

## ASTRONAUTICS

# Plan Missile to Moon

To land 50 pounds of instruments on the lunar surface would require a three-stage rocket weighing about a million pounds, an engineer for Rand Corporation calculates.

► INTERPLANETARY MISSILES zooming around Venus and Mars and landing on the moon are being planned by leading rocket engineers and scientists, who reported their progress at a symposium on earth satellites at the Franklin Institute, Philadelphia.

A three-stage rocket weighing about a million pounds would be needed to place 50 pounds of scientific instruments on the moon's surface, George H. Clement said. The senior engineer at Rand Corporation, Santa Monica, Calif., an independent research facility engaged in defense work, said deceleration rockets and energy-absorbing devices would be needed to land the instruments in usable condition.

To reach the moon, the vehicle would need a velocity of about 35,000 feet per second at an altitude around 350 miles above the earth's surface, Mr. Clement calculates. Less push would have to be given to the rocket if it were fired from the side of the earth facing away from the moon at the time of launching.

Krafft A. Ehrlicke, head of preliminary missile design at General Dynamics Corporation's Convair Division in San Diego, said a "crowning accomplishment" for humans would be landing satellites on the moon by remote control, then using television to study lunar conditions.

The chairman of the International Geophysical Year's panel on earth satellites, R. W. Porter, a General Electric Company consultant, proposed a method for recovering photographs and biological samples sent up in satellites.

A balloon with a thin metal skin, he said, would provide the required slowing action and withstand the high temperatures generated during descent. A small rocket would start the balloon spiraling down, and a radio transmitter in the balloon would make a brief broadcast so the object could be located.

A payload of about 100 pounds, about five times that now planned for the first earth satellites to be launched during the International Geophysical Year, would be needed to scan the heavens from above the earth's atmosphere, Dr. Lyman Spitzer Jr., director of Princeton University Observatory, calculates.

A stabilized telescope, a spectroscope and auxiliary equipment on a satellite, he said, "might well revolutionize the study of astrophysics."

Among the problems that could be investigated with such a set-up are: 1. the detailed distribution with height of all elements in the earth's upper atmosphere; 2. the composition of the atmospheres of

the moon, Venus, Mars and other planets; 3. the abundance of the main atomic and molecular species in interplanetary, interstellar and intergalactic space; and 4. the temperature and compositions of stars with high surface temperatures and the coronas surrounding these stars.

Dr. Homer E. Newell Jr. of the Naval Research Laboratory, Washington, said decisions concerning what experiments would be done from the satellites are now being made. Paths the satellites will take as they whirl overhead, he noted, will be made widely known so as many people as possible can view the earth-circling moonlets.

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## STATISTICS

## U. S. Women 42 to 51 Have Had Fewer Children

► AMERICAN WOMEN now between the ages of 42 and 51 have had fewer children than the women who are now younger or older, a study made by the Scripps Founda-

tion for Research in Population Problems at Miami University, Oxford, Ohio, shows.

The small families borne by women who were born between the years 1905 and 1914 represent the end of a decline in family size that began more than a century ago in the United States, P. K. Whelpton, director of the Foundation, states.

Among the women born in 1875-1879, for example, there were about 380 births per 100 women, compared to 232 births per 100 women for the 1905-1914 group. As another illustration of the size of the decline, Mr. Whelpton points out that 100 women who were born in the early 1800's probably had between 700 and 900 births on the average, if they lived to age 50.

Final figures, Mr. Whelpton reports, are not available for the women born between 1915 and 1919, "for they were having only their 36th to 40th birthdays in 1955," but their completed fertility has been estimated and is expected to be 250 per 100 women.

It is among the younger women of the nation, Mr. Whelpton states, that larger increases in the average family size may be occurring. Among the 1920-1924 group, for example, there have been about 234 children born per 100 women already.

Among still younger women, those now 18 to 30 years old, there has been a marked tendency to marry and start families at younger ages.

This probably does not mean a corresponding increase in the average number of children when their families are completed.

Science News Letter, April 28, 1956



**ATOMIC EXHIBIT VIEWED**—Teen-age scientists, members of the Junior Washington Academy of Sciences, learn how engineers control the explosive release of nuclear energy in a reactor. The exhibit, featured in the Second Annual Atomic Exhibition, uses electronic instruments to simulate a reactor's operation. Here Rober Menzer, 17, president of the group, starts the reactor as Minneapolis-Honeywell engineer Bill Forsythe explains how the various electronic units measure and control the reaction.