

AERONAUTICS

Faster Than Sound Flight

Use of new wind tunnels is helping to penetrate the mystery of transonic speed range, which is about 600 to 1,000 miles per hour.

See Front Cover

► THE greatest unknown region of aviation, the speed range from about 600 to 1,000 miles per hour, is being conquered. The fear and mystery of the "stone wall" of the transonic range is being overcome through use of new wind tunnels at the Langley Aeronautical Laboratory of the National Advisory Committee for Aeronautics.

For two years there has been no question but that man could fly faster than sound. The X-1 did it for a few minutes and probably several other experimental planes have done so since and will go on doing it. (Just how fast and when and where and how are still kept secret).

But more is necessary. Thorough exploration of the speeds close to sound's speed must be done in artificial superhurricanes—wind tunnels.

During the series of inspections of the great NACA research plant at Langley Field, Va., now under way, a new transonic wind tunnel was disclosed. Actually it has been in operation for several years, piling up information that has been kept secret in the interests of devising planes that can fly through the sound speed barrier and beyond.

This new tunnel gets its speeds by whirling a model on the rim of a disk about five feet in diameter. Its speed range is from Mach 0.80 to Mach 1.3, as the scientists express it. This corresponds to 600 to 1,000 miles per hour, since Mach 1.0 is the speed of sound, which at sea level is approximately 760 miles per hour. This range of the NACA transonic wind tunnel has been considered the blind spot in tunnel techniques.

There are several other tunnels at the Langley Laboratories that have speeds well above the speed of sound. These supersonic tunnels, as well as the subsonic tunnels, so useful in designing conventional aircraft of the past, get a choking effect and fail to give reliable results through range of the speed of sound.

Information about what happens at about the speed of sound is obtained by flight tests of several sorts. Models heavily weighted have been dropped from airplanes high in the air, and while plunging down to earth what happens to them is radioed back by instruments carried. Rockets launched from the ground carry models into the ordinary atmosphere to give other transonic tests. Little models are mounted in such a way on test airplanes, diving at

530 miles per hour, that a supersonic wind created over part of the upper surface of the wing does the testing.

The fastest of the NACA wind tunnels is the four-by-four-foot supersonic tunnel at Langley, although there are somewhat larger supersonic tunnels at both Ames Laboratory in California and the Lewis Propulsion Laboratory at Cleveland. Speeds up to Mach 2.2 (1670 miles per hour) are obtained in the four-by-four-foot tunnel. Viewing apparatus allows observers to see the shock wave envelop the model as the speed is increased, and finally the shock wave can be seen actually to detach itself from the forward edge of the supersonic wing so that the shock gets there before the arrival of the airplane part that causes it.

These complex tunnels and instruments

are the stuff that will allow the design of the supersonic airplanes of the future.

At present there are no supersonic airplanes ready to fight or do useful work. We don't know enough to carry a tactical airplane through the speed of sound and beyond and have it operate the way pilots expect good airplanes to do. There are not yet practical man-carrying fighters at above the speed of sound.

But there is no longer fear of the speed of sound. Aviation is well on its way through the transonic range and beyond.

Science News Letter, May 28, 1949

On This Week's Cover

► TO improve the design of helicopters, the air flow around the whirling blades, called rotors, are studied at the Langley Aeronautical Laboratory of the National Advisory Committee for Aeronautics. The cover photograph shows the flow pattern of the air when the blades start whirling and there is rapid increase of thrust. The way the air travels is shown by balsa dust whirled around by the model.

Science News Letter, May 28, 1949

MEDICINE

Check Enlargement III

► ACROMEGALY, the disease in which there is progressive enlargement of the head, feet and hands, apparently can be controlled with sex hormones if detected in the early stages.

Furthermore, a reliable test for detecting it early has been developed, and a second test is being perfected. The second test involves the first assay of the growth hormone in human blood.

This has been reported by a group of University of California Medical School scientists working under a contract with the Office of Naval Research. The scientists include Drs. Laurence W. Kinsell, George D. Michaels, C. H. Li, and William E. Larsen, Lt. (jg) M. C., USN.

In a follow-up of work suggested several years ago at Harvard University, the scientists have succeeded in halting the progress of the disease for a period of two years in two male patients. Androgens, male hormones, and estrogens, female hormones, were administered to the patients.

The successes are based on a theory posed by the group to account for the differences in growth in childhood and adolescence.

Dr. Kinsell said that apparently the growth hormone of the pituitary, tiny gland at the base of the brain, is solely responsible for growth during childhood. At puberty the sex hormones are manufactured, suppress the activity of the growth hormone, and substitute a new type of growth stimulation which brings about maturity.

In some cases, when the sex hormones fail to suppress the growth hormone, the individual continues to grow to abnormally large size. This is known as acromegalic gigantism.

In other instances there is a sudden renewal of growth after maturity, and this is true acromegaly. Dr. Kinsell says this is usually caused by a tumor of the pituitary, resulting in such over-production of the growth hormone that the sex hormones cannot suppress its action.

Evidence to support this concept was found, and resulted in the development of the group's diagnostic test. They found that whenever there is fast growth—in childhood, in gigantism or in true acromegaly—there is a consistently high phosphorus content in the blood.

To back this up, Dr. Li found there is an increase in the amount of growth hormone in the blood under the same conditions, though this test is still in the early stages.

The phosphorus test can now be used to detect acromegaly and to determine how effective treatment is.

Treatment of the two patients, aged 20 and 28, with testosterone propionate and ethinyl estradiol, brought about a cessation in severe headaches, abnormal growth, a decrease of phosphorus in the blood, and an apparent decrease in the size of pituitary tumors. There has been no apparent growth since treatment was started.

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