ASTRONAUTICS

Supercool Man for Space

One of the problems of space travel, the intense heat to which the space man will be subjected, is being studied with evidence pointing to supercooling as a solution.

➤ MAN CAN stand the heat much better if he is pre-cooled first, the Air Force has found out.

The lower the temperature of a man's insides, the better he can stand outside heat, says Dr. Paul Webb of the Aero Medical Laboratory, Wright Air Development Center, Dayton, Ohio. Dr. Webb and a group of military and civilian scientists are studying man's tolerance to high temperatures as one of the problems to be encountered in space flight.

"If we knew how the human body thermostat works, we probably could double man's tolerance of heat," Dr. Webb said. He and the military members of his section serve as "guinea-pigs" in their own experiments.

The theory is borne out by tests showing that a sedentary worker, such as the pilot of a space ship, finds outside heat intolerable when his inside temperature rises above 102 degrees Fahrenheit. When subjected to external 160 degrees heat, his internal temperature rises one degree in 20 minutes. Thus a man with a normal temperature of 98.6 degrees Fahrenheit could stand this external heat only for about an hour before his internal temperature reached 102 degrees.

In the pre-cooling process, the subjects were first placed in a tank of 60-degree water. Their internal temperatures showed little change from normal in the first half hour. During the next half hour, their internal temperatures dropped one degree, and in the third half-hour it dropped another degree to a little over 96 degrees.

Popped into the 160-degree chamber, the subjects were then able to withstand the searing heat for almost two hours. The difference of one hour represents the time required to raise the body temperature to normal at the rate of one degree every 20 minutes.

Also under investigation is "transient" heating, such as might be experienced by a man in a space-ship during escape from and re-entry into the earth's atmosphere. In this experiment, men are heated from room temperature to 160 degrees; left for a half hour; and then recooled. In other tests, an unclothed subject is kept for half-hour intervals at 130 degrees, 75 degrees, and 55 degrees. Various patterns of the three temperatures are often used.

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ZOOLOGY

Doubt Thrown on Ability Of Paramecium to Learn

➤ PROBABLY the primitive one-celled animal, the paramecium, cannot learn after all. At least a research team of scientists find that its ability to learn is not proved.

Previously scientists have found these little creatures can "learn" to go to a platinum wire suspended in the liquid in which they are swimming, if the wire has previously held food. Another study seemed to indicate that paramecia can "learn" to avoid the lighted portion of their swimming pool when that side of the well had previously been heated to an uncomfortable temperature.

Now it seems more likely that it is the pool and not the animal that was "conditioned." When the conditions of the experiment are so arranged that there is no possibility of permanent or relatively permanent changes in the environment of the paramecium, then no change occurs in the behavior of the one-celled animal.

The new research is reported in *Science* (June 27) by Drs. Allan F. Mirsky of the National Institute of Mental Health, Bethesda, Md., and Milton S. Katz of the University of Rochester, Rochester, N. Y.

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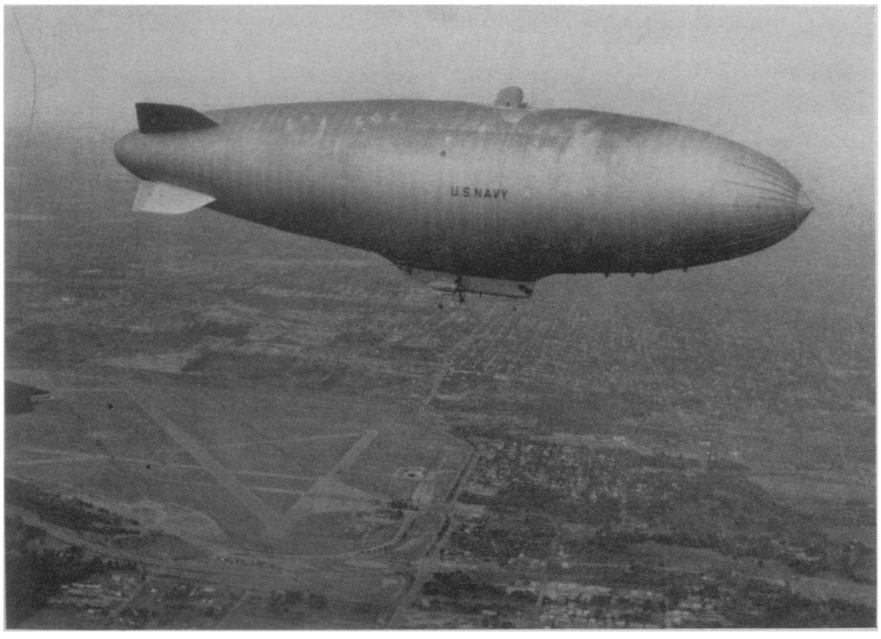

LARGEST BLIMP—The U. S. Navy's new ZPG-3W, believed to be the world's largest non-rigid airship, is shown on its maiden flight. Concealed within the envelope or "bag" is the largest revolving radar antenna ever carried by an aircraft. The blimp's capacity is said to be approximately 1,500,000 cubic feet.

GEOPHYSICS

80-Year-Old Tide Theory Confirmed by Computers

➤ HIGH-SPEED electronic computers have confirmed an 80-year-old theory that the circular wobble of the earth's poles causes small ocean tides.

In the 1870's Lord Kelvin, a famed British scientist, suggested that the earth's poles moved in a rough circle, approximately 16 feet in diameter, within a 14-month period.

From this, he postulated that the polar motion, called "free nutation" and akin to the wobbly motion of a spinning top, should create its own ocean tides.

Proof of this theory had never been attempted, largely because of the amount of mathematical computations required.

One scientist long interested in the theory has been Dr. Walter H. Munk, professor of geophysics at the University of California Scripps Institution of Oceanography and the UCLA Institute of Geophysics.

Joined by Richard Haubrich, graduate student in geophysics, he collected data for the last 100 years from each of 11 tide stations in Europe, South America, the United States, and in the Indian Ocean.

Dr. Munk and Mr. Haubrich took their carload of data to the Numerical Analysis Research center at UCLA for preliminary work and then fed the raw material into an aircraft company's high-speed computer, which clicked off the necessary 250,000,000 mathematical computations within one and a half hours.

Interpreting the computed data, the two geophysicists proved the existence of a polar-created tide, independent of the tides caused by the sun or moon.

"Our findings, which would hardly have been possible before the development of the computer, fill another gap in our incomplete knowledge of the shape and behavior of the earth," says Dr. Munk.

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