***Editorial comment, space medicine*. J Aviat Med 1950; 21:359–60.**

This Classic of Space Medicine paper was published in the journal in October 1950. Although the author is not named, it is recorded in the Space Medicine Association's archives that it was Col. Robert J. Benford. The purpose was to communicate to the Aero Medical Association membership that several members had met on May 31, 1950, and had started a process to form the Space Medicine Branch, which is now called the Space Medicine Association. The entire editorial is reprinted here as a snapshot of early space medicine thinking and concerns. It is a fitting tribute to these early pioneers to whom we owe so much to and is worthy of being the final article in the series "Classics in Space Medicine."

Editorial Comment - Space Medicine

At the recent meeting of the Aero Medical Association in Chicago, steps were taken to establish a section on space medicine within the framework of the parent association. The formation of this affiliate is certainly in keeping with the best American tradition of never neglecting an opportunity to organize a new society. The foundling will have to survive the smiles of some and the criticism of others, but it seems foreordained to be successful. Its initial membership comprises many of the leaders in aviation medicine plus a hard core of first-rate investigators. Because of the spectacular nature of its interests, it should receive a "good press."

In order that space medicine will have the same meaning for all people, the term must be defined and the field of interest delimited. The word "space" to most people probably implies that "boundless void" beyond the Earth's atmosphere. Actually, space can be variously defined; it is as difficult to pin down as the word "fatigue" and is at about the same level of abstraction. The following definition is gratuitously offered with the full realization that it may not be acceptable to all: *Space medicine is concerned with the medical problems involved in modes of travel which are potentially capable at least of transporting us beyond the Earth's gravitational field; and it is also concerned with special hazards encountered in the upper part of our atmosphere and beyond.*

To escape the Earth's gravitational field, a single-stage rocket must attain an initial speed of 25,000 miles an hour. It is inconceivable that such a rocket could be manned, even if it could be built. However, the greater the reduction in initial velocity, the greater the power requirement, and, for this reason, the technical design of the first space ships will probably represent a compromise between engineer and biologist; the magnitude of the medical problems involved here requires no emphasis.

Travel in the upper reaches of our atmosphere and beyond is fraught with dangers over and above those associated with rocket propulsion per se. Elsewhere in this issue, Schaefer points out that the intensity of cosmic radiation increases with increasing altitude to reach a maximum at 70,000 feet; at this level, the tolerance dose for man is approached. Above this level, heavy nuclei rays are encountered which consist of atomic nuclei stripped of all their orbital electrons. Their kinetic energy is in the billion e-volt range, and they can penetrate to a depth of 10 cm in living tissue. At sea level, the protection afforded by the atmosphere is equivalent to a lead shield more than a yard thick; the equivalent of at least 1 cm. of lead will be needed at about 70,000 feet. The atmosphere also shields us from strong ultraviolet radiation, solar x-rays and the myriads of meteorites encountered aloft.

At great distances from the Earth, the gravitational attraction of this body becomes negligible, and one enters a zero or near-zero gravity environment. It is difficult to imagine all of the physio-pathological changes which will take place as the traveller's weightless space ship rides the gravitational waves.

The aims of the new society will be to formulate and encourage a research program which will parallel in its development the technical advances in rocket flight. It will also serve as a clearinghouse for information and for the dissemination of this knowledge in this field. A big step forward was taken in 1949 when General H. G. Armstrong established the first Department of Space Medicine at Randolph Field.

Background

In November 1948 Col. Harry G. Armstrong organized a panel meeting, "Aeromedical Problems of Space Travel," at the USAF School of Aviation Medicine at Randolf Field, TX. The enthusiasm generated at that meeting motivated Col. Armstrong to establish a Department of Space Medicine at the same institution on February 19, 1949, with Dr. Hubertus Strughold named as a Professor of Space Medicine. Another symposium, "The Biological Aspects of Manned Space Flight," was organized by Gen. Armstrong and Dr. Andrew Ivy at the Medical College of the University of Illinois in March 1950. This was widely publicized by the press and the attendance (expected to be small) was well beyond all expectations, with standing room only. This enthusiastic conference led to discussions to form a permanent space medicine organization. An informal meeting held during the annual Aero Medical Association meeting on May 31, 1950, was attended by 16 founders, including Col. Benford. A petition and constitution were submitted to the Executive Committee that October and the first official meeting of the Space Medicine Branch was held following the publication of this editorial on May 17, 1951, with 33 people in attendance (2,5). Membership was already at 36 and would quickly rise to more than 160 by 1958. This was the first constituent organization formed within the Aero Medical Association, as its constitution had only recently been amended to allow for the creation of such entities.

At the time of this editorial, Col. Benford was on the Executive Committee of the Aero Medical Association. He had received his medical degree in 1934 and then joined the U.S. Army, where he was immediately involved in research in aviation physiology. During World War II he was the senior staff medical officer for the XX Bomber Command. Following the war, he was given command of the AAF Aeromedical Center in Heildelburg, Germany, collecting intelligence on German aviation medical research that had occurred during the war. He took command of the Air Research and Development Command in 1947 and became the editor for the *Journal of Aviation Medicine* in 1955.

Comment

Despite the forward-looking approach of this editorial, written by someone known to have a very optimistic attitude about the rapid development of rocket technology, the capability to achieve escape velocity with a manned capsule was still beyond comprehension. In fact that was achieved with the Apollo 8 mission less than 20 yr later. The editorial clearly reflects the predominant concern with the potentially lethal effects of radiation in space, an issue that receded several years later with better characterization of the radiation environment with high altitude sounding rockets and the 1958 discovery of the protective Van Allen belts (4). The physiological response to weightlessness was completely unknown and could only be guessed. Many researchers at that time were speculating that the neurovestibular and cardiopulmonary responses could be disabling (1,3). Other issues that were then completely unknown, but were soon dis-

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covered, included space motion sickness, deconditioning, full pressure suits, sealed cabin life support, acceleration tolerance, astronaut selection criteria, and in-flight medical care. These medical and technical issues were addressed and incorporated into operational space flight with a speed that was beyond the imagination of even those unconventional, far-sighted founders of the Space Medicine Branch.

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