalance the good.

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#### AERONAUTICS

## Flight Training on Ground

**Electronic Flight Simulator duplicates in exact detail the cockpit of a Stratocruiser with electronic devices for simulating flight conditions.**

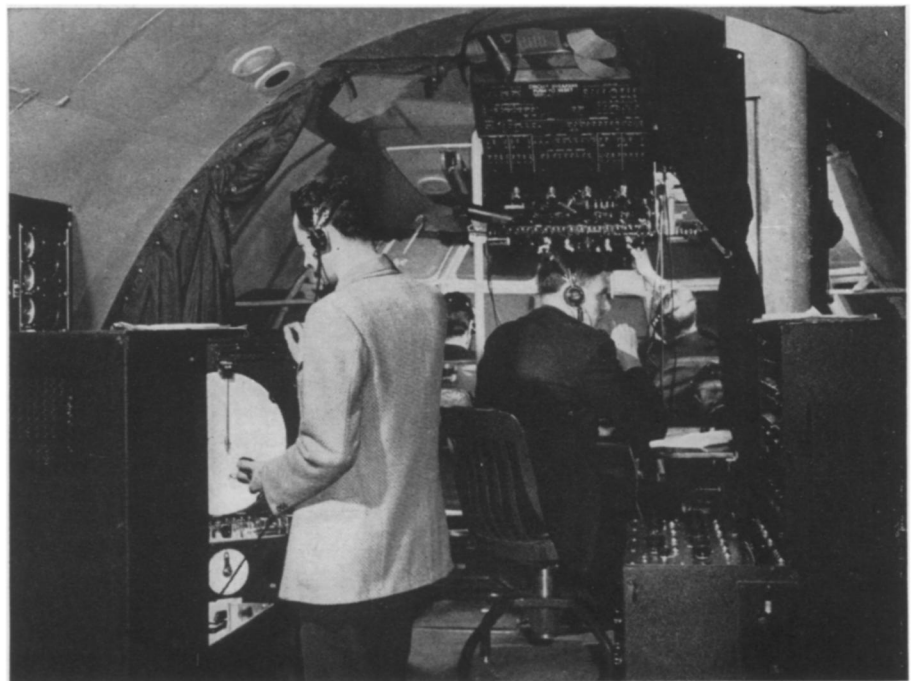
➤ PILOTS of the future, particularly those who handle giant passenger airplanes, will receive much of their training without leaving the ground. This will be the training that has to do with operation techniques, and the ground-training is made possible by the development of a huge electronic-mechanical device in a model of a cockpit with all the hundreds of dials, levers, switches and controls which a pilot encounters in a plane.

This device is called the Electronic Flight Simulator. It reproduces in exact detail the flight deck or cockpit of the airplane whose performance it is designed to reproduce. It incorporates all the existing aerodynamic data upon which the plane itself was produced. Without leaving the ground, it can accurately simulate any condition of flight

of which the plane itself is capable.

The simulator was conceived and designed by Dr. R. C. Dehmel of the Curtiss-Wright Corporation, with the cooperation of Boeing Aircraft Company. It is a complete replica of the Boeing Stratocruiser-type giant transport cockpit. The instruments and controls function precisely as in the real airplane. The device has just been purchased by Pan American Airways, and will be used in pilot training for handling Pan American Stratocruisers. Similar simulators can be built to aid in training for other planes.

This flight simulator cost some \$250,000 to build, and this does not include the cost of ten years of research work which preceded its actual construction. It looks like a lot of money to put into



**SIMULATED FLIGHT**—Instructor supervises a simulated flight in the Curtiss-Wright Dehmel Electronic Flight Simulator with a Pan American World Airways crew in an exact duplicate of the cockpit of the Boeing 377 Clipper. On the left, the instructor watches the "scriber" trace the performance of the crew. The flight engineer, center, checks his engine instrument readings and reports to the pilot.

one training device, but as a "training plane" it can handle four times the number of flight and ground crews at a tenth the cost and in a fraction of the time involved in the use of an actual airplane.

One important feature of this new flight simulator is that the entire operating crew, pilot, co-pilot, engineer and

others, are trained at the same time. An instructor behind them operates switches which activate the pilot's dials to indicate trouble with fuel flow, wrong oil pressure, carburetor icing, faulty spark plugs and other difficulties. Pilot response is noted by him, and also the corrective action taken.

