Space Medicine Branch Report
May 2002 Meeting

The Annual Space Medicine Branch (SMB) Executive Committee Breakfast Meeting and the 51st Annual Business Luncheon were held at the 73rd Annual Scientific Meeting of the Aerospace Medical Association (AsMA) on Thursday, May 9, 2002, at the Queen Elizabeth Hotel in Montreal, Canada.

Dr. Melchor J. Antufiano, SMB President for the 2001-2002 term, presented the gavel by the gavel custodian (Wyck Hoffier, M.D.,) to Dr. William Albery (Technical Director of the Wright Brothers Memorial) for lending their VCR to be used by the new SMB President (2002-03). Dr. Sekiguchi presented the SMB President's Plaque to Dr. Antufiano and thanked him for his outstanding contributions in the area of Space Medicine that span over 7 decades. (See accompanying article on award recipients.)

Dr. Antufiano introduced the guest speaker, Jeff Davis M.D., who presented a very interesting lecture entitled "Space Life Sciences: Current Status and Future Directions." Dr. Davis provided a glimpse of what space travel may encompass in the future and the impact the space life sciences will have on accomplishing the goals of interplanetary space exploration.

Following Dr. Davis's lecture, Dr. Antufiano thanked all SMB members for giving him the opportunity and the honor to serve as SMB President. Then he passed the gavel to Dr. Sekiguchi who was installed as the new SMB President (2002-03). Dr. Sekiguchi presented the SMB Past President's Plaque to Dr. Antufiano and thanked him for his outstanding dedication and efforts in support of the SMB. Dr. Sekiguchi proceeded to adjourn the meeting and returned the gavel to the custodian.

Lloyd Tripp, M.A., Secretary-Treasurer
Melchor Antufiano, M.D., President, 2001-02

Dr. Antufiano discussed several SMB accomplishments during the last year including: 1) co-sponsoring of two panels on the Physiologic and Clinic Issues of a Mission to Mars (presented on Wednesday); 2) planning of a 2003 panel on the History of Space Medicine to participate in AsMA's commemoration of the 100th Anniversary of the first powered flight by the Wright Brothers; 3) AsMA approval of an SMB resolution on "Uniformity of Medical Standards for Commercial Space Flight"; 4) ongoing development of a biographical book on the Young Investigator Award recipients; 5) ongoing translation of NASA Spinoff into 12 languages; 6) translation of the AsMA Physician Guidelines into Greek; 7) pursuing a formal working relationship with University Space Research Association to provide research opportunities in aerospace medicine for students and medical residents; and 8) participation in the development of the proposed FAA Guidelines for Medical Screening of Commercial Aerospace Passengers and AsMA's Medical Guidelines for Space Passengers.

Dr. Antufiano thanked the following individuals: Dr. Sekiguchi for putting together an outstanding ballot of candidates for SMB office, Lloyd Tripp for his work as SMB Secretary-Treasurer, SMB Committee chairs for their accomplishments, the former and current SMB Historians for their efforts and dedication to preserve our historical records, Past-President Phil Scarpa for his personal guidance and advice, Dr. William Albery (Technical Director of the Wright Brothers Memorial Chapter of the SAFE Organization) for lending their VCR to be used by the SMB guest speaker, Dr. Paul Humbert for obtaining a $500 donation from Comprehensive Health Services, and Dr. Jeff Davis for accepting the invitation to be the 2002 SMB guest speaker and for waiving his travel expenses and honorarium to enable the SMB to give a $1000 donation to the Patty Hilliard (former NASA astronaut) Memorial Fund.

