

ROCKETS AND MISSILES

Launch Four-Ton "Moon"

► THE U. S. AIR FORCE launched an 85-foot-long Atlas intercontinental ballistic missile (ICBM) weighing about 8,800 pounds into an earth-circling orbit from Cape Canaveral, Fla., on Dec. 18.

President Eisenhower said the launching constitutes "a distinct step forward in space operations," and opens "new opportunities to the U. S. and all mankind for activities in outer space."

Preliminary data indicated the satellite was orbiting the earth once every 100 minutes, reaching an apogee of 928 miles and a perigee of 114 miles. Because this orbit is relatively low and the atmosphere's drag on the object is therefore greater than on more distant orbits, the satellite is expected to stay up only about 20 days.

The satellite carried in its cylindrical body a communications system designed to record messages from ground stations and play them back on demand. It is called "Score" for "satellite communications orbit relay experiment."

The Air Force Atlas missile was launched to test its satellite vehicle launching capability. So successful was the test that the entire vehicle achieved an orbit. It was the first time that a high accuracy missile guidance system was used to steer a satellite into precisely the orbit path planned. Previous satellites have been hurled rather than guided into orbit.

It will be visible near dawn and dusk to persons living in a belt 32 degrees north or south of the equator.

The Atlas missile has three rocket engines totaling about 350,000 pounds of thrust. The payload of instruments weighs about 150 pounds, of which equipment for the communications experiment takes about 35.

Planning and implementation of the project were carried out by the Air Force ballistic missile division of the Air Research and Development Command in collaboration with the Army Signal Corp. Assisting were the Atlas ICBM technical team consisting of the Space Technology Laboratory, contractors to the Air Force for technical direction and system engineering; Convair Astronautics, builder of the Atlas missile; General Electric Co., Syracuse; and Burroughs Corp., developers of the accurate guidance systems; and Rocketdyne, division of North American Aviation, developer of the Atlas propulsion system.

Total weight of Sputnik II and its carrier rocket, which orbited as separate objects, has been estimated at about 7,000 pounds. Sputnik III and its carrier are believed to have weighed even more. Atlas' payload and carrier are one unit, with some of the payload housed in the carrier.

Science News Letter, December 27, 1958

PHYSIOLOGY

Study Cholesterol Effects

► ATHEROSCLEROSIS can occur even in an artificial blood vessel following a high cholesterol diet, three scientists report.

Nylon and orlon fabric tubes were used to replace pieces of blood vessels.

This is believed to be the first time scientists have been able to make such a change in artificial blood vessel grafts.

Working with adult dogs, the scientists removed a section of the aorta and replaced it with about an inch of either nylon or orlon tubing. Approximately two weeks after the operation the dogs were placed on a diet of horse meat, a dog food preparation and five percent cholesterol.

The six animals studied were kept on the high cholesterol diet for 15, 18, 28, 58, 60 and 62 weeks respectively, the scientists report in the *Proceedings of the Society for Experimental Biology and Medicine* (Nov.).

In two animals kept on the diet for 60 weeks and 57 weeks, atheromatous changes developed in the inside surface of the graft. None of these changes affected the usefulness of the nylon or orlon, however.

Scattered yellow plaques slightly raised from the surface appeared on the newly formed connective tissue encasing the nylon. Large foam cells, associated with lipid or fat deposit, were also found.

These changes do not occur unless the animal goes through a long period of taking in large amounts of cholesterol, the scientists

said. The synthetic blood vessel is also less susceptible to the changes than is normal blood vessel.

The discovery is expected to "shed some light on the mechanism by which such changes occur," the scientists conclude. Already it has lent support to the filtration concept of atherosclerosis in which the capillaries and blood plasma play a role in depositing lipid substances.

An "inherent metabolic or enzymatic capacity of the normal tissues of the vessel wall to form atheroma" does not seem to be essential to atherosclerosis.

Drs. George L. Jordan Jr. and Michael E. DeBaakey of Baylor University College of Medicine and Bela Halpert of the Veterans Administration Hospital, Houston, Texas, who reported the research, say further studies using less porous synthetics for the blood vessel grafts are being made.

Science News Letter, December 27, 1958

MEDICINE

X-Irradiated Mice Studied for Anemia

► A "STRIKING RELATION" between a decrease in the number of red blood cells and the amount of total liver fats in rats and mice is reported by a Czechoslovakian scientist.

When the animals are given high doses

of X-irradiation there is usually damage to the liver in the form of fat degeneration, Dr. M. Skalka of the department of biophysics, Czechoslovak Academy of Sciences, explains. Severe anemia may also result.

Now a statistically highly significant correlation has been found between the two, the scientist reports in *Nature* (Dec. 6).

It is known, he says, that severe anemia and the resulting lack of oxygen in the organs causes damage to the liver. However, the relationship "as far as we know" has not been investigated in the case of irradiation effects.

There are indications that severe hypoxia (oxygen shortage) of the tissue "after irradiation is malignant to the organism," Dr. Skalka concludes.

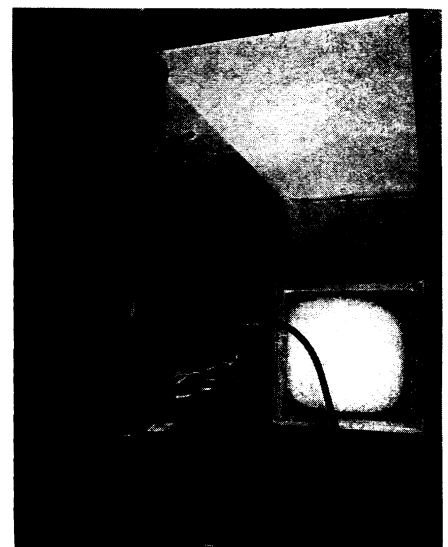
Two other Czechoslovak researchers, M. Pospisil and L. Novak of the Biophysical Institute, also reported on studies of X-irradiated mice.

They have found that a mouse's consumption of oxygen under conditions of adapting to new environment is reduced before death due to irradiation. Interpreting this reduction as due to the nervous system's failure in its capacity for adaptation, the scientists fed the mice thyroid before irradiation.

For 20 days, male mice were given dried thyroid daily along with their food. Five days after this pre-treatment was stopped the animals were given a dose of whole-body X-irradiation of 600 roentgens.

Mortality for one untreated group was 70% at 30 days, the scientists reported; the treated mice had a mortality of 55%. In a second group, the untreated mice suffered 91% mortality, while those mice receiving the thyroid pre-treatment had only a 40% mortality.

Science News Letter, December 27, 1958



PARTICLE TRAP—A filter mat, designed for collecting radioactive particles in the atmosphere for subsequent measurement, has been developed at Stanford Research Institute. It is built up by spraying a special solution of polystyrene in methylene chloride solvent against a square of Dacron mesh.