

Drugs Studied To Aid Astronauts

Work funded by National Institute of Mental Health induces disorientation similar to that encountered in space missions

HALLUCINOGENIC DRUGS to train astronauts so that they will be able to function although disoriented by space travel are being studied by a scientist at the Albert Einstein Medical Center in Philadelphia.

Working under funds from the National Institute of Mental Health, Physiology Department Chief Dr. Leonard Cohen is experimenting with primates on the effects of the drugs known as LSD, Sernyl and Ditrane. The work differs from that being supported by

NASA at the Naval School of Aviation Medicine under Dr. Ashton Graybiel (M/R, Aug. 31, p. 26) in that drugs are being used which actually produce similar symptoms to space disorientation rather than drugs to counteract it.

Cohen told MISSILES AND ROCKETS that the drugs look very promising as a means to expose astronauts to the sensations they might encounter when removed from gravitational cues. He suggested that they could thus be familiarized and trained to increase their resistance to disorientation and motion sickness.

• **Testing methods**—An elaborate primate testing room was constructed containing various devices such as a vertical ladder, a swing that can be motor driven at constant speed for free-swinging, a vertical pole, a vertical peg climbing board in which the arrangement of the pegs can be varied, and adequate floor space for walking.

By rewarding the animals with food, Dr. Cohen can induce them to perform given tasks before and during the influence of drugs. Some of the test animals—monkeys and baboons—are surgically modified so that the normal gravity-and-motion-sensing organs are removed. Their performance is monitored by a 16-mm Kodak Reflex special camera with Eastman Tri-X reversal film, type 7278. The use of this film record provides a precise means of comparing their behavior in each situation, removing the previous subjective analysis by the experimenter.

ACTIVITIES of monkey under the influence of hallucinogenic drugs are recorded from outside special animal chamber in which primate is confined at Albert Einstein Medical Center. Monkey's behavior is filmed with a 16-mm Kodak Reflex special camera focused through one-way glass into chamber. Film record allows researchers to make precise comparisons of behavior with different combinations of drugs and surgical modifications that simulate stages of disorientation that could occur in astronauts during space flight.

• **Different approach**—The work has led Dr. Cohen to an interest in the nerves of the neck as being the seat of gravitational sensory input, rather than the vestibular organs being studied by almost all researchers in the field of disorientation.

Cohen said he has found that primates that have had the first three pairs of dorsal nerve routes in the neck severed show severe disorientation. In clinical studies also, he said, it has been found that people with muscular strain or trauma to the neck or shoulder region sometimes have this disorientation as well. Most literature on disorientation ascribe the condition to the organs of the inner ear, specifically to the "hairs" of the semicircular canal.

Should it be found that the neck proprioceptors are equally important, it will be necessary to revise thinking on how to aid astronauts in coping with possible "space sickness." Although simple weightlessness is not expected to cause great difficulty, the combination of accelerations and movements will require remedial action, especially in the case of a rotating space station.

Cohen hopes to get a qualitative answer to the question of whether neck or vestibular phenomena cause disorientation with the aid of these drugs. He feels that by giving the drugs to an animal with the neck sensory mechanisms removed, he may get some clues. If the animal, already disoriented by the loss of the nerves, is further disoriented by the drugs, it will indicate that the drugs have acted upon another mechanism. If it does not complicate the effect, it may mean that the neck was to blame. The same principle would apply in testing labyrinthectomized animals.

• **Agreement**—Both schools of thought—neck vs. ear—agree that whatever the cause, training will help. With the use of the drugs, Cohen feels, a qualitative analysis can be made of the effect. And one of the big hazards to the astronaut—fear of the new sensation—would be removed before he went into space. ■

