

Complete Scientific Program of 31st Annual Aerospace Medical Association Meeting, Miami Beach, May 9, 10, 11

Leading scientists in the field of aviation and space medicine, including Project Mercury astronauts, will present more than 150 research and clinical reports at the 31st annual meeting of the Aerospace Medical Association at the Americana Hotel, Miami Beach, Florida, May 9 to 11, Dr. Ludwig G. Lederer, president of the society, has announced.

The complete scientific program for this eventful meeting, prepared by a committee under the chairmanship of Colonel James B. Nuttall, USAF, is announced in this issue of *AEROSPACE MEDICINE*.

NASA REPORT

The climax of the numerous scientific sessions of the meeting will be a report on Project Mercury, sponsored by the National Aeronautics and Space Administration, on Wednesday afternoon, May 11. The speakers will be Lt. Commander Walter M. Schirra, Jr., USN, Mercury astronaut, and Lt. Colonel James P. Henry of NASA's Life Sciences Branch, Langley Field, Virginia. Other sessions will be sponsored by the Dade County Medical Society, Armed Forces Institute of Pathology, Joint Committee on Aviation Pathology, Armed Forces-NRC Committee on Bio-Astronautics, American College of Preventive Medicine, and Civil Aviation Medical Association.

A record-breaking number of scientific and technical exhibits have been assembled by Dr. William J. Kennard, secretary-treasurer of the Association, who is also general chairman of the meeting. Other groups meeting concurrently with the Association are the Airline Medical Directors' Association, Civil Aviation Medical Association, and the Medical Committee of the International Air Transport Association. The American Board of Preventive Medicine will conduct examinations for certification of candidates in aviation medicine, it has also been announced.

BAUER LECTURE

Dr. Detlev W. Bronk, president of the National Academy of Sciences and of the Rockefeller Institute, will present the sixth annual Louis H. Bauer Lecture, established in 1955 as a living tribute to the founder and first president of the Association. Dr. Bauer also served as editor for 25 years of *AEROSPACE MEDICINE*, formerly the *Journal of Aviation Medicine*. Dr. Bronk's lecture will follow Dr. Lederer's address of wel-

come on the opening morning of the meeting.

More than 100 top aerospace medical scientists and flight surgeons from other countries will attend the Miami Beach meeting, according to Colonel George B. Green, USAF, chairman of the International Committee. A group of senior military officers of the air forces of these nations will be the official guests of the United States Air Force on a tour of medical facilities following the meeting. The group will be accompanied by Major General Oliver K. Niess, Air Force Surgeon



WIVES' WING—Mrs. Kenneth L. Stratton, wife of the medical director of American Airlines, is president of the Wives' Wing of the Aerospace Medical Association. She will preside at the annual meeting of the ladies' auxiliary to be held during the Association's scientific and social program at the Americana Hotel, Miami Beach, Florida, May 9, 10 and 11.

SCIENTIFIC PROGRAM

General, on visits by military aircraft to the Air Force Missile Test Center, Patrick AFB, Florida, USAF Aerospace Medical Center in Texas, and Aerospace Medical Laboratory.

SPACE LUNCHEON

The Space Medicine Branch of the Association, under the presidency of Captain Clifford P. Phoebus, USN, will sponsor a special luncheon on May 11, which is open to all registrants at the meeting, for a panel discussion of "The Continuum of Man-Machine Systems from Aircraft to Spacecraft." Speakers include Scott Crossfield, North American test pilot; Carl Christianson, United Air Lines' vice president; Melvin Gough, NASA scientist; Lt. Col. John Glen, USMC, Mercury astronaut; Alfred

Mayo, Douglas Aircraft engineer, Owen Niehaus of Bell Helicopter Corporation; and Dr. W. Randolph Lovelace II. The annual business meeting and luncheon of the Association will be held on May 10 when consideration will be given to adoption of a revised Constitution and Bylaws and election of officers. The proposed Constitution and Bylaws was published in the February number of *AEROSPACE MEDICINE*.

AWARDS ANNOUNCED

At the closing banquet on May 11 the winners of the Association's awards for scientific achievement will be announced, and Dr. George J. Kidera, medical director of United Air Lines, will be installed as the Association's thirty-second president.

Scientific Program

MONDAY, MAY 9, 1960

Opening Ceremony—8:30 A.M.

ADDRESS—Dr. Ludwig G. Lederer, President Aerospace Medical Association

THE LOUIS H. BAUER LECTURE—Dr. Detlev W. Bronk, President, National Academy of Sciences and the Rockefeller Institute

Clinical Aerospace Medicine—10:30 A.M.

Honorary Sponsor: Dade County Medical Association

Chairman: Franklin J. Evans, M.D., President, Dade County Medical Association, Miami, Florida; *Co-Chairman:* George J. Kidera, M.D., President-Elect, Aerospace Medical Association, Chicago, Illinois

