



RCA

**ELECTRONIC EYES**—A giant tracking radar designed and built by Radio Corporation of America has been placed into operation at the Ballistic Missile Early Warning System site at Clear, Alaska, by the U.S. Air Force. The tracking radar, housed in a radome made of paper, fiberglass and plastic, will provide long-range, ultra-high-speed warning in event of a ballistic missile attack over the top of the world.

#### PUBLIC SAFETY

## Smoke Dims Drivers' View

► **CHRONIC** cigarette smoking, closed windows and drivers' medical ignorance generally play subtle physiologic roles in the tragic human destruction on the highways, a U.S. professor has found.

Dr. Ross A. McFarland of Harvard University has reported to the World Health Organization, Geneva, his analysis of "The Dangers of Motor Vehicle Design."

Dr. McFarland believes accident prevention depends largely on controlling "certain environmental variables to which the driver is exposed," including temperature, humidity, ventilation, noise, vibration and gas. Opening the windows makes a big difference.

"Poor ventilation causes lethargy and sleepiness," Dr. McFarland noted. "Ideally about one cubic meter of fresh air should be supplied each person, at speeds of 18 to 50 feet per second, to maintain a sense of freshness without creating undesirable drafts."

When humidity is below 15%, the eye membranes, nose and throat are affected and make the driver uncomfortable, he said.

Dr. McFarland said that small amounts of carbon monoxide are absorbed rapidly by the blood stream, resulting in an oxygen deficiency that may at first not be noticed by the driver.

"The initial reaction to CO consists of lowered attention, difficulty concen-

trating, slight muscular incoordination, sleepiness and lethargy.

"One of the earliest demonstrable effects is to reduce the sensitivity of the eye under low illumination, as in driving at night."

Heavy cigarette smokers have been found to have from four to eight percent carboxyhemoglobin in their blood, corresponding to that at an altitude of 7,000 feet, Dr. McFarland reported. If additional CO enters the car body from the exhaust system, a state of oxygen deficiency may result, "with serious implications for road safety."

Tinted windshields have not caught on in Europe as in the States. Dr. McFarland told the WHO experts that they are excellent during the day but very risky at night. Older drivers have decreased retinal sensitivity to light at low levels, so tinting "raises a serious question of safety."

Ordinary cars are allegedly designed so the "average man" can easily handle the controls, but the Harvard specialist estimated that they are adapted probably to only half the drivers.

WHO resolved at its recent annual assembly of 126 member states to do more in the field of traffic accidents, citing the fantastic rise in fatalities and injuries in Europe, Japan and even developing countries.

#### TECHNOLOGY

## Airborne Missiles Get New Winter 'Overcoat'

► A **NEW** cold-weather "overcoat" for the rocket motors of airborne missiles reportedly works well at temperatures as low as 120 degrees below zero F., 60 to 80 degrees colder than previous materials.

Actually the overcoat is more of an innercoat—an internal insulation for solid rocket motors that must be used over a wide range of temperatures.

Until about 18 months ago the best available materials contained synthetic rubbers called Buna N and Buna S, which became brittle and lost their strength at about minus 40 and minus 60 degrees respectively. To keep the insulation flexible, a low temperature material was added containing a large quantity of "plasticizers." Unfortunately, in high-temperature uses the plasticizers boiled out, leaving the insulation almost as badly off as before.

To make the insulation behave at both high and low temperatures, scientists at Lockheed Propulsion Company, Redlands, Calif., developed a new polymer with which to replace the material containing the plasticizers. Thus, there were no plasticizers to boil away at high temperatures, and in extreme cold the new polymer performed better than the plasticizers had.

Tactical missiles of various types can use the insulation, but air-launched systems are the most likely application. In addition to keeping the "innercoat" flexible, the polymer has reportedly improved dimensional stability and insulating qualities.

#### MATHEMATICS

## Nobel Prize Winner's Math Is Now Proved

► **THE MATHEMATICS** by which one of last year's Nobel Prize winners, Dr. Richard P. Feynman of California Institute of Technology, Pasadena, described how certain things happen in atomic nuclei has now been proved.

Since the time when Dr. Feynman first used the then empirical mathematics in 1951, physicists have found it extremely valuable for calculating several quantities required to explain nuclear interactions using the theory of quantum electrodynamics. However, his empirical "operator calculus" was not mathematically justified at that time.

Now two mathematicians at International Business Machines Corporation's Thomas J. Watson Research Center, Yorktown Heights, N.Y., have rigorously formalized Dr. Feynman's calculus. Drs. W. L. Miranker and B. Weiss reported details of their mathematical proof in *SIAM Review*, 8:224, 1966, journal of the Society for Industrial and Applied Mathematics.