

# The Space Medicine Branch of the Aerospace Medical Association

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**T**HE SPECTACULAR ADVANCES in rocketry during the 1940's stimulated an increasing number of aeromedical investigators to become interested in the biological and medical aspects of space flight. The great majority of the scientific community, however, remained skeptical whether space travel would be possible at all.

Showing great foresight, scientific know-how, and not a small amount of courage for those times, Maj. Gen. H. G. Armstrong organized a Panel Meeting on the topic of "Aeromedical Problems of Space Travel" in November of 1948. The presentations at the meeting, held at the USAF School of Aviation Medicine, Randolph Field, Tx, were made by Gen. Armstrong, Prof. Hubertus Strughold, who already then was regarded as the "Father" of space medicine, and the astrophysicist, Dr. Heinz Haber. Gen. Armstrong showed the same foresight 1 year later when he established a Department of Space Medicine at the School.

At the 20th Annual Scientific Meeting of the Aero Medical Association, held in New York in 1949, two papers were presented that pertained to space flight. The word "space," however, did not appear in the titles because, at that time, "space" was relegated to science fiction writers, and its use would not have been compatible with the serene and dignified atmosphere of the scientific sessions. Thus, the authors, Gen. Armstrong and Dr. Paul A. Campbell, respectively, spoke about "Some Aviation Medical Problems Associated with Potential Rocket Flight," and "Cybernetics and Aviation Medicine."

The discrimination against "space" very likely existed in most countries. As an interesting parallel, I would like to recount a situation that occurred at the same time in Buenos Aires. The Aeromedical Institute of the Argentine Air Force was conducting airborne studies on the effects of weightlessness, producing brief periods of weightlessness by vertical diving flights in an open cockpit aerobatic biplane (FW 44). The duration of weightlessness was severely restricted by the limited maximal allowable diving speed of the aircraft and by the altitude necessary to recover from the dive at a sufficiently high altitude over the airfield. As the experiments involved some risk, the responsible safety officers took a grim look at these studies, and threatened to ground the aircraft and the investigator several times. To obtain weightlessness of longer duration, it was necessary to fly parabolic (Keplerian) trajectories, and this could be accomplished only with a more powerful aircraft. In the formal request to Headquarters, Argentine Air Force, for the assignment of such an aircraft, the official justifi-

cation also avoided the mention of "space" flight; rather, it emphasized that periods of weightlessness can occur in some air combat maneuvers. The justification reads:

"... combination of diving flights and pull outs into parabolas do occur when fighter aircraft make—for instance—gunnery runs on bombers. The attacking plane penetrates the fighter escort by high-speed diving from a superior altitude, makes its pass at the bomber from below as he pulls out, then evades the bomber's tail guns by another dive. If this parabolic flight path by accident approximates a Keplerian trajectory, the pilot would experience short periods of weightlessness. Thus, it is desirable to investigate whether these periods of weightlessness affect the pilot's neuromuscular coordination and/or orientation, as has been predicted by several authors."

This diplomatic formulation very likely eased the favorable decision of the official at Headquarters, although he may have suspected the real purpose of the flights. The assigned aircraft (Fiat G 56) was deployed with a Fighter Wing at Mendoza, near the Andes Mountains, about 600 miles from Buenos Aires. Only 1 week after the request had been submitted, this aircraft was ordered to El Palomar Air Base in Buenos Aires. The Aeromedical Institute was notified of the favorable decision when the aircraft had already taken off from Mendoza, so that the investigator had to prepare the protocol and the airborne zero-G instrumentation very hastily.

This rapid assignment of a research aircraft was unprecedented and, for quite a while, was the topic of discussions in the aeronautical circles of Buenos Aires. Jokingly, it was stated that this victory over bureaucratic inertia was only possible because the project was "weightless."

Meanwhile, in the United States, the conception of a space medicine organization emerged as a result of a significant meeting. This was the symposium on "Biological Aspects of Manned Space Flight" held at the Medical College of the University of Illinois on 3 March, 1950. Gen. H. G. Armstrong and the late Dr. Andrew C. Ivy, then Vice President of the Chicago Professional Colleges of the University of Illinois, co-sponsored this historic meeting.

This time, the prominent authors no longer had to avoid the word "space," as can be seen from the titles of the lectures: "*Space Medicine in the United States Air Force*," by Maj. Gen. Harry G. Armstrong USAF, MC; "*Multi-Stage Rockets and Artificial Satellites*," by Dr.