THE INITIAL SIX MONTHS' EXPERIENCE WITH AIRLINE PILOTS ELECTROCARDIOGRAM REQUIREMENTS

J. H. Britton, Federal Aviation Agency, Washington, D. C.

SUMMARY OF ELECTROCARDIOGRAPHIC ABNORMALITIES FOUND IN THE AIR FORCE FLYING POPULATION

L. E. Lamb and *K. H. Averill*, School of Aviation Medicine, USAF Aerospace Medical Center, Brooks AFB, Texas

CARDIOVASCULAR DISEASE AND AIR TRAVEL

N. D. Sanborn and *A. Graybiel*, Cardiovascular Laboratory, USN School of Aviation Medicine, Pensacola, Florida

THE BALLISTOCARDIOGRAPHIC RESPONSE OF "NORMAL" AND CARDIAC PATIENTS TO NITROGLYCERINE

L. R. Krasno and *G. J. Kidera*, Medical Department, United Air Lines, Chicago, Illinois

THE SIGNIFICANCE OF BLOOD-LIPID ANALYSIS IN USAF FLYING PERSONNEL

G. D. Talbott, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

APPLICATION OF ADVANCED ENGINEERING DEVELOPMENT TO MEDICAL USE

A. M. Mayo, Douglas Aircraft Company, El Segundo, California

SCIENTIFIC PROGRAM



SUNNY FLORIDA.—This spectacular air view of the Bal Harbour section of Miami Beach, Florida, shows the Americana Hotel and cabanas in the foreground. The Aerospace Medical Association will hold its 31st annual meeting here May 9, 10, 11, 1960. Make your hotel reservations now!



LUDWIG G. LEDERER, M.D.
President
Aerospace Medical Association



COL. JAMES B. NUTTALL, USAF
Chairman
Scientific Program Committee

SCIENTIFIC PROGRAM

**Physiological Monitoring of Aerospace Crews—
May 9, 10:30 A.M.**

Chairman: W. Randolph Lovelace, II, M.D., Director, Lovelace Foundation, Albuquerque, New Mexico; *Co-Chairman:* Donald D. Flickinger, Brigadier General, USAF, MC, Surgeon, Air Research and Development Command, Andrews Air Force Base, Maryland

PITFALLS IN INTERPRETING ELECTROCARDIOGRAPHIC CHANGES OCCURRING WHILE MONITORING STRESS PROCEDURES

R. G. Hiss, G. B. Smith, and L. E. Lamb, School of Aviation Medicine, USAF Aerospace Medical Center, Brooks AFB, Texas

THE EEG AS A METHOD OF MONITORING STATE OF ALERTNESS AND THE PRESENCE OF HYPOXIA IN PILOTS

J. J. Gordon, Aviation Medical Acceleration Laboratory, USN Air Development Center, Johnsville, Pennsylvania

RECORDING OF INFLIGHT STRESS IN JET FIGHTER PLANES

C. W. Sem-Jacobsen, EEG Laboratory, Gaustad Hospital, Vinderen, Oslo, Norway

A SYSTEM FOR MONITORING AND RECORDING PHYSIOLOGICAL VARIABLES DURING ENVIRONMENTAL STRESSES ENCOUNTERED IN AEROSPACE VEHICLES AND THEIR GROUND SIMULATION COUNTERPARTS

R. E. Jensen, J. J. Gordon, W. Sipple, and R. D. Squires, Aviation Medical Acceleration Laboratory, USN Air Development Center, Johnsville, Pennsylvania

HOMEOSTATIC INSTRUMENTATION FOR SPACE CABINS

J. H. Miller, I. Cooper, and E. B. Konecci, Douglas Aircraft Company, Santa Monica, California

AUTOMATIC METHODS FOR THE ANALYSIS OF PHYSIOLOGICAL DATA

W. J. Carbery, C. A. Steinberg, and W. E. Tolles, Department of Medical and Biological Physics, Airborne Instruments Laboratory, Deer Park, L. I., New York, and A. H. Freiman, Sloan-Kettering Institute, New York, New York

Physiology of Acceleration—May 9, 10:30 A.M.

Chairman: Ashton Graybiel, Captain, MC, USN, Director of Research, U. S. Naval School of Aviation Medicine, Pensacola, Florida; *Co-Chairman:* Rufus R. Hessberg, Jr., Lt. Colonel, USAF, MC, Chief, Aeromedical Field Laboratory, Holloman Air Force Base, New Mexico

RESPIRATORY EFFECTS OF FORWARD ACCELERATION

F. W. Zechman, N. S. Cherniack, and Alvin S. Hyde, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

THE MEASUREMENT OF CARDIAC OUTPUT DURING HEADWARD ACCELERATION USING THE DYE-DILUTION TECHNIQUE

E. F. Lindberg and R. N. Headley, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio, and W. F. Sutterer, H. W. Marshall, and E. H. Wood, Mayo Foundation, Rochester, Minnesota

HEMODYNAMIC CHANGES DURING TRANSVERSE ACCELERATION

S. H. Steiner, G. C. E. Mueller, R. M. Rapp, N. S. Cherniack, and J. L. Taylor, Jr., Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

MAN'S CARDIOVASCULAR RESPONSE TO HEADWARD ACCELERATION WHILE IMMERSSED IN WATER

E. H. Wood, E. F. Lindberg, C. F. Code, and E. J. Baldes, Mayo Foundation, Rochester, Minnesota

OBSERVATIONS OF A HUMAN EXPERIENCING 2 G FOR 24 HOURS

C. C. Clark, Aviation Medical Acceleration Laboratory, USN Air Development Center, Johnsville, Pennsylvania

THE ABILITY OF PILOTS TO PERFORM A CONTROL TASK IN VARIOUS SUSTAINED ACCELERATION FIELDS

H. A. Smedal, B. Y. Creer, and R. C. Wingrove, Ames Research Center, National Aeronautics and Space Administration, Moffett Field, California

THE PATHOLOGICAL CHANGES PRODUCED IN LARGE PRIMATES EXPOSED TO HIGH POSITIVE G WHILE IMMERSSED IN A WATER CAPSULE

P. H. Craig, K. R. Coburn, R. F. Gray, and E. L. Beckman, Aviation Medical Acceleration Laboratory, USN Air Development Center, Johnsville, Pennsylvania

SCIENTIFIC PROGRAM

AFTERNOON SESSIONS—MAY 9, 1960

Thermal Stress—2:00 P.M.

