

AERONAUTICS

Plane Research Speeded

Large wind tunnels for supersonic research promise better fast planes. New type radar makes running speed record of airplane models.

See Front Cover

➤ **RAPID DEVELOPMENT** of airplanes to travel faster than sound is made possible with recent modifications of a giant 16-foot high-speed wind tunnel at Langley Aeronautical Laboratory to give transonic speeds, and of a four-by-four-foot supersonic tunnel. Supplementing these is a 11-inch hypersonic tunnel which operates at speeds ranging from five to ten times the speed of sound.

The Langley Laboratory near Hampton, Va., is one of three research establishments maintained by the National Advisory Committee for Aeronautics. These NACA laboratories do not design or build planes. The end product of their work is to acquire technical information which can be used by airplane designers, manufacturers and operators. Results of their studies are incorporated in practically every type of plane built in America.

The fact that these tunnels had been modified and repowered was revealed to a group of visiting science writers, who were conducted through the tunnel with a 16-foot test section and saw others at work. But details of the modifications were not disclosed for security reasons. It is believed no other nation has been able to make tunnel modifications to secure similar results.

The front cover of this week's *SCIENCE NEWS LETTER* shows an interior view of the long air return passage of this 16-foot transonic wind tunnel. Turning vanes to keep the air flowing smoothly are visible at the far end of the tunnel.

"Now, for the first time," said Floyd L. Thompson, chief of research of Langley Laboratory, "we are able to duplicate transonic flow conditions in the Laboratory with large models. This was made possible by the discovery of a way to eliminate the 'choking' effect that occurs in a wind tunnel when air rushes through the test section at nearly the speed of sound."

The fact that large wind tunnels can now be used to study airflow conditions at the speed of sound will give America a tremendous advantage in designing supersonic jet fighters, ultra-fast bombers, guided missiles and other very-high-speed aircraft, he stated.

"Scientists already have acquired sufficient information to predict with reasonable accuracy the over-all aerodynamic behavior of an airplane flying at low supersonic speeds," he added, "but every plane that flies faster than sound must pass twice

through the transonic region—at the beginning and end of the trip." This transonic region is roughly from 0.8 to 1.2 the speed of sound.

Track With New Radar

➤ **NEW TYPE** radar equipment in use on Wallops Island, Va., is making continuous records of the speeds of models of proposed airplanes traveling to great heights and at velocities up to four times that of sound. It is a radar that sends out a continuous radio wave instead of the intermittent waves commonly used.

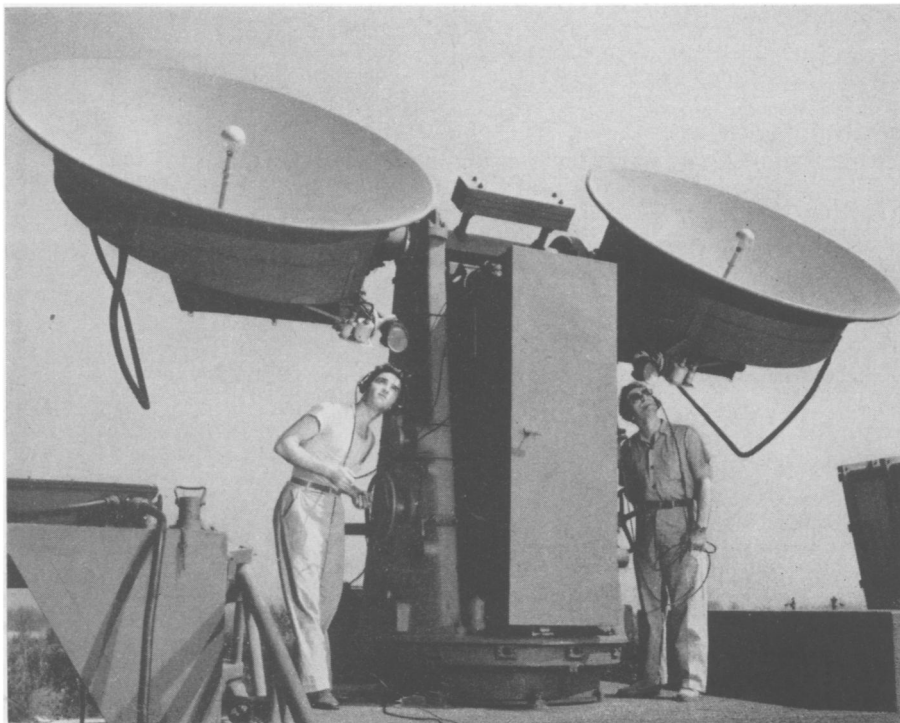
In this equipment, two large saucer-shaped antennas are placed side by side and move as a single unit. One is the transmitter, the other the receiver. Waves reflected back from the speeding model do not interfere with the waves being transmitted because their frequency has been slightly changed. This is due to what scientists call the Doppler effect. A familiar example of the Doppler effect is the change

