Do You Know?

Dark, close-grained stone called *basalt* makes good ballast for railroads.

Canned *milk*, once opened, should be kept covered and cool, just as fresh milk should be.

Molasses is a common preservative used in farm silos for corn and other forage crops.

The U. S. *Army Corps of Engineers* is older than the Republic; it was established by an act of the Continental Congress on June 16, 1775.

Rooms in modern homes, with low ceilings to save cost, appear higher when sidewalls and overhead are finished with a high reflection paint.

Panama *honey-creepers* are beautiful, small, deep-blue birds that cling tightly to the stems of plants while they sip nectar from the flowers.

The *otter*, whose fur is highly prized, is an unusually large member of the weasel family; its webbed feet are better adapted for swimming than for travel on dry land.

Dropping a *fumigant* by a machine ahead of a plow has been found a successful method of controlling wireworm in the soil; ethylene dibromide solution is one effective substance used.

Brass fixtures in houses, after being cleaned in preparation for a coating of lacquer or other material, must not be touched with the hands; even a slight touch may leave a trace of oiliness from the pores of the skin.

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PHYSICS-ASTRONOMY

Projectiles for Research

➤ TWO WARTIME inventions, the long-distance rocket and the bazooka-type high-explosive charge, are being combined to hurl artificial meteors into outer space for purposes of pure research in physics and astronomy. Dr. F. Zwicky, professor of astrophysics at the California Institute of Technology, tells of the experiments in *Army Ordnance* (July-August).

The idea is to mount a shaped charge, with a metal lining in its conical cavity, on a super-rocket that will climb above practically all of the earth's atmosphere before the charge is fired. The metal lining will be converted by the intense explosion into one or more projectiles with velocities as great as 50,000 feet per second. This is about 20 times the muzzle velocity of a military rifle bullet.

These super-projectiles will be used as objects of research, such as bombarding the moon. The flashes resulting from their impact will be spectrographically analyzed, to find out what the moon is made of. Further refinements, and bigger rockets and charges, may make it possible to bombard still more distant targets, such as the other planets.

Another use of rockets suggested by Dr. Zwicky is the carrying of small photographic telescopes outside the earth's atmosphere. In this way it will be possible to obtain information about radiations from the sun and from more distant stars which is denied to observers on the ground with even the largest telescopes because the atmosphere absorbs a large part of all radiations. He mentions particularly a class of stars with temperatures higher than 100,000 degrees absolute. At present we know practically nothing about them because their radiations consist almost entirely of short-wave ultraviolet, which the atmosphere stops before it reaches the earth's surface.

Astronomical telescopes of the Schmidt type are proving more useful and accurate than radar in tracking rockets fired in the White Sands experiments, Dr. Zwicky states. They follow the rockets by the glow of their white-hot graphite rudders. They also have been used in recording the trajectories of metal particles hurled out by shaped charges in experiments on the ground.

Science News Letter, July 19, 1947

BALLISTICS

To Build Better Rockets

➤ RESEARCH which may provide a basis for coping with the air-friction heating of surfaces of supersonic missiles and planes, one of the factors placing a ceiling on speeds which can be achieved in sustained supersonic flight, is now under way at the University of California.

Engineers are beginning work with a verification of German research for the V-2 rocket. This research, while it fitted the needs of the V-2, was only a beginning in a field of growing importance, according to H. A. Johnson, engineer in charge of the Army Air Forces-sponsored project.

Present studies are being made in a small, subsonic wind tunnel, using flat plate models of metal and bakelite, to which are attached thermo-couples giving an extremely sensitive reading. Given the same conditions, the heat flow rates at supersonic speeds can be calculated from subsonic results. Next year the engineers hope to study air friction heating in a supersonic tunnel.

At the present time, Mr. Johnson explained, air travel above 600 miles per hour at sea level is not practical because the uncomfortable temperature of 120 degrees Fahrenheit is generated in the aluminum skin of an airplane. At 1,200 miles per hour at sea level a temperature of 200 degrees Fahrenheit would be generated, and this is about the limit of safety for metals now in use. With greater temperatures and stresses set up by sustained high speed travel, aluminum would tend to break up.

Change in temperature of the air at different altitudes is a factor in the research. At sea level the air temperature is 60 degrees Fahrenheit, while at 100 miles it appears to be about 570 degrees with a variation down to 70 degrees below zero at 35,000 feet. Thus the heat generated on the skin of a plane or missile would be influenced by the belt of air in which it traveled.

Science News Letter, July 19, 1947

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