Chairman: Henry B. Hale, Ph.D., Department of Physiology, School of Aviation Medicine, Brooks Air Force Base, Texas; *Co-Chairman:* W. Vincent Blockley, Supervisor of Physiology, Human Factors Group, North American Aviation, Los Angeles, California

RESPONSE OF HUMAN SUBJECTS TO A SIMULATED RE-ENTRY THERMAL PROFILE

E. Hendler and L. J. SantaMaria, Air Crew Equipment Laboratory, Naval Air Materiel Center, Philadelphia, Pennsylvania

BIOENERGETICS IN SPACE ENVIRONMENT CONTROL

N. L. Barr, Republic Aviation Corporation, Farmingdale, New York

CALORIE NEUTRALIZATION DURING THERMAL STRESS

J. Gold, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

RENAL RESPONSES TO HEAT AND ALTITUDE

R. M. Rapp, L. A. Whitehair, and N. P. Clarke, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

THE ROLE OF CUTANEOUS RECEPTORS IN THE CONTROL OF SWEAT PRODUCTION

D. McK. Kerslake, RAF Institute of Aviation Medicine, Farnborough, England

Human Engineering or Aerospace Vehicles—May 9, 2:00 P.M.

Chairman: Ross A. McFarland, Ph.D., Harvard School of Public Health, Boston;

Co-Chairman: Henry G. Wagner, Captain, MC, USN, Naval Medical Research Institute, Bethesda, Maryland

CONTROLS AND DISPLAYS FOR ORBITAL VEHICLES

E. L. Brown, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

OPTIMUM THEORETICAL VISUAL CAPABILITIES OF THE HUMAN OPERATOR IN AN ORBITAL VEHICLE

W. F. Swartz and R. W. Obermayer, The Martin Company, Baltimore, Maryland

PREDICTION OF MAN'S VISION IN AND FROM THE MERCURY CAPSULE

E. R. Jones, McDonnell Aircraft Corporation, St. Louis, Missouri

THE ROLE OF A FLEXIBLE COCKPIT IN HUMAN ENGINEERING RESEARCH

R. B. Ziegler, N. M. Burns, J. Lazo, and E. C. Gifford, Air Crew Equipment Laboratory, Naval Air Materiel Center, Philadelphia, Pennsylvania

Clinical Aerospace Medicine—May 9, 2:00 P.M.

Sponsor: Civil Aviation Medical Association

Neal E. Baxter, M.D., Bloomington, Indiana, President

Chairman: George B. McNeely, M.D., Bloomington, Illinois; *Co-Chairman:* Delbert F. Rey, M.D., Palo Alto Medical Clinic, Palo Alto, California

CARDIOLOGY IN THE EXAMINATION OF CIVIL AIR CREWMEN

L. E. Lamb, School of Aviation Medicine, USAF Aerospace Medical Center, Brooks AFB, Texas

PSYCHIATRY—"THE WHAT AND WHY OF THE NEW REGULATIONS"

P. B. Phillips, Naval Aviation Medical Center, Pensacola, Florida

METABOLIC AND ENDOCRINE DISORDERS

J. H. Tillisch, Mayo Clinic, Rochester, Minnesota

ORTHOPEDIC INJURIES COMMON TO AIRPORT OPERATIONS

J. S. Neviasser, Washington, D. C.

SCIENTIFIC PROGRAM

Aerospace Pathology—May 9, 4:00 P.M.

Sponsor: Joint Committee on Aviation Pathology

Chairman: Joe M. Blumberg, Colonel, MC, USA, Deputy Director, Armed Forces Institute of Pathology, Washington, D. C.; *Co-Chairman:* F. Warren Lovell, Major, USAF, MC, Chief, Aerospace Pathology Branch, Armed Forces Institute of Pathology, Washington, D. C.

HUMAN FACTORS IN AEROSPACE PATHOLOGY

K. E. Pletcher, Directorate of Flight and Missile Safety Research, Norton AFB, California

AIRCRAFT ACCIDENT RECONSTRUCTION FROM POSTMORTEM EXAMINATIONS

F. M. Townsend, Armed Forces Institute of Pathology, Washington, D. C.

APPRAISAL OF SAFETY AND EQUIPMENT RELATIVE TO AEROSPACE

P. J. Stevens, RAF Institute of Pathology and Tropical Medicine, Halton, Aylesbury, Bucks, England

MORBID ANATOMY IN YOUNG ADULTS IN AVIATION PATHOLOGY

J. R. Jackson, Office of General Medical Services, Department of National Defence, Ottawa, Canada

Aerospace Crew Performance—May 9, 4:00 P.M.