to a bystander of the pitch of a locomotive whistle passing him at high speed.

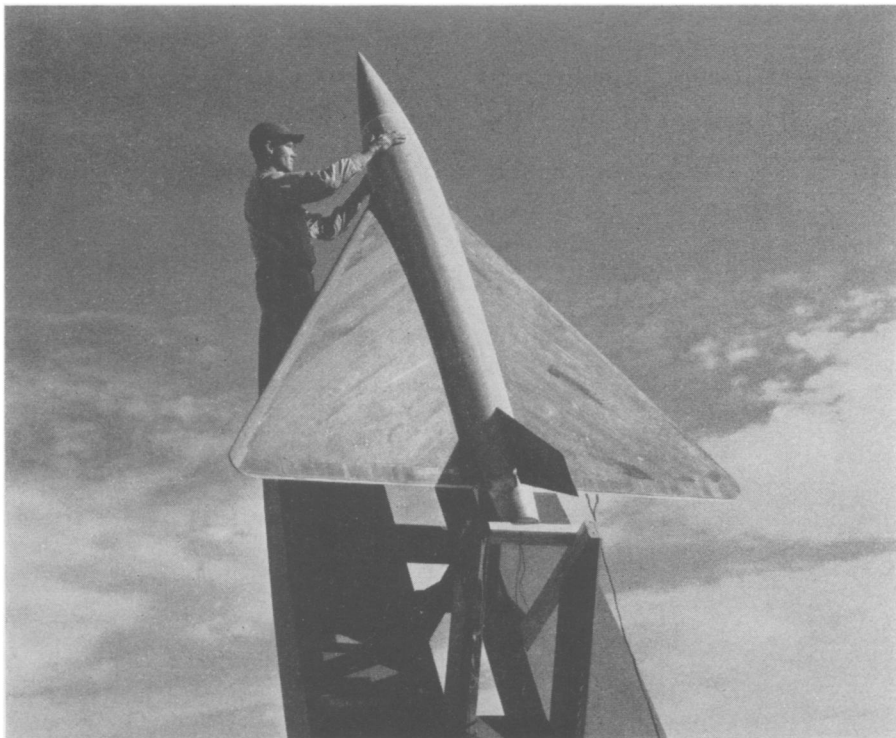
In fact, the device is called the continuous wave Doppler velocity radar. Only five of them have been constructed as yet, a group representing the science press was told by Robert R. Gilruth, chief of the Pilotless Aircraft Research Division of the Langley Laboratory conducted by the National Advisory Committee for Aeronautics.

This is the first time in the six-year-old history of this Langley Laboratory substation that "outsiders" have visited it. Until now, it has been behind a "security curtain." It is a "shooting" station for new aircraft designs developed at the Langley Laboratory. Wallops is a treeless, sandy stretch of land on the Atlantic coast from which the models can be projected high into the air to drop miles out in the ocean.

The aerodynamic information being gathered is for use in developing the supersonic planes of the future. The models are precision duplicates of proposed planes from four to perhaps 12 feet in length. They are propelled by rocket power to altitudes usually up to 30,000 feet, but sometimes to 100,000 feet. They travel from 15 to 40 miles a minute, the latter meaning between three and four times the speed of sound.