Smith Johnston, M.D., co-Chair of the Awards Committee for the Strughold Award explained that this award is presented each year to an individual who has demonstrated outstanding dedication and contributions in advancing the frontiers of Space Medicine and/or for sustained contributions to further the goals of the Space Medicine Branch. The winner of the 2002 Strughold Award was Earl H. Wood, M.D., Ph.D., of the Mayo Clinic for his outstanding contributions in the area of Space Medicine that span over 7 decades. (See accompanying article on award recipients.)
Awards of the Space Medicine Branch

At the Scientific Meeting of the Aerospace Medical Association in May 2002, the Space Medicine Branch presented two awards, the Hubertus Strughold Award and the Young Investigator Award. The Strughold Award winner was Earl H. Wood, M.D., Ph.D., and the Young Investigator Award winner was Sophie Lalande, B.Sc., M.S.

Hubertus Strughold Award
Earl H. Wood, M.D., Ph.D.

The Hubertus Strughold Award is presented each year to a member of the Space Medicine Branch for dedication and outstanding contributions in advancing the frontiers of Space Medicine, and/or for sustained contributions to furthering the goals of the Space Medicine Branch. Nominations for this Award can only be made by the members of the Executive Committee and by former recipients of the Award who are active members of the Space Medicine Branch. We received 13 outstanding nominations and carried out two voting sessions to arrive at our recipient for our Branch's highest honor.

Our 2002 recipient comes from a great Minnesota family and a great Aerospace institution, the Mayo Clinic. His accomplishments span 7 decades. Dr. Earl H. Wood received his B.A. from Macalester College in St. Paul and his B.S., M.S., Ph.D., and M.D. degrees from the University of Minnesota, graduating in 1941. His Ph.D. thesis, "The Distribution of Water and Electrolytes Between Cardiac Muscle and Blood Serum with Special Reference to the Effects of Digitalis," was the first work to demonstrate the intracellular Na, K, and water interchanges as related to the therapeutic effects of digitalis.

In 1941, Dr. Wood was awarded a National Research Fellowship at the University of Pennsylvania. The following year he received an appointment as Instructor in Pharmacology at Harvard University. When the war broke out, he had applied for a commission to the Air Corps, but was refused because medical school teachers were considered too valuable for combat. Still wanting to contribute to the war effort, he returned to Minnesota to join the Mayo Aeromedical Laboratory in 1942, where his exemplary career has proceeded until his first retirement from the active clinical staff in 1982 at the age of 70 – to his present day investigative and consulting work as Emeritus Professor of Physiology and Medicine at the Mayo Clinic.

Dr. Wood's major contributions, accomplishments, and awards, by decades, are listed below:

In the 1940s:
- Collaborative development of Mayo's human centrifuge, where he played an outstanding role in the design and implementation of investigations which defined and clarified the pathophysiology of GLOC;
- 1942-45 he experienced 1198 seconds of +25Gx exposure, 299 G exposures with complete light loss, 8 instances of GLOC;
- Collaborative development of the earpiece oximetry;
- 23 separate G-suit designs – the M-21 selected by Army Air Corps Work with David Clark Company to mass-produce M-21 suits;
- Development of M-1 straining maneuver for Army Fighter Pilots in WWII;
- Accompanied Hubertus Strughold ("Strugi") when they were asked by the Air Surgeon's office to go to Germany after WWII to recruit/interview all the German scientists and collate the report that finally resulted in the publication of "German Aviation Medicine in WW II". For his work, which had contributed so greatly to the success of American fighter pilots in combat, he was awarded the Certificate of Merit by President Harry Truman in 1947.
- Development of cardiac catheterization.

In the 1950s:
- Collaborative development heart-lung oxygenators, bypass machines which helped pioneer open heart surgery (with John Kirklin, Dave Donald, et al.);
- Development of Cardio-Green and indicator dilution techniques for the analysis of cardiac function in humans (with J. J. Fox);
- Through award grants began the training of a generation of cardiologists and cardiovascular physiologists, who later became leaders and department heads in medical centers across the world, including Germany, France, Switzerland, Italy, Japan, United States, Russia, and People's Republic of China, including the present CEO of Mayo Clinic Rochester.

