Do You Know?

Sugar is the hub of Cuban economy.

Panama has recently established a factory to produce *wax matches.*

Cull potatoes are no longer an agricultural outcast; they now have wide usage in the manufacture of industrial alcohol.

As a substitute for war-scarce tin, *beryllium* forms an alloy with copper that can take the place of bronze.

Food is just as hot whether it is *boiling* fast or slowly, and fast-boiling uses more fuel.

Inclusion of *hydrogen* in amounts as small as one two-thousandth of 1% can make steel brittle.

The male *halibut* rarely grows to a weight of more than 40 pounds, but females have been found weighing ten times as much.

Substitutes are being sought for wartime costly *mercury salts* used in cabbage maggot control.

Carbolic acid, called phenol by chemists, was at one time used principally as a germicide; now its primary use is in making plastics, dyes and explosives.

A new type of spray gun used by the armed forces contains an insecticide and a liquid mixture that forms a *"cold smoke"* as it escapes through a special nozzle and does not settle for hours.

Pollution is thought to be the chief cause for the decline of shad in the Delaware River which prior to 1900 produced 15,000,000 pounds annually, but now yields from 100,000 to 150,000 pounds.

The discarded pulp of *henequen* leaves, from which the fiber for twine has been removed, is so acid that parts of de-pulping machines must be made of copper, bronze or brass to resist the acid.

Zirconium sulfate is used in a new white mineral tanning agent to obtain white leather; zirconium is a metallic element of the titanium group of chemical elements whose silicate, known as zircon, is valued as a jewel.

PHYSICS

Super Speeds Questioned

Expert believes airplanes may some day travel at speed of sound, but they have not yet reached it. Lift coefficient will decrease with higher speeds.

➤ AIRPLANES may some day travel at the speed of sound. They will do it first in diving at high altitudes; but it is doubtful if this speed has already been made, in spite of previous news that one or another pilot has reached such high velocity.

This opinion was expressed by Dr. Theodore von Karman, director of the Guggenheim Aeronautical Laboratory, California Institute of Technology, in the Joseph Henry lecture before the Philosophical Society of Washington.

"Obviously," he said, "it is an interesting question whether there are any intrinsic limits for flight velocity. Many people will ask you 'shall we ever fly faster than sound?' I do not believe that at the present time this question can be answered by a straight yes or no." At sea level this would require a flight speed of 780 miles per hour, at high altitudes somewhat less.

A discovery of fundamental importance in the development of the steam and gas turbine was referred to by Dr. von Karman. In the nineteenth century, he said, many engineers believed that it is impossible to produce higher efflux or outflow velocities than the velocity of sound. Then the Swedish engineer, De Laval, demonstrated that by a so-called convergent-divergent nozzle much larger velocities can be reached.

As to the motion of solid bodies in a medium faster than sound, the science of ballistics offers interesting facts, the speaker stated, which have bearing on aeronautical problems too. Airplanes will go to the velocity of sound probably in diving at high altitude, he continued. "The check of possibilities shows that previous news that one or another pilot reached the velocity of sound are probably erroneous."

In general, Dr. von Karman declared, it can be said that whereas, for example, it is impossible to design vehicles which would leave the gravity field of the earth unless new fabulous fuels are discovered, the velocity of sound should not be a "stonewall of despair" for faster motion.

The amount of lift produced by an airplane wing, generally speaking, is determined by the difference of pressure between the lower and upper surfaces, he explained. In the case of a cambered wing the air is accelerated along the upper surface to a greater extent than at the lower surface, and therefore, at the upper surface a larger suction results. This suction furnishes the lift of the wing. The camber is the curvature of the centerline of the wing section.

"Now it is evident that because of the larger camber of the upper surface the velocity of sound will be reached sooner in the upper than in the lower . . . After that even if we further increase the flight velocity of the wing the magnitude of the suction at the upper surface will cease to increase, the lift practically becomes independent of the velocity of flight." The ratio between the lift per unit area and the dynamic pressure of the corresponding flight velocity is the lift coefficient. "Hence, if the lift remains constant with increasing flight velocity, the lift coefficient must rapidly decrease."

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