Chairman: Saul B. Sells, Ph.D., Professor of Psychology, Texas Christian University, Fort Worth, Texas; *Co-Chairman:* Randal M. Chambers, Ph.D., Aviation Medical Acceleration Laboratory, USN Air Development Center, Johnsville, Pennsylvania

BIO-ELECTRONIC ANALYSIS OF PERFORMANCE

H. F. Glassner and *G. A. Peters*, Douglas Aircraft Company, El Segundo, California

THE EFFECTS OF LONG TERM CONFINEMENT ON PERCEPTION AND PERSONALITY

N. M. Burns, *R. B. Ziegler*, and *E. C. Gifford*, Air Crew Equipment Laboratory, Naval Air Material Center, Philadelphia, Pennsylvania

MAINTENANCE OF VIGILANCE DURING PROLONGED SIMULATED SPACE FLIGHT

G. T. Hauty, *G. R. Steinkamp*, *W. R. Hawkins*, and *D. M. Keller*, School of Aviation Medicine, USAF Aerospace Medical Center, Brooks AFB, Texas

EFFECTS OF G ENVIRONMENTS ON PSYCHOMOTOR ABILITIES

R. M. Chambers, Aviation Medical Acceleration Laboratory, USN Air Development Center, Johnsville, Pennsylvania

BIOASTRONAUTICAL RESEARCH FOR PROJECT MERCURY

R. L. Burdick and *N. M. Burns*, Air Crew Equipment Laboratory, Naval Air Material Center, Philadelphia, Pennsylvania

Aerospace Physiology—May 9, 4:00 P.M.

Chairman: William K. Stewart, Air Commodore, RAF, Royal Air Force Institute of Aviation Medicine, Farnborough, Hants, England; *Co-Chairman:* Loren D. Carlson, Ph.D., Department of Physiology and Biophysics, School of Medicine, University of Washington, Seattle, Washington

INVESTIGATIONS INTO THE SIGNIFICANCE OF ELEVATED POST MORTEM BRAIN LACTIC ACID

A. M. Dominguez, *J. R. Halstead*, *H. McMichael*, *L. R. Goldbaum*, *H. I. Chinn*, and *F. W. Lovell*, Armed Forces Institute of Pathology, Washington, D. C.

PLASMA AND ELECTROLYTE CHANGES PRODUCED BY HYPERCAPNIA, HYPOCAPNIA AND HYPOXIA

E. B. Brown, Jr., Department of Physiology, University of Minnesota, Minneapolis, Minnesota

THE FULL RANGE OF CEREBRAL VASCULAR RESPONSE TO ALTERATION IN ARTERIAL CARBON DIOXIDE TENSION

A. J. Wasserman and *J. L. Patterson*, Cardiovascular Laboratory, Medical College of Virginia, Richmond, Virginia

THE RESPONSE OF THE HUMAN RETINAL VESSELS TO POSITIVE PRESSURE BREATHING

I. D. Green, *P. R. Wagner*, and *B. F. Burgess*, RAF Institute of Aviation Medicine, Farnborough, England

FATFREE BODY WEIGHT OF SWEDISH AIR FORCE PILOTS

W. von Döbeln, Department of Physiology, Kungliga Gymnastiska Centralinstitutet, Stockholm, Sweden

SCIENTIFIC PROGRAM

MORNING SESSIONS—TUESDAY, MAY 10, 1960

Symposium on Bioastronautics—8:30 A.M.

Sponsor: Armed Forces-NRC Committee on Bio-Astronautics

Chairman: Otto H. Schmitt, Ph.D., Professor of Zoology and Physics, University of Minnesota, Minneapolis, Minnesota; *Co-Chairman:* Sam F. Seeley, M.D., Division of Medical Sciences, National Research Council, Washington, D.C.

ORGANIZATION AND FUNCTION OF THE ARMED FORCES-NRC COMMITTEE ON BIO-ASTRONAUTICS

S. F. Seeley, National Academy of Sciences, National Research Council, Washington, D. C.

EXTRA-TERRESTRIAL MICROBIOLOGY

W. Vishniac, Brookhaven National Laboratory, Upton, New York

CLOSED ECOLOGICAL SYSTEMS

W. O. Pipes, Jr., Northwestern University, Evanston, Illinois

BIO-INSTRUMENTATION

O. H. Schmitt, University of Minnesota, Minneapolis, Minnesota

ACTIVITIES OF THE ACCELERATION PANEL

J. D. Hardy, Aviation Medical Acceleration Laboratory, USN Air Development Center, Johnsville, Pennsylvania

BIOLOGICAL ORIENTATION AND NAVIGATION

S. R. Galler, Office of Naval Research, Washington, D. C.

ACTIVITIES OF PANEL ON PSYCHOLOGY

W. F. Grether, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

RADIATION BIOLOGY

H. J. Schaefer, USN School of Aviation Medicine, Pensacola, Florida

BIO-ENGINEERING OF PROTECTIVE SYSTEMS

C. F. Gell, Office of Naval Research, Washington, D. C.

**Aerospace Equipment Design, Development and Testing—
May 10, 8:30 A.M.**

Chairman: Roy Stubbs, Wing Commander, RCAF, Flight Personnel Medical Establishment, Institute of Aviation Medicine, Toronto, Ontario, Canada; *Co-Chairman:* E. L. Hays, Air Crew Equipment Laboratory, Naval Air Material Center, Philadelphia, Pennsylvania

HUMAN FACTOR CONSIDERATIONS IN THE DESIGN OF THE B-58 ESCAPE CAPSULE

G. A. Valentine, Stanley Aviation Corporation, Denver, Colorado

THE DEVELOPMENT OF AN AUTO-ADJUSTING AND POSITIONING SINGLE DISCONNECT UPPER TORSO RESTRAINT HARNESS FOR THE B-58 ESCAPE CAPSULE

G. A. Holcomb, Stanley Aviation Corporation, Denver, Colorado

EMERGENCY ESCAPE CAPSULE SYSTEM

W. F. Mickelson, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

A CORRELATION OF PHYSIOLOGICAL AND MECHANICAL TESTING TO MEASURE OXYGEN BREATHING SYSTEM EFFICIENCY

A. Bloom, Sierra Engineering Company, Sierra Madre, California

OXYGEN EQUIPMENT AND USE IN PRIVATE AIRCRAFT

A. E. Miller, Scott Aviation Corporation, Lancaster, New York

Space Environment Simulators—May 10, 10:30 A.M.

