NASA SP-7011(39)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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NASA SP-7011(39)

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A CONTINUING BIBLIOGRAPHY

WITH INDEXES

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA Information System during June 1967

Scientific and Technical Information Division
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. JULY 1967

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In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis will be placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion. The contents of this issue are comprised of abstracts that were prepared by the three contributing organizations.

Each entry consists of a standard citation accompanied by its abstract. It is included in one of three groups of references that appear in the following order:

a. NASA entries identified by their *STAR* accession numbers (N67-10000 series),
b. AIAA entries identified by their *IAA* accession numbers (A67-10000 series); and
c. LC entries identified by a number in the A67-80000 series.

Many of the abstracts included in this publication have been reproduced from those appearing in *STAR* and *IAA*. This procedure, adopted in the interests of economy and speed, has introduced some variation in size, style, and intensity of type.

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(continued)

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For further details please consult the *Introductions* to *STAR* and *IAA*, respectively.

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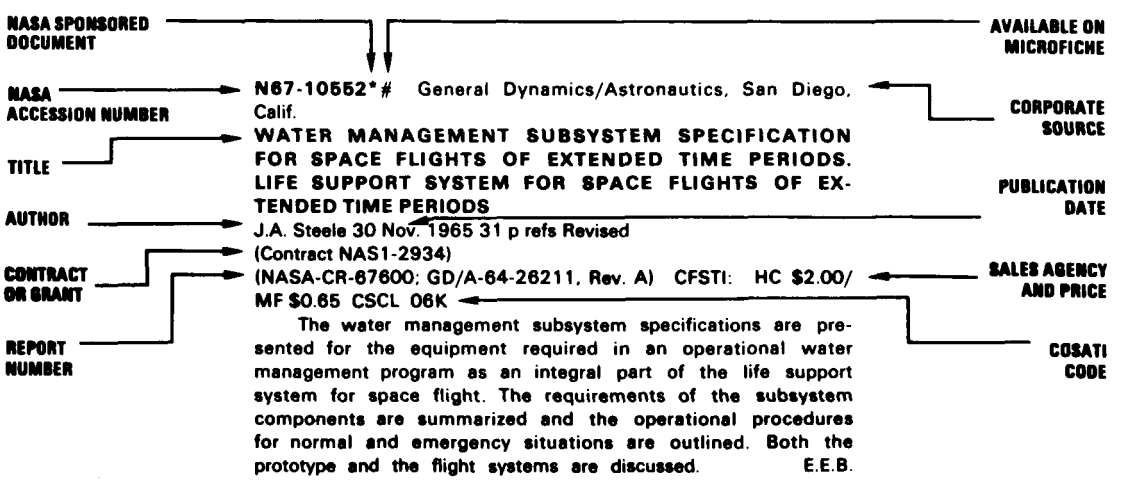
TYPICAL CITATION AND ABSTRACT



AEROSPACE MEDICINE AND BIOLOGY

a continuing bibliography JULY 1967

STAR ENTRIES

N67-21961*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
JET SHOES—AN EXTRAVEHICULAR SPACE LOCOMOTION DEVICE
David F. Thomas, Jr., John D. Bird, and Richard F. Hellbaum Washington, NASA, Apr. 1967 33 p refs Technical Film Supplement L-892 available on request
(NASA-TN-D-3809) CFSTI: HC $3.00/MF $0.65 CSCL 06B

This report presents the results of an investigation into the feasibility of an extra-vehicular locomotion device. This device consists of low thrust jets mounted on the soles of a pair of shoes to provide a controllable thrust vector which can be used to produce translational and rotational motions. It was found that with a little practice, the subject could control his attitude and motion with a reasonable degree of precision. Author

N67-22097# Federal Aviation Agency, Oklahoma City, Okla.
ADAPTATION TO VESTIBULAR DISORIENTATION. III: INFLUENCE ON ADAPTATION OF INTERRUPTING NYSTAGMIC EYE MOVEMENTS WITH OPPOSING STIMULI
W. E. Collins Sep. 1966 9 p refs
(AM-66-37) CFSTI: HC $3.00/MF $0.65

Failure of adaptation of nystagmic eye movements to occur under certain conditions of stimulation by angular acceleration has been ascribed to a failure to allow the eye-movement response to run its course. Three groups of subjects were tested under conditions of repeated angular accelerations in which Group A received unidirectional stimulation, Group B received bidirectional stimulation with both responses allowed to run their course, and Group C received bidirectional stimulation but the response in one direction was interrupted. Adaptation occurred for all groups in spite of the different test procedures. Other implications of the results are discussed. Author

N67-22151*# Webb Associates, Yellow Springs, Ohio.
BIO-THERMAL RESPONSES TO VARIED WORK PROGRAMS IN MEN KEPT THERMALLY NEUTRAL BY WATER COOLED CLOTHING
Paul Webb and James A. Annis Washington, NASA, Apr. 1967 70 p refs
(Contract NASw-1306)
(NASA-CR-739) CFSTI: HC $3.00/MF $0.65 CSCL 06S

During periods of heavy work, such as those expected in extra-vehicular activity, metabolic heat can be removed at nearly any reasonable rate with water cooled clothing. We have studied the cooling needed for various work levels up to 15 kcal/min (3600 Btu/hr), using five different programs of activity over 3 to 6-hour periods. With thermally isolated subjects, and using a fixed water flow rate of 1.5 lpm (3.3 lbs/min), we adjusted water inlet temperatures so that the men neither sweated nor became chilled. Experimental data show continuous curves for "Q" (quantity of heat removed), water inlet temperature, oxygen consumption, rectal temperature, and mean skin temperature. Mean body temperature is held nearly constant, and the subjects are "comfortable" throughout the experiments. From such data one can specify control of cooling for any reasonable level of work and for many patterns of work. Author

N67-22222*# Aeronutronic, Newport Beach, Calif. Space and Re-entry Systems Div.
AUTOMATED BIOLOGICAL LABORATORY SOIL SAMPLING STUDY Final Report, 17 Feb. 1966–17 Feb. 1967
Wilfred H. Bachle 17 Feb. 1967 301 p refs
(Contract NASw-1065)
(NASA-CR-83516; UG-3962) CFSTI: HC $3.00/MF $0.65 CSCL 06C

Conceptual design, breadboard fixture, and engineering prototype development phases are described for a sample handling system capable of acquiring, transporting, processing, and transferring small particulate samples to the analytical instruments to be used within the Voyager-class capsule configurations in the 1970's. The prototype systems are both horizontally and vertically deployed sampling systems. The former consists of a rotating brush deployed on a telescoping boom containing a combined pneumatic and mechanical transporting and collection mode. Transfer can be made by gravity drop stages and/or omnidirectional pneumatic tubes or helical screw conveyors. The vertical system is a rotating conical sieve that is dumped by rapid spinning and vibration caused by eccentric weight. Both samplers can acquire and transport particulate samples weighing one gram or more from soils that are firmly cemented, loose rubble, sand, or compacted silt. M.W.R.

N67-22303# Rocky Flats Div., Dow Chemical Co., Golden, Colo.
DATA USED IN HEALTH PHYSICS CONSIDERATIONS FOR PLUTONIUM AND AMERICIUM
E. A. Putzier 23 Nov. 1966 40 p refs
(Contract AT(29-1)-1106)
(RFP-795) CFSTI: HC $3.00/MF $0.65

Data used in health physics considerations of Pu and Am are summarized. The nuclear constants of ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Pu, ^{242}Pu, ^{241}Am, and ^{237}U are presented. Data are included on the γ dose rates from semi-infinite thick pure metal slabs of ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Pu plus the daughters ^{241}Am and ^{237}U, surface dose rates from x and γ rays from

^{241}Am growth, surface dose rates from γ rays from ^{237}U growth; the effects of the decay of ^{241}Pu to ^{241}Am and ^{237}U on on the x and γ activity of a mixture of Pu isotopes; neutron radiation values (ngs) for ^{238}Pu, ^{239}Pu, ^{240}Pu, and ^{242}Pu; methods used to express the growth of ^{241}Am from ^{241}Pu; the amounts and energies of fission product impurities ($^{103}Ru-^{103}Rh$ and $^{95}Zr-^{95}Nb$) associated with Pu operations; the γ shielding properties of various materials, including Pb glass, Pb gloves, safety glass, plexiglass, Pb, and steel; data useful for calculating the isotopic abundance and radiation dose from Pu during shipment; data used in monitoring work areas for α and β activity associated with Pu isotopes; and data used to calculate the body burden from inhaled particles of Pu or Pu-contaminated wounds. NSA

N67-22312# Oak Ridge National Lab., Tenn.
THE MOLECULAR ANATOMY OF CELLS AND TISSUES: THE MAN PROGRAM Annual Report, Jul. 1, 1965–Jun. 30, 1966
N. G. Anderson Nov. 1966 99 p refs
(Contract W-7405-ENG-26)
(ORNL-3978, Spec.) CFSTI: HC $3.00/MF $0.65

The Molecular Anatomy (MAN) Program is concerned with the development of tools for the dissection and analysis, down to the molecular level, of cells and tissues. The following questions are asked: If available separation methods are extended to the limits of experimental resolution, would they resolve the complex mixture that is the cell? Given a complete molecular scan of cell contents in health and in disease, would differences due to an underlying malfunction be evident? What specific systems remain to be developed before a reasonably complete description of the molecular anatomy of a cell may be written? This report analyzes some aspects of these questions, describes analytical systems being developed under the program, and presents results of various bioseparations. Two new zonal centrifuge rotors, B-XIV and B-XV, are described in detail, together with studies on the application of these rotors to particle isolation. Both rotors allow large-volume rate-zonal and isopycnic-zonal centrifugation to be done in conventional preparative ultracentrifuges. In addition, a computer method has been developed for calculating the radial distance from the center of the rotor for a specific volume, and improvements have been made to other B Series rotors. A series of rotors is being designed and tested for large-scale virus isolation and other purposes by use of the continuous-flow principle. The prototype K-I rotor operates in the conventional air-driven Sharples machine. The large-volume (<10 liters/hr) K-II rotor is the first of several rotors that are being designed to do specific tasks. Direct motor drive or an air turbine will probably be the most economical method of spinning a production model of the K-II rotor. Advanced concepts, such as high-speed drive systems and magnetically suspended rotors, are being explored. Materials requirements are stringent for systems in these categories because of extremely high g forces. From experimental separations with several rotors, results with a number of materials are reported: lysosomes, human breast tumors, and natural waters. High-performance chromatographic systems are being modified and refined. A laboratory model of an automated carbohydrate analyzer is described, together with results of experiments in following changes in soluble carbohydrates of synchronized Tetrahymena and in assaying sugars of human urine. Ultraviolet-absorbing components of urine were chromatographically separated with a modified nucleotide analyzer. From a group of supporting studies, the following is reported: (1) physical properties of potassium citrate solutions, (2) design and testing of dialysis equipment and density indicator beads, (3) stress and corrosion tests in sodium perchlorate, and (4) determination of carbon in liquid streams or solid samples with a flame-ionization analyzer. This program is cosponsored by the National Cancer Institute and the U.S. Atomic Energy Commission. Author (NSA)

N67-22326# Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex. Dept. of Aerosol Physics.
EVALUATION OF PARTICLE SIZING TECHNIQUES; COMPARISON OF COMPUTER PARTICLE SIZING PROGRAMS Technical Progress Report
S. Posner, H. J. Ettinger, O. R. Pratt, Jr., and R. Moore Jul. 1966 16 p refs
(Contract AT(29-2)-1013)
(LF-30) CFSTI: HC $3.00/MF $0.65

Aerosol sampling and sizing techniques from several different laboratories were compared in Part I of the evaluation. Results from the participants agreed within ±10% in defining count median diameter and geometric standard deviation. These were obtained via hand calculation of the data. Part II deals with comparing the same, or similar, data by computer programs. Four of these programs for analyzing particle size data are compared, and resulting differences are statistically evaluated. Author (NSA)

N67-22356*# Mayo Clinic, Rochester, Minn.
STUDIES OF THE EFFECTS OF ACCELERATION ON CARDIOVASCULAR AND RESPIRATORY DYNAMICS Semiannual Status Report
Earl H. Wood and John H. Reed, Jr. 1 Apr. 1967 25 p refs
(Grant NsG-327)
(NASA-CR-83323) CFSTI: HC $3.00/MF $0.65 CSCL 06S

A model of the pulmonary circulation is presented which is based on data from isolated lung preparations and is supported by the use of radioactive gas studies in man. The former have the disadvantage that they are non-physiological, and the latter have the disadvantage that there are large errors in counting and correcting scan data to provide a measure of the flow per unit volume of lung. Data are presented from intact dogs studied in the right lateral position. The results of the studies indicate that the distribution of regional blood flow to the lungs is not a simple function of the differences in various vascular and airway pressures. It appears highly probable that regional differences in pleural pressures present in the intact thorax, which are weight dependent and hence determined by the direction and magnitude of resultant inertial and gravitational force vectors, play an important role as a determinant of blood flow to different regions of the lung. Author

N67-22380*# California Univ., Berkeley. Space Sciences Lab.
CHEMISTRY OF LIVING SYSTEMS Semiannual Report, 1 Oct. 1966–31 Mar. 1967
Thomas H. Jukes 31 Mar. 1967 26 p refs *Its* Space Sci. Lab. Ser. no. 8, Issue no. 24
(Grant NsG-479)
(NASA-CR-83321) CFSTI: HC $3.00/MF $0.65 CSCL 06A

Subdivision and reconstitution of ribosomes, evolution of enzyme systems in pseudomonas, and the molecular mechanism in the assembly of the T4 bacteriophage from its protein units to form an infective organism were investigated along with other studies related to the chemistry and evolution of living systems. Consideration is given to protein synthesis during the early stage of germination of B. subtilis, and a sequential study of spinach ferredoxin is reported. Optical rotatory dispersion, X-ray scattering, and birefringence of DNA and RNA were investigated, as were the regulation of deoxyribose metabolism in E. coli, the ribonucleoside triphosphate binding site, and base sequences in TMV–RNA. M.W.R.

N67-22429# Oak Ridge National Lab., Tenn.
HEALTH PHYSICS DIVISION ANNUAL PROGRESS REPORT, PERIOD ENDING JUL. 31, 1966
Oct. 1966 309 p refs
(Contract W-7405-ENG-26)
(ORNL-4007) CFSTI: HC $3.00/MF $0.65

CONTENTS:

N67-22430# Oak Ridge National Lab., Tenn.
RADIOACTIVE WASTE DISPOSAL
F. L. Parker *In its* Health Phys. Div. Oct. 1966 p 1–41 refs (See N67-22429 11-04) CFSTI: HC $3.00/MF $0.65

Continuing studies of the field plots show a reduced rate of loss of ^{137}Cs in the fall and winter months of the second year. There is a logarithmic relationship between ^{137}Cs loss and the soil loss. Mass balance analyses do not provide a satisfactory accounting of the total ^{137}Cs applied to the clipped meadow plot. Studies of the selective adsorption of cobalt by layer lattice silicates show that adsorption is influenced by the method of sample preparation. With identical sample preparation techniques, trioctahedral lattices sorb more cobalt than comparable minerals with dioctahedral lattices. The most probable failure mechanisms limiting the ultimate capacity of the shale formation in the hydraulic-fracturing waste-disposal method appear to be related to the stresses induced in the rocks surrounding the injection by the injection itself. The problem of defining the number and size of injections required to produce a failure condition and examination of the nuclide retention properties of the set grouts, especially those containing low-cost fly ash, continued. Final preparations for Project Salt Vault were completed. NSA

N67-22431# Oak Ridge National Lab., Tenn.
RADIATION ECOLOGY
S. I. Auerbach *In its* Health Phys. Div. Oct. 1966 p 43–119 refs (See N67-22429 11-04) CFSTI: HC $3.00/MF $0.65

Examination of salivary gland chromosomes of 755 larvae from populations of Chironomous collected from White Oak Creek and White Oak Lake which had been exposed to an estimated radiation dose of 230 rads/yr for over 120 generations revealed 12 different aberrations not found in nonirradiated insects. The effects of γ radiation on viability, interspecific competition, and mutation induction were studied in laboratory populations of Drosophila. The major activation products in soil samples exposed to 2056 rads of fast neutrons were identified as ^{56}Mn, ^{51}Cr, ^{86}Rb, ^{181}Hf, and ^{95}Zr–^{95}Nb. The effects of fast neutrons (505 and 1011 rads) on the uptake of ^{65}Zn and growth of three-year-old red oak seedlings were studied. The translocation of radioisotopes in predator–prey systems was studied using ^{134}Cs-labeled brown crickets (Acheta) as the prey and a praying mantis (Tenodera), a centipede (Otocryptops), and lycosid spiders as predators. Results demonstrated a high accumulation of ^{134}Cs by predators during the feeding process. An aerial photographic technique using infrared color photographs made with camouflage detection film and taken at a scale of 1:3960 proved efficient for the identification of insect-infested trees and timber types in forests infected with the southern pine beetle (Dendroctonus). Results are reported from measurements of the content of Cs, K, and ^{137}Cs in the flesh of fish collected monthly from the Clinch River and the content of ^{137}Cs, ^{60}Co, and ^{90}Sr in fish and periphyton in White Oak Lake. NSA

N67-22432# Oak Ridge National Lab., Tenn.
RADIATION PHYSICS
G. S. Hurst *In its* Health Phys. Div. Oct. 1966 p 121–169 refs (See N67-22429 11-04) CFSTI: HC $3.00/MF $0.65

Various brief summaries of research are presented on the following areas: theoretical radiation physics, atomic and molecular radiation physics, interaction of radiation with solids and liquids, and physics of tissue damage. NSA

N67-22433# Oak Ridge National Lab., Tenn.
RADIATION DOSIMETRY
J. A. Auxier *In its* Health Phys. Div. Oct. 1966 p 171–210 refs (See N67-22429 11-04) CFSTI: HC $3.00/MF $0.65

Progress is reported in the evaluation of γ and neutron doses received by residents of Hiroshima and Nagasaki exposed to the effects of atomic explosions and the effects of various shielding parameters on the radiation doses. A transistorized fast neutron dose integrator was built for use in the presence of severe environmental conditions. Neutron cross sections are presented for the production of γ rays in air by the $^{14}N(n,\gamma)^{15}N$; $^{14}N(n,\alpha)^{11}B$; $^{40}Ar(n,\gamma)^{41}Ar$; $^{16}O(n,n')^{16}O$; $^{16}O(n,\alpha)^{13}C$; or $^{16}O(n,p)^{16}N$ reactions that show that ^{14}N is the dominant γ producing source in air with most of the γ rays coming from the inelastic scattering of neutrons by ^{14}N and ^{16}O. Neutron-energy threshold detector units employing solid-state nuclear tract detectors were improved by replacing the conventional fissile foils with fissile radiators and nuclear track detectors. Results are reported from an intercomparison of nuclear accident dosimetry systems in which 7 groups participated. The sensitivity of cellulose acetate butyrate for use in solid-state α particle track detection was evaluated. Plastics were irradiated with helium ions and deuterons using the DOSAR low-energy accelerator and the design is described of a deflection chamber for use with a pair of beam deflection plates on the target end of DOSAR during the irradiation. The final endurance testing of the 150-keV positive-ion accelerator (HPRR) was completed. NSA

N67-22434# Oak Ridge National Lab., Tenn.
INTERNAL DOSIMETRY
W. S. Snyder *In its* Health Phys. Div. Oct. 1966 p 211–241 refs (See N67-22429 11-04) CFSTI: HC $3.00/MF $0.65

The revision of the standard man is suggested to include the information needed for the estimation of radiation dose, whether from external or from internal sources, to provide an estimate of the variability of dose due to individual differences, and to afford methods of adjusting the estimate to correct for an individual's characteristics. Data are presented on the mass (in g or ml) and the percent of total body of 52 tissues and organs based on a 70 kg man. The use of the model in studies on the deposition and clearance of particulate matter from the respiratory tract is discussed and methods and formula for obtaining dose estimates of radioactive aerosols are presented. Phantoms of infants and adults were used to determine variations in the radiation dose $(\beta+\gamma)$ from a given unit source of ^{137}Cs in the body of man as a function of body size and position of the source in the body. A three-compartment model for iodine metalbolism by the thyroid and by the body is presented that is valid radioactive iodine. Computer studies are discussed on the linear combination of exponentials representing power functions used to represent data on excretion from and retention in the body of bone-seeking radionuclides. NSA

N67-22435# Oak Ridge National Lab., Tenn.
HEALTH PHYSICS TECHNOLOGY
B. R. Fish *In its* Health Phys. Div. Oct. 1966 p 243–267 refs (See N67-22429 11-04) CFSTI: HC $3.00/MF $0.65

Mechanisms for the adhesion of solid particles to surfaces are reviewed with emphasis on capillary and electrostatic forces that may affect the accidental resuspension of radioactive particles from surfaces in the working environment. Data are included from a study of electrical forces in the adhesion of particles. Preliminary results of spectrum and radiation dose measurements from discrete β-emitting sources in contact with or implanted in the skin are reported and methods are described. Methods for the dosimetry of small intense β-emitting particles deposited on the skin or in the gastrointestinal tract of man are discussed and techniques using extrapolation dosimetry using an anthracene scintillation detector and computer analysis of data and ionization extrapolation chamber are compared. Methods for correcting ^{239}Pu wound counts for attenuation in tissues and for the ratio of ^{241}Am to ^{239}Pu were investigated. Methods are described that were used to measure the absorption of ^{90}Sr from a puncture wound of the finger made by a stainless steel wire contaminated with $^{90}Sr+^{90}Y$. The absorption of ^{90}Sr into the body was studied by analysis of blood and urine and residual ^{90}Y in the finger was determined by counting β activity with an end-window GM beta counter. Methods of sample preparation for the determination of ^{85}Sr and ^{90}Sr in urine are discussed. NSA

N67-22522# State Univ. of Iowa, Iowa City.
FACILITATION AND INTERFERENCE IN PERFORMANCE ON THE MODIFIED MASHBURN APPARATUS. II: THE EFFECTS OF VARYING THE AMOUNT OF INTERPOLATED LEARNING
Don Lewis and Dorothy E. McAllister [1966] 16 p refs
(Contract N9onr-93801)
(SDC-938-1-2; AD-643407) CFSTI: HC $3.00/MF $0.65

A previous report showed that the amount of interference in performing on the Modified Mashburn Apparatus increased with increasing amounts of original learning (OL). During OL, groups of male subjects were given different amounts of practice on the standard Mashburn task. Then after practicing for some fixed number of trials on the reversed task, they relearned the standard task. Decrements in number of matches at the outset of relearning (RL) were found to be related to the amount of OL. The present report is concerned with the effects of varying the amount of interpolated learning (IL) subsequent to some fixed amount of OL, on the relearning of the standard task. There were 12 experimental groups, composed of male students. With two exceptions, the groups were the same as those used in analyzing the effects of different amounts of OL. Two new groups were added to insure a more adequate interpretation of the findings. TAB

N67-22523# State Univ. of Iowa, Iowa City.
FACILITATION AND INTERFERENCE IN PERFORMANCE ON THE MODIFIED MASHBURN APPARATUS. I: THE EFFECTS OF VARYING THE AMOUNT OF ORIGINAL LEARNING
Don Lewis, Dorothy E. McAllister, and Jack A. Adams [1966] 25 p refs
(Contract N9onr-93801)
(SDC-938-1-1; AD-643406) CFSTI: HC $3.00/MF $0.65

The acquisition of skill on the standard Mashburn task facilitated and also interfered with the subsequent learning of the reversed task. The signs of both facilitation and interference were clearly present at the outset of reversed practice and persisted in recognizable form through several trials. The amounts of proactive facilitation and interference displayed during IL (interpolated learning) were not found to be positively related to the amount of OL (original learning) on the standard task. Only one of the 12 experimental groups yielded clear evidence of the functioning of retroactive facilitation. The experimental groups, especially those receiving 3 or 5 days of OL and IL, showed conspicuous signs of retroactive interference during the early stages of relearning. Results for the control groups showed that the decreases in matches and increases in errors displayed by the experimental groups at the outset of relearning were the result of retroactive interference and not the result of the mere passage of time from the last OL trial to the first RL trial nor of such intangible factors as boredom and fatigue. Author (TAB)

N67-22536# Naval Submarine Medical Center, Groton, Conn.
TEN POINT WEIGHTING WITH THE IBM-805 TEST SCORING MACHINE
James W. Parker and Joseph A. Auwood 8 Dec. 1966 8 p refs
(MEMO-66-18; AD-646305) CFSTI: HC $3.00/MF $0.65

Multiple choice tests designed to assess individual differences in achievement in various training situations are in common usage in the Navy. Most test scoring machines are designed to score test items with four or fewer response alternatives. Often, however, it is desirable to include a wider gamut of choices to evaluate differences in response to a particular content area tapped by the test item. This paper describes a straight-forward method of preparing scoring templates for the *IBM-805 Test Scoring Machine* to provide cumulative scores from 10-choice differentially weighted response alternatives. Author (TAB)

