

ENGINEERING

**Possibility of Mach 15
In Hypersonic Tunnel**

SPEEDS of Mach 15 and higher will be possible in a new low-cost wind tunnel at the Massachusetts Institute of Technology's Naval Supersonic Laboratory.

The tunnel is a result of a new concept in continuous flow hypersonic wind tunnel design. Speeds up to Mach 7.6 and a temperature of 1,000 degrees Fahrenheit have already been achieved. Further development will enable tunnel operators to reach Mach 15 and a temperature of 2,000 degrees Fahrenheit.

The MIT tunnel, developed with funds from the Office of Naval Research, Washington, D. C., places a hypersonic tunnel within an existing but lower-speed supersonic tunnel. (Supersonic speeds are those up to Mach 5, or five times the speed of sound. Hypersonic speeds are those above Mach 5.)

In this tunnel-within-a-tunnel concept, only the central hypersonic core of air is heated. The outer supersonic screen provided by the outer tunnel serves as an insulating blanket at normal temperatures.

These advantages plus a new technique for fabricating the hypersonic nozzle have reduced the cost of the MIT installation to \$150,000. This compares to several million dollars normally spent in building hypersonic wind tunnels by using conventional brute force techniques.

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BIOLOGY

**Insect-Eating Mammal
Has Toxic Salivary Gland**

THE STRANGE LOOKING agouta has another claim to fame: It has a potent poison in its salivary glands.

The agouta of Haiti—two feet long, with a long snout, short round ears, hard fur and a long scaly tail—is a very rare insect-eating mammal. Now, a "crude check" on its submaxillary salivary glands shows they contain venom, George B. Rabb of the Chicago Zoological Park reports.

Three of the animals that had died in the zoo were examined, he reports in the Natural History Miscellanea published by the Chicago Academy of Sciences. Parts of the submaxillary and parotid glands were ground and diluted in a salt water solution. This extract was injected into several mice. Those animals given between .38 and .55 milligrams for each gram of body weight died within two to six minutes. Smaller doses were followed by recovery of the injected animals. More than 400 mouse lethal doses could have been prepared from one agouta, he said.

Mr. Rabb reports he was unable to induce the agouta (whose scientific name is *Solenodon paradoxus*) to bite live mice, thus failing to get direct evidence of how the animal gets the poison into its prey. However, a duct of the poison gland is described as ending at the base of the large deeply channeled second incisor tooth of the lower jaw.

There is only one report of a human being bitten by the agouta.

There are some indications that the animal is not immune to its own poison, Mr. Rabb explains. One of the zoo animals had many bite wounds on its feet and no obvious internal evidence of other causes of death.

Since the animal is an insect-eater, the usefulness of the poison gland is unknown, the researcher concludes. Earlier forms may have used them, so the explanation may be phylogenetic and historical rather than one of present-day function. One possible use for the venom is defense or aggression against other agouti during, for example, the breeding season.

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AERONAUTICS

**Radio Heaters Threaten
Air Navigation Safety**

HEATERS that use radio waves to fuse plastic together are seriously interfering with radio navigation aids used by airplane pilots in many parts of the United States.

Improperly shielded radio frequency heating devices, used to make raincoats and other plastic products, pose an especially serious problem in the New York City area, the Federal Communications Commission states in its fiscal 1959 report.

"Clearing the New York City area of their interference is a difficult problem," the report says, "however, progress is being made."

This interference has also hampered police communications. But so far, neither an air crash nor failure of a policeman to make an arrest has been traced to the interference, George S. Turner, chief of the FCC's field engineering and monitoring service reports.

In one instance, a secret broadcast circuit used by the military for national defense was disrupted by interference from heaters for plastics.

"The airways check out their own electronic navigation beacons periodically," said Mr. Turner. "When serious interference near a beacon is noted, both pilots and the FCC are alerted."

Mr. Turner said most of the improperly shielded plastic heaters are used by small manufacturers operating on shoestrings. The number of these operators is increasing rapidly.

Tracking down improperly shielded heaters used by these people is difficult, he said. These manufacturers may occupy one or two rooms on the top floor of a building. They often are forced to move frequently due to non-payment of bills.

Adding to the difficulty of tracing the source of interference is the fact that the heaters do not operate on a single radio frequency.

The frequency of the heater changes rapidly as the plastic begins to melt. This causes interferences to sweep rapidly across a band of radio frequencies used by other people for communications. It makes difficult the job of getting a radio "fix" on the direction from which the interference is coming.

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MATHEMATICS

**USSR Pushing to Develop
Electronic Calculators**

THE USSR is spending lots of men and money to develop better electronic computers, Samuel N. Alexander, chief of the data processing systems division of the National Bureau of Standards, told the Philosophical Society of Washington.

On a recent trip to Russia, he was told that 400 students are enrolled in the University of Moscow's computational mathematics program.

"I think that may be more than, or at least equal to, the total number who take this specialty in all the Western world," he said.

Mr. Alexander said the USSR's present computers or electronic "brains" are less sophisticated than those in the West. "But the USSR seems to get quite acceptable results, so I am beginning to conclude they do it with better-trained men."

He said the USSR's calculations of satellite paths is an example of the country's ability to get good results.

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CHEMISTRY

**USSR's Chemical Papers
Said to Be Ignored Here**

THE USSR RANKS second among all nations in the output of chemical literature, but most of these writings go unnoticed by America's chemical engineers.

Lawrence W. Ross of the Georgia Institute of Technology told the national meeting of the American Institute of Chemical Engineers in Atlanta, Ga., that "Russia produces one-seventh of the world's chemical engineering literature, half as much as America." He said most of it is ignored in the U.S., because of the language barrier.

Mr. Ross said since Stalin's death there has been no "political chemistry" evident in Russian publications but that party-line political meddling had marred earlier scientific literature.

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PHYSICS

**Gyro in Satellite Could
Test Einstein's Theory**

A SPINNING gyroscope in a satellite promises to provide the next new experimental test of the general theory of relativity.

Unsatisfied with the gravitational red shift and the deflection of light as crucial tests of Einstein's general theory, because they can be inferred from special relativity or the equivalence principle, both well proved experimentally, Prof. L. I. Schiff of Stanford's Institute of Theoretical Physics calls for a gyroscope that will operate outside the pull of gravity aboard a satellite instead of in an earth-bound laboratory.

He presents this challenge to other physicists in Physical Review Letters, 4:215, 1960.

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