Wernher von Braun; "Physiological Considerations on the Possibility of Life under Extraterrestrial Conditions," by Hubertus Strughold, M.D.; "Astronomy and Space Medicine," by Heinz Haber, Ph.D.; "Orientation in Space," by Paul A. Campbell, M.D.; "Bioclimatology of Manned Rocket Flight," by Konrad Buettner, Ph.D.

The great number of enthusiastic attendees, the spirited discussions, the public response, and the news media coverage were beyond all expectations. Dr. John Marbarger, then head of the Environmental and Aviation Medical Laboratory of the University of Illinois, participated in the organization of the meeting, and edited and published the symposium proceedings in book form at the University of Illinois Press. This book, entitled "Space Medicine—The Human Factor in Flights beyond the Earth," was soon in its third printing. Thus, for space sciences, the year 1950 can be considered as the break-through from the science fiction level to accepted scientific status.

The immediate outgrowth of this successful meeting was that the participants and attendees agreed that an organization was necessary to coordinate and exchange information related to space medical research. It was the consensus that this organization should be within the framework of the Aero Medical Association.

Thus, an "Informal Committee Interested in Space Medicine" was formed. Dr. A. C. Ivy kindly agreed to be the *pro tem* chairman of the group. The first session was scheduled as a luncheon meeting during the 21st Annual Meeting of the Aero Medical Association in Chicago. Dr. Strughold and Dr. Haber were asked to make formal presentations at this luncheon meeting in the Palmer House Hotel on 31 May, 1950.

Dr. H. Strughold made the first presentation, which contained the following prophetic remarks:

"It can be predicted that rocket and space flight are in the same state of development as was aviation in 1920, whose field of research, including the medical sciences, experienced an explosive development in the following decades. It appears that the space sciences will develop along similar lines. In order to enable the medical faculty to keep pace with the presumable technical development, it is mandatory to place space medicine on the broadest possible basis and, in this manner, effect a rapid and extensive development."

Dr. Haber summarized the physical characteristics of the high-altitude atmosphere and of sealed cabins. Also, he recommended a formal space medical organization. Drs. O. O. Benson, E. J. Baldes, P. A. Campbell, and R. S. Benford participated in the discussion and agreed.

Following the discussion, a motion was made, seconded and passed, to petition the Aero Medical Association for affiliation as a section. A committee was established to prepare the petition for admission to be submitted to the Executive Council; its membership consisted of Drs. A. C. Ivy, J. P. Marbarger, R. J. Benford, P. A. Campbell and A. Graybiel.

Brig. Gen. Benson had to leave the meeting earlier to attend the Executive Council Meeting of the Aeromedical Association, where he submitted a "Memo for the

Record" which stated that a "Space Medicine Group" was meeting simultaneously and that the Group planned to petition the Council for branch or section status. Dr. Marbarger, Acting Secretary of this new organization "in statu nascendi," drafted this petition and also a constitution, which was accepted by the committee, submitted to the parent organization, and approved on 15 May, 1951.

Thus, the newly formed Space Medicine Branch (Table I) held its first formal meeting in the following year, on 17 May, 1951, during the 22nd Annual Scientific Meeting of the Aero Medical Association in Denver, Co. Col. Paul A. Campbell, then Director of Research, USAF School of Aviation Medicine, became the first elected Branch President. Dr. J. P. Marbarger, who had volunteered to be Acting Secretary for the first "fledgling" year of the Branch, was extended the gratitude of the members for his outstanding services. The following year, he succeeded Dr. Campbell as the second elected Branch President. Dr. Hubertus Strughold, then Head of the Department of Space Medicine, USAF School of Aviation Medicine, was elected Secretary for the year 1951-52, and CAPT Ashton Graybiel, MC, USN, U.S. Naval School of Aviation Medicine, was elected Chairman of the Membership Committee.

The speakers were again Dr. Strughold and Dr. H. Haber, who presented a joint paper entitled "Space as a Functional Concept." Then, the chairman requested Dr.

TABLE I. FOUNDERS AND CHARTER MEMBERS OF THE SPACE MEDICINE BRANCH.

FOUNDERS: Paul A. Campbell, M.D., and John P. Marbarger, Ph.D.