Chairman: Eugene B. Konecni, Ph.D., Human Factors Group, Douglas Aircraft Company, Santa Monica, California; *Co-Chairman:* Roland A. Bosee, Captain, MSC, USN, Air Crew Equipment Laboratory, Naval Air Material Center, Philadelphia, Pennsylvania

DESIGN CONCEPT OF THE BIO-ASTRONAUTICAL RESEARCH AND TEST FACILITY OF THE AIR CREW EQUIPMENT LABORATORY, NAVAL AIR MATERIAL CENTER

E. L. Hays and *R. A. Bosee*, Air Crew Equipment Laboratory, Naval Air Material Center, Philadelphia, Pennsylvania

SPACE ENVIRONMENT SIMULATION

J. Freeman, Republic Aviation Corporation, Farmingdale, New York

SCIENTIFIC PROGRAM

SPACE ENVIRONMENT SIMULATORS

- O. Schueller*, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio
A CLOSED ENVIRONMENTAL SYSTEM SIMULATOR FOR MANNED SPACE FLIGHT
J. A. McCaffrey and *J. A. Stern*, Boeing Airplane Company, Seattle, Washington

AFTERNOON SESSIONS—MAY 10, 1960

Stress—2:30 P.M.

- Chairman*: William R. Franks, M.D., RCAF Institute of Aviation Medicine, Toronto, Canada; *Co-Chairman*: Earl T. Carter, M.D., Department of Preventive Medicine, Ohio State University, Columbus, Ohio

AN APPROACH TO THE ADVANCE PREDICTION OF TOLERANCE TO ACUTE PHYSICAL STRESS

- T. F. McGuire*, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

VENOUS PLASMA LEVELS OF CATECHOL AMINES IN RESPONSE TO SEVERAL PHYSICAL STRESSES

- J. P. Meehan*, Department of Physiology, School of Medicine, University of Southern California, Los Angeles, California

THE EFFECT OF STRESS AND ANTICIPATION TO STRESS OF URINARY LEVELS OF A CATECHOLAMINE CATABOLITE

- M. L. Berman* and *J. A. Pettitt*, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

Physiology of Angular Acceleration—May 10, 2:30 P.M.

- Chairman*: M. G. Whillans, M.D., Defence Research Board, Department of National Defence, Ottawa, Ontario, Canada; *Co-Chairman*: Jorma I. Niven, Ph.D., U. S. Naval School of Aviation Medicine, Pensacola, Florida

HUMAN PERFORMANCE DURING ADAPTATION TO STRESS IN THE PENSACOLA "SLOW ROTATION ROOM"

- B. Clark* and *A. Graybiel*, USN School of Aviation Medicine, Pensacola, Florida

EVALUATION OF A SIMPLE CORIOLIS TEST FOR VESTIBULAR SENSITIVITY

- R. N. Kraus*, School of Aviation Medicine, USAF Aerospace Medical Center, Brooks AFB, Texas

SOME EXPERIMENTS ON THE RELATIVE EFFECTIVENESS OF VARIOUS TYPES OF ACCELERATIONS ON MOTION SICKNESS

- W. H. Johnson* and *N. B. G. Taylor*, Defence Research Medical Laboratories, Toronto, Canada

Clinical Aerospace Medicine—May 10, 2:30 P.M.

Sponsor: Civil Aviation Medical Association

- Chairman*: George B. McNeely, M.D., Bloomington, Illinois; *Co-Chairman*: Delbert F. Rey, M.D., Palo Alto Medical Clinic, Palo Alto, California

FEDERAL AVIATION AGENCY MEDICAL DEPARTMENT

- J. L. Goddard*, Federal Aviation Agency, Washington, D. C.

MEDICAL AND ADMINISTRATIVE PITFALLS OF THE CIVIL AVIATION FLIGHT SURGEON

- J. H. Britton*, Federal Aviation Agency, Washington, D. C.

EDUCATION AND TRAINING IN CIVIL AVIATION MEDICINE

- B. V. Leamer*, University of California Medical School, Los Angeles, California

APPLICATION OF MEDICAL RESEARCH TO CIVIL AVIATION MEDICINE

- J. E. Smith*, Federal Aviation Agency, Washington, D. C.

Biodynamics of Impact Forces—May 10, 4:00 P.M.

- Chairman*: E. J. Baldes, Ph.D., Mayo Clinic and Mayo Foundation, Rochester, Minnesota; *Co-Chairman*: Clayton S. White, M.D., Director of Research, Lovelace Foundation and Clinic, Albuquerque, New Mexico

HUMAN FACTOR RESPONSES DURING GROUND IMPACT

- R. N. Headley*, *R. F. Managan*, *J. W. Brinkley*, and *G. Lokatos*, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

HUMAN TOLERANCE TO ULTRA HIGH G FORCES

- E. L. Beeding* and *J. D. Mosely*, Aeromedical Field Laboratory, Holloman AFB, New Mexico

SCIENTIFIC PROGRAM

ACCELERATION SHOCK EXPERIMENTS USING LIVE PIGS

F. J. Brock, McDonnell Aircraft Corporation, St. Louis, Missouri

HUMAN VOLUNTARY TOLERANCE TO VERTICAL IMPACT

J. J. Swearingen, E. B. McFadden, J. D. Garner, and J. G. Blethrow, FAA Civil Aeromedical Research Center, Oklahoma City, Oklahoma

Rapid Decompression in Passenger Jet Airlines—

May 10, 4:00 P.M.

