

AVIATION MEDICINE

Space Travel Menace

Pilots in stratosphere in northern latitudes must be protected from heavy nuclei in primary cosmic rays, aeromedical expert believes. Shielding would have to be very thick.

➤ WHEN MAN flies into the stratosphere in the northern part of the world, it will be impossible to protect him from the heavy nuclei in primary cosmic radiation "unless one thinks in terms of a space platform or artificial satellite in which tons of fuel or other materials are to be stockpiled and could be placed around the crew compartment."

"Utterly discouraging figures" showing this were reported by Dr. H. J. Schaefer of the U. S. Naval School of Aviation Medicine, Pensacola, Fla., at the meeting of the Aero Medical Association in Los Angeles.

At extremely high altitudes, he explained, the heavy nuclei, part of the primary cosmic radiation, are a potential hazard to humans. These are essentially low energy nuclei, and protecting humans from the heavy nuclei means selective shielding of the low energy hits, called "thin-down hits."

The number of these thin-down hits to which a "standard man" at very high altitudes would be exposed has been calculated. They occur only at latitudes higher than 50 degrees north, which would take in that part of the world above Korea and the Aleutians and would include Alaska, most of Canada and northern Europe.

For the most harmful type of hit, nuclei of the element iron, the number of hits for a standard man increases from one hit per hour at 70,000 feet to 10 per hour at 80,000 feet or 100 per hour at 100,000 feet altitude. The total number of hits from all components of the heavy spectrum, carbon to iron, amounts to about 1,200 per hour at 80,000 feet.

But, Dr. Schaefer pointed out, peculiar relationships result if you calculate the thicknesses of compact materials, such as aluminum or steel, which could replace the shielding effect of the outer atmosphere for a ship flying entirely outside the atmosphere. The density of such materials is, by a factor of about 100,000, greater than the surrounding air in the heavy nuclei region.

The shielding layer of such material, it can be calculated, actually serves to intensify the number of thin-down hits to which man would be exposed, and the protective effect does not develop until several centimeters of aluminum are reached.

These are the "utterly discouraging figures" for any engineer trying to construct a ship with walls thick enough to protect the crew from heavy nuclei.

Protection, Dr. Schaefer suggested, would be possible only by limiting the exposure time so that the number of hits per day stays below the permissible level. What the permissible exposure is cannot yet be guessed.

Animal experiments are needed to learn this and they must be carefully planned as to the latitude and altitude of the flight and the appropriate amount of moderating absorbing layers for protection.

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MEDICINE

Growing Polio Virus Brings Quicker Diagnosis

➤ THE THIRD of the three known strains of poliomyelitis virus can now be made to grow in laboratory mice, Drs. C. P. Li and Morris Schaeffer of the Public Health Service's virus and rickettsia laboratory, Montgomery, Ala., have announced.

The achievement is expected to help laboratories to a cheaper and quicker method of diagnosing polio cases and to give a new tool for assessing the value of gamma globulin and vaccines in the pre-

vention and control of the disease. The method by which the third polio virus was adapted to growth in mice is reported in the *Proceedings of the Society for Experimental Biology and Medicine* (March).

Science News Letter, May 23, 1953

PHYSICS

Hovering Time of Charge Over Atoms Is Measured

➤ THE EXACT time that an electric charge hovers over one or another of the atoms in a molecule has now been calculated and reported.

By studying the hyperfine structure of the spectrum, Drs. J. Owen and K. W. H. Stevens of the Clarendon Laboratory, University of Oxford, England, have found that one particular atom of chlorine in the salt being studied held the charge for three percent of the time. For 18% of the time, the charge was held by some one of the six chlorine atoms in the complex ammonium iridium chloride whose spectrum was observed.

How the spectrum structure will be changed by substituting bromine for chlorine and potassium for ammonium in combination with the iridium will be investigated next. The research scientists report their findings in *Nature* (May 9).

Science News Letter, May 23, 1953



GROWING POLIO VIRUS—Latest advance in the fight against polio is discovery by Public Health Service scientists that the third virus type can be grown in mice. A development that makes this possible is the intraspinal inoculation of mice. After the mouse is anesthetized, its skin, as shown here, is clipped to expose the spinal column.