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#### NUCLEAR PHYSICS

## Future Atomic Advances

► **EXPERIMENTAL** atomic power plants "within a year or two" and ships running on atomic energy "within a decade" were forecast by a famous American atomic scientist.

The scientist is Dr. Edward U. Condon, director of the National Bureau of Standards, who has been under attack from a subcommittee of the House Un-American Activities Committee. Dr. Condon's views on the future applications of atomic energy are given in a report to the American Institute of Electrical Engineers in New York. (March 10)

"Three atomic power plants are now under way—at Oak Ridge, Tenn., Chicago, Ill., and Schenectady, N. Y.—and it should be possible to realize experimental production of power within a year or two," the atomic scientist forecast.

For cars, planes or even railroad loco-

motives, atomic power plants are likely to be too heavy, he believes.

"However, it is reasonable to suppose that within a decade some ships may derive their power from (atomic) piles."

Other atomic advances expected by Dr. Condon include better ways of producing the atomic bomb elements uranium 235 and plutonium, smaller-sized chain-reacting piles, important "special purpose energy sources" and aids in medical and other scientific work.

Whether or not other elements can be used to release atomic energy "can be decided only by future research," declares the scientist.

"At present no means of doing this is in sight, but it should be remembered that in 1938 the atomic bomb would have seemed fantastic to the best nuclear physicists."

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#### CHEMISTRY

## Fresh Water from Ocean

► **SCIENTIFIC** research to make fresh water from sea water is proposed by a bill introduced in Congress by Rep. Charles K. Fletcher, R., California, which would place the study in the hands of the Navy.

The measure would authorize the Secretary of the Navy to construct, and operate one or more demonstration plants to produce potable water from sea water, or other liquids, elements or substances. These plants would be of a size to provide engineering data for industries desiring to convert salt water to fresh for manufacturing and other purposes.

De-salting sea water has long been carried out by the ordinary distillation process on shipboard and other places. This of course requires considerable fixed equipment. During the war there

were several de-salting methods developed primarily for use on lifeboats and life rafts which required only such equipment as could be easily stored with other supplies in the boats and rafts.

The outstanding method uses a new chemical de-salter. It is a product of Permutit Company of New York. A briquet of it, the size of a small candy bar, is dropped into a plastic bag containing sea water. It absorbs the chemical salts in the sea water so that they can be filtered out as the water is sucked through a plastic tube. Each briquet weighs only one-sixth as much as the drinking water produced and takes up only one-tenth as much space. One briquet is good for about a pint of drinking water. The entire kit for a life raft is the size of a small hand-bag.

The principle employed in this and other de-salting methods is what is

known as ion exchangers. These cause an interchange of ions between the material in solution and the solid introduced. The process is used in water softeners. The particular type used to freshen sea water is known as anion exchangers or acid absorbers. They absorb the acids formed when a salt containing water is passed through a hydrogen exchanger.

During the war scientists at the Naval Medical Research Institute tested a dozen or so de-salters suggested for downed flyers on life rafts. Most of them were rejected as unsatisfactory for one reason or another.

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#### PHYSICS

## Measure Water Vapor in Gases by Improved Means

► **A WARTIME** need for a quick method to determine the dryness of aviators' oxygen led the National Bureau of Standards to develop an improved electrical method for measuring small amounts of water vapor in many kinds of gases and the moisture content of certain liquids and solids.

The method has just been made public. Essentially it depends upon the change in electrical resistance of an electrolytic film as it absorbs vapor. It is a procedure carried out with speed, simplicity, high sensitivity, and wide range. It was developed by E. R. Weaver of the Bureau staff.

The principle utilized has been employed at the Bureau in various devices for some time. A thin film of liquid, which may be phosphoric acid or a solution of sulfuric acid or other electrolytic compounds in a gelatin or plastic binding material, is spread over the surface of a solid insulator between metallic electrodes. The electrolyte absorbs moisture and tends to reach equilibrium with the water vapor in the surrounding gas and to form a solution the electric conductance of which is a measure of the concentration of water vapor in the gas.

In the improved method, the electrical resistance of a film in the gas of unknown moisture content is compared with one in a sample gas containing a known amount of water vapor. By adding measured moisture to one or the other a balance can be obtained, and the moisture content of the unknown quickly determined.

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The rare *trumpeter swan* is appearing in southern Alaska in growing numbers.