Chairman: Donald G. M. Nelson, Group Captain, RCAF, Royal Canadian Air Force Institute of Aviation Medicine, Toronto, Ontario, Canada; *Co-Chairman*: Charles I. Barron, M.D., Medical Director, Lockheed Aircraft Corporation, Burbank, California

CREW OXYGEN REQUIREMENTS IN HIGH ALTITUDE TRANSPORT AIRCRAFT

A. C. Bryan, W. G. Leach, and R. A. Stubbs, RCAF Institute of Aviation Medicine, Toronto, Canada

THE REACTIONS AND PERFORMANCE OF PILOTS FOLLOWING RAPID DECOMPRESSION TO 40,000 FEET

G. Bennett, British Overseas Airways Corporation, London, England

ACUTE HYPOXIA DURING RAPID DECOMPRESSION AND EMERGENCY DESCENT IN COMMERCIAL AIRCRAFT

R. T. Donaldson, E. T. Carter, C. E. Billings, Jr., and F. A. Hitchcock, Departments of Physiology and Preventive Medicine, Ohio State University, Columbus, Ohio

PASSENGER EMERGENCY OXYGEN BAG

A. C. Bryan, W. G. Leach, and R. A. Stubbs, RCAF Institute of Aviation Medicine, Toronto, Canada

Clinical Aerospace Medicine—May 10, 4:00 P.M.

Chairman: Vincent M. Downey, Colonel, USAF, MC, Surgeon, 9th Air Force, Shaw Air Force Base, South Carolina; *Co-Chairman*: Charles A. Berry, Major, USAF, MC, Chief, Aerospace Crew Effectiveness Section, Office of the Air Force Surgeon General, Washington, D. C.

SEVERE DYSBARISM IN FLIGHT: A CASE REPORT

H. R. Unger and W. F. Turner, Air Materiel Command, Wright-Patterson AFB, Ohio

REPORT OF A CASE OF DECOMPRESSION SICKNESS SUCCESSFULLY TREATED WITH RE-COMPRESSION

A. M. Donnell, Office of the Surgeon, Tactical Air Command, Langley AFB, Virginia

PATHOLOGIC FINDINGS IN THREE CASES OF DECOMPRESSION SICKNESS

R. R. Robie, F. W. Lovell, and F. M. Townsend, Armed Forces Institute of Pathology, Washington, D. C.

X-RAY SURVEY FOR BONE CHANGES IN LOW-PRESSURE CHAMBER OPERATORS

C. A. Berry, Office of the Surgeon General, U. S. Air Force, Washington, D. C., and *G. L. Hekhuis*, USAF School of Aviation Medicine, Brooks AFB, Texas

MORNING SESSIONS—WEDNESDAY, MAY 11, 1960

Clinical Practice of Aerospace Medicine—8:30 A.M.

Sponsor: American College of Preventive Medicine

Chairman: J. L. Holland, Rear Admiral, MC, USN, U. S. Naval Aviation Medical Center, Pensacola, Florida; *Co-Chairman*: Harold V. Ellingson, Colonel, USAF, MC, Commander, U. S. Air Force Medical Service School, Gunter Air Force Base, Alabama

MEDICAL CONSIDERATIONS IN CIVILIAN JET OPERATIONS

O. B. Schreuder, Pan American World Airways, Jamaica, New York

NEWER AEROMEDICAL PROBLEMS OF CARRIER AVIATION

M. H. Goodwin, Bureau of Medicine and Surgery, Department of the Navy, Washington, D. C.

OTOSCLEROSIS—MANAGEMENT IN PILOTS

C. M. Kos, Department of Otolaryngology, University Hospitals, Iowa City, Iowa

HUMAN FACTORS IN B-52 OPERATIONS

V. H. Marchbanks, Jr., USAF Hospital, Loring AFB, Maine

SCIENTIFIC PROGRAM

CHANGING CONCEPTS IN PHYSICAL STANDARDS

F. S. Spiegel, Office of the Surgeon General, Department of the Air Force, Washington, D. C.

MEDICAL SUPPORT TO STRATEGIC MISSILE OPERATIONS

T. C. Bedwell, Office of the Surgeon, Strategic Air Command, Offutt AFB, Nebraska

Life Support Technology I—May 11, 8:30 A.M.

Chairman: Hubertus Strughold, M.D., Advanced Studies Group, USAF Aerospace Medical Center, Brooks Air Force Base, Texas; *Co-Chairman*: Clifford P. Phoebus, Captain, MC, USN, Director, Astronautical Division, Bureau of Medicine and Surgery, Washington, D. C.