1950

CHARTER MEMBERS IN ATTENDANCE AT FOUNDING MEETING

Dr. E. J. Baldes	Dr. Fritz Haber
Col. R. J. Benford	Dr. James Henry
Brig. Gen. Otis O. Benson, Jr.	Dr. V. K. Henschke
Dr. K. Buettner	Dr. A. C. Ivy
Dr. Paul A. Campbell	Dr. J. P. Marbarger
CAPT Ashton Graybiel	Dr. H. J. Schaefer
Dr. V. Guillemain, Jr.	Lt. Col. B. Strickland
Dr. Heinz Haber	Dr. H. Strughold

CHARTER MEMBERS ELECTED AT FOUNDING MEETING

Maj. Gen. H. G. Armstrong	RADM B. Groesbeck, Jr.
Dr. L. H. Bauer	Dr. F. G. Hall
CAPT A. Behnke	Dr. J. Kaplan
Dr. D. Beischer	CAPT W. E. Kellum
Capt. L. D. Carson	Dr. G. J. Kidera
Dr. D. B. Dill	Dr. W. R. Lovelace, II
Dr. W. O. Fenn	CAPT J. R. Poppen
Lt. Col. A. P. Gagge	Lt. Col. H. M. Sweeney
Dr. O. Gauer	Lt. Col. J. M. Talbot
Dr. C. F. Gell	Col. A. D. Tuttle

From: The History of the Space Medicine Branch, Section I, by Paul A. Campbell, M.D. (Unpublished monograph).

TABLE II. PAST PRESIDENTS OF THE SPACE MEDICINE BRANCH.

Andrew C. Ivy, M.D. . . . . .	Temporary Chairman for Organization
Paul A. Campbell, M.D. . . . . .	1951-52
John P. Marbarger, Ph.D. . . . . .	1952-53
John R. Poppen, M.D. . . . . .	1953-54
Col. A. P. Gagge, USAF, MC . . . . .	1954-55
CAPT Ashton Graybiel, MC, USN . . . . .	1955-56
Fred A. Hitchcock, M.D. . . . . .	1956-57
Randolph Lovelace, M.D. . . . . .	1957-58
Alfred M. Mayo, B.E. . . . . .	1958-59
Hubertus Strughold, M.D. . . . . .	1959-60
CAPT Clifford P. Phoebus, MC, USN . . . . .	1960-61
Col. John M. Talbott, USAF, MC . . . . .	1961-62
CAPT Frank B. Voris, MC, USN . . . . .	1962-63
A. H. Schwichtenberg, M.D. . . . . .	1963-64
James G. Gaume, M.D. . . . . .	1964-65
Charles A. Berry, M.D. . . . . .	1965-66
Ralph L. Christy, M.D. . . . . .	1966-67
Col. Rufus R. Hessberg, Jr., USAF, MC . . . . .	1967-68
George B. McNeely, M.D. . . . . .	1968-69
CAPT Frank Austin, Jr., MC, USN . . . . .	1969-70
Col. Stanley C. White, USAF, MC . . . . .	1970-71
A. Duane Catterson, M.D. . . . . .	1971-72
CAPT Roger G. Ireland, MC, USN . . . . .	1972-73
Col. James F. Culver, USAF, MC . . . . .	1973-74
Walton L. Jones, Jr., M.D. . . . . .	1974-75
David L. Winter, M.D. . . . . .	1975-76
Karl H. Houghton, M.D. . . . . .	1976-77
Maj. Gen. Heinz S. Fuchs, GAF, MC . . . . .	1977-78

Herman J. Schaefer to make a few remarks about "Radiation Hazards in Space." Gen. H. G. Armstrong and Brig. General O. O. Benson participated in the discussion.

Nov. 6-9 of that same year, 1951, marked a most noticeable symposium, entitled "Physics and Medicine of the Upper Atmosphere—A Study of the Aeropause." This meeting was held in San Antonio, Tx, and was co-sponsored by the USAF School of Aviation Medicine, Randolph Field, Tx, and the Lovelace Foundation for Medical Education and Research, headed by the late Dr. William Randolph Lovelace, III, a prominent aeromedical investigator since the days of WW II, and a founding member of our Branch. The names of the organizers, session chairmen, and speakers read like a roster of the Space Medicine Branch, e.g. Drs. H. G. Armstrong, O. O. Benson, K. J. Buettner, P. A. Campbell, A. Graybiel, F. Haber, H. Haber, J. P. Henry, A. Krebs, U. Luft, A. Mayo, H. Schaefer, H. Strughold, J. Talbot, and Clayton S. White.

Similarly, as in the 1950 Chicago symposium on the "Biological Aspects of Manned Space Flight," a number of pioneers in disciplines other than space medicine participated. They included Drs. Wernher von Braun, Fred Whipple, James A. Van Allen, Marcel Nicolet, Homer E. Newell, and Joseph Kaplan.

