parts. When traveling through the atmosphere, it operates only after acquiring enough speed from some other source to pick up sufficient air under pressure to produce combustion with fuel fed into its tapering cylinder. In the afterburner the oxygen for combustion is provided in the exhaust from the turbo-jet itself.

Science News Letter, May 22, 1948

METALLURGY

German Magnetic Alloy Now Made in America

➤ A FORMER German magnetic alloy, particularly suitable for use in rectifiers to change alternating electric current into direct current, has now been produced for the first time in the United States at the Naval Ordnance Laboratory, White Oak, Md., the Department of the Navy revealed.

This valuable alloy, known as Permenorm 5000-Z, is a result of a fusion of nickel and iron under an intricate heat-treatment process. It was first made in Germany in 1943, where it was applied in the electrochemical industry in the construction of huge rectifiers.

Unfinished samples of the new alloy were brought to this country after the close of the war by American scientists, and distributed to American governmental and industrial laboratories to be duplicated for domestic uses. Although details of the process were available, no laboratory until now was successful in producing the type of alloy which had the required magnetic properties.

Permenorm 5000-Z has important applications in the fabrication of magnetic amplifiers to give additional strength to feeble electrical pulses. Employed for this purpose, it may replace many of the complicated, delicate and troublesome electronic tube amplifiers now used in guided missiles, equipment to control gun firing, and underwater ordnance.

Credit for the reproduction of the alloy and its new applications goes to Dr. Gustaf W. Elmen and Edward A. Gaugler, physicists at the Naval Ordnance Laboratory. Dr. Elmen, well-known as the inventor of other magnetic alloys, served as consultant, while Mr. Gaugler was actively in charge of the project. At a scientific meeting to discuss magnetic materials, to be held at the Naval laboratory in the near future, the Permenorm development will be described at length.

Science News Letter, May 22, 1948

MEDICINE

Hope for Amputees

New suction socket makes walking more comfortable and easy for those who have lost legs. New arms make it possible to shave self or drive truck.

See Front Cover

➤ SUCTION SOCKET that makes an artificial leg feel like part of the amputee's own body. A hook so controllable that it can pick up a marshmallow or a hamburger. A natural looking dress hand, with thumb motion, that will cost a fourth or a sixth the price of present motionless dress hands.

These are among the new artificial arms, legs and hands and hooks demonstrated at the National Academy of Sciences. They were developed by governmental, industrial and university laboratories in a program sponsored by the Army, Navy, Air Forces and Veterans Administration and coordinated by a National Research Council Committee.

Certificates of appreciation were presented in Washington by Secretary of the Army Kenneth C. Royall to 15 of 27 amputees who have tested the devices and made valuable suggestions for improvements. The other 12 are receiving their certificates at ceremonies in other parts of the country.

At least 200 of the suction sockets have already been successfully fitted. The second phase of the experimental program, now being started, will supply about 450 more. The socket holds the leg on by suction, created by the intake and outgo of air as the amputee walks. It replaces the heavy belt around the hips now used to hold on artificial legs. Besides feeling comfortable, the suction socket actually builds up the leg, or stump, in contrast to the pale, anemic condition that may develop with present leg attachments.

The young veterans shown on the cover of this week's SCIENCE NEWS LETTER are demonstrating that with the new leg it is possible to put the weight of the body on the artificial leg when going downstairs. This has been impossible with the older types, as has also putting the foot flat on the step. Suction socket with combination valve and knee flexion and ankle rotation with some lateral motion make this possible.

"The hook of the future" is the enthusiastic description given by Pfc. Leo J. Qualiotto, Cleveland, to the one that picks up a marshmallow. Mr. Qualiotto has been testing hooks, hands and arms since October, 1946. Officially it is known as the Army Voluntary Hook. Its advantage is that the user can control the closing and pressure of the hook, using whatever degree of grip he wishes.

The dress hand with movable thumb

SCIENCE NEWS LETTER

Vol. 53 MAY 22, 1948 *No. 21*

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., NOrth 2255. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years, $8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566 and 360 N. Michigan Ave., Chicago, STAte 4439.

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.

Science News Letter, May 22, 1948

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.

Science News Letter, May 22, 1948

AERONAUTICS

Flight Training on Ground

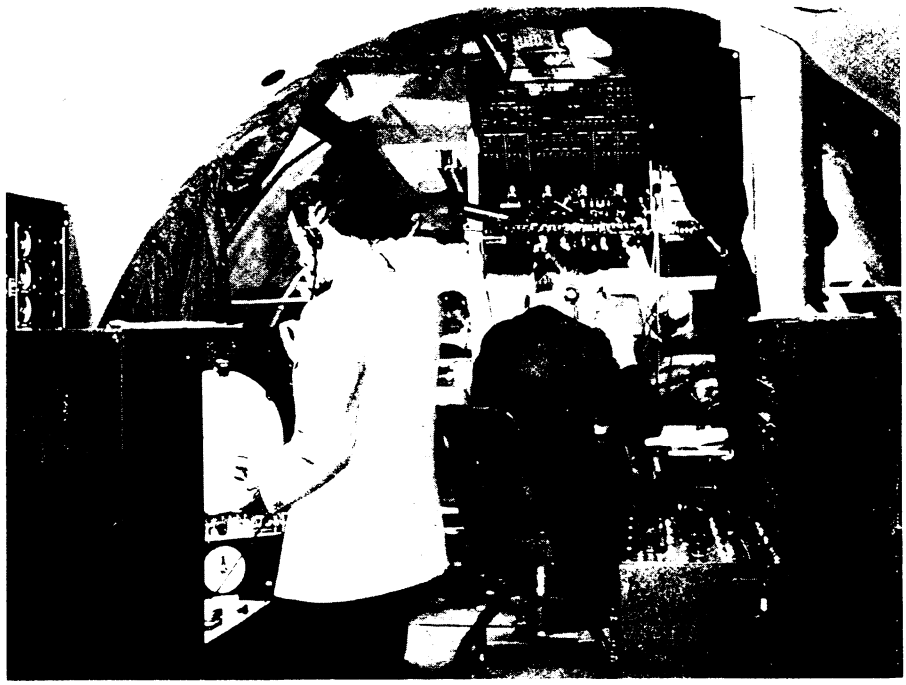
Electronic Flight Simulator duplicates in exact detail the cockpit of a Stratocruiser with electronic devices for simulating flight conditions.

➤ 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.