CLOSED CIRCUIT RESPIRATION AND ENVIRONMENTAL CONTROL SYSTEMS

D. A. Mancinelli, Air Crew Equipment Laboratory, Naval Air Material Center, Philadelphia, Pennsylvania

AN INTEGRATED LIFE SUPPORT SYSTEM FOR ORBITAL FLIGHT

R. E. Hayes, *C. A. Metzger*, and *D. A. Keating*, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

THE INFLUENCE OF BIOLOGICAL VARIABILITY UPON LIFE SUPPORT SYSTEM DESIGN

R. G. Lindberg, Astro Systems and Research Laboratories, Hawthorne, California

TERELLA TOXICOLOGY

O. H. Minney, Missile Division, North American Aviation, Downey, California

DIAGNOSIS OF THE STATE OF HEALTH OF A MAN IN SPACE

J. N. Waggoner, AiResearch Manufacturing Company, Los Angeles, California

CRITERIA FOR DESIGN OF THE MERCURY ENVIRONMENTAL CONTROL SYSTEM (METHOD OF OPERATION AND RESULTS OF MANNED SYSTEM OPERATION)

H. R. Greider and *J. R. Barton*, McDonnell Aircraft Corporation, St. Louis, Missouri

Weightlessness—May 11, 8:30 A.M.

Chairman: John P. Stapp, Colonel, USAF, MC, Chief, Aerospace Medical Laboratory, Wright-Patterson Air Force Base, Ohio; *Co-Chairman*: Harold J. Von Beckh, M.D., Research Laboratory, Holloman Air Force Base, New Mexico

RECENT EXPERIMENTS ON SUBGRAVITY AND ZERO-G STRESS

S. J. Gerathewohl, Army Ballistic Missile Agency, Redstone Arsenal, Alabama

THE EFFECT OF WEIGHTLESSNESS ON SOME POSTURAL MECHANISMS

T. C. D. Whiteside, RAF Institute of Aviation Medicine, Farnborough, England

PHYSIOLOGICAL EFFECTS OF POSTURAL DISORIENTATION BY TILTING DURING WEIGHTLESSNESS

B. G. King, Operations Research Incorporated, Silver Spring, Maryland

THE RESPONSE OF MAMMALIAN GRAVITY RECEPTORS TO SUSTAINED TILT

R. L. Cramer, School of Aviation Medicine, USAF Aerospace Medical Center, Brooks AFB, Texas

NULL-GRAVITY SIMULATION

R. B. Levine, Lockheed Aircraft Corporation, Marietta, Georgia

Emergency Escape from Aircraft—May 11, 10:40 A.M.

Chairman: John C. Wickett, Wing Commander, RCAF, Director of Aviation Medicine, Air Force Headquarters, Ottawa, Ontario, Canada; *Co-Chairman*: Frank B. Voris, Captain, MC, USN, Director, Aviation Medicine Technical Division, Bureau of Medicine and Surgery, Washington, D. C.

USAF EMERGENCY ESCAPE EXPERIENCE 1949-1959

K. E. Pletcher and *S. E. Neely*, Directorate of Flight and Missile Safety Research, Norton AFB, California

STABLE VS. UNSTABILIZED FREE FALL FROM HIGH ALTITUDES

J. W. Kittinger, Jr., Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

PHYSIOLOGICAL EFFECTS OF DYNAMIC EXPOSURE TO RAM PRESSURES

D. I. Fryer, RAF Institute of Aviation Medicine, Farnborough, England

UNDERWATER RESEARCH TO SAVE PILOTS

L. A. Fuchs and *B. S. Hutchins*, Engineering Development Department, USN Air Development Center, Johnsville, Pennsylvania

SCIENTIFIC PROGRAM

Life Support Technology II—May 11, 10:40 A.M.

Chairman: Paul A. Campbell, Colonel, USAF, MC, Assistant to the Commander for Advanced Studies, U. S. Air Force Aerospace Medical Center, Brooks Air Force Base, Texas; *Co-Chairman:* Charles F. Gell, Captain, MC, USN, Special Assistant for Medical Allied Sciences, Office of Naval Research, Washington,

SPACE ECOLOGY: I—DESIGN REQUIREMENTS FOR CHEMICAL CONTROLS OF SEALED CABIN ATMOSPHERES

I. Cooper, J. H. Miller, and E. Konecni, Douglas Aircraft Company, Santa Monica, California

OXYGEN RECOVERY SYSTEM FOR MANNED SPACE FLIGHT

J. J. Konikoff, Aerosciences Laboratory, General Electric Company, Philadelphia, Pennsylvania

RECENT ADVANCES IN THE DEVELOPMENT OF A CLOSED ECOLOGICAL SYSTEM

J. H. Bates, School of Aviation Medicine, USAF Aerospace Medical Center, Brooks AFB, Texas

PLANT GROWTH UNDER NEAR-ZERO OR ZERO GRAVITY

S. P. Johnson, Boeing Airplane Company, Seattle, Washington

Aerospace Physiology II—May 11, 10:40 A.M.

Chairman: John P. Marbarger, Ph.D., Aeromedical Laboratory, University of Illinois, Chicago, Illinois; *Co-Chairman:* A. P. Gagge, Colonel, USAF, Commander, Air Force Office of Scientific Research, Washington, D. C.