N67-22542# Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, Ohio.
EFFECT OF DISTANCE BETWEEN AN INDICATOR AND ITS CORRESPONDING CONTROL UPON CONTROL ACTIVATION TIME
Earl D. Sharp and Edwin H. Sasaki Jan. 1967 9 p
(AMRL-TR-67-6; AD-645753) CFSTI: HC $3.00/MF $0.65

The study was designed to determine if variations in the distance between a control and its associated display affected control activation time. The time required to activate toggle switches was measured with control-display separations of 1.27 cm(0.5 in.), 3.81 cm(1.5 in.) and 6.34 cm(2.5 in.). The mean control activation times and their associated standard deviations were not differentially affected by the control-indicator distances used in the study. Author (TAB)

N67-22543# Wakoff Research Center, Staten Island, N. Y.
INTERPERSONAL RELATIONS AND MILITARY PERFORMANCE
Sheldon Blackman, Kenneth M. Goldstein, and Donald J. Collins Nov. 1966 101 p refs
(Contract DA-49-193-MD-2538)
(Rept.-3; AD-646048) CFSTI: HC $3.00/MF $0.65

It is hypothesized that an individual's performance is related to his perception of the support available to him from others. This support may be in two forms: (1) emotional support, or (2) being supplied with goods and services. The basic premise underlying the theoretical position is that when an individual feels he has support available to him from other people, he is better able to tolerate stress and his performance will be maintained at a high level. Therefore, the aspect of the interpersonal relationship focused on in this study is the feeling of an individual that he has others to call on should he need their support. In basic training one important source of support is from squadmates. This research is a study of the effects on performance of the relationships of recruits to their squadmates. TAB

N67-22544# George Washington Univ., Washington, D. C. Human Resources Research Office.
THE IMPORTANCE OF TRAINING REQUIREMENTS INFORMATION IN THE DESIGN AND USE OF AVIATION TRAINING DEVICES

Wallace W. Prophet Dec. 1966 11 p Presented at the Flight Safety Found. 16 Ann. Intern. Air Safety Seminar, Athens, Nov. 1963 *Its* Profess. Paper 8–66
(Contract DA-44-188-ARO-2)
(AD-645961) CFSTI: HC $3.00/MF $0.65

It is believed that observance of the following guidelines can result in effective devices that allow increases in efficiency and economy in training, as well as real increases in flight safety: (1) Training devices should be built only after careful analysis of the training requirements. (2) Analysis of training requirements should be primarily psychological rather than engineering in nature. (3) Determination of device characteristics should be oriented toward providing task fidelity, with physical fidelity being provided only as necessary to task fidelity. (4) Synthetic training programs should receive as careful consideration in their development as do the trainers themselves. (5) Devices and synthetic training programs should be tested for training effectiveness just as aircraft are tested. (6) Training devices and simulators can provide an effective means of reinforcing infrequently occurring behaviors. Author (TAB)

N67-22550# Naval Air Development Center, Johnsville, Pa. Aerospace Medical Research Dept.
A PERSONAL FM/FM BIOTELEMETRY SYSTEM
George E. Bergey, William C. Sipple, William A. Hamilton, and Russell D. Squires 23 Nov. 1966 36 p refs
(NADC-MR-6624; AD-645665) CFSTI: HC $3.00/MF $0.65

The report describes an FM/FM biotelemetry system capable of monitoring respiration, temperature, EEG and EKG and is easily converted to telemeter additional channels of data as required. This system is a combination of standard components, pasteless electrodes and relatively uncomplicated circuitry incorporated in a quick-donning comfortable garment to facilitate easy connection of the subject to the system. Author (TAB)

N67-22552# Melpar, Inc., Falls Church, Va.
ANALYSIS OF CRYOGENICALLY TRAPPED TRACE CONTAMINANTS BY IONIZING GAS CHROMATOGRAPHY Final Report, 15 Oct. 1965–15 Jan. 1967
Hannibal S. de Schmertzing, Sol S. Nelson, and Harold G. Eaton 15 Jan. 1967 21 p
(Contract AF 41(609)-2958)
(AD-645714) CFSTI: HC $3.00/MF $0.65

The purpose of the work was to determine quantitatively the concentration of micro contaminants in a sealed environmental system. The separation and identification of the cryogenically trapped trace contaminants was accomplished with liquid gas chromatography using a flame ionization detector. Forty sets of samples were analyzed, each set consisting of 3 cylinders, trapped at Brooks AFB. The compounds contained in the sample cylinders were identified by their elution time from a column and the amount measured with the aid of peak areas. The response characteristics of the chromatograph were calculated from response obtained with standard mixtures. The forty sample sets were composed of 9 samples from a manned simulator run conducted in October-November, 1965; 30 samples from a similar run conducted in March-April 1966, and one sample set consisting of trapping efficiency runs. Author (TAB)

N67-22555# Tulane Univ., New Orleans, La. Delta Regional Primate Research Center.
ANALYSIS OF POSITIONAL BEHAVIORS IN THE RHESUS MONKEY (MACACA MULATTA) Technical Report, May 1, 1965–Aug. 31, 1966
Joan Deutsch Oct. 1966 45 p refs
(Contract Nonr-475(II); Grant PHS-FR-00164-03)
(TR-66-1; AD-645538) CFSTI: HC $3.00/MF $0.65

Systems and methodologies for the classification and description of motor behavior were evaluated in the light of the present needs of psychologists, primatologists, and investigators of electrically elicited movement in primates. The system developed in this study involved an angular-displacement kinematic analysis of the relations established between units of the body anatomy of monkeys during spontaneously occurring activity. Approximate angular displacements of body units were measured by means of a protractor from sketches of animals in profile traced from sequences of stills of movie film. Sitting, bipedal and quadrupedal standing postures were classified according to the most widely varying positional elements such as the amount and level of back curvature or leg flexion. The mode and the range of specific classes of the postures were specified and examples of the modal patterns were presented. Quadrupedal walking sequences which represented the most frequently observed sequence of foot contact with the substrate were analyzed, and the angular displacements of the body units and their temporal relations during successive phases of the locomotion were measured. Two extreme types of quadrupedal walking were differentiated in terms of positional elements, timing and patterning. The specific social and physical referents for the derived classes of postures and quadrupedal locomotion were specified. The possible applications of this system of analysis of positional behavior to special and general areas of neurophysiological and psychological investigation were discussed. Author (TAB)

N67-22575# General Electric Co., Santa Barbara, Calif. Tempo.
COMPUTER AUGMENTED LEARNING—A SURVEY
J. Kindred 16 Nov. 1966
(Rept.-66TMP-55; AD-645121) CFSTI: HC $3.00/MF $0.65

The report contains a description and summary of computer augmented learning devices and systems. The devices are of two general types: programmed instruction systems based on the teaching machines pioneered by Pressey and developed by Skinner, and the so-called docile systems that permit greater user-direction with the computer under student control. Even sympathetic criticisms by practitioners reveal limited understanding of the psychology of learning and knowing, expose potential restrictions to adequate selection of computer-based curricula, and recognize technical hazards that impede the development of effective computerized educational tools. Author (TAB)

N67-22581*# Neurosciences Research Program, Brookline, Mass.
NEUROSCIENCES RESEARCH PROGRAM BULLETIN, VOLUME 4 (SUPPLEMENT)
15 Jul. 1966 97 p refs
(Grants NsG-462; NIH-GM-10211-04; Nonr(G)-00067-65)
(NASA-CR-83422) CFSTI: HC $3.00/MF $0.65 CSCL 06P

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2. HYSTERESIS AND MACROMOLECULAR MEMORY A. Katchalsky and A. Oplatka p 71–93 refs (See N67-22583 11-04)

N67-22582*# Massachusetts General Hospital, Boston.
CORRELATIONS BETWEEN SPECIFIC HUMAN BRAIN LESIONS AND MEMORY CHANGES
Robert G. Ojemann *In* Neurosci. Res. Program Bull., Vol. 4 (Suppl.) 15 July 1966 p 1–70 refs (See N67-22581 11-04) CFSTI: HC $3.00/MF $0.65

A critical survey is presented of the literature that correlates a specific loss of brain tissue with the details of the memory

deficit or lack of it. Cases related to surgical removal, disease, or congenital absence are considered. Changes in memory are described in three general categories: a loss of ability to store recent memory, as measured by the inability to learn or record ongoing day-to-day events; amnesia for events immediately prior to the loss of brain tissue, with the period varying from less than a day to several months; and memory for events occurring several years before the lesion. Clinical case histories are presented on lesions associated with medial temporal lobe, lateral temporal lobe, entire temporal lobe, fornix, hippocampus, commissures, thalamus, hypothalamus, third ventricle and adjacent structures, frontal lobe, corpus callosum and cerebral commissures, and multiple brain regions. The various tests of memory functions which were used are described. An annotated bibliography is included. M.G.J.

N67-22583*# Weizmann Inst. of Science, Rehovoth (Israel). Polymer Dept.

HYSTERESIS AND MACROMOLECULAR MEMORY

Aharon Katchalsky and Abraham Oplatka *In* Neurosci. Res. Program Bull., Vol. 4 (Suppl.) 15 July 1966 p 71–93 refs (See N67-22581 11-04) CFSTI: HC $3.00/MF $0.65

The requirements imposed on memory devices as an integral part of cybernetic self-organizing systems are examined. Memory devices, in this context, are defined as the means for recording, storage, and readout of individual experience, as distinguished from the hereditary memory underlying the master plan of an organism. Working hypotheses for interpretating subcellular memory storage and readout are reviewed; the mechanisms suggested assume that memory imprints involve changes in the primary structures of suitable macromolecules. Data are presented to indicate that there exists the possibility of a physical record in biopolymers based on conformational changes in single macromolecules or in cellular macromolecular structures such as membranes. Since hysteresis is a suitable indicator for the existence of mestastable forms of high permanence, hysteresis phenomena are discussed, and consideration is given to metastable macromolecular conformations with a capacity for memorizing the imprint of surrounding events. Experimental results are presented on the hysteresis behavior of RNA, and on a thermodynamic analysis of the cycles exhibited by the simpler structures. M.G.J.

N67-22585# University of Southern Calif., Los Angeles. Dept. of Psychology.

TRAINING OBJECTIVES FOR CORRECTIVE MAINTENANCE OF THE AN/URC-32 TRANSCEIVER Technical Report, Aug. 1966

Joseph W. Rigney, Edward T. Langston, Ralph B. Macaruso, and Robert Fromer Aug. 1966 112 p refs

(Contract Nonr-228(22))

(TR-48; AD-646027) CFSTI: HC $3.00/MF $0.65

This report contains a detailed description of the criterion tasks required for the corrective maintenance of the AN/URC-32 transceiver. These represent terminal behaviors that graduates of a Class C AN/URC-32 School should be able to perform. The specification of these criterion behaviors is a first step in the development of a training program. The description is organized in terms of six corrective maintenance requirements; system state recognition, fault localization, circuit isolation, component isolation, maintenance adjustments, and repair. The tasks necessary to fulfill these requirements, the general skills in the use of test equipment, and the acceptable degrees of accuracy for performing the major task are described. The steps which must follow this first step in gaining control over training as a process are outlined, and recommendations for the use of these training objectives are made. TAB

N67-22590# Library of Congress, Washington, D. C. Aerospace Technology Div.

HIGHLIGHTS OF SOVIET BIOASTRONAUTICS AT THE 17TH IAF CONGRESS IN MADRID

Boris Mandrovsky *In its* Foreign Sci. Bull., Vol. 2, No. 12 Dec. 1966 p 24–37 refs (See N67-22587 11-05) CFSTI: HC $3.00/MF $0.65

An indication of future trends and summary data on several aspects of the Soviet space program are presented. The Kosmos-110 experiment, in which two dogs were orbited for 22 days and brought back to earth, showed that it required eight or nine days for the dogs to adjust their motor coordination to weightlessness. No noticeable pathological changes in the cardiovascular system occurred during the flight. Pharmacological preparations used in enabling man to withstand various space flight stresses are listed. Acceleration experiments which relate the problem to hypoxia are discussed. Cabin atmospheres and spacesuit problems are assessed, and it is reported that Soviet scientists are considering high oxygen atmospheres for future space flights. Maneuvering and orientation problems related to extravehicular activity are mentioned. In discussing partially closed ecological systems, interest centered on (1) the use of higher plants as a link in potential ecosystems; (2) the problem of treating human wastes and other life support system byproducts; and (3) an aerobic method of biological mineralization. The basic parameters for biotelemetry measurements are defined. M.G.J.

N67-22615# American Inst. for Research, Pittsburgh, Pa. Inst. for Performance Technology.

AN EXPERIMENTAL ANALYSIS OF SELECTED PROBLEMS OF LARGE-SHELTER MANAGEMENT, ENVIRONMENTAL THREAT, AND SMALL-SHELTER HABITABILITY UNDER CONDITIONS OF STRESS Final Report

John F. Hale, Donald E. Meagley, Robert W. Smith, and Robert L. Davis Sep. 1966 220 p refs

(Contract OCD-PS-64-57)

(AIR-D93A(1&2)-9/66-FR; AD-645343) CFSTI: HC $3.00/MF $0.65

The research program was composed of three major efforts: (1) the initial development of and the feasibility testing of a large-shelter contingency game for use in the analysis of problems associated with large-shelter management, (2) the development of techniques for and the feasibility of the use of an underwater shelter as a method for producing an experimental analog of the threat associated with actual shelter habitability, and (3) the design and execution of four 24-hour habitability studies to investigate the effects of increased realism of a shelter stay, in terms of the number and range of problems presented to the shelterees and the realistic representation of other aspects of the expected shelter environment under the condition of nuclear attack. Results of these efforts indicated that (1) the contingency game is a meaningful and feasible technique by which to explore problems of large shelter management, (2) the condition of being underwater appeared to produce anxiety which was reflected in part, by marked attentiveness to atmospheric monitoring tasks in the shelter, an attentiveness that appeared to be greater than that exhibited to the analogous task of radiological monitoring in the shelter studies, and (3) some knowledge of the concept of dual-purpose shelters is desirable on the part of the public; EBS programming should be continuous; authoritarian leadership is most effective, but there are some potentially dangerous aspects in its use; and concern over the maintenance of group discipline at shelter exit is definitely called for. Author (TAB)

N67-22664*# Massachusetts Inst. of Tech., Cambridge.

COMMUNICATIONS BIOPHYSICS

P. R. Gray, P. G. Katona, W. T. Peake, W. M. Siebert W. A. Rosenblith et al *In its* Res. Lab. of Electron. Quart. Progr. Rept. No. 84 15 Jan. 1967 p 311–332 refs (See N67-22641 11-34) CFSTI: HC $3.00/MF $0.65
(Grants NsG-496; NIH 5-R01-NB-05462-03; NSF GK-835; NIH 2-P01-MH-04737-06; Contract DA-36-039-AMC-03200(E))

Electrophysiological and behavioral experiments emphasizing hearing are reported. Research on the peripheral auditory system, neuroelectrical correlates of conditioning, psychophysics, neurophysiology, EEG studies, and cardiovascular system are summarized. An electrical analog for the mechanical system of the middle ear of cats is described. A system is presented of time-division multiplexing employing a magnetic delay drum to provide filtering of two signals in which the disturbance is of the same frequency in both. Studies on the arterial pressure receptors indicate that the firing pattern of single pressure receptor nerves is reproducible when the pressure waveform is periodic, and that nerve firings tend to occur at well-determined instances of time. N.E.N.

N67-22665*# Massachusetts Inst. of Tech., Cambridge.
NEUROPHYSIOLOGY
W. S. McCulloch, J. V. Lettvin, P. D. Wall, M. Blum, J. E. Brown et al *In its* Res. Lab. of Electron. Quart. Progr. Rept. No. 84 15 Jan. 1967 p 333–346 refs (See N67-22641 11-34) CFSTI: HC $3.00/MF $0.65

A calculus for triadas is presented. Definitions are included and unary, binary, and triadic operations are described. Theorems are given which follow the combining of closed operations among triadas. N.E.N.

N67-22670# George Washington Univ., Washington, D. C. Human Resources Research Office.
THE EFFECT OF PROGRAMMED INSTRUCTION RESPONSE CONDITIONS OF ACQUISITION AND RETENTION
Thomas J. McCrystal and T. O. Jacobs Dec. 1966 41 p refs
(Contract DA-44-188-ARO-2)
(TR-66-20; AD-646347) CFSTI: HC $3.00/MF $0.65

The objective was to evaluate the effect on criterion scores of programed instruction requiring subjects either to write or not to write their responses, under either constructed or prompted conditions, with military tactics as the content. One hundred and twenty Infantry lieutenants in groups of 30 used the programed booklet instruction with the four response conditions: constructed-overt, constructed-covert, prompted-overt, and prompted-covert. Two control groups were also tested. Although test scores from conventional lecture and programed instruction methods did not differ significantly, the lecture method required twice the average training time of the fastest programed method. The similarity in effectiveness resulting from the disparate response conditions suggests that, for content of this nature and length, constructed responses (either overt or covert) may be dispensed with in favor of prompted-covert responses, which require less learning time without compromising the training effectiveness of programed instruction. TAB

N67-22684# Illinois Univ., Urbana. Coordinated Science Lab.
THE EFFECT OF COMPLEXITY OF NATURAL LANGUAGE MEDIATORS AND THE ASSOCIABILITY OF PAIRS ON PAIRED-ASSOCIATE LEARNING
Alexander J. Wearing and William E. Montague Jan. 1967 19 p refs
(Contracts DA-28-043-AMC-00073(E); Nonr-3985(08))
(R-333; AD-645740) CFSTI: HC $3.00/MF $0.65

Natural language mediators (NLM) are widely used by Ss in paired-associate learning. Experiments which have documented their effect on learning have, however, largely ignored qualitative differences between them. Two large groups each learned a different CVC-word list after which they reported any NLMs they had used. Judges rated the complexity of NLMs using a scale developed by Martin, Boersma and Cox (1965) with different materials. The results agree with theirs in that complex NLMs produced fewer errors in learning. However, some categories on the scale were used infrequently which may indicate that, at least with highly meaningful material, a simpler dichotomous categorization (NLM or Rote) may be preferable. Author (TAB)

N67-22697# Naval Applied Science Lab., Brooklyn, N. Y.
ELECTROMAGNETIC RADIATION HAZARDS IN THE NAVY
C. Christianson and A. Rutkowski 24 Jan. 1967 26 p
(TM-3; AD-645696) CFSTI: HC $3.00/MF $0.65

The many and varied sources of electromagnetic hazards in todays modern Navy are described in this paper. High power communication transmitters, radars, lasers and radar power tubes produce hazards ranging from high voltage shock to ionizing radiation. Effects on man are thermal (e.g. retinal and skin burns) and athermal (e.g. pearl-chain formation). Body tissue absorption of RF radiation, heating, tolerance dosage and safety limits are discussed. Safe distances from present Naval radars, and future increases in radar power are indicated. Characteristics of protective devices (Radar Suit, Radar Goggles, High Voltage Insulator Links for Ships Cranes, X-Ray Hazard Meter) developed at NASL, are described. Remaining problems and some unusual effects (RF Hearing) are mentioned. Author (TAB)

N67-22718# Royal Aircraft Establishment, Farnborough (England).
SOME CHARACTERISTICS OF THE HUMAN OPERATOR AND HIS MATHEMATICAL REPRESENTATION IN THE TRACKING ROLE
W. F. Fielding Aug. 1963 29 p refs
(RAE-TN-WE-38) CFSTI: HC $3.00/MF $0.65

The physiological factors which affect a human operator's performance of a tracking task are discussed, together with the limitations of mathematical representations of the human operator, sufficient to enable a nonpsychologist to obtain a reasonable picture of how a human operator works. Factors affecting control design, system response and display are discussed, together with some suggestions for evaluation of the constants in the operator's equation. A bibliography of some relevant papers is given as an appendix. Author

N67-22724# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
EFFECT OF REDUCED BAROMETRIC PRESSURE ON THE SECRETORY FUNCTION OF SALIVARY GLANDS
S. I. Filippovich 3 Aug. 1966 26 p refs Transl. into ENGLISH from Arkhiv Biologicheskikh Nauk, v. 58, no. 3 p 3–17
(FTD-TT-65-1678; AD-645857) CFSTI: HC $3.00/MF $0.65

Experiments conducted on people and animals at reduced barometric pressure in a pressure chamber at different altitudes (from 4000 to 10000 m) gave the following results: The first ascents after 4-5 hours in the pressure chamber produced an appreciable decrease in the secretion of salivary glands in response to a food stimulant and to acid, this decrease being frequently replaced by an increase in secretion in the following days. The aftereffect in dogs continued for up to five to seven days, and in man, three to four days. The first ascents produced an increase (frequently abrupt) of spontaneous salivation. A decrease in the organic components of the saliva of dogs at altitude was observed, and also an increase in the amount of urea in the saliva; in people (4000 m altitude) an increase in the dense residue and in many cases an increase in the diastatic strength of the saliva and an increase in urea were observed. In oxygen inhalation, the above-described changes in people (altitudes up to 8 km) were expressed to a considerably lesser degree, and were completely

absent in dogs in most cases (altitudes up to 10 km). In repeated ascents, the period of the aftereffect gradually became shorter. In dogs after four to five ascents without oxygen, the changes were observed only in the pressure chamber itself, and the aftereffect disappeared. Adaptation phenomena occurred faster and were more stable in short-term and systematic ascents. Author (TAB)

N67-22740# Geoscience, Ltd., Solana Beach, Calif.
WHOLE ORGAN FREEZING AND THAWING HEAT TRANSFER AND THERMAL PROPERTIES Quarterly Report, Oct. 1–Dec. 31, 1966
Heinz F. Poppendiek, Norman D. Greene, and R. Randall 31 Dec. 1966 19 p refs
(Contract Nonr-4095(00))
(GLR-50; AD-646333) CFSTI: HC$3.00/MF$0.65

Thermal conductivity measurements for water and ice down to cryogenic temperature ranges were made and are compared to other information found in the literature. Conductivity measurements for bovine liver in the unfrozen and frozen states were also determined and compared to the behavior of water and ice. Heat capacity measurements of bovine liver in the unfrozen and frozen states were determined and compared to the values known for water. The numerical and analytical techniques used to investigate the transient temperature behavior of idealized biological materials that are being cryogenically frozen and thawed are presented. The techniques were applied to a representative slab problem and the results presented. Author (TAB)

N67-22793# Queens Univ., Belfast (Northern Ireland).
THE ADDITION OF PERIPHERAL VISION TO THE ARTIFICIAL HORIZON
K. J. Holden Aeronautical Research Council, Jun. 1963 14 p refs
(ARC-CP-731; ARC-24916) CFSTI: HC$3.00/MF$0.65

This report describes an attempt to make instrument flying easier. Horizontal lines were placed on either side of the pilot at the periphery of his field of view. They move up and down differentially as the aircraft rolled and together as it pitched, simulating the apparent motion of the real horizon. Tested in a fixed cockpit these lines or 'side-bars' did not completely succeed in creating the illusion of a stationary horizon. However, the pilot's performance as regards accuracy was much improved in tasks requiring simultaneous monitoring of roll and pitch. Author

N67-22878*# Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
SPACE-CABIN ATMOSPHERES. PART III: PHYSIOLOGICAL FACTORS OF INERT GASES
Emanuel M. Roth Washington, NASA, 1967 135 p refs Prepared for NASA
(NASA-SP-117) CFSTI: HC$3.00/MF$0.65 CSCL 06K

The physiology of inert gases in space cabins is considered from an operational viewpoint. A review of the physical chemistry of inert gases covers their atomic structure, physical and biochemical properties, and chemical reactions. Also discussed are the prime role of inert gases in decompression sickness, the metabolic effects of inert gases, the engineering implications of using inert gases in space cabins, and the role of inert gas physiology in selecting space cabin atmospheres. R.N.A.

N67-22885*# National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY—A CONTINUING BIBLIOGRAPHY, FEBRUARY, 1967
Mar. 1967 48 p refs
(NASA-SP-7011(35)) CFSTI: HC$3.00/MF$0.65 CSCL 06S

The bibliography with abstracts is composed of entries formerly announced in *Scientific and Technical Aerospace Reports*, and *International Aerospace Abstracts*, and those made available by the Library of Congress. The subject coverage concentrates on the biological, physiological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. A subject index, corporate source index, and personal author index are included. N.E.N.

N67-22896*# National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY — A CONTINUING BIBLIOGRAPHY, 1966
Jan. 1967 929 p refs
(NASA-SP-7011(33)) CFSTI: HC$3.00/MF$0.65 CSCL 06S

A cumulative index is presented for the past 12 issues of a continuing bibliography on aerospace medicine and biology. The publication includes entries from NASA's *Scientific and Technical Aerospace Reports* and *International Aerospace Abstracts* and is indexed by subject, corporate source, and personal author. S.P.