In the 1960s:
- Development of video densitometry for measurement of cardiac blood flow and valve patency using radiopaque contrast agent;
- First use of a computer to analyze cardiovascular parameters in real time;
- Design, fabrication, and application of the world's first video special effects and split-screen generator (now in wide commercial use) (with Ralph Sturm PIP);
- First use of analog video tape recording technology to store continuous-motion X-ray vector imagery of the heart, lungs, and circulation of patients and experimental animals (with Ampex);
- Initial work on biplane subtraction angiography, which led directly to present-day clinical use of digital subtraction angiography techniques;
- Began his collaboration with NASA when NASA and the USAF asked him to reactivate the centrifuge and study the effects of transverse acceleration on the human body;
- Calibration of equipment on Mayo's centrifuge for the USAF and NASA, prior to launch of the animals on suborbital flights;
- Testing of Mercury and Gemini couches and space suits on Mayo's centrifuge for NASA;
- Demonstration of the feasibility of liquid breathing at high G levels for NASA, with the intent of protecting the lungs of astronauts during emergency egress;
- Member of advisory team for USAF's Manned Orbiting Laboratory (classified program) which later became NASA's Space Shuttle Program;
- Member of the Mayo Research committee where he championed the ethical treatment of Animal and Human research subjects;
- Chairman of Mayo's first Computer Committee;
- Tenth scientist to be named Career Investigator of the American Heart Association.

In the 1970s:
- While Head of the Biodynamic Research Unit at Mayo, began development of the Dynamic Spatial Reconstructor, a 3-D, real-time X-ray computed tomography machine, whose commercial successor is the Imatron X-ray scanner;
- Convinced General Electric Corporate Research and Development Center to begin investing in X-ray computed tomography, eventually resulting in GE's position as the world's leading producer of diagnostic X-ray computed tomography machines;
- Consultant for USAF on ejection seat placement in the experimental versions of the F-15 and F-16 fighters;
- Recipient of NASA's Award for lifetime achievement;
- Recipient of Air Force's Award for lifetime achievement.

In the 1980s:
- Chairman of American Physiology Society (APS)
- Chairman of Federated Societies for Experimental Biology (FASEB)
- Compilation and summary of world literature on G-LOC from 1940s to 1980s, as a two-volume publication distributed to all world centers of acceleration physiology research; support by DARPA.

In the 1990s:
- Independent analysis of Atlantis Warner and Libelle G-Suits;
- Analysis of several versions of modern G-Suits including a new one developed with the David Clark Company; tested on Canadian See WOOD, p. 949.
The Young Investigator Award
Sophie Lalande, B.Sc., M.S.

The Young Investigator Award is a competition intended for those making their first major efforts into Aerospace Medicine Research.

To compete for this award, contestants must be making their first presentation of a paper or poster at an AsMA meeting (excluding cases presented at Grand Rounds as a student resident); they must appear as first author on the paper; and the must prepare and submit a manuscript for judging. Finalists compete in a second phase of competition at the AsMA Meeting involving further evaluation of their presentation and interviews.

The potential applicability of the findings to the field of space medicine and the degree of involvement of the student in the project are major considerations.

The finalists in this years' competition, selected from 143 contestants, are a highly qualified and diversified group. (see below).

The winner of the 2002 SMB YIA is Sophie Lalande B.Sc. Ms. Lalande is truly a young investigator, new to the field of aerospace research. She has begun her foray into this realm with work on the Masters thesis at the University of Toronto in the laboratory of the Defence and Civil Institute of Environmental Medicine. The paper is entitled "Improved +Gz Tolerance in Acute, Repetitive Exposures To Acceleration.” Dr. Fred Buick is co-author.

The Young Investigator Award—Sophie Lalande, B.Sc., M.S. (center) received the SMB 2002 Young Investigator Award plaque from Melchor Antuñano (left), President, and Jeffrey Myers, M.D., Co-Chair Awards Committee.