PHYSIOLOGICAL FACTORS WHICH LIMIT THE MINIMAL UTILIZABLE OXYGEN FOR RATS IN A CLOSED MICROENVIRONMENT

F. G. Hall, Duke University Medical Center, Durham, North Carolina

DEPENDENCE OF OXYGEN CONSUMPTION OF MICE ON TENSION AND AMBIENT PRESSURE

D. E. Beischer, USN School of Aviation Medicine, Pensacola, Florida

A METHOD FOR THE QUANTITATIVE DETERMINATION OF GASEOUS TISSUE NITROGEN

S. F. Marotta, E. F. Robbins, and J. P. Marbarger, Aeromedical Laboratory, University of Illinois, Chicago, Illinois

THE PERIPHERAL VASCULAR RESPONSE TO LOCAL COLD INJURY AS OBSERVED IN THE RABBIT EAR CHAMBER

A. W. Gottmann, Arctic Aeromedical Laboratory, Ladd AFB, Alaska

SPECIAL LUNCHEON SESSION—MAY 11, 1960

Panel Discussion: Continuum of Man-Machine Systems from Aircraft to Spacecraft

Sponsor: Space Medicine Branch of the Association

President: Clifford P. Phoebus, Captain, MC, USN, Bureau of Medicine and Surgery, Washington, D. C.; *Chairman:* G. W. Hoover, Commander, USN (Ret.), Los Angeles, California

Panel Participants

SCOTT CROSSFIELD, Chief Test Pilot, North American Aviation, Inglewood, California

CARL CHRISTIANSON, Vice President, United Air Lines, Denver, Colorado

MELVIN GOUGH, NASA Liaison Officer, Patrick Air Force Base, Florida

JOHN GLEN, Lt. Colonel, USMC, Astronaut, Space Task Group, NASA, Langley Field, Virginia

ALFRED MAYO, Chief Equipment and Safety Research, Douglas Aircraft Company, Inc., El Segundo Division, El Segundo, California

OWEN NIEHAUS, Chief Electronics Engineer, Bell Helicopter Corporation, Fort Worth, Texas

W. RANDOLPH LOVELACE, II, The Lovelace Foundation, Albuquerque, New Mexico

SCIENTIFIC PROGRAM

AFTERNOON SESSIONS—MAY 11, 1960

Physiology of Sealed Cabin Atmospheres—2:15 P.M.

Chairman: Christian J. Lambertsen, M.D., Department of Pharmacology, University of Pennsylvania Medical School, Philadelphia, Pennsylvania; *Co-Chairman:* Karl E. Schaefer, Ph.D., Physiology Branch, U. S. Naval Medical Research Laboratory, U. S. Naval Submarine Base, New London, Connecticut

A CONCEPT OF TRIPLE TOLERANCE LIMITS

K. E. Schaefer, U. S. Naval Medical Research Laboratory, U. S. Naval Submarine Base, New London, Connecticut

TOLERANCE OF PURE OXYGEN ATMOSPHERES

D. M. Keller, and *J. H. Bates*, School of Aviation Medicine, USAF Aerospace Medical Center, Brooks AFB, Texas

HUMAN PHYSIOLOGIC VARIATIONS OBSERVED DURING EXPOSURE TO 5 PSI PURE OXYGEN AMBIENT PRESSURE

S. Miller, *F. B. Quinn*, and *B. Leamer*, University of California Medical Center, Los Angeles, California

Aerospace Radiobiology—May 11, 2:15 P.M.

Chairman: Douglas L. Worf, Ph.D., Program Administrator, Bioscience, National Aeronautics and Space Administration, Washington, D. C.; *Co-Chairman:* Gerrit L. Hekhuis, Colonel, USAF, MC, Chief, Department of Radiobiology, School of Aviation Medicine, Brooks Air Force Base, Texas

AEROSPACE NUCLEAR SAFETY

J. A. Connor, Jr., Aerospace Nuclear Safety Board, U. S. Atomic Energy Commission, Germantown, Maryland

VOLUME DOSE AND DEPTH DOSE IN A HUMAN TARGET IN HIGH INTENSITY PROTON RADIATION FIELDS IN SPACE

H. J. Schaefer, USN School of Aviation Medicine, Pensacola, Florida

RESULTS OF BIOASTRONAUTICS 1959 PRIMARY COSMIC RADIATION RESEARCH PROGRAM

D. G. Simons, School of Aviation Medicine, USAF Aerospace Medical Center, Brooks AFB, Texas

STATUS OF SPACE-VEHICLE SHIELDING WORK

J. W. Keller, and *N. M. Schaeffer*, Convair, Fort Worth, Texas

Biodynamics of Mechanical Vibration—May 11, 2:15 P.M.

Chairman: Edwin P. Hiatt, Ph.D., Chief, Biophysics Branch, Aerospace Medical Laboratory, Wright-Patterson Air Force Base, Ohio; *Co-Chairman:* D. E. Goldman, Commander, MSC, USN, Biophysics Division, Naval Medical Research Institute, Bethesda, Maryland

OBSERVATIONS ON DAMAGE TO EXPERIMENTAL ANIMALS EXPOSED TO MECHANICAL VIBRATION

R. W. Pape, and *D. E. Goldman*, Naval Medical Research Institute, Bethesda, Maryland

SHORT TIME HUMAN TOLERANCE TO SINUSOIDAL VIBRATIONS

G. H. Ziegenruecker and *E. B. Magid*, Aerospace Medical Laboratory, Wright-Patterson AFB, Ohio

HUMAN PERFORMANCE UNDER VIBRATION: PHYSIOLOGICAL AND PSYCHOMOTOR RESPONSE OF A VIBRATING SUBJECT MONITORING A VIBRATING DISPLAY

T. M. Fraser, *G. Hoover*, and *W. F. Ashe*, Department of Preventive Medicine, Ohio State University, Columbus, Ohio

Progress Report on Project Mercury—May 11, 3:40 P.M.

Sponsor: National Aeronautics and Space Administration

PROGRESS REPORT ON PROJECT MERCURY

Lieutenant Commander, USN, Walter M. Schirra, Jr., Mercury Astronaut, and *Lieutenant Colonel, USAF, MC, James P. Henry*, Life Systems Branch, NASA Space Task Group, Langley Field, Virginia