N67-23029# Kernforschungsanlage, Juelich (West Germany). Zentralabteilung Strahlenschutz.
ISODOSES OF THE Cs RADIATION EQUIPMENT OF THE KFA JUELICH (PROBLEM OF THE DEEP RAY THERAPY) [ISODOSEN DER Cs-BESTRAHLUNGSANLAGE DER KFA JUELICH (PROBLEME DER TIEFENSTRAHLENTHERAPIE)]
K. Kasperek and H. G. Schnippering Sep. 1964 38 p refs In GERMAN
(JUL-194-ST) CFSTI: HC$3.00/MF$0.65

The application of isotopic cesium radiation for therapeutical and diagnostic purposes in a radiological institute is discussed. Nine tubular attachment geometries in front of the cesium isotope container are evaluated for their focusing at deep penetration dosage in a water tank and the measurements are combined graphically. Results indicated that the use of several tubes with one focused, bundled beam diminishes scattering, insures proper penetration depth of the carcinoma, and gives better protection for the surrounding healthy tissues. Transl. by G.G.

N67-23042# George Washington Univ., Washington, D. C. Human Resources Research Office.
THE PERFORMANCE OF GROUND OBSERVERS IN DETECTING, RECOGNIZING, AND ESTIMATING RANGE TO LOW-ALTITUDE AIRCRAFT
A. Dean Wright Dec. 1966 35 p refs
(Contract DA-44-188-ARO-2)
(TR-66-19; AD-645537) CFSTI: HC$3.00/MF$0.65

The purpose of the test was to determine mans capability to visually detect, recognize, and estimate range to low-altitude aircraft. Twenty-seven Army enlisted men served as observers. The results indicate that man can detect and recognize low-altitude aircraft at a considerable range under near-optimum field conditions. The value of binoculars for aircraft detection was found to be dependent upon (a) observer offset from the aircraft flight path, (b) accuracy of early warning, (c) aircraft speed, and (d) exhaust smoke trail characteristics of the aircraft. Under the test conditions employed, binoculars reduced the detection range on the most potentially threatening targets, high-speed, head-on jet aircraft. The data show that large range estimation errors occurred. Filmed simulation of the recognition task appears promising as a training tool. Author (TAB)

N67-23049# Army Medical Research Lab., Fort Knox, Ky. Pathology Div.
HEMATOLOGICAL DATA ON THE SOOTY MANGABEY MONKEY *(CERCOCEBUS TOROUATES ATYS)*
Martin A. Ross and Winslow G. Sheldon 12 Sep. 1966 26 p refs
(Rept.-679; AD-645448) CFSTI: HC $3.00/MF $0.65

The average hematologic values of the species reported show some variations from the values for other species reported in the literature. In particular, the total RBC counts appear to be somewhat lower while hemoglobin and packed cell volumes are somewhat higher than in other species. The differential counts show a marked prevalence of lymphocytes as opposed to neutrophils being present in a ratio of about 3 to 1, whereas in other species the ratios range from 1 to 1 to 2 to 1. The sooty mangabey, an Old World species of subhuman primate, seem to be suitable animals for many research programs as they are reasonably available, relatively inexpensive, and are no more difficult to maintain than other varieties. Author (TAB)

N67-23050# Pisa Univ. (Italy). Inst. of Physiology.
COMPARATIVE NEUROPHYSIOLOGY OF VISION Final Scientific Report, Sep. 15, 1965–Sep. 14, 1966
Giuseppe Moruzzi 15 Sep. 1966 13 p refs
(Grant AF-EOAR-61-(052)-830)
(AFOSR-66-2764; AD-643497) CFSTI: HC $3.00/MF $0.65

The results of the following investigations are reported: (1) Visual control of flashing in fireflies; (2) Evidence of presynaptic inhibition in the lateral geniculate body following reticular stimulation; (3) Presynaptic inhibition in the lateral geniculate body with regard to the problem of reciprocal binocular interaction; (4) Receptor and neural responses in the cats retina; (5) Temporal and spatial relations in retinal units; (6) Surgical immobilization of eye and pupil. TAB

N67-23057# Stanford Research Inst., Menlo Park, Calif.
CHARACTERISTICS THAT DETERMINE SPEAKER RECOGNITION Final Report, 16 Sep. 1963–15 Sep. 1966
Frank R. Clarke, Richard W. Becker, and James C. Nixon Dec. 1966 75 p refs
(Contract AF 19(628)-3303)
(ESD-TR-66-636; AD-646135) CFSTI: HC $3.00/MF $0.65

Development and evaluation of three types of speaker-discrimination tests are discussed, including effects of various types of signal degradation upon human speaker-recognition performance and comparisons of various techniques for differentiating among speakers. Properties of three tests--a Four-Alternative Forced-Choice Test, an ABX Test, and a Same-Different Test--are described. Using these tests, it was found that effects of signal degradation upon speaker discrimination performance are small in comparison with effects of the same degradation upon intelligibility. It was found that various physical measures and psycho-physical scaling techniques provide information appropriate for discrimination among talkers. However, none of these techniques performed as well as human observers and provided little direct information regarding the characteristics used by human observers in discriminating among talkers. Author (TAB)

N67-23087# Istituto Superiore Di Sanita, Rome (Italy). Laboratori Di Fisica.
ON THE ACID AND ALKALINE DENATURATION OF DNA AND ITS DEPENDENCE ON THE SALT CONCENTRATION
E. Dore and C. Frontali 26 Sep. 1966 16 p refs Sponsored by the Consiglio Nazl. Delle Ric.
(ISS-66/33) CFSTI: HC $3.00/MF $0.65

The results of a systematic study carried out to clarify the effect of variations in pH and salt concentration on the state of DNA in solution, are described. The results are presented in the form of a map, which shows the ranges of pH and salt concentration in which DNA is found either in the native or in the denatured state. In contrast with what has been claimed by several authors, the DNA we used remains in the native state in distilled water, at neutral pH, for periods exceeding 24 hours. The reasons for this discrepancy may be sought in the high molecular weight of this DNA. Measurements of the intrinsic transition width for alkaline denaturation yielded a value of 0.35 pH units, which can be considered as the upper limit. Author

N67-23103# RAND Corp., Santa Monica, Calif.
LINGUISTIC RELATIVITY AND THE LANGUAGE LEARNING PROCESS
Robert M. Schwarcz Dec. 1966 14 p refs
(Contract AF 44620-67-C-0045; Proj. RAND)
(RM-5210-PR; AD-644929) CFSTI: HC $3.00/MF $0.65

A five-stage analysis of the language-learning process is presented, and an investigation is made of whether this analysis supports or contradicts the Whorfian hypothesis of linguistic relativity. The syntactic constructions of a language influence the types of conceptual relationship that the child perceives. Words and phrases grouped together by the conventions of the language have a determining effect on conceptual representations associated with them. This effect is somewhat mitigated by the transformational phase of language learning, which opens up the full range of stylistic devices available in a language, thus extending the number of percepts and concepts that may gain expression in that language. However, earlier preceptual and conceptual habits will probably persist throughout a persons adult life unless he is forced to change by some new experience, such as the mastery of a different language. Author (TAB)

N67-23105# Army Medical Research Lab., Fort Knox, Ky. Experimental Psychology Div.
RECOVERY FROM IMPULSE NOISE INDUCED ACOUSTIC TRAUMA
J. L. Fletcher and A. B. Cairns 22 Nov. 1966 10 p
(Rept.-686; AD-645898) CFSTI: HC $3.00/MF $0.65

Recovery from impulse noise induced acoustic trauma was examined in soldiers stationed at Fort Knox, Ky. Serial audiograms were obtained on the day of exposure, one day, three days, one week, two weeks, four weeks, six weeks, 12 weeks, four months, five months, and six months post exposure. Recovery from temporary threshold shifts as large as 35 dB was observed at frequencies from 500 - 2,000 cycles. At the higher frequencies shifts of magnitudes as great as 85 dB were observed with good recovery most of the time. Our results indicate that for legal purposes six months is a minimum waiting period necessary to substantiate permanent hearing loss. However, recovery at the speech frequencies is essentially complete in about two weeks. Author (TAB)

N67-23113# Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
STUDY OF EXTRAVEHICULAR PROTECTION AND OPERATIONS
P. Iribe and J. A. Lieske Jul. 1966 133 p refs
(Contract NOw-62-0604-c)
(APL-TG-841; AD-644909) CFSTI: HC $3.00/MF $0.65

The report is a study of the requirements placed on extravehicular protection and operation devices by the orbital environment and contemplated orbital missions. The orbital missions studied cover the period 1970-1978 to the extent that they are presently defined. The conclusions favor a suited astronaut supported by propulsion, communication and working aids (non-anthropomorphic suits were not included in this study). Concepts

of vehicles satisfying the requirements developed are presented as is the concept of a modularly assembled device which can be modified to best suit specific mission requirements. Author (TAB)

N67-23119# Northwestern Univ., Evanston, Ill.
AUDITORY FUNCTION OF THE HEARING IMPAIRED Formal Progress Report, No. 41 16 Jun.–15 Dec. 1966
T. W. Tillman 15 Dec. 1966 31 p
(Contract AF 41(609)-2643)
(AD-645616) CFSTI: HC $3.00/MF $0.65

The specific goals of the project are: (1) the development of test procedures for assessing the effects of hearing impairment on receptive communicative efficiency in difficult listening environments; (2) the development of valid methods for detecting the individual whose hearing has deteriorated to the point where he has become a hazard to himself and others because of reduced communicative capacity. Author (TAB)

N67-23122# Douglas Aircraft Co., Inc., Huntington Beach, Calif. Advanced Research Lab.
MUSCLE SHORTENING HEAT: ENERGY DISSIPATION DUE TO STRUCTURAL DAMPING Research Paper
Alexander F. Metherell Jul. 1966 38 p refs *Its* Res. Commun. No. 11
(Douglas Paper-4139; AD-644988) CFSTI: HC $3.00/MF $0.65

The paper presents a study to predict theoretically the main source and effect of structural damping in the contractile component of muscle. The most obvious source is the coulomb friction effects at the contact sites between the myosin cross-bridges and the actin filaments. The equation derived for the energy dissipated during filament sliding due to the friction at these sites is Energy dissipation = (pPo + qP)x. Since this expression agrees with A. V. Hills (1964a) equation for heat of shortening, it is concluded that heat of shortening is a structural damping phenomenon. The interface tension theory presented in the preceding paper (Metherell, 1966) is modified to take account of these structural damping effects. The energy relation, when taking account of the strain energy h stored in the series elastic component, is shown to be E = A + alpha x + We + h which is the same as the equation that Hill (1964c) obtained experimentally. Author (TAB)

N67-23123# Stanford Research Inst., Menlo Park, Calif.
SURVEY OF MICROCELLULAR RESEARCH
Robert C. Minnick Jul. 1966 70 p refs
(Contract AF 19(628)-5828)
(SR-1; AFCRL-66-475; AD-637010) CFSTI: HC $3.00/MF $0.65

This report is a survey of research on microcellular techniques. Of particular interest are those techniques that are appropriate for realization by modern batch-fabrication processes, since the rapid emergence of reliable and economical batch-fabricated components represents probably the most important current trend in the field of digital circuits. First the manufacturing methods for batch-fabricated components are reviewed, and the advantages to be realized from the application of the principles of cellular logic design are discussed. Also two categorizations of cellular arrays are made in terms of the complexity of each cell (only low-complexity cells are considered in this report), and in terms of the various application areas. After a survey of very early techniques that can be viewed as exemplifying cellular approaches, modern-day cellular arrays are discussed on the basis of whether they are fixed cell-function arrays or variable cell-function arrays. In the fixed cell-function arrays the switching function produced by each cell is fixed; the cell parameters are used only in the modification of the interconnection structure. Several versions of NOR gate arrays, majority gate arrays, adder arrays, and others are reviewed in terms of synthesis techniques and array growth rates. Similarly, the current status of research is summarized in variable cell-function arrays, where not only the interconnection structure, but also the function produced by each cell is determined by parameter selection. Author (TAB)

N67-23129# Illinois Univ., Urbana. Group Effectiveness Research Lab.
THE EFFECT OF INTER-GROUP COMPETITION ON GROUP MEMBER ADJUSTMENT
Fred E. Fiedler 1966 17 p refs
(Contract DA-49-193-MD-2060)
(AD-645220) CFSTI: HC $3.00/MF $0.65

The paper briefly reviews research showing that competition among small face-to-face groups may also contribute to the individual group members adjustment and morale. While many of the studies were conducted with military units, the findings should apply equally well to industrial work groups. Author (TAB)

N67-23130# Vanderbilt Univ., Nashville, Tenn.
AFFECTIVE FACTORS IN THE STEREOSCOPIC PERCEPTION OF PERSONS AND OBJECTS
Gordon E. Kulberg and Carroll E. Izard Jun. 1966 40 p refs
(Contract Nonr-2149(03))
(TR-28; AD-645202) CFSTI: HC $3.00/MF $0.65

The study was designed to test the concept that there is a relationship between a persons feelings toward other people and his tendency to view human figures as opposed to objects when given the opportunity to look at one or the other. The subjects feelings toward others were measured by the FIRS+. The effect of immediate interpersonal feelings with the experimenter on the person-object perception was manipulated by treating some subjects negatively, some positively, and others with scientific aloofness. The perceptual task utilized an Engel type stereoscope and involved the presentation of a picture of an object to one eye and a picture of a male figure to the other. Perceptual predominance for the human or the object was measured by that picture seen first and the one seen the greatest amount of the time. The results did not support the predictions. There was no relationship between the FIRS+ scores and the number of human figures seen. The treatment by the experimenter did not influence the perceptual predominance. Author (TAB)

N67-23131# Vanderbilt Univ., Nashville, Tenn.
ON UNDERSTANDING AND PROMOTING HUMAN EFFECTIVENESS
Carroll E. Izard Oct. 1966 41 p refs
(Contract Nonr-2149(03))
(TR-29; AD-645203) CFSTI: HC $3.00/MF $0.65

Perhaps I have not done much more than state my claim to membership in the group that believes strongly in the possibility and desirability of change. I certainly agree with McClelland that such belief is a highly important factor in changing people and social institutions. I would go a bit further and say that such belief is in many cases essential to the process of change, though admittedly not so in every case. Also, I have expressed allegiance to the complex and difficult goal of understanding, via our science, and promoting, via our profession, human effectiveness--particularly in the interpersonal and social spheres. Within this broad area I have presented some theoretical formulations regarding the role of affect in personality and interpersonal functioning and its role in the process of change toward greater effectiveness. Effective functioning and change toward greater effectiveness involve the three processes of affect experiencing, affect differentiation, and affect expression and the integration of these with motor and cognitive processes. The three affective processes were described and their optimal levels tentatively defined. The relationships of the three processes to adjustment and effective functioning were considered. Finally, I described some of the principles and procedures

of the Feeling-Feedback exercise, one of the exercises in integrating affect and cognition in social interaction used in the Interpersonal Effectiveness Groups of the Vanderbilt Human Effectiveness Program. TAB

N67-23171# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE DIURNAL RHYTHM OF FUNCTIONS OF HUMANS IN CONDITIONS OF LIMITED MOBILITY
N. Ye. Panferova 17 Nov. 1966 17 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (Moscow), v. 50, 1963 p 741–749
(FTD-TT-65-1994; AD-646291) CFSTI: HC $3.00/MF $0.65

The diurnal rhythm of man's physiological functions is a complex reaction that developed in the process of phylogenic and ontogenic adaptation of living organisms to the conditions of vital activity on earth. According to certain of the literature it is inborn. It appears sharply in the second year of life and becomes more expressed as the individuals age increases. In adults it is relatively stable. Certain experiments were performed in which certain individuals were suspended in water and other were kept in chairs and indulged in various activities without strong physical exertion. When man is subjected to prolonged immobility the ordinary diurnal rhythm of the body temperature changes. The diurnal variations become less expressed; in a number of cases at night, a rise in body temperature was observed instead of a drop, and in the daytime it was reduced. The body temperature stays at one level for a long time, but its changes have a step-wise character. The curves of the body temperature diurnal variations for the same subject had different configurations during different days of the experiment. Under conditions of limited mobility the diurnal variations of the pulse rate and the maximal blood pressure became less expressed. The change in the diurnal variations of the pulse and respiration rates and blood pressure under conditions of limited mobility is less expressed than the change in the diurnal variations of the body temperature. The diurnal changes in the pulse and respiration rates also do not always repeat the diurnal body temperature changes. Author (TAB)

N67-23236# Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
EFFECT OF THE SAVANNAH RIVER PLANT ON ENVIRONMENTAL RADIOACTIVITY Semiannual Report, Jan.–Jun. 1966
Aug. 1966 17 p refs
(Contract AT(07-2)-1)
(DPST-66-30-2) CFSTI: HC $3.00/MF $0.65

The results of the environmental monitoring program for the period January 1 through June 30, 1966, for the atmosphere, vegetation and food, and water are reported. The quantity of radioactive waste released by the Savannah River Plant to its environs was, for the most part, too small to be distinguished from natural background radiation or was obscured by worldwide fallout from nuclear weapons testing. Fallout from the Chinese nuclear test on May 9, 1966, was detected at SRP. Beta activity in air, which showed no relation with plant operations, was about one-half of that for the same period of 1965. Radioactive materials in fish flesh continued to be far below levels considered significant from a health standpoint. The average concentration of radionuclides in river water did not exceed 3.7% of the Maximum Permissible Concentrations. Author (NSA)

N67-23239# San Diego State Coll., Calif.
HUMAN FACTORS IN THE DESIGN OF AN OBSERVER'S KEYSET
P. S. Gallo, Jr. and J. R. Levine 14 Oct. 1966 40 p refs
(Contract N123-(953)55266A)
(NEL-1411; AD-645653) CFSTI: HC $3.00/MF $0.65

The report describes an investigation of the effects of changes in a number of design characteristics and other variables on operation with keysets used to record information in binary notation from stimulus displays that contain a maximum of five bits of information per stimulus. Principal result was a demonstration of superiority in transmission and error rates of five-key pattern entry over two-key sequential entry. Other variables tested were less significant. Author (TAB)

N67-23251*# Naval School of Aviation Medicine, Pensacola, Fla. Aerospace Medical Inst.
THE EGOCENTRIC LOCALIZATION OF THE VISUAL HORIZONTAL IN NORMAL AND LABYRINTHINE-DEFECTIVE OBSERVERS AS A FUNCTION OF HEAD AND BODY TILT
Brant Clark and Ashton Graybiel 17 Jan. 1967 11 p refs Joint Rept. with NASA
(NASA Order R-93; Proj. MR005.04-0021)
(NASA-CR-83525; NAMI-991; Rept.-142) CFSTI: HC $3.00/MF $0.65 CSCL 06S

Perception of the visual horizontal by observers in five different combinations of head and body position was studied to determine the effect of 20-degree body tilts. Both normal and labyrinthine-defective observers made five settings to the visual horizontal for each condition using a goggle device which presented a collimated line of light to the right eye while the other eye was covered. The results showed no significant constant errors in the settings by either group, and it is suggested that the absence of the E-phenomenon was due primarily to adequate contact cues and kinesthetic cues. The data also make it clear that vestibular information is not required for veridical perception of the visual horizontal under these experimental conditions. Author

N67-23252*# Indiana Univ., Bloomington. Dept. of Anatomy and Physiology.
THE INFLUENCE OF ALTITUDE ON THE ANAEROBIC AND AEROBIC CAPACITIES OF MEN IN WORK Final Scientific Report
C. Dawson, E. D. Michael (Calif. Univ., Santa Barbara), L. G. Myhre, S. Robinson, J. L. Newton et al 31 Dec. 1966 15 p refs
(Grant NsG-408)
(NASA-CR-83526) CFSTI: HC $3.00/MF $0.65 CSCL 06S

Maximal aerobic and anaerobic capacities were measured on four men working to exhaustion on a bicycle ergometer before, and on an ergometer and a treadmill during a 5-week sojourn on White Mountain (altitude of 3800 m). In the first 10 days at 3800 m maximal values for work capacity, O_2 uptake, ventilation (STPD) and heart rate were markedly lower, but little change was observed in oxygen debt and blood lactate following work. During the remaining 5 weeks at 3800 m the tolerance time for a fixed rate of exhausting work increased 16% without a corresponding increase in maximal O_2 consumption. Accompanying this increase in work capacity were increases in lactate (30%) and O_2 debt (5%) during the stay at altitude. The increase in maximal work performance during the stay at 3800 m is attributed to an increasing ability to utilize energy from the anaerobic mechanisms and an improvement in the efficiency of work on the ergometer in the men who were not accustomed to work on the bicycle. Upon return maximal values for O_2 debt, O_2 uptake, ventilation (STPD), duration of work and lactate were not only greater than the altitude values, but also considerably higher than the prealtitude controls. Author

N67-23255*# Indiana Univ., Bloomington. Dept. of Anatomy and Physiology.
DISTRIBUTION OF LACTIC ACID BETWEEN PLASMA AND RED CELLS DURING WORK AND RECOVERY

J. L. Newton and S. Robinson 31 Dec. 1966 9 p refs
(Grant NsG-408)
(NASA-CR-83529) CFSTI: HC$3.00/MF$0.65 CSCL 06S

Lactic acid concentrations in whole blood, plasma and red cells were determined on samples drawn from the femoral veins of men during 2 to 3-minute runs to exhaustion on the treadmill. Plasma lactate concentration increased rapidly during the runs, but the rise in whole blood was slowed by the delayed diffusion of lactate into the red cells during the first 1 to 2 minutes of work. In one man plasma lactate in femoral vein blood began to decline within 30 seconds after a 3 minute exhausting run, while lactate continued to diffuse into the red cells for 10 minutes following the run. In another man plasma and cell lactates continued to rise for 2 to 20 minutes respectively following a 2-minute run to exhaustion. This delayed diffusion of lactate into the red cells contributes to the continued increase in whole blood lactate following strenuous work. Author

N67-23267*# Arkansas Univ., Little Rock.
THE ROLE OF NUCLEOTIDE METABOLISM IN THE REPAIR OF RADIATION INJURY Semiannual Progress Report, 1 Oct. 1966–1 Apr. 1967
1 Apr. 1967 8 p refs
(Grant NGR-04-001-014)
(NASA-CR-83540) CFSTI: HC$3.00/MF$0.65 CSCL 06R

Continuing research in the role of nucleotide metabolism in the repair of radiation injury is summarized, including reports on the effect of Co^{60} gamma radiation on respiration and ATP metabolism of L cells, the effect of Co^{60} gamma radiation on nucleotide metabolism of L cells, a nonlinear method for fitting cell survival curves, the effect of Co^{60} gamma radiation on ATP synthesis by L cells, and the effect of 2,4 dinitrophenol on ATP synthesis and post-irradiation survival by L cells. L.E.W.

N67-23270*# Naval School of Aviation Medicine, Pensacola, Fla.
RADIATION MONITORING WITH NUCLEAR EMULSIONS ON PROJECT GEMINI. II. RESULTS ON THE 14-DAY MISSION GEMINI VII
Hermann J. Schaefer and Jermiah J. Sullivan 11 Jan. 1967 16 p refs Prepared jointly with NASA
(NASA-CR-83543; NAMI-990) CFSTI: HC $3.00/MF $0.65 CSCL 06R

Small nuclear emulsion packs worn by the astronauts at three locations inside their space suits were evaluated by track, grain, and enders count for evaluation of LET spectrum and absorbed dose. By using G.5/K.2 emulsion pairs, a sustained resolution over the entire LET scale of protons from zero to relativistic energies was obtained. It was found that the energy dissipation centers heavily on low energies, with 40 percent of the absorbed dose due to protons of less than 0.1 g/cm^2 residual range. Total proton doses at the six locations (left and right chest, thigh pocket of each astronaut) varied from 159 to 233 millirads. The enders count was found to vary by as much as a factor of 1.35 within the same 1 by 1-1/2-inch film sheet, indicating that the radiation field within the vehicle not only varies over distances comparable to body size, but also reflects local inhomogeneties of shielding conditions on a centimeter and millimeter scale. Author

N67-23324*# RAI Research Corp., Long Island City, N. Y.
RESEARCH, DESIGN AND DEVELOPMENT OF AN IMPROVED WATER RECLAMATION SYSTEM FOR MANNED SPACE VEHICLES
S. B. Tuwiner Apr. 1966 62 p refs
(Contract NAS1-4373)
(NASA-CR-66323) CFSTI: HC$3.00/MF$0.65 CSCL 06K

This study was to develop a method and prototype equipment for the recovery of the water contained in urine while removing the salts in the form of a brine concentrate and destroying the organic components by converting them to nitrogen, carbon dioxide, and hydrogen. The two steps of the system are electrochemical conversion of the organic components and the recovery of the water by reverse osmosis separation employing a membrane stack at 1500 lbs./sq. in. The electrochemical conversion requires 457 watt-hrs. for each liter of urine. A neutral solution free of chlorine and oxidizable matter (COD) is produced by treating the solution with activated carbon and magnesium oxide. The membrane stack contains 10 circular membranes, 4 inches in diameter, a 3 inch diameter circle constitutes the surface which is available for reverse osmosis separation. The capacity of this stack is 18 liters per day. Potable water was produced by this unit from electrochemically treated urine. The indicated recovery is 90 per cent as a minimum. Phase separation is required for operation under zero G conditions. Author

N67-23327*# Litton Systems, Inc., Beverly Hills, Calif. Space Sciences Labs.
LUNAR SAMPLE RECEIVING LABORATORY GLOVE SYSTEM Interim Monthly Progress Report, Oct. 1966–Jan. 1967
Feb. 1967 27 p
(Contract NAS9-5872)
(NASA-CR-65605; MPR-9) CFSTI: HC $3.00/MF $0.65 CSCL 06B

The report describes design and fabrication of two prototype one-atmosphere arm systems comprised of operational arms and a pair of overgloves. The system has a very low leak rate and is capable of performing in vacuum chambers maintained at a pressure of 10^{-6} Torr. Materials, test performances, and the initiation of quality assurance procedures are also discussed. K.W.