CONTINUOUS RADAR—This continuous wave Doppler velocity radar unit gives a running record of the speed of rocket-powered models. The operators track by sight and sound to keep their antennae properly aimed.



DELTA WING MODEL—Research model of a delta wing prepared for launching at the NACA's pilotless aircraft research station at Wallops Island, Va.

Although the models are lost at sea, their record is not. Their flight and behavior are recorded by motion pictures on fast-moving strip film. Two types of radar are used, the Doppler and a flight path radar. Very important are tiny telemeter

electronic instruments within the model which send radio signals continuously to instruments at the ground-station. They provide up to ten kinds of information on flight characteristics, including roll, drag, flutter and skin temperatures.

Science News Letter, June 2, 1951

NUTRITION

Special Foods for Wounded

► THE ARMY Medical Corps is looking for special foods for its wounded. Right now, wounded soldiers in Korea who need their nutritional balance re-established receive aid from an aid station hospital pack containing such hot, stimulating beverages as cocoa, tea and coffee.

However, this is not enough. Lieut. Col. Carl J. Koehn, chief of the nutrition branch in the Office of the Surgeon General, wants the food industry to develop a high protein, high calorie drink which could be simply prepared by medical corpsmen under front line conditions. It should be in dry powder form and probably be constituted of 60% milk, he said. It must taste good, too, he said, or the wounded men might not drink it. The powder must mix well with water and stay mixed so that it can be fed the wounded through nasal tubes if necessary.

This drink would be useful not only in the aid station at the front lines but

also at the clearing and collecting stations and in the evacuation hospitals. It would reduce the effect of shock and mean the difference between life and death for some of the wounded.

Clearing and collecting stations and also portable surgical and evacuation hospitals now are on what is called "operational B Rations" plus a fixed hospital ration supplement for the estimated 15% of the hospital population which medically would require more proteins. This does not meet the needs of a treatment diet.

Col. Koehn also wants industry to work on the problem of a stable fat emulsion to be used for vein feeding of patients when they cannot be fed either through the mouth or with a tube. This problem, complicated by the necessity of shipping and storing the emulsion, is admittedly difficult.

Science News Letter, June 2, 1951

PHYSICS

Moon Rocket Would Shed Sections on Way

► THE FIRST rocket to try to reach the moon will probably shed pieces from itself one by one during the trip.

With fuels now available, the best way to make the extremely long distance rocket flights to the moon or other planets would be a rocket built in stages, Anthony Nerad of the General Electric Research Laboratory told the New York section of the American Chemical Society.

These sections would drop off one by one after the fuel is used. Because of fuel costs, chemicals rather than atomic energy will be more likely to be used for rocket power, he said. Hydrogen gas seems to offer some important theoretical advantages for the propellant.

Science News Letter, June 2, 1951

SOCIOLOGY

Reduced Death Rates Give Hope Man Can Conquer War

► WAR'S CASUALTIES in an atomic age can be conquered by an application of man's social intelligence, judging by the way that we have been able to reduce the menace of deaths from airplane accidents, railroad travel, infected milk and lynchings.

Optimistically viewing the over-towering crisis of the atomic age, Dr. Hornell Hart, Duke University sociologist, reasons that our recent failure to achieve equal success with war casualties need not be regarded as conclusive.

The railroad death rate required 50 years to be reduced to one-tenth of its 1890 level. The airplane death rate was cut to one-tenth of its 1930 level in 15 years. Dr. Hart views this as evidence that social change is taking place at faster and faster rates.

The persistent decline of lynchings is regarded as especially significant by Dr. Hart because the lynching problem is considered parallel to the problem of dealing with international warfare.

Science News Letter, June 2, 1951

INVENTION

Magnets Help Housewives Ease Burden of Heavy Iron

► THE BURDEN of using a heavy flat-iron by the housewife, or exerting heavy downward pressure on a light iron, is relieved by a so-called magnetic electric iron on which patent 2,554,111 was awarded to Charles A. Leonard of Cincinnati, Ohio. It is an ordinary electric iron but within it are permanent magnets. The ironing board used with it contains a magnetic material. Magnetic attraction between iron and board gives the necessary pressure.

Science News Letter, June 2, 1951