



**TURBO-PROP AIRCRAFT**—A new observation plane, the U.S. Army's first turbo-prop powered fixed-wing plane, has been built by the Grumman Aircraft Engineering Corporation. The AO-1 Mohawk is designed to operate from small, unimproved fields, water, snow and mud; a bubble canopy provides maximum visibility.

## ASTRONAUTICS

## New "Air" for Space Ship

Synthetic air, half helium and half oxygen, for the space traveler to breathe during his round trip adventure to the moon, has been proposed.

► SYNTHETIC "air" for the first space ship to circle the moon and return is proposed by John Gustavson of the University of California, Berkeley. The man-made atmosphere would be half helium and half oxygen kept at a relatively low pressure.

Providing an adequate air supply system and livable temperatures for a crew of four or five for at least ten days, Dr. Gustavson's studies show, is quite a problem. Today's pilots are getting a sample taste of what it is like to fly in space, but only for an hour or so at a time.

In the space vehicle of the future, the temperature must lie between 70 and 90 degrees Fahrenheit and the humidity must be stabilized at about 40%. Crew members will have to spend several days before departure adjusting themselves gradually to the helium-oxygen atmosphere.

"Hot spots" on space ships will make temperature control difficult. The sun's radiation will be the main source of heat. Some of this can be dissipated into space by treating the ship's surface facing the sun with a highly reflective material, while that away from the sun is given a coating that allows the heat to escape.

Other heat sources within a space ship are the electronic equipment, the crew itself, and cooking facilities and lighting.

The best way to remove this heat, Dr. Gustavson suggests, is through use of a heat exchanger. The heat would be absorbed by a chilled fluid, which would then be pumped through a radiator on the

dark side of the vehicle. This system will also permit easy removal of water vapor, which might condense in the heat exchanger.

Eliminating either toxic gases or those that could burn spontaneously, such as hydrogen and methane, is another problem. The carbon dioxide breathed out by crew members could be absorbed by lithium oxide pellets.

The usual proposal of using the tiny green water plants known as algae, which produce oxygen, to balance the carbon dioxide is of "doubtful" value. This system is only 25% efficient, providing the proper growth conditions is difficult and the algae are extremely temperature-sensitive. Most important, Dr. Gustavson says, some algae produce deadly carbon monoxide along with the oxygen.

His conclusions are reported in the publication of the American Rocket Society, *Astronautics* (Nov.).

Science News Letter, November 9, 1957

## PHYSIOLOGY

## Men Are Physically Able To Travel in Space Now

► MEN ARE physically capable of surviving space trips right now, says Dr. Nello Pace, University of California, authority on high altitude physiology. (See SNL, Oct. 19, p. 247.)

However, human ventures into space at

present would be marginal. The efficient use of human observers on missiles and space platforms for extended periods requires much more research on man and his relationship to his environment.

The scientist, who is operations director of the University's 14,250-foot-high White Mountain research station, pointed out that American achievements in conquering physiological problems of space are already considerable.

The Navy's Stratolab Project twice has put two men up to 80,000 feet for several hours, and the Air Force's Manhigh Project kept an observer at more than 100,000 feet for more than 24 hours.

"The conditions in space are not essentially different from those at 100,000 feet," Dr. Pace said.

He added that psychological stresses and problems of food and air supply in atomic submarines are almost identical with those encountered at high altitudes. These and other problems of extended submergence have been extensively studied.

Important problems remain to be solved, however, Dr. Pace said. One of the most important concerns the effects of gravitation. It has been found in rocket flights that animals become disoriented, and similar results have been found in humans in brief periods of weightlessness at certain points in the parabolas of diving aircraft.

Science News Letter, November 9, 1957

## ASTRONAUTICS

## Big Space Race: Rocket to Moon

► THE NEXT great space race between the United States and U.S.S.R. is: Who will be the first to get a rocket to the moon?

It is not so impossible as it may sound.

A velocity of seven miles per second at any altitude above the atmosphere will allow a rocket to escape into outer space. This means that it could hit the moon.

Already the Russian satellite has achieved five miles per second velocity. Only two more miles per second are needed.

The giant Far Side U.S.A. rocket that was fired from a high altitude balloon on Eniwetok Atoll Oct. 21 rose 2,750 miles in altitude and may have reached a height of 4,000 miles.

This U.S.A. rocket was expected to travel at about the velocity of the Russian satellite, five miles per second.

The gap between what has been achieved and the escape velocity is closing.

Perhaps from a propaganda standpoint, the U.S.A. should hit the moon first. How fast it could be done and what more it would cost beyond the present missile expenditures is a question.

Half a billion dollars might do it in a matter of months if the good old U.S.A. punch is put behind the project.

If a small payload were landed on the moon, consisting of a brilliant blue powder that would spread and mark the moon so that anyone with a field glass would know an earth-to-moon rocket were successful, it might neutralize the Russian accomplishment of sputnik.

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