N67-23328* Environmental Research Associates, Randallstown, Md.
A STUDY OF THE PERFORMANCE OF AN ASTRONAUT DURING INGRESS AND EGRESS MANEUVERS THROUGH AIRLOCKS AND PASSAGEWAYS Final Phase I
Harry L. Loats, Jr. and G. Samuel Mattingly 31 Aug. 1964 66 p refs
(Contract NAS1-4059)
(NASA-CR-66340; ERA-64-6) CFSTI: $3.00 CSCL 05H

A time-displacement analysis using motion pictures was performed to assess experiments involving pressure-suited astronaut egress under balanced gravity conditions. A full scale airlock with three distinct hatch configurations and a cylindrical passageway was used at Langley Research Center. The experiments were performed in three modes: (1) ground/normal gravity; (2) water immersion/neutral buoyancy; and (3) aircraft/balanced gravity. Comparative parameters for the three modes were suit pressure, subject, and suit type. Egress maneuvers using the water immersion and aircraft modes could be correlated as regards psychological and operational considerations. The major dissimilarity of the ground tests was in the total times of egress and in discrete task performance times and modes, all due to mobility decrement caused by the pressure suit and by normal gravity effects. Valid experiments of egress under balanced gravity require water immersion tests backed up with a number of aircraft tests. Ground/normal experiments are additionally required for control and procedure determinations. K.W.

N67-23329* Environmental Research Associates, Randallstown, Md.
A STUDY OF THE PERFORMANCE OF AN ASTRONAUT DURING INGRESS AND EGRESS MANEUVERS THROUGH AIRLOCKS AND PASSAGEWAYS. VOLUME I: SUMMARY Final Phase II Report

Harry L. Loats, Jr., G. Samuel Mattingly, and C. E. Brush 30 Apr. 1965 17 p
(Contract NAS1-4059)
(NASA-CR-66341; ERA-65-3, Vol. I) CFSTI: $3.00 CSCL 05H

The performance characteristics of a pressure-suited astronaut during ingress-egress through a cylindrical, manually operated airlock were studied by water immersion simulation techniques. The buoyancy force induced by water displacement of a totally immersed subject was used to counteract his adjusted total weight to provide the simulated weightless environment. The subject performed a real-time ingress-egress maneuver as determined by functional task analysis of a representative mission. The following airlock operational characteristics were investigated by factorial replication: The effect of airlock geometry and volume on total performance. The effect of hatch geometry, diameter and operation direction on performance. The contribution of torque requirements, hardware placement and motion aids to the problems and procedures comprising ingress-egress and manned replenishment. Correlation to actual weightless conditions was provided by similarity comparison with experiments performed aboard zero gravity research aircraft. Author

N67-23331*# Naval School of Aviation Medicine, Pensacola, Fla.
KINEMATICS NOMENCLATURE FOR PHYSIOLOGICAL ACCELERATIONS WITH SPECIAL REFERENCE TO VESTIBULAR APPLICATIONS
W. Carroll Hixson, Jorma I. Niven, and Manning J. Correia 8 Aug. 1966 98 p refs *Its* Monograph 14
(NASA Order R-93)
(NASA-CR-83568) CFSTI: HC $3.00/MF $0.65 CSCL 06S

A mathematical nomenclature in the language of kinematics has been formulated to provide precise, man-referenced identifications of the real accelerations comprising the basic vestibular stimuli and of certain selected vestibular response measures. The system is based on establishing anatomical landmarks in the form of three mutually orthogonal cardinal head axes and planes to which the magnitude and direction characteristics of both the acceleration stimuli and the vestibular responses can be referenced. Notation is provided to describe separately the resultant linear acceleration and the resultant angular acceleration arising in any force environment in terms of their components acting along and about, respectively, the three cardinal axes. The notation and application format of the nomenclature has application in the general acceleration physiology field as well as the vestibular area. Author

N67-23342* Environmental Research Associates, Randallstown, Md.
A STUDY OF THE PERFORMANCE OF AN ASTRONAUT DURING INGRESS AND EGRESS MANEUVERS THROUGH AIRLOCKS AND PASSAGEWAYS. VOLUME II: TECHNICAL DISCUSSIONS
Harry L. Loats, Jr., G. Samuel Mattingly, and C. E. Brush 31 Apr. 1965 130 p refs
(Contract NAS1-4059)
(NASA-CR-66342; ERA-65-3, Vol. ii) CFSTI: HC $3.00/MF $0.65 CSCL 05H

The performance characteristics of a pressure-suited astronaut during ingress-egress through a cylindrical, manually operated airlock were studied by water immersion simulation techniques. Position-velocity time profiles of the maneuvers were analyzed for three simulation modes; ground-normal gravity, aircraft-zero gravity, and water immersion-neutral buoyancy. Data for the following replicated parameters are presented: subject, suit type, suit pressure level, hatch configuration, hatch diameter, and hardware location. Demonstrations of the problems and procedures comprising the application of torque during ingress-egress, manual replenishment through the airlock, and the employment of external motion aids such as fixed bar and tethers were accomplished. A.G.O.

N67-23343* Environmental Research Associates, Randallstown, Md.
A STUDY OF THE PERFORMANCE OF AN ASTRONAUT DURING INGRESS AND EGRESS MANEUVERS THROUGH AIRLOCKS AND PASSAGEWAYS. VOLUME III: APPENDICES Final Report
Harry L. Loats, Jr., G. Samuel Mattingly, and C. E. Brush 31 Mar. 1965 43 p
(Contract NAS1-4059)
(NASA-CR-66343; ERA-65-3, Vol. III) CFSTI: HC $3.00/MF $0.65 CSCL 05H

Subject anthropometric data, an experiment summary, a statistical analysis, subject/suit calibration data, and drag estimations are presented as supporting material to an astronaut performance study. Also included is a glossary of physiological and technical terms which are related to the ingress and egress experiments. A.G.O.

N67-23353# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A MODEL FOR THE RENAL BLOOD FLOW REGULATING MECHANISM
Robert P. Couch (M.S. Thesis) Nov. 1966 85 p refs
(GNE/PH/67-4; AD-645891) CFSTI: HC $3.00/MF $0.65

A flexible tube model of the renal blood flow regulating mechanism was studied from both a theoretical and an experimental standpoint. The one dimensional steady flow equations of a flexible tube subject to an external collapsing pressure were solved using an iterative third order Runge-Kutta technique. The equations were solved for the cases where (1) the collapsing pressure is independent (open loop), and (2) the collapsing pressure is derived at some point upstream (closed loop). Experimental measurements were made on a model (constructed of Penrose tubing) under steady and oscillating flow conditions. The model exhibited flow regulation characteristics similar to those of an actual kidney. The theory predicted the regulation and stability characteristics of the system within about 15%. It was found that the regulation could be improved so that a doubling of pressure caused only an 0.5% change in the flow rate. Author (TAB)

N67-23365# Florida State Univ., Tallahassee.
MODELS FOR PAIRED COMPARISONS
W. A. Thompson, Jr. and Jagbir Singh Jul. 1966 16 p refs
(Contract Nonr-988(08); Grant NSF-GP-3807)
(M-111; ONR-TR-21; AD-639657) CFSTI: HC $3.00/MF $0.65

A central concept in this paper is that of linear model. A model is called linear if the frequency probability with which a subject reports the stimulus X sub 1 as greater than X sub 2 has the form H (t (X sub 1)-t (X sub 2)). Interrelations among various models for paired comparisons are studied. The Thurstone, Bradley–Terry, and Scheffe models are treated as special cases of the general linear model. It is shown that all of these special cases introduce a concept of 'psychological distance between stimuli.' The increase or decrease of the probability of detecting the larger stimulus for linear-models is shown to depend primarily on t rather than H. The uniqueness of the linear representation of a Bradley–Terry model is discussed. A final section proposes a general model allowing for the response of no apparent difference. Author (TAB)

N67-23367# Florida State Univ., Tallahassee. Dept. of Statistics.
THE USE OF LIMIT THEOREMS IN PAIRED COMPARISON MODEL BUILDING
W. A. Thompson, Jr. and Jagbir Singh Jun. 1966 21 p refs
(Contract Nonr-988(08); Grant NSF GP-3807)
(M-111; ONR-TR-20; AD-639656) CFSTI: HC $3.00/MF $0.65

The Thurstone and the Bradley-Terry models, both initially advanced on intuitive grounds, have proved useful in the analysis of paired comparisons. The psychological meaning of these models and their relation to one another is unclear, but they fit data. Stevens has observed that there may be two basic mechanisms of discrimination (1) additive and (2) substitutive. We advance two corresponding mathematical models: that experienced sensation is (1) the sum of a large number of independent signals and (2) the maximum of a large number of independent signals. These assumptions yield (1) Thurstones model and (2) the model of Bradley-Terry. Psychological interpretations of the various parameters, in terms of sensation, present themselves in a natural manner. Thus this paper presents a theory which unifies and interprets two paired comparison models that have proved useful in fitting experimental data. Author (TAB)

N67-23371# Lincoln Lab., Mass. Inst. of Tech., Lexington.
SIGNAL PROCESSING CHARACTERISTICS OF THE PERIPHERAL AUDITORY SYSTEM
Thomas J. Goblick, Jr. and Russell R. Pfeiffer 30 Sep. 1966 142 p
(Contract AF 19(628)-5167)
(ESD-TR-66-449; TN-1966-50; AD-645781) CFSTI: HC $3.00/MF $0.65

The fundamental question in speech compression is that of determining the minimum information rate that must be maintained between speaker and listener in order to achieve a specified level of speech fidelity or quality. The problem in answering this question is that a measure of speech quality must first be defined. Any meaningful definition of speech quality clearly must consider the manner in which speech is processed by the listener. If the details of the signal processing in the auditory system were known, speech quality could be defined in terms of the sensitivity of the listener to distortions of signals within the auditory system. A study of the manner in which sounds are processed by the human auditory system was done to provide the basic information to define a measure of speech fidelity. The mechanical or soundconducting parts of the auditory system are reasonably well understood and can be considered as linear systems in an engineering sense. The neural processing of the peripheral auditory system is only partly understood. Further experimental work is necessary. Author (TAB)

N67-23402# Joint Publications Research Service, Washington, D. C.
BIOLOGICAL PROBLEMS IN SPACE FLIGHT
M. Kh. Bengson and F. U. Toma 7 Feb. 1967 6 p Transl. into ENGLISH from Priroda (Moscow), no. 11, 1966 p 29–31
(JPRS-39804; TT-67-30452)

The effects of an isolated biologically limited medium on the changes and simplifications of the intestinal flora in humans are discussed. It is noted that in the sterile conditions of space flight that a reduced number of species of microorganisms are observed in the intestinal microflora. Lethal simplifications of microflora are discussed along with the changes that occur quicker than the consequences can be avoided. Possibilities of combating these effects are suggested; and include control over existing conditions, the introduction of antibiotics in diets, and sterilization of spacecraft before flight. C.T.C.

N67-23403# Joint Publications Research Service, Washington, D. C.
RELATIVE BIOLOGICAL EFFECTIVENESS OF VARIOUS TYPES OF RADIATIONS
M. P. Domshlak 3 Feb. 1967 44 p refs Transl. into ENGLISH from the book "Voprosy Obshchey Radiobiologiya" Moscow, Atomizdat., 1966
(JPRS-39774; TT-67-30422)

Consideration is given to the relative biological effectiveness (RBE) of various types of radiations to induce a response of a definite strength at a given absorbed dose, usually in comparison with X-rays. The numerical value of the RBE is defined as the ratio of the doses of the given radiation and X-ray radiation necessary to obtain the same effect. Relative to this, investigations are made of the physical aspects of the RBE, the RBE of high-energy protons, and model studies of the biological effects of cosmic radiation. C.T.C.

N67-23409# Joint Publications Research Service, Washington, D. C.
CHANGES IN THE ERYTHROCYTES OF RATS TRAINED TO HYPOXIA
A. I. Barbashova and G. I. Grigor'yeva 18 Jan. 1967 13 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (Moscow), v. 52, no. 11, Nov. 1966 p 1346–1352
(JPRS-39586; TT-67-30235)

An investigation was made of the hypothesis that the osmotic erythrocyte resistance (OER) increase in rats adapted to hypoxia might be connected with an altered cation permeability of the erythrocyte membranes. The experimental method is described, and the results are discussed with the aid of graphs and tables. It was found that the adenosine triphosphatase activity (ATP) of the blood plasma was reliably increased in rats trained to hypoxia during winter and spring seasons. Since this increase showed no correlation with the general resistance to hypoxia or with the change in osmotic resistance of erythrocytes, it is regarded as not in connection with OER changes. The ATP activity of erythrocytes decreased in the experiments of winter series, where the rats proved to be well adapted and the osmotic resistance of blood cells was increased. The buffer capacity of the hemolysate of erythrocytes cleared of plasma was increased in well adapted rats (winter series). C.T.C.

N67-23422# Library of Congress, Washington, D. C. Aerospace Technology Div.
SOVIET RESEARCH ON THE NEURAL EFFECTS OF MICROWAVES
Christopher Dodge and Simon Kassel 7 Nov. 1966 38 p refs
(ATD-66-133)

The primary purpose of the report is to outline Soviet research on the effect of low-intensity microwave radiation on the central nervous system of living organisms, including man. The organizations and individual researchers, subject development, specific neural functions and structures, in vivo neural effects, neural effects of low-frequency electromagnetic and magnetic fields, clinical, therapeutic, and hygienic aspects are considered. The discussion which follows summarizes important facts and deductions from the foregoing sections and speculates on the intensity and type of Soviet research efforts in this area in the future. The bibliography at the end of the report includes 42 entries. Author

N67-23440# Israel Program for Scientific Translations, Ltd., Jerusalem.
STAUB, VOLUME 26, NO. 8
Aug. 1966 47 p refs Transl. into ENGLISH from German Published for NSF and Dept. of Health, Educ. and Welfare
CFSTI: HC $3.00/MF $0.65

Hygiene effects and control of dusts, fogs, gases, vapors, and radioactive particles are discussed. The terms dust and very fine mineral particles are defined, and microscopes used in determining mineral particles are described. The limiting dark field

method of particle size determination in a range from 6μ to 0.2 mm and the hot stage microscope for direct observation of melting up to 1600°C in transmitted light are described as the new methods using optical microscopy. The importance of dust containing germs in working places is explained. The applicability of aerosols in xerography is discussed, and with simplified assumptions the velocity at which aerosols settle on charged surfaces is calculated. Determinations of size and electric charges of individual particles of different aerosols were made, and the particle size distribution of nearly all aerosols followed Gaussian distribution. A nomogram is given in the form of a slide rule for the rapid conversion of particle-number concentrations to gravimetric concentrations of industrial aerosols. Studies are presented on the concentration of absorption solutions of primary aliphatic amines and the generation of amine/air mixtures used to check these methods. Additional topics considered are air filters, dust collectors, vacuum cleaners and sweepers, and trace substances in non-polluted air. S.P.

N67-23459# Joint Publications Research Service, Washington, D. C.

WHAT SHOULD THE COSMONAUTS BREATHE ?

V. Stantso 2 Feb. 1967 6 p ref Transl. into ENGLISH from Khim. i Zhin (Moscow), v. 2, no. 12, Dec. 1966 p 7–9
(JPRS-39740; TT-67-30388) CFSTI: HC $3.00/MF $0.65

A nondetailed comparison was made of various spacecraft cabin atmospheres. Advantages and disadvantages were given in terms of astronaut protection and life support efficiency, and in terms of the various problems encountered in spacecraft design. C.L.W.

N67-23466 Army Electronics Labs., Ft. Monmouth, N. J.

THE MENTAL PROCESS

Marco T. Bonfitto [1967] 16 p refs

The empirical approach is used to deduce the logic scheme of the human brain in identifying the various contingencies encountered by man within his local environment by the use of sensual receptors (the matter of perception). How the output of the logic network is matched to the memory network to produce reflex action is shown in block diagram of a differential circuit of the overall complex. An electronic model of the human nervous system is conceived, and the intrinsic functional elements are indicated. Finally, education and the means of instilling memory or knowledge is shown. Limitations and psychological features are also intimated within the context of the paper. Author

N67-23535 Joint Publications Research Service, Washington, D. C.

SOVIET RESEARCH IN NUTRITION

17 Feb. 1967 41 p refs Transl. into ENGLISH from two Russian publications
(JPRS-39942; TT-67-30590)

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N67-23536 Joint Publications Research Service, Washington, D. C.

EXTRACTION OF PROTEINS FROM UNICELLULAR ALGAE

N. S. Klyuskina and V. I. Fofanov *In its* Soviet Research in Nutrition 17 Feb. 1967 p 1–9 refs Transl. into ENGLISH from Vopr. Pitaniya (Moscow), no. 6, 1966 p 3–9 (See N67-23535 12-04)

Studies were conducted to develop an effective semi-production means of breaking down cell membranes of protococcal algae, extracting the maximum protein from the biomass, and obtaining a protein separation along with subsequent testing of its biological value. A 90% breakdown of protococcal algae cells was achieved using a homogenizer with an agitator mixer and polished granules as the disintegrating agent. Proteins were extracted from the disintegrated cells with weak alkali solution and precipitated by acidulation to a pH of 4.5 to 5.0. The protein obtained is twice as digestible as the initial biomass. A four month diet of this protein fed to albino rats provided a positive nitrogen balance, caused no intoxication, and did not affect the generative function of the rats. R.N.A.

N67-23537 Joint Publications Research Service, Washington, D. C.

THE USE OF 50 AND 100 GRAMS OF DRY BIOMASS FROM UNICELLULAR ALGAE IN THE HUMAN DIET

Yu. I. Kondrat'yev, V. P. Bychkov, A. S. Ushakov, N. N. Boyko, N. S. Klyushkina et al *In its* Soviet Research in Nutrition 17 Feb. 1967 p 10–18 refs Transl. into ENGLISH from Vopr. Pitaniya (Moscow), n. 6, 1966 p 9–14 (See N67-23535 12-04)

The effect of a unicellular algae diet on human metabolism was studied. Two groups had 50 and 100 grams of dry algae biomass included in their diets for 22 and 23 days. The diet, consisting of a mixture of Chlorella and Scenedesmus, had no significant effect on the subject's physiological functions, with the exception of lipoid metabolism. The study concludes that up to 100 grams of dry algae biomass can be included in the human diet for a period of 22 days. R.N.A.

N67-23538 Joint Publications Research Service, Washington, D. C.

THE USE OF 150 GRAMS OF DRY BIOMASS FROM UNICELLULAR ALGAE IN THE HUMAN DIET

Yu. I. Kondrat'yev, V. P. Bychkov, A. S. Ushakov, N. N. Boyko, N. S. Klyushkina et al *In its* Soviet Research in Nutrition 17 Feb. 19–27 Transl. into ENGLISH from Vopr. Pitaniya (Moscow), n. 6, 1966 p 14–19 (See N67-23535 12-04)

The effect of a diet containing 150 grams of dry algae biomass on the metabolic processes of the human organism was investigated. Of the five subjects, two received a diet with added unbleached algae biomass while the other three received a diet with added bleached algae biomass. Both control and experimental diets were used. Results showed that the inclusion of 150 grams of either dry bleached or unbleached algae biomass in the human diet led to a number of deviations in the physical condition of most of the subjects, including dyspepsia, edema, rash, and other allergic reactions. Therefore, the 150 gram algae diet is not recommended for humans. R.N.A.

N67-23566# Brown Univ., Providence, R. I.
FURTHER INVESTIGATIONS CONCERNING THE EFFECTS OF COSMIC RAY HEAVY NUCLEI AND OF MICROBEAMS ON MAMMALIAN SKIN Final Summary Report, May 1, 1957–Mar. 31, 1966
Herman B. Chase 19 Sep. 1966 5 p refs
(Contract AT(30-1)-2018)
(NYO-2018-8) CFSTI: HC$3.00/MF$0.65

Work performed during the contract period is summarized. In general the work confirmed the original hypothesis that cosmic ray heavies may have more of a tissue effect than a cellular effect, as predicted on physical grounds, and that there are radiation effects that depend more upon arrangements of cells than upon individual cellular viability. A list of 19 publications resulting from work done under the contract is included. NSA

N67-23603# Army Medical Research Lab., Fort Knox, Ky. Experimental Psychology Div.
CHARACTERISTIC PACE AS DETERMINED BY THE USE OF A TRACKING TREADMILL
Gary L. Holmgren and George S. Harker 14 Nov. 1966 21 p refs
(Rept.-685; AD-645454) CFSTI: HC$3.00/MF$0.65

It was found that when subjects walked on a tracking treadmill under a comfortable-but-determined (C-D) walking instructional set for a minimum of 30 min on each of three testing days: (1) subjects demonstrated a characteristic C-D pace that was stable on any given day; (2) subjects' C-D pace differed statistically from each other ($P < 0.001$); and (3) subjects' C-D pace measures were most reliable between testing days 2 and 3 ($P < 0.01$). Author (TAB)

N67-23606# National Cash Register Co., Dayton, Ohio.
EFFORT TO EVOLVE A METHOD OF EYE PROTECTION FROM FLASH BLINDNESS Final Report, 1 Oct. 1965–31 Aug. 1966
Robert C. Bertelson, Kenneth D. Glanz, David B. McQuain, and Francis D. Thomson Brooks AFB, Tex., School of Aerospace Med., Dec. 1966 57 p refs
(Contract AF 41(609)-2957)
(AD-645730) CFSTI: HC$3.00/MF$0.65

Photochromics of the spirobi(naphthopyran) classes are shown to give significant improvements over present spiropyrans when used in practical eye-protection systems. In particular, the open-state luminous transmittance of the total system was increased to 67% while still retaining the capability of closing to a luminous density of approximately 3 within 100 micro sec. The photobleaching by visible light was negligible even at intensities corresponding to a nuclear weapon range at which the aircraft and crew could not survive. The preparation of a variety of new photochromics and the necessary intermediates is described. Author (TAB)

N67-23625# Army Medical Research Lab., Fort Knox, Ky. Biophysics Div.
HUNGER LEVEL DURING FOOD CONSUMPTION: EFFECTS ON SUBSEQUENT PREFERENCE
Samuel H. Revusky 23 Sep. 1966 12 p refs
(Rept.-681; AD-645207) CFSTI: HC$3.00/MF$0.65

Rats in Group G were fed grape juice while hungry and milk while satiated; Group M was fed milk while hungry and grape juice while satiated. In a subsequent choice between grape juice and milk, Group G preferred grape juice more than Group M. It is theorized that the mechanism responsible for this change in preference is also responsible for the major effects of hunger on performance. Author (TAB)

N67-23628# Stockholm Univ. (Sweden). Dept. of Zoology.
NEURAL MECHANISMS INVOLVED IN INSTINCTIVE BEHAVIOR Final Scientific Report
Eric Fabricius 29 Nov. 1966 22 p refs
(Grant AF-EOAR-65-30)
(AFOSR-67-0097; AD-645298) CFSTI: HC$3.00/MF$0.65

Fear responses were reduced in the pigeon by lesions in the archistriatic region of the forebrain. Pigeons brought up by hand-rearing in isolation from other pigeons subsequently showed sexual responses both to men and to pigeons. Development of fear responses depended on the age at which social contact with parent-substitute was established. Author (TAB)

N67-23680# Naval Research Lab., Washington, D. C.
PILOT COMPARISON OF TWO THERMOLUMINESCENT DOSIMETRY SYSTEMS WITH FILM BADGES IN ROUTING PERSONNEL MONITORING
T. L. Johnson and F. H. Attix 3 Jan. 1967 36 p refs *Its* Test and Evaluation Report 69
(AD-645901) CFSTI: HC$3.00/MF$0.65

An intercomparison was made of the performance of two thermoluminescent dosimetry (TLD) systems and conventional film badges in a routine gamma-ray personnel monitoring operation. Quartz fiber pocket dosimeters were worn in some cases also, but were read out more frequently than the monthly interval used for the other systems. One of the TLD systems consisted of the U.S. Navy experimental prototype Computer-Indicator CP-748(XN-1)/PD and Detectors DT-284(XN-1)/PD, (respectively the reader and dosimeters). The other was a commercial model of foreign manufacture which will be referred to here as the M system. Both of these types of dosimeters employed calcium fluoride TLD material sealed in a glass envelope with an internal ohmic heater. Both types of TLDs were found to contain radioactive contamination which gave rise to background readings in excess of ambient background by approximately 21-24 mR/mo. Author (TAB)