Dr. Clayton S. White, then Director of Research of the

TABLE III. HUBERTUS STRUGHOLD AWARD WINNERS.

CAPT Ashton Graybiel, MC, USN . . . . .	1963
Maj. Gen. Otis O. Benson, Jr., USAF (Ret.) . . . . .	1964
Hans Georg Clamann, M.D. . . . . .	1965
Herman J. Schaefer, Ph.D. . . . . .	1966
Charles A. Berry, M.D. . . . . .	1967
David G. Simons, M.D. . . . . .	1968
Stanley C. White, M.D. . . . . .	1969
RADM Frank B. Voris, MC, USN . . . . .	1970
Don Flickinger, M.D. . . . . .	1971
Col. Paul A. Campbell, USAF (Ret.) . . . . .	1972
Dr. Andres I. Karstens . . . . .	1973
CDR Joseph P. Kerwin, MC, USN . . . . .	1974
Lawrence F. Dietlein, M.D. . . . . .	1975
Harald vonBeckh, M.D. . . . . .	1976
William K. Douglas, M.D. . . . . .	1977
Walton L. Jones, M.D. . . . . .	1978

Lovelace Foundation, referred to this symposium when he was the featured speaker at the 2nd Annual Meeting of the Branch in 1952:

"The primary objective of the Symposium was to collect available data needed to form a background of information essential to the planning of aeromedical research for manned flights into and beyond the outer fringes of the atmosphere of the earth. Plans for the symposium recognized that a similar attack should be made on classified material, and that final research plans could only be made by working teams of experts armed with information which truly took them to the frontiers of knowledge.

"Those who planned the symposium also recognized another very significant fact; namely, that undistributed information was simply and practically equal to no information at all. Consequently, the San Antonio symposium was documented in book form and released 1 July, 1952, by the University of New Mexico Press, Albuquerque, NM. It is composed of 21 chapters containing contributions from 34 of the world's leading scientists representing talent from fields of radiobiology, upper-atmospheric physics, aviation medicine, toxicology, and aeronautical engineering. It is hoped that this volume will play a potent role in creating regions of common interest among individuals basically trained in biology and the physical sciences."

As a matter of fact, this book was considered in the following years the most useful "handbook" for aerospace medical research.

In the foregoing pages I have described the prodromal events which led to the foundation of the Space Medicine Branch. I also covered the first year of its existence and its gradual acceptance by the Scientific Community.

At this time, I would like to express my gratitude to Dr. Paul A. Campbell, whose unpublished monograph, "The History of the Space Medicine Branch," provided me with painstakingly detailed information, which I in-

corporated with Dr. Campbell's permission into this report.

Unfortunately, it is not possible to chronicle the further development of the Branch over the ensuing 28 years with the same detail. Therefore I must apologize for not mentioning the many aeromedical scientists who contributed to the steady growth of the Branch by their excellent leadership and scientific achievements. As a matter of fact, the names of the 28 Past Presidents, which are listed in Table II, read like a "Who's Who" in manned space exploration.

As Prof. Strughold predicted at the Founding Meeting in 1950, the "explosive" development of space research became a reality. As a matter of fact it occurred in three stages. The first followed President Eisenhower's announcement on 29 July, 1955, to participate in the International Geophysical Year by launching an earth satellite; the second, after the launching of Sputnik I, on 4 Oct., 1957, when, overnight, unbelievers became believers, and "I told you so-ers" and bandwagoners came in from all directions; and the third, after President Kennedy announced the plan to land a man on the moon.

That in these years nearly the entire aeromedical community became involved in space projects, was reflected by the fact that our parent organization (not

without dissent) changed its name to the Aerospace Medical Association. Thus, the danger existed that our branch would become an "annual luncheon Society of old timers." Fortunately, this was not the case, because the branch did, and still does, attract young scientists and enthusiasts of manned space exploration. This recruiting of young talent has been further fostered by the creation of the Space Medicine Branch Award, which is presented to a junior scientist contributing an outstanding paper in the area of space medicine at the annual scientific meeting of our parent organization.

In 1963, the Branch created, in honor of the "Father" of space medicine, the Hubertus Strughold Award to recognize deserving members ". . . for dedication and distinguished contributions to the advancement of the science and art of space medicine, the allied sciences, and manned space flight."

The award winners (Table III) include founder and charter members, as well as the first American physician-astronaut, and members whose scientific or managerial brilliance made the nation's manned space program possible.

I have no doubt that the members of our Branch will remain in the vanguard of space exploration and provide unflagging leadership and resolute interest in all future space endeavors.