N67-23720*# National Aeronautics and Space Administration, Washington, D.C.
METABOLIC RATE AND LONGEVITY OF DROSOPHILA. II: THE LONGEVITY AND METABOLIC RATE IN DROSOPHILA MELANOGASTER AT DIFFERENT POPULATION DENSITIES [INTENSIVNOST' OBMENA I PRODO LZHITEL 'NOST' ZHIZNI DROSOPHILA. II. PRODOL' ZHITEL 'NOST' ZHIZNI I INTENSIVNOST' OBMENA U DROSOPHILA MELANOGASTER PRI RAZNOY PLOTNOSTI NASELENIYA]
A. P. Shcherbakov May 1967 8 p refs Transl. into ENGLISH from Arkh. Biol. Nauk, v. 38, no. 3, 1935 p 651–655
(NASA-TT-F-466) CFSTI: HC$3.00/MF$0.65 CSCL 06C

The intensity of oxygen absorption in adult *Drosophila melanogaster* varies with the change in the density of population. With increase of density the intensity of respiration increases. With a density of two flies per vessel (30 cc volume), the absorption of O_2 per hour per gram of weight equals 4.13 cc; with a density of 200 flies respiration increases to 5.16 cc O_2. The intensity of respiration changes much less than the duration of life of the flies according to Pearl. The changes of these two factors have an entirely different character. While the longevity of the flies decreases in both directions from a certain optimal density of population (30–50 flies per vessel), respiration simply increases, though irregularly, with the increasing density. Author

N67-23754# Production Group, United Kingdom Atomic Energy Authority, Annon (Scotland).
TISSUE DOSE-EQUIVALENT RATES. I: FROM COSMIC RAY NEUTRONS. II: IN THE LOW LEVEL ENVIRONMENT OF CHAPELCROSS NUCLEAR POWER STATION

D. E. Watt, D. M. Clare, and A. R. B. Gordon 1966 12 p refs
(PG-734) HMSO: 2s 6d

On the basis of published data from cosmic ray studies, the dose-equivalent rate due to naturally occurring neutron radiation is calculated to be 11.8±1.0 mrem/yr for a small piece of tissue in air at sea level and at a location with geographical coordinates (lat. 55°2'N, long 3°21'W). It is deduced that the neutron dose equivalent experienced by the population at sea level for isotropic irradiation varies from 6.2±0.5 mrem/yr at the surface of the body to 56% of this value at 10 cm deep assuming the body is represented by a semi-infinite slab of tissue 20 cm thick. The dose-equivalent rate at the surface of the body for persons flying at supersonic transport altitudes (65,000 ft) is 0.20±0.02 mrem–hour. Experimental measurements, using the spherical moderator technique, confirm the calculated value for the natural dose-equivalent rate. These measurements were extended to determine contours of dose-equivalence in the low level environment of the reactor installation. It is found that the natural level is not exceeded outside the perimeter fence and that the normal working locations of all employees within the establishment are subjected to neutron dose-equivalent rates well below the maximum permissible recommended by I.C.R.P. In most cases the levels are about five times natural background. Author (NSA)

N67-23789*# National Aeronautics and Space Administration, Washington, D. C.
METABOLIC RATE AND LONGEVITY OF DROSOPHILA. I: INTRODUCTORY REMARKS AND REVIEW OF THE LITERATURE
A. P. Shcherbakov May 1967 17 p refs Transl. into ENGLISH from Arkh. Biologicheskikh Nauk, v. 38, no. 3, 1935 p 639–650
(NASA-TT-F-468) CFSTI: HC $3.00/MF $0.65 CSCL 06C

Summarizing the material regarding the duration of life and the metabolism in Drosophila melanogaster, it is concluded that all the existing material supports the theoretical concepts laid down by Rubner and developed further by E. Bauer. Rubner's constant for normal (wild) Drosophila melanogaster equals approximately 8.7 mg of CO_2 per milligram of weight. This corresponds to 2.5×10^4 calories per 1 kilogram of weight, assuming RQ = 0.85. From the fact that the constant proved the same at different temperatures, it follows that within the limits of a certain temperature range (physiologic limits) the longevity is in inverse proportion to the rate of the metabolism, other conditions being equal. The difference in longevity between males and females is related to differences of the metabolism in inverse order. Rubner's constant therefore proves to be the same in both sexes. Author

N67-23821# School of Aerospace Medicine, Brooks AFB, Tex.
AN EXPLORATORY STUDY OF FACTORS AFFECTING AIRCREW MORALE
Bryce O. Hartman, George K. Cantrell, and Lewis S. Sims Jul. 1966 13 p refs
(SAM-TR-66-62; AD-639141) CFSTI: HC $3.00/MF $0.65

Aircrew morale was studied in 176 MAC aircrewmen. In interviews and questionnaires, nine problem areas were identified. The primary problem reported by the aircrewmen was lack of planned free time. This factor had a negative effect both on duty and off duty. The remaining eight factors were more specific to the working environment. Several were a function of the mission of the command but some were accessible to local modification. In the face of these problems, aircrewmen maintained good motivation, probably because of the satisfactions obtained from flying and from other aspects of their Air Force careers. Author (TAB)

N67-23822# Washington Univ., St. Louis, Mo. Dept. of Psychology.
SHIFTING AGREEMENT AND DISAGREEMENT IN DYADS UNDER CONDITIONS OF PERCEIVED DIFFERENCES IN TASK COMPETENCE
Richard H. Willis Aug. 1966 24 p refs
(Contract Nonr-816(12))
(AD-641675) CFSTI: HC $3.00/MF $0.65

40 males and 40 females were run in like-sexed dyads in 5 replications of a 2 × 2 × 4 orthogonal design. Independent variables were (a) sex of Ss, (b) direction of difference in perceived task competence, and (c) mode of partner behavior (Conformity, Independence, Anticonformity, Variability). A simulated interaction situation was used in which behavior of partners, as perceived by Ss, was manipulated along two dimensions of response to generate the four modes. Net Conformity and Independence scores were subjected to analysis of variance. Main results: (a) In all but one condition, the unidimensional Conformity-Independence model was applicable; (b) the main effect due to difference in perceived task competence was highly significant and in the expected direction; (c) the interaction between sex of Ss and mode of partner behavior, as measured by Net Conformity scores, was significant, with males and females exhibiting opposite reactions to anticonformity; and (d) the double-clustering of Ss' perceptions of partners, found in a previous experiment on the four modes of behavior but without differences in perceived competence, did not emerge with any consistency. Author (TAB)

N67-23853# University of Southern Calif., Los Angeles.
BIOLOGICAL ENGINEERING
W. Morrison and G. A. Bekey In its [Solid State, Appl. Electromagnetics and Plasmas, and Inform. Sci.] 30 Sep. 1966 p 178–183 (See N67-23841 12-26)
(Grant NIH NB-06196-01)

A digital sequence generator was designed and fabricated for the direct electrical stimulation of walking movements in paraplegic animals. Patterned movements of dog knee and hip flexors were obtained by imbedded needle electrodes. Mathematical models of the spinal control reflex were validated by comparing computer simulations with the performance of human subjects in a manual tracking task. G.G.

N67-23868# Bunker-Ramo Corp., Canoga Park, Calif.
HUMAN ENGINEERING SUPPORT TO AIR FORCE FLIGHT CONTROL AND FLIGHT DISPLAY INTEGRATION PROGRAM Final Report, 15 Mar. 1965–11 Mar. 1966
Gerald F. Rabideau and Clarence A. Semple, Jr. Mar. 1966 17 p refs
(Contract AF 33(657)-8600)
(AD-646016) CFSTI: HC $3.00/MF $0.65

The Bunker-Ramo program of human engineering tasks may be characterized as broad in scope and covering a diverse collection of control-display problems. Technical activities included consultation, participation as members of control-display system teams, reviews and analyses of specific control-display problem literature, development and study of methodological problems, experimentation and development of human engineering methods, and evaluation of controls and displays. The objectives of the individual tasks and their nature are briefly reviewed and discussed in this report. References are made to Technical Reports pertinent to the completion of each of the tasks. Individual reports, however, are not included as a part of this Summary Final Report. Among the most significant human engineering contributions were those concerned with the development of solid state (electroluminescent) display concepts, V/STOL and Multi-Jet Transport control-display configurational work, the determination of scale factors critical to tape information display, evaluation of the photochromic display, simulator evaluation of a side stick controller, inflight evaluation of

force wheel steering in the heavy transport aircraft, a preliminary evaluation of a microvision display and an assessment of the state-of-the-art with respect to attitude indicators. TAB

N67-23869# Hebrew Univ., Jerusalem (Israel). Dept. of Psychology.
REACTIONS TO STRESS Scientific Report
S. Kugelmass 1 Jan. 1967 90 p refs
(Contract AF 61(052)-839)
(AFOSR-67-0530; AD-647467) CFSTI: HC $3.00/MF $0.65

This report on a series of experiments involves the following research: The influence of blood pressure cuff application on the efficiency of GSR detection; examination of certain biographical correlates of GSR reactivity during experimental lie detection; experimental evaluation of GSR and blood pressure change indices during criminal interrogation; the role of lying in psychophysiological detection; the effect of variation in the mode of stimulus presentation on differential GSR reactivity; identification of variables related to the efficiency of the detection of information within the organism, using a physiological index. TAB

N67-23870# Douglas Aircraft Co., Inc., Huntington Beach, Calif. Advanced Research Lab.
VIRUS GROWTH-GENE REPRESSION HYPOTHESIS OF RADIATION PROTECTION BY AUXIN ANALOGUES
David Norman and Robert D. Schultz (North Am. Aviation, Inc.) Jul. 1966 23 p refs
(Grant NIH PH-43-64-865)
(Douglas Paper-4138; AD-644987) CFSTI: HC $3.00/MF $0.65

A working hypothesis is developed which postulates (1) that death from radiation sickness in mammals is to an appreciable extent the result of the activation of initially latent but potentially cytopathic viruses, and (2) that a radiation-protective auxin analogue blocks such activation by allosterically stabilizing an active form of an auxin-sensitive repressor of a viral gene. The phenomena of lysogeny and virogeny are used as models to develop this hypothesis. Author (TAB)

N67-23923# Johns Hopkins Univ., Baltimore, Md.
MOUNTING ANGLE OF A VJ REMOTE RADAR INDICATOR AND ITS EFFECT ON OPERATOR PERFORMANCE
A. Chapanis [1947] 13 p refs
(TR-166-1-41; AD-646273) CFSTI: HC $3.00/MF $0.65

A VJ remote radar indicator was mounted at seven angles (scope-face with respect to the floor: 0, 15, 30, 45, 60, 75, 90 degrees) and tests were made to discover whether there is an optimum mounting angle for operator performance. The results of the experiment show that the angle at which a VJ is mounted has no significant effect on an operators speed and/or accuracy in target indication. A questionnaire was given to the group of subject-operators used in the experiment to determine which mounting angle they preferred. An analysis of these results gave the following rank order (from most to least preferred): 15, 45, 30, 60, 0, 75, 90 degrees. The 0 degrees position is the conventional mounting angle. Author (TAB)

N67-23927# York Univ., Toronto (Ontario). Molecular Psychobiology Lab.
THE EFFECT OF RNA INJECTIONS ON SHOCK AVOIDANCE CONDITIONING AND ON BRAIN CHEMISTRY
Elizabeth Schaeffer and John Gaito 9 Dec. 1966 28 p refs
(Contract Nonr-4935(00); Grant NRC APB-110)
(MPL-7; AD-645551) CFSTI: HC $3.00/MF $0.65

Two experiments were conducted in which labelled RNA was extracted from shock avoidance trained rats and from untrained rats and subsequently injected into naive rats. There were no meaningful differences in conditioning nor in brain chemical patterns (amount of RNA, DNA, and proteins; ratios of these three; specific activity of RNA and tissue pool fractions, and relative specific activity of RNA fraction) in the recipients as a result of the injections. Author (TAB)

N67-23932# Systems Technology, Inc., Hawthorne, Calif.
HUMAN PILOT DYNAMIC RESPONSE IN SINGLE-LOOP SYSTEMS WITH COMPENSATORY AND PURSUIT DISPLAYS
R. J. Wasicko, D. T. McRuer, and R. E. Magdaleno Dec. 1966 79 p refs
(Contract AF 33(657)-10835)
(STI-TR-134-4; AFFDL-TR-66-137; AD-646652) CFSTI: HC $3.00/MF $0.65

The primary purpose of the experimental series reported here is to investigate, on a preliminary and exploratory basis, human operator performance differences between pursuit and compensatory displays. For each display type a wide range of forcing function bandwidths and controlled element dynamics was used. The effect of the additional information provided by separately displaying both forcing function and controlled element output (pursuit) rather than their difference (compensatory) was evaluated using the mean-squared error and a quantity called the effective open-loop describing function (Y beta). As a prelude to the new data, past pursuit/compensatory tracking results are reviewed, and then a tie-in is made between these and the current series. Author (TAB)

N67-23933# Army Medical Research Lab., Fort Knox, Ky. Biophysics Div.
THE INFLUENCE OF SOME HEXITOLS AND SUGARS ON CO_2 PRODUCTION BY STARVED AND X-IRRADIATED, STARVED YEAST CELLS
Edward S. Spoerl and Ronald J. Doyle 27 Sep. 1966 17 p refs
(Rept.-682; AD-645204) CFSTI: HC $3.00/MF $0.65

Incubation of irradiated and unirradiated yeast cells in solutions of mannitol, ribose, methyl glucose or cellobiose maintained equivalent rates of CO2 production by the two cell types when output was measured with glucose as substrate. This result is in contrast with a relatively higher rate of CO2 output by irradiated cells after a 21 hour incubation in water (starved). Incubation of the cells with the above compounds also eliminated a lag period in CO2 output and preserved a high capacity to produce CO2. On the other hand, incubation with glucose or fructose, though it eliminated the lag, lowered the rate of CO2 output and did not eliminate the difference in output between irradiated and unirradiated cells. Conversion of cells to spheroplasts also eliminated the radiation-induced difference in the rate of CO2 production, and, because sorbitol was used as a stabilizing agent for the spheroplasts, suggested first that sorbitol and other hexitols and sugars be examined. Reincubation, after a 21 hour starvation in water, with any of the compounds tested removed the lag period, though CO2 output was reduced. Author (TAB)

N67-23934# Army Medical Research Lab., Fort Knox, Ky. Experimental Psychology Div.
STIMULUS CHANGE PROPERTIES OF THE RT READY SIGNAL
C. K. Adams and I. Behar 31 Aug. 1966 13 p refs
(Rept.-676; AD-645206) CFSTI: HC $3.00/MF $0.65

Two studies tested the generality of the Perkins-Logan hypothesis in the reaction-time experiment. Both studies used a parametric design with four ambient (intertrial) intensities of white noise ranging from 0 to 90 dB in all combinations with the same four intensities used as ready signals. Direction of change (increase or decrease) from the ambient intensity was significant in one of the two studies, but magnitude of change (30, 60, or 90 dB) produced a highly significant effect in both studies. Author (TAB)

N67-23938# Systems Technology, Inc., Hawthorne, Calif.
EFFECTS OF MANIPULATOR RESTRAINTS ON HUMAN OPERATOR PERFORMANCE
R. E. Magdaleno and D. T. McRuer Dec. 1966 55 p refs
(Contract AF 33(657)-10835)
(STI-TR-134-2; AFFDL-TR-66-72; AD-645289) CFSTI: HC $3.00/MF $0.65

The purpose of the experimental efforts is to explore on a preliminary basis the limiting characteristics of the human operators actuator or neuromuscular system dynamics as affected by the manipulator. The effects of three manipulators (pressure, free-moving, and spring-restrained) on system performance and the human operators describing function are presented for three controlled elements and two high bandwidth forcing functions. Describing function differences are primarily in the phase, i.e., the effective time delay at high-frequency and an effective phase lag at very low frequencies. Generally the mean square error and describing function results for the spring-restrained manipulator were intermediate to those for the free-moving (no spring) and the pressure (infinite spring) manipulators. The pressure controller gave lower mean square error and less effective time delay than the free-moving controller. In addition, the effective phase lag at very low frequencies was either the same as or larger than that for the free-moving control. Author (TAB)

N67-23989 Royal Aircraft Establishment, Farnborough (England). Inst. of Aviation Medicine.
THE INFLUENCE OF ALVEOLAR NITROGEN CONCENTRATION AND ENVIRONMENTAL PRESSURE UPON THE RATE OF GAS ABSORPTION FROM NON-VENTILATED LUNG
J. Ernsting London, Flying Personnel Res. Comm., Jul. 1965 19 p refs
(FPRC/1242)

The airway to the left lung was separated in the anaesthetised dog from the right lung by an endobronchial cannula. After both lungs had respired one of five nitrogen-oxygen mixtures for at least 45 min, the left lung was connected to a bag. The subsequent changes in gas composition in the left lung-bag system and the absorption rate of gas were recorded. Gas absorption proceeded in two phases. In the faster initial phase the composition of the gas in the closed system changed continually, whilst in the final slower phase it remained constant. The rate of absorption in the initial phase was independent of the inspired nitrogen concentration and increased with reduction of environmental pressure. During the final phase the rate of absorption decreased as the inspired nitrogen concentration was raised and the environmental pressure was lowered. Calculations based on these results suggest that the effectiveness of a given inspired concentration of nitrogen in retarding the development of acceleration atelectasis increases as the environmental pressure is reduced. Author

N67-24045# Douglas Aircraft Co., Inc., Huntington Beach, Calif. Advanced Research Lab.
INTERFACE TENSION THEORY OF MUSCULAR CONTRACTION
Alexander F. Metherell May 1966 35 p refs *Its* Res. Commun. No. 10
(Douglas Paper-4037; AD-644981) CFSTI: HC $3.00/MF $0.65

The purpose of this theoretical study is to identify and explain the fundamental source of the forces that cause filament sliding and tension generation during muscular contraction. This paper considers the interface tension in the interface phase of the myoplasmic fluid at the actin and myosin filament boundaries. Because of the geometrical arrangement of the filaments and the localized chemical reactions that are known to take place, gradients occur in the interface tension which cause molecules in the interface phase of the myoplasmic fluid to move parallel to the filaments. The motion at the interface causes viscous shearing in the myoplasmic fluid, which balances the gradient in tension. It is shown that the forces that cause filament sliding and muscular load are the reactions to the viscous shear stresses in the myoplasmic fluid between the overlapping filaments. The velocity of the molecules in the interface phase with respect to the filament is expected to be less than five microns per second, even at maximum physiological effort. This velocity is compatible with motion in close proximity to the solid filaments. This study unexpectedly showed that the contractile load is carried by the myoplasmic fluid interfaces rather than by the filaments themselves. The stresses in the filaments are always compressive, being in a lower state of compression when the muscle is generating force. Author (TAB)

N67-24056# Webb Associates, Yellow Springs, Ohio. Aerospace Medical Research Dept.
SILICONE SUBMERSION: A FEASIBILITY STUDY
Paul Webb and James F. Annis 21 Oct. 1966 63 p refs
(Contract N62269-3212)
(NADC-MR-6620; Rept.-9; AD-645080) CFSTI: HC $3.00/MF $0.65

The report details a study which demonstrated the feasibility of maintaining men totally and continuously submerged for five days by using silicone fluid in a specially designed tank. Five submersions were tried, 3 were in water for 6 hours for training purposes and 2 were in silicone; one for 16 hours and the final run which lasted a full five days (120 hours) with complete submersion for about 60% of the time and head out immersion for the remaining 40%. It was found that silicone fluid can be used as a weightless simulation medium in prolonged immersion and that subjects can be kept free of skin irritation or maceration for long periods of time if diligent quantity control of the fluid is maintained. It was also found that long submersion need not result in a negative water balance due to diuresis. Author (TAB)

N67-24279# Boeing Co., Seattle, Wash.
DEVELOPMENT OF A DEVICE FOR PHYSICAL CONDITIONING DURING WEIGHTLESSNESS
Gary Chase, Caswell Grave, John Goode, and Gary Graham *In* NASA Marshall Space Flight Center Proc. of the Interdisciplinary Symp. on Apollo Appl. Programs, 12–13 Jan. 1966 Dec 1966 p 241–248 refs (See N67-24268 12-30)

Reported are laboratory and engineering design studies of an exercise device for maintaining the functional integrity and physical well being of astronauts during exposure to a weightless environment. The device, which resembles a double trampoline, was designed for testing in an experimental simulation (bed rest) of the zero-g environment. It provides conditioning for the muscular, skeletal, and cardiovascular system by imparting cyclic, pulsatile accelerations along the long axis of the body. A runner-mounted carrier supports the subject in a face-up, horizontal position and is free to move back and forth between two vertical, opposed trampolines. The subject oscillates by bouncing between the trampolines over a distance necessary to develop the desired acceleration-time profile. Preliminary implications of laboratory studies, and details of machine construction are included. Also included is a concept for a lightweight model for eventual application in a space station. It is suggested that the trampoline device be tested and analyzed along with other methods for preventing deconditioning of the astronaut. S.C.W.

N67-24320*# National Aeronautics and Space Administration, Washington, D. C.
OVERCOMING NEGATIVE EMOTIONS [PREODOLENIYE OTRITSATEL'NYKH EMOTSIY]
K. Ioseliani and Yu. Smirnov Dec. 1966 5 p refs Transl. into ENGLISH from Aviats. i Kosmonavt. (Moscow), no. 9, 1966 p 68–70
(NASA-TT-F-10606) CFSTI: HC $3.00/MF $0.65 CSCL 05J

Methods of controlling the emotional states of pilots in flight are discussed and their importance is emphasized in view of the great nervous and emotional strain associated with piloting modern aircraft and spacecraft. Several methods for self-regulation of emotional states in flight conditions are recommended, including such elementary devices as listening to pleasant sounds and encouraging oneself with phrases like "I can", "I must", etc. Physical exercises, selected for their effect on the muscle groups most fatigued by prolonged static stress, have proved effective. It is further suggested that: (1) Pilots should be familiar with all varieties of breathing exercises, and the physiological and psychological effect of each on the organism (for instance, breathing deeply and exhaling slowly has a calming effect); and pilots should be trained to shift their thoughts at will to pleasant and successful flying experiences, thus overcoming unfavorable emotions arising during flight. Author

N67-24369# Lund Univ. (Sweden).
MONOAMINERGIC MECHANISMS IN NERVOUS TISSUE Final Report, 1 Nov. 1965–31 Oct. 1966
Erik Dahl and Bengt Falck 26 Jan. 1967 15 p refs
(Grant AF-EOAR-66-14)
(AFOSR-67-0531; AD-647401) CFSTI: HC $3.00/MF $0.65

Using the sensitive and specific fluorescence method of FALCK and HILLARP in combination with histochemical methods for cholinesterases, electronmicroscopy and biochemical methods for the localization and estimation of the monoamines, their immediate precursors, and the pertinent enzymes, monoaminergic mechanisms are studies in a broad comparative material. Monoaminergic mechanisms constitute a considerable part in many invertebrate nervous systems and have been studied in detail in numerous species. These studies also led to the finding of a hitherto unknown type of nerve cell i.e. a catecholamine-containing sensory or senso-motoric neuron that has now been localized and mapped out in many species. A comprehensive study on the innervation of the eye and its adnexa has been completed. A characterization of the adrenergic and cholinergic receptors in the hearts of the lamprey and the plaice has been performed. The significance of monoaminergic mechanisms for the development of ventricular fibrillation during induced hypothermia has been extensively studied. A study on adrenergic and cholinergic terminal nervous system has disclosed that such systems may interact probably also by axo-axonatic synapses in several mammalian organs. Author (TAB)

N67-24375# Naval Missile Center, Point Mugu, Calif.
TIMED HEAT-RELEASE CHEMICAL SYSTEM FOR UNDERWATER APPLICATIONS
K. N. Tinklepaugh and C. J. Crowell, Jr. 20 Feb. 1967 26 p refs
(TM-67-1; AD-647892) CFSTI: HC $3.00/MF $0.65

Divers and aviators downed in the ocean require warming to prevent excessive loss of body heat. A combination of chemical heating and fabric insulation was evaluated for this purpose. Chemical heating results from the programmed heat of solution of an inexpensive cream in water. Less than 25 pounds per hour for the aviator and 5 pounds per hour for the wet-suit diver will probably be required to prevent excessive loss of body heat. Author (TAB)

N67-24380# Kansas State Univ., Manhattan. Inst. for Environment Research.
THE CHIMPANZEE A Topical Bibliography
Frederick H. Rohles, Jr. Feb. 1967 77 p refs
(ARL-TR-67-4; AD-647768) CFSTI: HC $3.00/MF $0.65

In June 1962, The Chimpanzee, A Topical Bibliography was published as Aeromedical Research Laboratory Technical Documentary Report (AD-282 661). The first addenda was published in October, 1963, as Aeromedical Research Laboratory Technical Documentary Report (AD-423 069). This report is published as the second addenda and lists 477 new references in chimpanzee research and methodology. Author (TAB)

N67-24401# Stanford Univ., Calif. Dept. of Physiology.
THE DISTRIBUTION OF BLOOD FLOW IN HUMAN SKIN
J. M. Crismon 1 Sep. 1966 56 p refs
(Contract DA-49-193-MD-2311)
(AD-647559) CFSTI: HC $3.00/MF $0.65

Contents: Design, Performance Analysis and Calibration Problems of a Light-weight Capacitance Gauge for Forearm Volume Plethysmography; A Constant-current, Voltage-regulated Control, Calibration and Measuring Circuit for Waggoners High-impedance Elastic Force Gauge; Procedures and Equipment for Measurement of Trans-cutaneous Flux of Helium and Rates of Sweating at Varying Levels of Skin Blood Flow; Clearance of I-131 and Na-22 from Skin in the Presence of Plasma Albumin; The Role of Lymphatics in the clearance of I-131 from Skin Assessed from Clearance Rates of Radio-iodinated Human Serum Albumin; Helium Flux through the Skin of Subjects at 25 plus or minus 2C, with and without Locally-induced Sweating by means of Mecholyl and Pilocarpine Nitrate Iontophoresis; The Effects of General Body Warming, Cooling Posture and Exercise upon Helium Flux through Forearm Skin and upon Total Forearm Blood Flow. Author (TAB)

N67-24403# Aerojet General Corp., Azusa, Calif.
ANALYSIS OF TRACE CONTAMINANTS IN CLOSED ECOLOGIC ATMOSPHERES
M. L. Moberg Dec. 1966 25 p
(Contract AF 41(609)-2783)
(SAM-TR-66-99; AD-647618) CFSTI: HC $3.00/MF $0.65

A 27-day experiment designed to determine mans contribution to trace contaminants in a sealed environment was conducted jointly by the United States Air Force and the National Aeronautics and Space Administration. Direct analysis of the sealed environment was not adequate for this type of comprehensive survey. The use of cryogenic fractionation and concentration, however, did provide samples with sufficient level of contaminants for analysis by means of gas chromatography and mass spectroscopy. Author (TAB)

N67-24410# Library of Congress, Washington, D. C. Aerospace Technology Div.
INDUSTRIAL HYGIENE PROBLEMS OF WORKING WITH ULTRA SHORT-WAVE TRANSMITTERS USED IN TELEVISION AND RADIO BROADCASTING. SURVEYS OF FOREIGN SCIENTIFIC AND TECHNICAL LITERATURE [COPROSY GIGIYENY TRUDA PRI RABOTE S UKV PEREDATCHIKAMI, PRIMENYAYEMYMI V TELEVIDENII I RADIOVESHCHANII]
N. N. Goncharova, V. B. Karamyshev, and N. V. Maksimenko 27 Sep. 1966 125 p refs Transl. into ENGLISH from Gigiena Truda i Prof. Zabolevaniga (Moscow), No. 7, 1966 p 10–13
(ATD-66-125; AD-647687) CFSTI: HC $3.00/MF $0.65

The aim of the research was to study the health aspects of the working conditions of personnel employed in the vicinity of ultrashort-wave television transmitters, and to determine the effects of the electromagnetic fields within these wavelengths. The studies were conducted at radio and television stations whose basic equipment consisted of 2-5 kw transmitters operating at 67-230 Mc. The 16 transmitters studied each consisted of a metal cabinet housing, enclosing power tubes, condensers, oscillators, power line and switching components, and control-and-measuring components. Author (TAB)

N67-24413# Monsanto Research Corp., Everett, Mass.
FACTORS AFFECTING THE EFFICIENCY OF A CHEMICALLY DEFINED DIET Final Report, 15 Jan.–15 Nov. 1966
Yuoh Ku Jan. 1967 50 p refs
(Contract AF 41(609)-2980)
(MRB2038F; AD-647836) CFSTI: HC $3.00/MF $0.65

The retarded growth of rats fed a chemically defined diet has been attributed to the high osmolality of the diet. This investigation was undertaken to study the effect of various carbohydrates on such diets. This idea was based on the premise that the higher molecular weights of certain carbohydrates should reduce the osmolality created by the lower molecular weight of the amino acids. Results show that when starch was used in these diets, the rats ate more and grew better. In most cases, glucose supported better growth than did sucrose in an amino acid diet. These data do not support the hypothesis of an osmotic effect. The data on stomach emptying pattern revealed that rats fed with starch-amino acid diet empty their stomach contents slower than those receiving amino acid diets containing glucose or sucrose. These data also suggest that the better growth of rats on agar gel diets could be due to the delay in stomach emptying rather than to the water in the diet. Author (TAB)

N67-24416# Southwest Research Inst., San Antonio, Texas.
STUDY OF CALCIUM, PHOSPHORUS, AND NITROGEN MOBILIZATION RESULTING FROM CONDITIONS OF INACTIVITY IN MACACA IRUS MONKEYS
Arthur L. Gross, Kenneth T. Roberson, Louis H. Krough, Jr., and John W. Miesse Nov. 1966 47 p refs
(Contract AF 41(609)-2749)
(SAM-TR-66-94; AD-647617) CFSTI: HC $3.00/MF $0.65

A study was made of calcium, nitrogen, and phosphorus balance resulting during conditions of inactivity. Monkeys, Macaca irus, were inactivated by three different methods: surgical denervation, plaster casts, and tranquilization. The monkeys were placed in the plaster casts either in the sitting position or in the supine position. Balance studies were conducted by measuring food intake and urine and fecal output of calcium, nitrogen, and phosphorus. Calcium was measured by flame photometry, and nitrogen and phosphorus were measured colorimetrically. The animals inactivated by surgical denervation and plaster casts experienced what appeared to be a negative nitrogen balance which could be attributed to disuse atrophy of skeletal muscles. The urinary phosphorus excretion increased in the inactivated animals by severalfold but there was no overall reduction in the total phosphorus excreted. No noticeable changes in calcium balance were observed in the inactivated animals. Author (TAB)

N67-24421*# Fairchild Engine and Airplane Corp., Farmingdale, N. Y.
EFFECT OF DIET AND ATMOSPHERE ON INTESTINAL AND SKIN FLORA. VOLUME I—EXPERIMENTAL DATA
Lorraine S. Gall and Phyllis E. Riely Washington, NASA, Apr. 1967 22 p refs
(Contract NAS9-4172)
(NASA-CR-661) CFSTI: HC $3.00/MF $0.65 CSCL 06P

Aerobic and anaerobic microbiological determinations are reported on human subjects confined for a longer period in an altitude chamber with 100% oxygen. Minimal hygienic procedures with and without space suits and space type diets were observed. The following results were obtained: (1) microorganisms found in each body area and feces were in good agreement with known studies; (2) the total number of colonies increased as the experiment progressed; (3) microflora in the axilla, groin, and glans penis contained staphylococci or micrococci and croynebacteria; streptococci were found in the throat and buccal area; (4) bacterial buildup on body areas related to minimal personal hygiene procedures; (5) isolated potentially pathogenic bacteria did not transfer readily between subjects; (6) in the feces strict anaerobes represented over 95 percent of the predominating bacteria. G.G.

N67-24424# Arbeitsgruppe Biophysikalische Raumforschung, Frankfurt am Main (West Germany).
EXTRATERRESTRIAL BIOPHYSICS AND BIOLOGY [EXTRATERRESTRISCHE BIOPHYSIK UND BIOLOGIE]
[1966] 171 p refs In GERMAN Presented at Frankfurt am Main, 26–27 Oct. 1966; Sponsored by Bundmin. fuer Wiss. Forsch.
CFSTI: HC $3.00/MF $0.65

Symposium papers are presented on extraterrestrial biophysics, space factors, closed ecological systems, exobiology, and simulation of space factors. For individual titles, see N67-24424 through N67-24447.

N67-24425# Arbeitsgruppe Biophysikalische Raumforschung, Frankfurt am Main (West Germany).
MOTIVE AND DUTIES OF THE WORK SESSION [MOTIVE UND AUFGABEN DER ARBEITSTAGUNG]
B. Rajewsky *In its* Extraterrest. Biophys. and Biol. [1966] p 5–11 (See N67-24424 12-04)

Biophysical and biological space research activities in West Germany center on technical developments and experiments in biochemistry, biology, and medicine as well as information exchange with the ESRO organization, the USA, and the USSR. Major emphasis is placed on the education of specialists for future experimental verification of interesting problems. Transl. by G.G.

N67-24426# Federal Aviation Agency, Washington, D. C.
BIOLOGICAL EXPERIMENTS IN SPACE OF THE GEMINI PROGRAM, AAP (APOLLO APPLICATIONS PROGRAM) AND AES (APOLLO EXTENSION SYSTEM) [BIOLOGISCHE EXPERIMENTE IM RAHMEN DER PROGRAMME GEMINI, AAP (APOLLO APPLICATIONS PROGRAM) UND AES (APOLLO EXTENSION SYSTEM)]
S. J. Gerathewohl *In* Arbeitsgruppe Biophys. Raumforsch. Extraterrest. Biophys. and Biol [1966] p 15–19 (See N67-24424 12-04)

Large scientific orbiting satellites will be used: (1) as laboratories for investigating physical–biological exchange reactions; (2) as experimental stations for testing regenerative life support systems; (3) as combined experimental stations and laboratories for human clinical assessment; (4) as bases for synoptic studies of terrestrial biology and ecology; (5) as bases for planetary observations in regard to extraterrestrial life; (6) as receiving stations for micrometeorites and connected chemical–biological analyses; (7) as laboratories to investigate pre-biological material; and (8) as planetary quarantine stations. Possible manned scientific missions will study the phenomena of weightlessness, ionizing radiation, ultrahigh vacuum effects, periodicity, and geobiological observations. Transl. by G.G.

N67-24428# Arbeitsgruppe Biophysikalische Raumforschung, Frankfurt am Main (West Germany).
WORK ON COSMIC BIOLOGY IN THE USSR [ARBEITEN UEBER KOSMISCHE BIOLOGIE IN DER UDSSR]
H. Buecker *In its* Extraterrest. Biophys. and Biol. [1966] p 31–36 refs (See N67-24424 12-04)

This summary of extraterrestrial biological research in the USSR gives a brief review of bioscience activities from 1949 through 1966. The first satellite experiments used dogs, monkeys, and

rabbits to study acceleration, weightlessness, safety and retrieval factors; later followed a series of dog, mice, and lower biological specimen tests of special life support and flight control systems, radiation and genetic effects, cell physiological changes, and long duration flights. Manned space flights investigated psychological factors of space flight and working conditions outside the spaceship during orbit. The last experimental flights exposed dogs and biological specimen to long duration zero-G and observed the radiation density of the Van Allen belt. Transl. by G.G.

N67-24429# Arbeitsgruppe Biophysikalische Raumforschung, Frankfurt am Main (West Germany).
AN AUTOMATIC BIO-SONDE FOR SERVICE IN SATELLITES [EINE AUTOMATISCHE "BIOSONDE" FUER DEN EINSATZ IN SATELLITEN]
Robert G. A. Lotz *In its* Extraterrest. Biophys. and Biol. [1966] p 37–41 (See N67-24424 12-04)

Described is the development and construction of a biosonde that is able to support small animals in an orbiting satellite for over one year. This ecological loop system contains in succession an animal chamber, an impurity filter, an adsorption filter or ion exchanger, a carbon dioxide absorption filter, and an electrolytic cell. The m/15 phosphate buffer solution of the system is circulated by centrifugal pump; the entire physiological support system is hermetically sealed but contains a circular window encased in an elastic membrane. Changes in membrane pressure caused by oxygen absorption of the enclosed animal are monitored by a photoelectric pressure transducer which in turn agitates the electrolytic cell to reconstitute the necessary oxygen amount. This life support system weighs under 3 kg and requires only 2.5 to 3 Watt power; it can be used in connection with telemetry to monitor the biological rhythms in full. Transl. by G.G.

N67-24430# Arbeitsgruppe Biophysikalische Raumforschung, Frankfurt am Main (West Germany).
A FEW RESEARCH PROBLEMS IN EXTRATERRESTIAL BIOPHYSICS, ESPECIALLY THE EFFECTS OF SPACE FACTORS [EINIGE FORSCHUNGSPROBLEME DER EXTRATERRESTRISCHEN BIOPHYSIK, INSBESONDERE DER WIRKUNG VON RAUMFAKTOREN]
Horst Buecker *In its* Extraterrest. Biophys. and Biol. [1966] p 45–50 (See N67-24424 12-04)

Biophysical factors of the extraterrestrial environment can be used to study the physical and chemical laws of our ecology and to form a basis for effective shielding of living organic systems during space flight. Considered are weightlessness effects on sensory-psychological processes and possible circulatory disturbances, pressure variations in the otolytic apparatus, and specific changes in the metabolism of the biological cell. Reactions to extraterrestrial ultraviolet radiation and ionization can be monitored with the help of a luciferin-luciferase fermentation reaction with its high sensitivity to radiation effects. Transl. by G.G.

N67-24431# Deutsche Versuchsanstalt fur Luft- und Raumfahrt, Bad Godesberg (West Germany). Institut fuer Flugmedizin.
BIOLOGICAL PROBLEMS OF WEIGHTLESSNESS [BIOLOGISCHE PROBLEME DER SCHWERELOSIGKEIT]
W. Briegleb *In* Arbeitsgruppe Biophys. Raumforsch. Extraterrest. Biophys. and Biol. [1966] p 51–58 (See N67-24424 12-04)

The importance of physiological weightlessness as environmental factor in formation and function of the live plasma, and thus for biological organism, is outlined. Possible simulation techniques for biological weightlessness studies include specimen rotation vertical to the direction of gravity, free fall, and acceleration of fluid combinations of little affinity and differing weights. The latter method leads to the formation of sliding boundary layers that can be utilized to represent formation and motion of jellyfish. The primary reaction of georeceptors in plants is attributed to shifting of amyloplasts and mitochondria in the cell. Transl. by G.G.

N67-24434# Medizinischen Akademie, Luebeck (West Germany).
THE RENAL SECRETION OF 17-KETOSTEROIDS. ON THE QUESTION OF CORTICOSTEROID CHANGES BY STRESS ACTION [DIE RENALE AUSSCHEIDUNG VON 17-KETO-STEROIDEN. ZUR FRAGE DER CORTICOSTEROID VERAEN-DERUNGEN NACH STRESS-EINWIRKUNG]
H. Schreiber *In* Arbeitsgruppe Biophys. Raumforsch. Extraterrest. Biophys. and Biol. [1966] p 75–78 refs (See N67-24424 12-04)

Renal elimination of corticosteroids during space flight is attributed to optical radiation energy and its impact on the terminal vegetative nerve elements of the skin. Transmittal of the irritation signal to the cortex pituitary regulation center in turn initiates the general biological leucocyte reaction regarded as adaptation syndrome and thus leads to the stress related increased production of steroid hormones. Transl. by G.G.

N67-24436# Gottingen Univ. (West Germany). Institut fuer Mikrobiologie.
CLOSED ECOLOGICAL SYSTEMS—REGENERATION OF AIR FOR BREATHING [GESCHLOSSENE OEKOLOGISCHE SYSTEME—ATEMLUFTREGENERATION]
H. G. Schlegel *In* Arbeitsgruppe Biophys. Raumforsch. Extraterrest. Biophys. and Biol. [1966] p 87–93 (See N67-24424 12-04)

Removal of carbon dioxide, oxygen regeneration, and the production of nutritional substances by microorganism are considered for closed ecological systems during prolonged space flight. Oxygen regeneration by chemical reduction of carbon dioxide and electrolytic decomposition of the obtained water requires relative high reaction temperatures and produces additional carbon monoxide and methane; oxygen regeneration by bioregenerative photosynthetic processes, using algae, utilizes only 2 to 5% of the energy source and poses a problematic weight factor; oxygen regeneration by biogenerative chemosynthetic systems of microorganism produces molecular hydrogen and oxygen from water electrolysis. Experiments with Hydrogenomonas bacteria show an energy consumption of 0.6 kW for the hydrolysis of 200 mol H_2O. Transl. by G.G.

N67-24437# Phillipps-Universitat, Marburg (West Germany). Institut fuer Angewandte Physiologie.
PROBLEMS OF OXYGEN SUPPLY UNDER VARIOUS OXYGEN PRESSURES OF THE ENVIRONMENT [PROBLEME DER SAUERSTOFFVERSORGUNG BEI VERSCHIEDENEN SAUERSTOFFDRUCKEN DER UMGEBUNG]
D. W. Luebbers *In* Arbeitsgruppe Biophys. Raumforsch. Extraterrest. Biophys. and Biol. [1966] p 95–104 refs (See N67-24424 12-04)

Energy production by mitochondria depends on their phosphorization potential; decreased oxygen pressure and lower breathing rates reduce the blood supply to the mitochondria and thus the capillary diffusion pressure. The effective critical oxygen pressure in organs is related to its specific capillary structure, the breathing volume, and the concentration of breathing ferments. Capillary structures and corresponding dimensional distribution of energy conversion and atom chain concentration represent together a particular optimization. Transl. by G.G.

N67-24438# Phillipps-Universitat, Marburg (West Germany). Institut fuer Arbeitsphysiologie.
CROSSED ADAPTABILITY BETWEEN BODILY TRAINING AND HIGH TOLERANCE [GEKREUZTE ANPASSUNG ZWISCHEN KOERPERLICHEM TRAINING UND HOEHENTOLERANZ]

E. Voigt *In* Arbeitsgruppe Biophys. Raumforsch. Extraterrest. Biophys. and Biol. [1966] p 105–106 (See N67-24424 12-04)

Blood chemical reactions of training athletes, exposed to an oxygen deficient atmosphere of 6900 m, gave the following results: plasma corticoid levels increased markedly during stress, in highly trained persons even more than in untrained subjects. Return to normal level started shortly after a resting position was assumed, but the normal unstressed corticoid level was always higher in trained subjects than in normal, untrained subjects. Transl. by G.G.

N67-24439# Max-Planck-Institut fur Biophysik, Frankfurt am Main (West Germany).

CHEMICAL EVOLUTION AND ORIGIN OF LIFE [CHEMISCHE EVOLUTION UND URSPRUNG DES LEBENS]

Klaus Dose *In* Arbeitsgruppe Biophys. Raumforsch. Extraterrest. Biophys. and Biol. [1966] p 109–117 refs (See N67-24424 12-04)

Biological evolution and the development of an atmosphere on earth are analyzed by projecting cosmic-chemical and biological-chemical reactions. Possible energy sources for a chemical evolution 4.5×10^9 years ago constitute ultraviolet radiation effects below 4000 Å, ionizing radiation of the earth mantle, electrical discharge, and vulcanic thermodynamic processes. Laboratory experiments demonstrate the chemical evolution of amino acids and other biological derivatives of aliphatic carbon hydrates directly from primitive atmospheres. Reported also are syntheses of polynucleoids from nucleoids in the presence of metaphosphates; fractionation of high polymers obtained from vulcanic lava gave some slightly enzymatic products. Transl. by G.G.

N67-24440# Phillipps-Universitat, Marburg (West Germany). Institut fuer Kernchemie.

CHEMICAL ANALYSIS OF PLANET SURFACES THROUGH LAND ROCKETS—THEIR MEANING FOR THE SEARCH FOR EXTRATERRESTRIAL LIFE [CHEMISCHE ANALYSE VON PLANETENOBERFLAECHEN DURCH LANDSONDEN—IHRE BEDEUTUNG FUER DIE ERFORSCHUNG EXTRATERRESTRISCHEN LEGENS]

Diether Schmidt *In* Arbeitsgruppe Biophys. Raumforsch. Extraterrest. Biophys. and Biol. [1966] p 119–123 (See N67-24424 12-04)

This survey contains the most important analytical methods to obtain chemical data on planetary surfaces by unmanned sounding and landing probes. Depicted chemical analyses for exobiological important organic substances include gas chromatographic methods and differential thermoanalysis. Proposed analytical methods are shown in table form in order of increased complexity with regard to exobiological factors. Transl. by G.G.

N67-24442# Arbeitsgruppe Biophysikalische Raumforschung, Frankfurt am Main (West Germany).

POSING THE PROBLEM OF BIOPHYSICAL SIMULATION CHAMBERS [PROBLEMSTELLUNGEN FUER BIOPHYSIKALISCHE SIMULATIONSKAMMERN]

Horst Buecker *In its* Extraterrest. Biophys. and Biol. [1966] p 129–133 refs (See N67-24424 12-11)

Ultrahigh vacuum chambers were utilized to simulate space factors for exobiological research. Experimental results with fungus spores established their high resistance; a 10 to 30% damage effect in germination did not increase after the first 5 minutes of exposure to 10^{-6} Torr. Various bacteria that form spores were not adversely affected by the high vacuum but their life lengths increased in contrast with controls. Other bacteria showed a 30% decrease in life expectancy. Fungus spores and myzetes were also not affected by the high vacuum. Transl. by G.G.

N67-24444# Leybolds (E.) Nachfolger, Cologne (West Germany).

ERECTION OF APPARATUS WITH THE BIOLOGICAL OBJECT OF SETTING UP THE CONDITIONS OF SPACE [AUFBAU VON APPARATUREN, IN DENEN BIOLOGISCHE OBJEKTE DEN BEDINGUNGEN DES WELTRAUMS AUSGESETZT WERDEN KOENNEN]

J. Moll *In* Arbeitsgruppe Biophys. Raumforsch. Extraterrest. Biophys. and Biol. [1966] p 141–143 (See N67-24424 12-11)

Investigation of biological objects under simulated space conditions requires definition of the following parameters: (1) time history of the degassing process in the vacuum chamber and possible termination at desired pressure; (2) determination and control of gaseous combination and vapor in the vacuum; (3) temperature determination of specimens during experiments; (4) measurements of characteristic parameters during the evacuation process; (5) instrumentation for possible exchange of samples in the chamber; (6) sample observation and radiation effects; and 7) a partial pressure analysis in the vicinity of samples. Transl. by G.G.

N67-24450*# National Aeronautics and Space Administration, Washington, D. C.

INTOXICATION BY HIGH OXYGEN PRESSURES [DE L'INTOXICATION PAR LES HAUTES PRESSIONS D'OXYGENE]

C. Hederer and L. Andre Feb. 1967 16 p ref Transl. into ENGLISH from Bull. Acad. Natl. Med. (Paris), v. 123, 1940 p 294–308

(NASA-TT-F-10758) CFSTI: HC $3.00/MF $0.65 CSCL 06S

The intoxication by oxygen at high pressure, specifically with respect to the physiopathological problems in submarine operation and deep-sea diving, was investigated on rabbits in a caisson at oxygen pressures ranging from normal to 6 atm abs. The poisoning, representing an association of clonic and tonic convulsions, is a reversible phenomenon which largely obeys the law of mass action. Younger experimental animals showed greater resistance than older subjects; fasting has a protective function by increasing the resistance of the individual; an organism sensitized by a first attack was more vulnerable to repeated oxygen exposure; carbon dioxide present in small amounts in the oxygen always led to morbid accidents; barbiturates, by exerting an antagonistic action, retarded, attenuated, and even prevented convulsions but not the fatal outcome. Author

N67-24479*# Little (Arthur D.), Inc., Cambridge, Mass.

A PROGRAM OF RESEARCH DIRECTED TOWARD THE EFFICIENT AND ACCURATE MACHINE RECOGNITION OF HUMAN SPEECH Final Report

Huseyin Yilmaz 14 Dec. 1966 69 p refs

(Contract NAS12-129)

(NASA-CR-80020; C-68366) CFSTI: HC $3.00/MF $0.65 CSCL 06H

A theory of speech perception is presented which falls within a more general approach to the problem of perception. This approach is evolutionary in its philosophy and statistical in its methods. It considers the physical properties of the stimulus energy and its statistical distributions in the environment, and the needs of the organism in terms of individual and social survival. Given suitable neural material and biochemical processes, and enough time for evolutionary forces to assert themselves, the perceptual devices evolve toward a functional optimum. A theory of vowel perception is given which is sufficiently specific to provide the parameters and their numerical values for constructing a device to test the validity and to demonstrate the practical usefulness of the approach. The construction and performance of the device are described along with suggestions for its improvement. Experiments performed on the device are presented. They were suggested by the evolutionary theory and their outcomes agree with those

predicted by the theory. Other existing approaches are discussed and compared with the evolutionary approach to perception theory.
R.N.A.

N67-24487# Library of Congress, Washington, D. C. Aerospace Technology Div.
CBE FACTORS Monthly Survey No. 13
1967 223 p refs
(ATD-67-4; TT-67-61113; AD-647668) CFSTI: HC $3.00/MF $0.65

The monthly survey is based on Communist World open sources. It is the thirteenth in a series of monthly surveys covering the following areas: I. Chemical factors (pesticides, herbicides, fertilizers, psychotomimetics, other chemicals); II. Biological factors (pathogens); III. Environmental factors (aerosols, ecology, micrometeorology, soil science). Author (TAB)

N67-24566# Battelle-Northwest, Richland, Wash.
NEUTRON DOSIMETRY USING THE FISSION FRAGMENT DAMAGE PRINCIPLE
W. V. Baumgartner and L. W. Brackenbush Dec. 1966 15 p refs
(Contract AT(45-1)-1830)
(BNWL-332) CFSTI: HC $3.00/MF $0.65

Data are given on the developments to incorporate the fission fragment damage principle into a personnel neutron dosimeter. Plastic, glass, and minerals used in conjunction with fissionable materials (^{235}U and ^{237}Np) provide the basis for a full energy spectrum neutron dosimeter. Prototype dosimeter results show marked improvement in dose response when compared to nuclear track emulsions neutron dosimeters. The fission fragment neutron dosimeters permitted dose evaluation in several neutron energy groups in mixed gamma and neutron radiation fields. Theoretical and experimental studies indicate that fast neutron doses as low as 150 mrem and thermal neutron doses of 1 mrem can be measured.
NSA

N67-24572# Rocky Flats Div., Dow Chemical Co., Golden, Colo.
ROCKY FLATS RESPIRATOR-FITTING PROGRAM
S. E. Hammond and J. E. Hill 28 Nov. 1966 5 p refs
(Contract AT(29-1)-1106)
(RFP-810) CFSTI: HC $3.00/MF $0.65

The experience is reviewed of fitting, in the field, over 2000 workers with several different types of half-mask respirators used for protection from toxic materials. Procedures, numbers receiving a satisfactory fit, and areas of possible respirator improvement are discussed. Author (NSA)

N67-24582 Deutsche Versuchsanstalt fur Luft- und Raumfahrt, Bad Godesberg (West Germany).
FUNCTIONAL TESTS OF THE KIDNEYS UNDER HIGH PRESSURE [NIERENFUNKTIONSPROBEN IM UBERDRUCK]
H.-H. Knapp Jan. 1967 41 p refs In GERMAN; ENGLISH summary
(DLR-FB-67-01)

Six male subjects were exposed to Clearance experiments under normal as well as under high pressure. The high-pressure tests were performed in a pressure chamber of a volume of 9 m^3. The subjects were younger people with an average age of 24 years. The tests should clear the question whether modifications of renal function may arise during an exposure of 2–3 hours to high pressure. The tests were restricted on the PAH-Inulin-Clearance and the Phenolred-test. During the increase of the glomerulum filtration-rate a significant reduction of the blood circulation of the kidneys was found. In four cases a reduction of the tubular excretion ability was found. Author

N67-24587 Royal Aircraft Establishment, Farnborough (England).
AIRCREW PROTECTION IN HIGH TEMPERATURE SURROUNDINGS [PROTECTION DE L'AVIATEUR CONTRE LES AMBIANCES THERMIQUES ELEVEES]
J. Colin and V. Houdas Dec. 1966 30 p refs Transl. into ENGLISH from Rev. Corps Sante, v. 6, n. 5, 1965 p 589–611
(RAE-LIB-TRANS-1205)

The four basic mechanisms in heat transfer between man and his environment, namely convection, radiation, evaporation, and conduction are analyzed. The use of ventilated suits to provide protection against extreme ambient temperatures is discussed and two designs described. A technique for measuring the effectiveness of air ventilated suits is propounded, involving calculation of the total heat lost or gained by the subject from a knowledge of body weight, average specific heat and average temperature, the last being derived from measurement of surface and deep body temperatures. Experimental results are given for a particular suit, and a nomogram provided to enable suit air flows to be calculated for various ambient temperatures. Author

N67-24589 Royal Aircraft Establishment, Farnborough (England). Inst. of Aviation Medicine
MEASUREMENT OF REGIONAL PULMONARY BLOOD VOLUME USING 125 I-POLYVINYLPYRROLIDONE
D. H. Glaister London, Flying Personnel Res. Comm., Jul. 1965 23 p refs
(FPRC/1241) CFSTI: HC $3.00/MF $0.65

Existing methods for the measurement of the quantity of blood in the lungs are discussed and their results compared. Most measure varying fractions of the central blood volume in addition to blood within the lung parenchyma. A new technique is described which allows not only the specific determination of lung blood content but also measurement of its distribution within the lung, and of the time course of any changes which take place. The circulating blood is labelled with iodine-125 tagged polyvinylpyrrolidone and the distribution of radioactivity in the lung fields is determined by external scintillation counting. The counters are calibrated using a specially developed lung phantom to give blood content in terms of μl/gm of lung tissue. The technique is evaluated by studying the effects of posture, passive alteration from supine to sitting causing a reduction in total lung blood content of 54 percent, the decrease being more marked in the upper lung than in the lower lung. These changes were completed within 15 sec of the alteration in posture. The effect of a Valsalva maneuver on regional lung blood content is also described. Author

N67-24597# Toronto Univ. (Ontario). Inst. for Aerospace Studies.
THE TRAINING OF SUBJECTS FOR UTIAS RESEARCH ON DYNAMICS OF HUMAN PILOTS
Rae R. Simpson Mar. 1967 55 p refs
(UTIAS-TN-106) CFSTI: HC $3.00/MF $0.65

The facility and the techniques used for the initial training of subjects for current research on human pilot dynamics are described. The data on the progress of training are presented and analyzed for each subject, and criteria are introduced for evaluation of the degree of proficiency of the subject. Initial steps to refine the system for future work are also described. Author

N67-24650# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SENSORY COGNITION
F. I. Georgiyev, V. I. Dubovskoy et al 31 Oct. 1966 259 p refs Transl. into ENGLISH of the book "Chuvstvennoye Poznaniye" Moscow, Izd. Mosk. Univ., 1965 p 1–237
(FTD-HT-66-431; TT-67-60991; AD-646929) CFSTI: HC $3.00/MF $0.65

Gnosiological analysis was made of the basic forms of sensory cognition-sensation, perception, and ideation. One of the central topics is the problem of adequacy of sensory cognition, particularly sensations and perceptions. Sensations, perceptions, and ideas are considered to be subjective images of reality and not symbols. The character of images produced by sensory cognition is affected by conditions under which the object reflected exists, the structure and activity of the individuals sense organs, etc. The relationship of images, symbols, and signals is discussed and the relationship of images and models is elucidated. Author (TAB)

N67-24655# RAND Corp., Santa Monica, Calif.
RATED ASSOCIATION VALUES OF 251 COLORS
Samuel W. Cochran Jan. 1967 14 p refs
(P-3511; AD-647433) CFSTI: HC$3.00/MF$0.65

Color has been used as a variable in learning experiments (e.g., Weiss and Margolius, 1954, and Hill and Wickens, 1962); however, a direct calibration of the association value of colors has not been made. In an effort to supply this information, this paper reports the rated association values of 251 centroid colors. The study indicates that colors do differ in association value; therefore, it is suggested that the association value of colors should be considered when color is a variable in learning experiments. Author (TAB)

N67-24659# North Carolina Univ., Chapel Hill. Dept. of Physiology.
HYPOTHERMIA AND BLOOD FLOW THROUGH SKELETAL MUSCLE, SEPTEMBER 1, 1958–AUGUST 31, 1965
Lloyd R. Yonce 31 Aug. 1966 53 p refs
(Contract DA-49-007-MD-1002)
(AD-647495) CFSTI: HC$3.00/MF$0.65

The effect of hypothermia on the circulation of skeletal muscle was studied. All experiments utilized the gracilis muscle of the dog. The rate of production of hypothermia determines the vascular response, a fast rate (> 1C/min) causing vasodilatation and a slow rate (< 1C/min) causing vasoconstriction. The oxygen uptake is decreased by temperature but is independent of the rate of production of hypothermia. The vascular response is well correlated with the pO2 of the venous blood (determined from the oxygen dissociation curve) whether the temperature is lowered rapidly or slowly. This suggests either a direct or indirect relationship between aerobic metabolism and vasomotor activity. The reactivity of the blood vessel, as indicated by reactive hyperemia, decreased during hypothermia but the rate of recovery of reactive hyperemia is independent of the temperature change and dependent on the rate of temperature change. This means that the time for recovery from reactive hyperemia is determined by the effect of hypothermia on the control blood flow. Author (TAB)

N67-24667# India. Dept. of Atomic Energy, Bombay. Biology Div.
STUDIES ON PRIMARY RADIATION DAMAGE AND MECHANISM OF RADIOSENSITIVITY Progress Report, Apr. 1–Dec. 31, 1965
31 Dec. 1965 15 p
(Contract IAEA-187/RB)
(NP-16209; PR-5) CFSTI: HC$3.00/MF$0.65

Studies are reported on: the effects of glycerol on free radical reactions in irradiated trypsin, and reactions of OH radicals with nucleic acid bases and some amino acids and proteins; and the dose response in adenine, thymine, and uracil and also in the equimolecular complexes of adenine-thymine and adenine-uracil. Tryspin was freeze-dried from aqueous solution that contained 15% glycerol by weight of the protein present. After irradiation and observation at 77°K, the ESR spectrum showed an asymmetrical line and no radicals due to glycerol were obtained. At room temperature Ch_2S radicals and doublet signal were found to grow as usual. Experiments have indicated that the free radical yield of the adenine-thymine complex is less than the sum of the yields of the two constituents on an equimolecular basis while that of the adenine-uracil complex is more beyond a certain dose. NSA

N67-24702# Naval Air Engineering Center, Philadelphia, Pa.
AN ENVIRONMENTAL WHOLE-BODY PLETHYSMOGRAPH
E. Hendler, D. W. Dery, J. B. Kearney, and S. Greco 13 Jan. 1967 5 p
(NAEC-ACEL-545; AD-646721) CFSTI: HC$3.00/MF$0.65

A device is described which functions both as a whole-body plethysmograph and as an environmental chamber, in which human subjects can be confined for prolonged periods. This device has been used to make pulmonary function measures while subjects have been exposed over 12 hour periods to air and 100 per cent oxygen, both at sea level and at altitude. Author (TAB)

N67-24712# Eye Research Foundation of Bethesda, Md.
THE EFFECT OF WAVELENGTH ON VISUAL ACUITY Final Report, Oct. 1, 1965–Sep. 31, 1966
Carl Richard Cavonius Jan. 1967 22 p refs
(Contract DA-49-193-MD-2839)
(ERF-RR-1/67-Cr; AD-646575) CFSTI: HC$3.00/MF$0.65

Visual acuity was measured in monochromatic light at wavelengths between 440 and 660 nm. The test objects were gratings which filled a 1.5 degree circular field centered in a 30 degree neutral surround. Luminance contrast between adjacent bars was adjustable, and acuity thresholds were determined for different contrasts. It was found that acuity depends primarily on luminance contrast and only slightly on wavelength, so that the same luminance contrast yields similar acuity thresholds at all wavelengths provided that the test objects are equated in luminance. It is suggested that the dominant wavelength of a visual display system (such as a cathode ray screen) is relatively unimportant in the perception of fine detail. Instead, criteria such as grain size and available luminance are more important. Author (TAB)

N67-24714# American Inst. for Research, Washington, D. C.
GOALS AND INTENTIONS AS DETERMINANTS OF PERFORMANCE LEVEL, TASK CHOICE AND ATTITUDES Final Report, Feb. 1, 1965–Jan. 31, 1967
Edwin A. Locke and Judith F. Bryan Jan. 1967 100 p refs
(Contract Nonr-4792(00))
(AIR-E-51-1/67-FR; AD-646392) CFSTI: HC$3.00/MF$0.65

Twenty laboratory experiments and 2 field studies were carried out to explore the relationship of goals and intentions to level of performance on tasks, task choice, and liking for, and interest in the task. The results indicated that: (1) hard goals led to a higher level of performance than easy goals and to a higher performance level than a goal of, do your best,; (2) incentives such as knowledge of score, money, and time limits did not affect performance level independently of S's goals; (3) there was a significant relationship between behavioral intentions and choice behavior and there was no effect of monetary incentives on choice independently of S's behavioral intentions; (4) overall task liking and satisfaction with performance were positive, linear functions of the number of successes achieved on the task; further, the amount of satisfaction attained from a given success was greater when: S had expended the most effort to achieve it; when S succeeded in less time than usual; and when success followed other successes rather than a series of failures; (5) specific hard goals produced more task interest than a goal of, do your best, (this difference was enhanced if the experiment lasted more than 2 hours); (6) there was no relationship between task liking or interest and

performance or performance improvement; both liking and performance were determined by the nature and difficulty of the individuals goal, rather than by each other. Author (TAB)

N67-24721# Imperial Coll. of Science and Technology, London (England). Dept. of Electrical Engineering.
NEURONAL NETS
Jack D. Cowan Jul. 1966 72 p refs
(Contract N62558-4256)
(AD-646624) CFSTI: HC $3.00/MF $0.65

Contents: The Neuron; Neuronal Nets: the electroencephalogram; electrocorticograms and evoked responses; microelectrode recordings and slow potentials; functional aspects of nets. TAB

N67-24724# Antioch Coll., Yellow Springs, Ohio. Behavior Research Lab.
HUMAN FACTORS IN THE DESIGN OF ELECTROLUMINESCENT DISPLAYS FOR AEROSPACE EQUIPMENT Final Report, 1 May 1965–1 May 1966
Herbert H. Stenson Wright-Patterson AFB, Ohio, Aerospace Med. Res. Labs., Sep. 1966 38 p refs
(Contract AF 33(615)-1086)
(AMRL-TR-66-130; AD-646459) CFSTI: HC $3.00/MF $0.65

The report presents an outline of a broad program of psychological research that will provide human engineering standards for the design of electroluminescent (EL) display devices. The physical characteristics of EL lighting are discussed, after which the possible types of EL displays are categorized as discrete or continuous displays, and as dynamic or static displays. Five types of perceptual tasks that might be required of an observer of an EL display are described, and each display category is then discussed in terms of the perceptual task(s) required to monitor the display in question. For each display-task combination, human factor research is proposed and some experiments are laid out in detail. The conventional variables such as intensity, contrast and viewing duration are considered for each display-task category as well as some less familiar variables based on the use of information theory. Examples of existing and proposed EL displays are given in connection with the proposed research. TAB

N67-24725# Army Medical Research and Nutrition Lab., Denver, Colo. Fitzsimons General Hospital.
RESPIRATORY FUNCTION IN NORMAL YOUNG ADULTS AT 3475 AND 4300 METERS, OCTOBER 1964–FEBRUARY 1965
C. Frank Consolazio, Herman L. Johnson, LeRoy O. Matoush, Richard A. Nelson, Gerhard J. Isaac et al 5 Jan. 1967 32 p refs
(USAMRNL-300; AD-646461) CFSTI: HC $3.00/MF $0.65

The respiratory function of two groups of normal, young adults were studied at altitudes of 3475 and 4300 meters for 21 and 28 days, respectively. In the 4300 meter study, physical conditioning in one-half of the subjects proved to be beneficial since it resulted in an additional increase in Maximal breathing capacity (MBC) during high altitude exposure. This suggests that physical conditioning may be a factor in assessing a superior physical condition at altitude. Maximal breath holding times, at altitude, were also significantly increased with physical conditioning. For the combined groups, the MBC were all significantly increased at high altitude, which was not apparent in the sea level group. This may have been due to the decreased work of breathing the rarefied air at altitude. Maximal breath holding times were significantly decreased for all groups during high altitude exposure, and forced vital capacities (FVCs) in general were decreased at altitude. The sea level controls showed no changes in MBC, FVC, and maximal breath holding time during the entire study. Author (TAB)

N67-24728# Massachusetts Univ., Amherst.
FACTORS AFFECTING INFORMATION PROCESSING IN SHORT-TERM MEMORY
Stanley M. Moss, Joseph F. Hearns, and John B. Soward Dec. 1966 75 p refs
(Contract Nonr-3357(06))
(Rept.-2; AD-646373) CFSTI: HC $3.00/MF $0.65

Three experiments were conducted to investigate several of the variables that affect information processing in short-term memory as reflected by the strategies used by Ss in a visual search task. The first study investigated differences in strategy as a function of method of payoff. The second study was concerned with changes in strategy when Ss shifted from one incentive ratio to another. The third study was concerned with differences in strategy when Ss were confronted with different work loads. Two general conclusions have emerged from these investigations. First, Ss strategy for optimal information processing in this task is determined by his method of payoff and his work load (Study 1 and Study 2). Second, the degree to which a strategy can be successfully implemented is limited by the interference effects of differential target value and value ratio (Study 1 and Study 2). Author (TAB)

N67-24731# Naval Medical Research Inst., Bethesda, Md.
THE RELATIONSHIP OF SCUBA DIVING TO THE DEVELOPMENT OF AVIATORS' DECOMPRESSION SICKNESS Research Report
Donald E. Furry, Elizabeth Reeves, and Ed Beckman Dec. 1966 17 p refs
(MF-011-99-1001; Rept.-5; AD-646494) CFSTI: HC $3.00/MF $0.65

The additional decrease in ambient pressure which occurs when a compressed air diver flies in an aircraft within a short time after diving may be sufficient to precipitate decompression sickness, even though the dive itself was in accordance with the U. S. Navy decompression tables. The current practice by both military and civilian divers of using air transportation after compressed air diving suggests the need for specific instructions regarding the decompression required before flying after diving. In order to quantitate the importance of this problem, an experiment was designed in which large dogs were exposed to compressed air for 7 hours at their no-bends pressure threshold as determined after the method of Reeves and Beckman. After pressurization, the animals were decompressed within 2–3 minutes to sea level. A sea level decompression interval of 1, 3, 6, or 12 hours was given prior to further decompression to a simulated altitude of 10,000 feet. The incidence of decompression sickness at altitude was 92.9% for the 1 hour surface decompression interval, 30% for the 3 hour interval, 27.8% for the 6 hour interval and 0% for the 12 hour interval. From these large animal studies it may be postulated that a surface decompression interval of at least 12 hours should be allowed before flying after compressed air diving of a depth and duration to require the use of diving tables. TAB

N67-24740# Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, Ohio.
APERTURE SIZES AND DEPTHS OF REACH FOR ONE- AND TWO-HANDED TASKS Final Report, Jun. 1962–Nov. 1965
Kenneth W. Kennedy and Byron E. Filler Oct. 1966 42 p refs
(AMRL-TR-66-27; AD-646716) CFSTI: HC $3.00/MF $0.65

The report presents data on (1) the optimal sizes and locations of maintenance apertures, and (2) mans working-reach distances through such apertures, for both the shirt-sleeved and the pressure-suited conditions. In all cases, the vertical dimension of the aperture permits the technician to maintain simultaneous visual and manual contact with the task area. Data include Depth of Reach, Breadth of Aperture, Vertical Dimension of Aperture, and distances to the floor from both the lower and the upper edges of

these apertures. Different apertures provide for forward or lateral reaches, in the standing or seated position, with one or both arms. Data are reported in the 5th, 25th, 50th, 75th and 95th percentiles. Ranges, Means and Standard Deviations are given. Recommendations are made regarding the appropriate application of maintenance accesses. Author (TAB)

N67-24748# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
OXYGEN DEFICIENCY AND AGE
A. Z. Kolchinskaya 23 May 1966 348 p refs Transl. into ENGLISH of the book "Nedostatok Kisloroda i Vozrast" Kiev, Izd. Naukova Dumka, 1964 p 1–336
(FTD-MT-65-222; AD-646963) CFSTI: HC$3.00/MF$0.65

The monograph is dedicated to questions of the action of deficiency of oxygen in inhaled air on the human organism in various stages of its growth. It described age-connected peculiarities of changes of higher nervous activity, external breathing, blood circulation, level of saturation of arterial blood with oxygen, and consumption of oxygen in an atmosphere with a lowered partial pressure of oxygen during inhalation of mixtures poor in oxygen, during rarefaction of air in a pressure chamber, in alpine conditions. Author (TAB)

N67-24757# Stanford Univ., Calif. Graduate School of Business.
PERCEPTION OF LEADERSHIP IN SMALL GROUPS Final Report
Thomas W. Harrell Jan. 1967 18 p refs
(Contract Nonr-225(62))
(AD-646769) CFSTI: HC$3.00/MF$0.65

Three hundred thirty-four men were studied in four and five man discussion groups. Some groups met for four sessions. An outside observer counted the number of times each man talked. Discussion group members rated the others and themselves on Participation, Best Ideas, Guidance, and Leadership. Discussion group members rated the others only on Being Liked. Subjects took a nine instrument personality test battery. At the end of the course subjects plus other class members rated each other on their positive and negative choices for Boss, Emotional Maturity, and Friend and Associate. There were no clear cut role differentiation at the end of four sessions. Peer ratings for positive and negative boss correlated significantly with current grade point average but not very much with test scores. There were some significant differences between the extreme performers in the small discussion groups on their peer ratings. There were a few significant personality test differences between the extreme performers in the small discussion groups. Author (TAB)

N67-24764# Cincinnati Univ., Ohio. Coll. of Medicine.
METABOLIC CHANGES IN HUMANS FOLLOWING TOTAL-BODY IRRADIATION Summary Report, Feb. 1960–Apr. 30, 1966
Eugene L. Saenger, Ben I. Friedman, James G. Kereiakes, and Harold Perry 30 Apr. 1966 174 p refs
(Contract DA-49-146-XAZ-315)
(DASA-1844; AD-646667) CFSTI: HC$3.00/MF$0.65

This report summarizes the data accumulated from fifty patients who have been given total or partial body irradiation at the University of Cincinnati Medical Center from February 1960 through April 1966. Psychological, hematological, metabolic, immunological and chromosomal findings are statistically analyzed and some implications concerning reduction in combat effectiveness of military personnel exposed to ionizing radiation are drawn. TAB

N67-24777# York Univ., Toronto (Ontario). Molecular Psychobiology Lab.
MOLECULAR NEUROCHEMISTRY OF THE HIPPOCAMPUS AND OTHER BRAIN SITES DURING CONDITIONED AVOIDANCE BEHAVIOR
John Gaito, James H. Davison, James Mottin, and Joanne Rigler 5 Jan. 1967 21 p refs
(Contract Nonr-4935(00); Grant NRC APB-110)
(MPL-8; AD-646701) CFSTI: HC$3.00/MF$0.65

Two experiments were conducted to evaluate neurochemical changes in the ventral hippocampus of rats in a one way active avoidance conditioning task. The dependent variables were amounts of RNA, DNA, and proteins; ratios of these three; the specific activity of protein and tissue pool fractions; and the relative specific activity of the protein fraction. In these experiments a lower shock level was used than in previous experiments. The learning animals showed a tendency to greater specific activity of TCA and protein fractions and to a greater relative specific activity of the protein fraction in brain tissue than did non-learning animals. The results concerning individual brain tissues suggested that the medial ventral cortex, and possibly the posterior ventral cortex, may be involved in this type of learning. No significant differences were found in the ventral hippocampus. Author (TAB)

N67-24778# RCA Service Co., Inc., Camden, N. J.
DEVELOPMENT AND EXPERIMENTAL EVALUATION OF AN AUTOMATED MULTI-MEDIA COURSE ON TRANSISTORS Final Report, Apr. 1965–Jun. 1966
J. H. Whitted, Jr., Edward E. Weaver, and John P. Foley, Jr. Wright-Patterson AFB, Ohio, AMRL, Sep. 1966 114 p refs
(Contract AF 33(615)-2880)
(AMRL-TR-66-142; AD-646671) CFSTI: HC$3.00/MF$0.65

A completely automated multi-media self-study program for teaching a portion of electronic solid-state fundamentals was developed. The subject matter areas included were fundamental theory of transistors, transistor amplifier fundamentals, and simple mathematical analysis of transistors including equivalent circuits, parameters, and characteristic curves. The media included a tape slide audio-visual presentations, a programmed text, a cued text, a sound movie, a workbook, and a RCA transistor trainer. A controlled experiment was conducted, comparing the effectiveness of the self-sufficient multi-media materials, with a conventional instructor/classroom presentation and existing self-study materials from Air Force Extension Course Institute. Even though the instructor/classroom subjects received somewhat higher ratio gain scores, on the average, than the multi-media subjects, this difference was not significant. Both of these modes were superior in effectiveness to the extension course materials. The principal measures of this effectiveness were a pre-test and a post-test made up of multiple choice items concerning the solid state theory covered. Author (TAB)

N67-24802# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE TESTERS
D. Pipko 12 Dec. 1966 30 p Transl. into ENGLISH from Nauka i Zhizn (Moscow), no. 4, 1966 p 42–52
(FTD-HT-66-352; TT-67-61120; AD-647712) CFSTI: HC $3.00/MF$0.65

The article gives a brief description of the history of aviation and ground experiments which led up to the first space flight by Yury Gagarin. Many medical and psychological experiments are narrated, such as normality, euphoria, and hypodynamia in space flight and the correction thereof. Equipment tests are reviewed. Author (TAB)

N67-24810# School of Aerospace Medicine, Brooks AFB, Tex.
THE EFFECT OF CHEMICALLY INERT GASES ON OXYGEN CONSUMPTION IN LIVING TISSUES Interim Report, Jan.–Dec. 1965
Domenic A. Maio and J. Ryan Neville Dec. 1966 23 p refs
(SAM-TR-66-109; AD-647808) CFSTI: HC$3.00/MF$0.65

The effect of N2, He, and A at normal pressures (approx. 560 mm. Hg) on the oxygen consumption of yeast cells, rat liver slices, and rat liver homogenates was studied. By utilizing both polarographic and Warburg technics, comparisons were made between 20% 02 - 80% inert gas mixtures and 100% 02. A consistent but small depression of oxygen consumption of yeast in the presence of inert gases was noted with the dropping mercury electrode. No effect of changing oxygen tension was apparent except below the critical oxygen tension (4 or 5 mm. Hg). With the Warburg technic, oxygen consumption of liver slices in inert gas mixtures was found to decrease as much as 60% compared to pure oxygen controls. Small but apparently insignificant differences in this depressive effect were noted between the inert gases. Manipulation of both shaking rate and temperature indicated that physical diffusion of oxygen was not a limiting factor. The rate of oxygen consumption by rat liver slices was found to be a constant regardless of oxygen tension throughout the range studied. Homogenates of rat liver tissue failed to display this depression in the presence of inert gas, oxygen consumption being identical to that for pure oxygen controls. This would seem to indicate that the site of the depressant action may be in the cell membrane and that the inert gas may possibly act on a membrane mechanism for oxygen transport into the cell. Author (TAB)

N67-24817# Army Medical Research Lab., Fort Knox, Ky. Experimental Psychology Div.
EXPLORATORY STUDY OF THE EFFECT OF PULSE DURATION ON TEMPORARY THRESHOLD SHIFT PRODUCED BY IMPULSE NOISE Final Report
John L. Fletcher and Michel Loeb Jan. 1967 18 p refs
(Rept.-680; AD-647540) CFSTI: HC$3.00/MF$0.65

Human Ss were exposed to a series of impulses of variable duration. Pre- and post-exposure hearing was examined to determine the differential effect of pulse duration on temporary threshold shift. An apparently linear duration effect was observed. Author (TAB)

N67-24825# Human Engineering Labs., Aberdeen Proving Ground, Md.
AN ANALYTICAL METHODOLOGY FOR ESTIMATING CREW COMPOSITION OF A TWO-MAN ARMY AERIAL VEHICLE
Michael A. Famiglietti, Stephan Moreland, and Joseph H. Sullivan Jun. 1966 19 p
(TM-7-66; AD-646800) CFSTI: HC$3.00/MF$0.65

This report describes a method for making coarse quantitative estimates of crew composition for a two-man Army aerial vehicle. It assumes that crew composition depends predominantly on the tasks men are assigned to perform. For illustration the method is applied to an aerial-vehicle concept for high-speed, low-altitude surveillance and target acquisition. TAB

N67-24833# Federal Aviation Agency, Oklahoma City, Okla.
EXPOSURE OF MEN TO INTERMITTENT PHOTIC STIMULATION UNDER SIMULATOR IFR CONDITIONS
C. E. Melton, E. A. Higgins, J. T. Saldivar, and S. Marlene Wicks Oct. 1966 14 p refs
(FAA-AM-66-39; AD-646872) CFSTI: HC$3.00/MF$0.65

Ten men were subjected to intermittent photic stimulation in an airplane cockpit in an environmental chamber by (1) a Grimes red rotating beacon (1.5 FPS), (2) an Air Guard strobe light (1.0 FPS) and (3) propeller flicker (10 FPS). IFR conditions were simulated by passing steam into the cooled chamber. Electroencephalograms and electrooculograms were recorded for the 10 minute period prior to photic stimulation, during 10 minutes of photic stimulation, and for 10 minutes after stimulation. None of the lights provoked seizure, syncope, nystagmus or photic driving. The strobe light evoked complaints of irritation from 7 of the subjects and caused pacing of the alpha rhythm together with pulsating pupils. Three subjects became drowsy during the Grimes light, six became drowsy during propeller flicker, none complained of drowsiness during the strobe light. These sources of intermittent light appear to be innocuous to normal people. The commonest complaint was annoyance. Drowsiness was probably due to the environment and nature of the task. TAB

N67-24834# Federal Aviation Agency, Oklahoma City, Okla. Office of Aviation Medicine.
PHYSIOLOGICAL RESPONSES OF PILOTS TO SEVERE WEATHER FLYING
Jess M. McKensie and Vincent Fiorica Jul. 1966 15 p refs
(AM-66-41; AD-646871) CFSTI: HC$3.00/MF$0.65

Selected measurements of stress-related and other physiological variables were made on jet aircraft pilots participating in USWB-NSSL turbulent weather programs. Data were gathered from two categories of flying conditions: (1) storm penetration flights (Scimitar type aircraft) and (2) storm perimeter flights (Canberra type aircraft). Measurements made before and after each flight included urinary catecholamine levels, urinary electrolyte concentrations, urinary hemoglobin levels and body weight. Results indicate a direct relationship between catecholamine output during the penetration flights and the pilots evaluation of the turbulence encountered. Increased output of catecholamines also corresponded to unusual inflight experiences during storm penetrations. No relationship between catecholamine output and instrumentally measured turbulence was detected in the Canberra aircraft. The data indicate that turbulence effects on sympathoadrenal responses are related to the pilots evaluation of the turbulence. Stress responses to severe weather flying may be related to the pilots previous experience and other factors which affect his assessment of the storm. Author (TAB)

N67-24837# George Washington, Univ., Washington, D. C. Human Resources Research Office.
PURSUIT ROTOR PERFORMANCE: II. EFFECTS OF REINFORCING SUCCESSIVELY LONGER INTERVALS OF CONTINUOUS TRACKING OVER PRACTICE SESSIONS
Richard W. Sheldon and John F. Bjorklund Dec. 1966 16 p refs
(Contract DA-44-188-ARO-2)
(TR-66-22; AD-646799) CFSTI: HC$3.00/MF$0.65

The objective was to determine whether pursuit rotor performance would be facilitated, and the level of achievement sustained, with the use of the reinforcement technique of shaping. The procedure used in this study was progressively lengthening, from session to session, the continuous target contact required to obtain a reinforcement, keeping the duration requirement constant within each session. Two groups of four subjects each practiced under the experimental conditions for ten 15-trial sessions. Reinforcement was provided during Sessions 2-7. Half of the experimental subjects improved appreciably during the reinforced practice. When reinforcement was withdrawn, the differences between the mean performance levels of the experimental subjects and a control group of eight subjects, who practiced without any reinforcement, were negligible. TAB

N67-24841# Federation of American Societies for Experimental Biology, Washington, D. C. Life Sciences Research Office
A STUDY OF MILITARY IMPLICATIONS OF PROTECTIVE DEVICES DESIGNED TO PREVENT OR AMELIORATE HEAD AND NECK INJURIES

Sep. 1966 67 p
(Contract DA-49-092-ARO-70)
(AD-646841) CFSTI: HC $3.00/MF $0.65

The major crash survival variables affecting the design and testing of U.S. Army aircrewmen helmets are presented and discussed. Such factors as head acceleration limits, impact velocity, impact surfaces, impact sites, suspension and retention harnesses, helmet ventilation, impact test methods, and structural concepts are considered. An examination of all available data on the tolerance of the human head to deceleration was conducted. Consideration was given to an analysis of acceptable design limits. A parallel study of head injuries occurring in aircraft accidents was conducted to determine the significant injury areas of the head and correlate this to protection area and techniques. A cockpit survey was conducted to develop criteria for testing the helmet and liner materials. Consideration was given during the program to a preliminary investigation of helmet retention systems and head cooling techniques. A series of instrumented drop tests was conducted to investigate various helmet design concepts and materials. Double-shell and single-shell helmets of nearly equal weight were analyzed. The advantages and disadvantages of three different methods of helmet impact testing are discussed. Author (TAB)

N67-24851# Washington Univ., Seattle. Dept. of Atmospheric Sciences.
WATER TRANSFER THROUGH HUMAN SKIN Final Technical Report

Konrad J. K. Buettner, Evelyne Robbins, Jean Crichlow, Margarete Pitts, David Jones et al [1966] 7 p refs
(Contract Nonr-477(22))
(AD-646848) CFSTI: HC $3.00/MF $0.65

The main purpose of this study was the investigation of the transfer function of human skin. G. E. Folk, R. E. Peary and K. Buettner discovered independently the passage of water from weak salt solutions into the human foot. This statement proved true also for hands, arms, backs, soles of man and for the non-hairy part of rabbits ears. The transfer into the body can also be observed if air of more than 90% relative humidity, and of skin temperature covers the skin. Author (TAB)

N67-24856# North American Aviation, Inc., El Segundo, Calif. Life Sciences Operations.
MARSUPIAL BIOMODULE EVALUATION STUDY Final Report, 1 Nov. 1965–31 Oct. 1966

Peter R. Barker, Hyman C. Bergman, William H. Hunter, William H. Lawrence, Cecil W. Steers et al Feb. 1967 105 p refs
(Contract AF 41(609)-2984)
(SID-66-1647; AMD-TR-66-3; AD-647844) CFSTI: HC $3.00/MF $0.65

Experiments were conducted involving the maintenance of opossum Didelphys virginiana postpartum embryos in an artificial marsupium (laboratory biomodule) during the period that they normally remain attached to the maternal teats. Areas investigated were laboratory biomodule life-support cells simulating the pouch environment; diet formulation and analysis of opossum milk; development of artificial nipples and nutrient dispensing systems, histology studies of the embryo attachment to the maternal teat; methods of monitoring physiological parameters by nonattached sensors; and the feasibility of a field-sequential television camera system to produce color photographs of small animals, such as opossum embryos, of a quality that would assist in remotely monitoring their development. Several laboratory biomodule configurations and nutrient dispensing systems, in combination with many nutrient formulations and nipple assemblies, were used to maintain the embryos studied in this program in the biomodules. Their mean survival time was approximately 67 hours, and the longest survival time being approximately 19 days. Limited testing demonstrated the capability to monitor respiration rate and gross body motion with nonattached sensors. A television camera system produced good-quality color photographs of immature rats. A specification for a field-sequential television camera system, suitable for use in a spacecraft, was prepared. Author (TAB)

N67-24869# American Inst. of Biological Sciences, Washington, D. C.
INSTRUMENT CONCEPTS: DEVELOPING A MULTI-PARAMETER VASCULAR ACTIVITY METER

Carl A. Budde (Diginetics, Glendale, Calif.) 1 Aug. 1966 5 p refs
(Contracts NASr-132; Nonr-4526(04))
(AD-647290) CFSTI: HC $3.00/MF $0.65

A new multivariable measuring instrument is described which could make a substantial contribution to a practical tool in cardiovascular measurements. The Biomedical Electronics Division of Diginetics is approaching the stroke problem from a logical standpoint, that is: utilizing the eye as the physiological and anatomical window into the brain of which it is an extension. By monitoring or examining the blood vessels of the eye, especially the retina, one can gain information regarding the blood vessels and hemodynamic or circulatory parameters necessary in order to diagnose and treat insufficiency or obstruction of the cerebral blood supply. Author (TAB)

N67-24879# Army Medical Research Lab., Fort Knox, Ky.
CORRELATION OF PERFORMANCE IN DETECTING VISUAL AND AUDITORY SIGNALS Final Report

Walter J. Gunn and Michel Loeb 20 Jan. 1967 16 p refs
(AMRL-713; AD-647539) CFSTI: HC $3.00/MF $0.65

Two experiments were performed in which Os were to detect which pulses of noise or pulses of light were slightly more intense than others in a train. It was found in the first experiment that both sensitivity (d) and degree of conservatism in responding (beta) were correlated for the two tasks. The auditory task was more difficult than the visual under the chosen conditions. Higher betas were noted for Os first performing on the visual task. In the second experiment, the tasks were more closely equated in difficulty, and Os performed both the auditory and the visual task twice. The effect of order previously noted for beta was not obtained. Beta and d were again significantly correlated for the first session; for the second session significant correlations were obtained for d but not beta. The results suggest that not only are there response biases common to detection in different modalities but also common factors affecting sensitivity. Author (TAB)

N67-24890# Army Medical Research Lab., Fort Knox, Ky.
SOME STATISTICAL TREATMENTS COMPATIBLE WITH INDIVIDUAL ORGANISM METHODOLOGY Final Report

Samuel H. Revusky 21 Feb. 1967 49 p refs
(USAMRL-716; AD-646751) CFSTI: HC $3.00/MF $0.65

Consider experimental treatments with consequences so irreversible that baseline performance cannot be recovered. The conventional method of assessing the effects of such treatments by statistical means involves separate experimental and control groups. An alternative proposed here is to administer the experimental treatment to each subject, one subject at a time and in a random order; whenever any subject receives the experimental treatment, those subjects which have not yet received it receive a control treatment. This procedure permits results significant at the one-tailed .05 level to be obtained with four subjects; if a two-group procedure evaluated by means of the U test is used, a minimum of six subjects is needed for the same significance level. Author (TAB)

N67-24895# Parma Univ. (Italy). Inst. of Human Physiology.
PROCESSING OF SENSORY VISUAL INFORMATION Final Report, 1 Jan.–31 Dec. 1966
Arnaldo Arduini 31 Jan. 1967 46 p refs
(Grant AF-EOAR-66-26)
(AFOSR-67-0403; AD-647119) CFSTI: HC $3.00/MF $0.65

Microelectrode investigations in the central visual pathways under Nembutal anesthesia demonstrated that the type of tonic response to illumination depends on the level of the impulse firing rate during dark adaptation. Micro- and macroelectrode researches in the pretrigeminal preparations seem to substantiate these results and prompted an investigation of the possibility of modifying the level of discharge of the retina in darkness in a light-independent way. The results were positive. Microelectrode investigations on the pretectal region were performed with the purpose of describing the processing of visual information which is at the base of the sensory-motor integration in the pupil-motor structures. Author (TAB)

N67-24906# MSA Research Corp., Evans City, Pa.
SUPEROXIDE CONFIGURATIONS FOR ATMOSPHERE CONTROL SYSTEMS Final Report, Apr. 1965–Jun. 1966
M. J. McGoff Wright-Patterson AFB, Ohio, AMRL, Nov. 1966 78 p ref
(Contract AF 33(615)-2792)
(MSAR-66-144; AMRL-TR-66-167; AD-647135) CFSTI: HC $3.00/MF $0.65

Solid superoxide forms were studied to evolve optimized configuration designs for life support of one man on 2-, 4-, 8-, 24-, and 48-hour space missions. Suitable designs were developed to generate O2 for these missions, but CO2 control becomes progressively more difficult as mission time decreases. Optimization for short mission configurations were gained by dynamic flow designs, preheating inlet flow streams, and use of a catalyzing agent. The evolution of available O2 was as high as 85% for 4-hour mission configurations and as high as 98% for 24-hour missions. The superoxide configurations that were developed are in plate form as opposed to discs since the former have more efficient O2 generation and CO2 absorption characteristics. The configurations feature rippled superoxide plates, which, when packaged, achieve a 20% increase in bulk density over granules, and a lower pressure drop, thereby minimizing fan power. Heat generated by the superoxide reaction was utilized in the following manner: the inlet flow stream was preheated by refluxing a part of the outlet stream with it. Effects of humidity, reduced pressure, O2/N2 balance and densification of solid forms on the mass transfer behavior of the superoxide configurations are described. TAB

N67-24923*# Kentucky Univ., Lexington.
SENSIBLE HEAT TRANSFER IN THE GEMINI AND APOLLO PRESSURE SUITS
J. E. Funk, J. B. Moegling, R. M. Drake, Jr., J. F. Hall, Jr., F. K. Klemm et al Wright-Patterson AFB, Ohio, AMRL, Dec. 1966 94 p refs
(Contract AF 33(615)-3370)
(NASA-CR-83744; AMRL-TR-66-173; AD-647828) CFSTI: HC $3.00/MF $0.65 CSCL 06K

The results of an experimental program to determine sensible heat transfer effects in the Gemini and Apollo pressure suits are reported. A copper manikin maintained at a constant surface temperature was used and the overall average body surface heat flux and the regional heat flux distribution were measured. The environmental variables studied were ventilating air flowrate, velocity of the air moving over and around the outside surface of the suit, and prevailing pressure. In addition, the following determinations were made: the heat transfer coefficient between the manikin surface and the ventilating air, the overall thermal conductance between the ventilating air and the air moving over the outside surface of the suit, the thermal emissivity of the Gemini suit, and the convection coefficient between the outside surface of the Gemini suit and the air moving over the outside of the suit. These data may be used for heat balances, determination of temperatures, and evaluation of the insulation value of the suit and outside air. The insulation value for the air ambient to the Gemini suit was found to follow a relationship different from the empirical equation for a nude manikin. Author (TAB)

N67-24933# Columbia Univ., New York. Teachers Coll.
STRATEGIES OF INDUCING COOPERATION: AN EXPERIMENTAL STUDY
Morton Deutsch, Yakov Epstein, Donnah Canavan, and Peter Gumpert 10 Feb. 1967 31 p refs
(Contract Nonr-4294(00))
(TR-5; AD-647801) CFSTI: HC $3.00/MF $0.65

Ss played a two-person laboratory game in which they could act altruistically, individualistically, defensively, or aggressively. Ss did not interact with a real person, but 5 programmed strategies were employed to see which was most effective in eliciting cooperation from a non-cooperative S. The strategies were: Turn The Other Cheek - the program responded to a threat or an attack by an altruistic choice and with a cooperative choice otherwise; Nonpunitive - the program responded defensively rather than with counter-threats or counter attacks when the S threatened or attacked, and reciprocated the rest of the Ss behavior; Deterrent - the program responded with a threat to any noncooperative act of the S, counter attacked when the S attacked and responded cooperatively to any cooperative behavior from the S; two types of Reformed Sinner strategy - in both the program responded with threats and aggression for the first 15 trials of the game and then changed dramatically on the 16th trial by disarming. In one form of the Reformed Sinner the program followed the Turn The Other Cheek strategy, and in the other the program became Nonpunitive. Results are consistent with findings of other investigators. Ss behaved most competitively during the 15 trials of the Reformed Sinner condition when the program was threatening and aggressive; Ss tended to exploit in the Turn The Other Cheek condition; Ss behaved most cooperatively in the Nonpunitive condition. Author (TAB)

N67-24949# Naval Air Development Center, Johnsville, Pa.
FURTHER OBSERVATIONS ON CHRONIC DEFICITS OF TEMPERATURE REGULATION PRODUCED IN CATS BY PREOPTIC LESIONS
Russell D. Squires 16 Dec. 1966 52 p refs
(NADC-MR-6626; Rept.-34; AD-647357) CFSTI: HC $3.00/MF $0.65

Destruction (by electrolysis) of a small region extending at least 0.5 mm either side of the midsagittal plane of the preoptic region of the hypothalamus of cats led to sustained, significant decrease of mean daily colonic temperature as long as the animals were undisturbed at ambient temperatures of 19 to 27 C. Exposure of such animals to unfamiliar surroundings, handling, physical restraint, local cooling of the skin, or cold (0 to -5 C) ambient temperatures produced a rise in colinic temperature accompanied by palpable shivering, which was absent as long as the animals were undisturbed. When the same animals were subjected to high (40 C) ambient temperatures, their previously subnormal colonic temperatures rose to levels higher than those of unoperated control animals similarly exposed, while panting was observed in both. Lesions of the same general region which tended to spare the medial preoptic region were often associated with initial hyperthermia, which sometimes gave way to delayed hypothermia. An initial hypothermia following a bilateral medial preoptic lesion, however, never gave way to delayed hyperthermia. It is therefore suggested

that the initial hyperthermia could have been due to inflammatory irritation of the medial preoptic region, and that the subsequent hypothermia was the result of progression of the inflammatory process to the point of destruction of a critical amount of medial preoptic tissue. These findings indicate that the preoptic region of the cats hypothalamus contains structures sensitive to both heat and cold, therefore to changes in blood temperature in either direction. Author (TAB)

N67-24988# Lyon Univ. (France).

MONOAMINES AND SLEEP: POLYGRAPHIC, NEUROPHARMACOLOGICAL AND HISTOCHEMICAL STUDY OF SLEEP IN THE CAT [MONOAMINES ET SOMMEILS: ETUDE POLYGRAPHIQUE, NEUROPHARMACOLOGIQUE ET HISTOCHIMIQUE DES ESTATS DE SOMMEIL CHEZ LE CHAT]

Francois Delorme Dec. 1966 177 p refs In FRENCH
(Grant AF-EOAR-66-64)
(AFOSR-67-0511; AD-647397) CFSTI: HC$3.00/MF$0.65

The neurophysiological aspects of the sleep mechanism are reviewed. Electroencephalo-polygraphic tracings of a normal adult cat were analyzed for the state of wakefulness, and the influence of sleep-inhibiting drugs. The pharmacological and histological effects of the following agents on paradoxical sleep were considered: serotinin, reserpin, catecholamine, and monoamine oxydase. A table compares the action of various drugs administered during laboratory experimentation on the cat. An extensive bibliography is also included. Transl. by R.LI.

N67-24996# Illinois Univ., Urbana. Group Effectiveness Research Lab.

LEADERSHIP STYLE AND THE PERFORMANCE OF CO-ACTING GROUPS

Fred E. Fiedler Oct. 1966 28 p refs
(Contract Nonr-1834(36); ARPA Order 454)
(TR-44; AD-647212) CFSTI: HC$3.00/MF$0.65

This paper reviews several studies of co-acting groups, that is, groups in which members typically do not interact with one another in performing a common task. While relatively few data are available, they are quite consistent in showing that the task-oriented (low LPC) leader tends to perform better in situations which are relatively pleasant and free from anxiety while the relationship-oriented leader of co-acting groups tends to perform better in situations in which tension or anxiety is relatively high. These findings are discussed in terms of group member requirements for quasi-therapeutic interactions which typically provide little psychological group support for the individual member. TAB

N67-25000# Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.

TEMPERATURE CONTROL OF THE ORBITAL OTOLITH EXPERIMENT

Paul R. Schrantz May 1966 75 p refs
(Contract NOw-62-0604-c)
(APL-TG-815; AD-646921) CFSTI: HC$3.00/MF$0.65

This report presents a description of the temperature control system that has been developed for the Orbital Otolith Experiment. The experiment has been packaged in a cylindrical vessel which will be installed in one of the first manned Apollo vehicles. A water supply in which two frogs are submerged must be maintained at 65 plus or minus 5 F for approximately 100 hours in orbit. The thermal design approach has been to thermally isolate the capsule from the Service Module. The total heat load may reach 20 watts including a continuous internal load of 12 watts. An evaporative cooling system has been developed for use during the time that the water temperature exceeds a thermostat setting of 65 F. Passive thermal control is employed during conditions of low ambient temperatures as well as during the prelaunch phase, when the evaporative cooler is inoperative. The program has reached the completion of the Engineering Model phase. This report includes a summary of the thermal vacuum test program which was carried out to verify the adequacy of the temperature control system. The results have been implemented in the design of the flight prototype and flight models to be supplied to NASA in 1966. Author (TAB)

N67-25018*# National Aeronautics and Space Administration, Washington, D. C.

RESEARCH ON THE INITIAL FACTORS OF MORPHOGENESIS IN ANURAN AMPHIBIA. PART I: RESULTS OF THE SCHULTZE EXPERIMENT AND THEIR INTERPRETATION [RECHERCHES SUR LES FACTEURS INITIAUX DE LA MORPHOGENESE CHEZ LES AMPHIBIENS ANOURES. I. RESULTATS DE L'EXPERIENCE DE SCHULTZE ET LEUR INTERPRETATION]

J. Pasteels Mar. 1967 27 p refs Transl. into ENGLISH from Arch. de Biol. (Liege), v. 49, 1938 p 629–667
(NASA-TT-F-10793) CFSTI: HC$3.00/MF$0.65 CSCL 06C

With respect to the initiating factors of morphogenesis in tailless amphibians, the results of the Schultze experiments (compression and inversion of the ovum after or at the beginning of segmentation) are interpreted and modified, using the fertilized undivided ova of Rana fusca, Rana esculenta, and Discoglossus pictus as experimental material. It is demonstrated that all points on the surface of the ovum are able to form a dorsal blastopore lip, provided that certain conditions for appearance of the prodromes of morphogenesis are met, including contact between the white vitelline substance of the vegetative pole and the pigmented substance. The prodromes of morphogenesis are due to an interaction of chemical nature between the vitelline gradient and a cortical substance distributed over a cortical dorsoventral field whose intensity decreases progressively from a dorsal focus. The dorsal lip of the blastopore forms the true nodal point of a complex system and has a dominant physiological action on the less developed lateroventral regions. The vitelline gradient determines the cephalocaudal polarity. Author

N67-25020*# National Aeronautics and Space Administration, Washington, D. C.

RESEARCH ON THE MORPHOGENESIS AND DETERMINISM OF UNEQUAL SEGMENTATIONS IN SPIRALIA [RECHERCHES SUR LA MORPHOGENESE ET LE DETERMINISME DES SEGMENTATIONS INEGALES CHEZ LES SPIRALIA]

J. Pasteels Mar. 1967 28 p refs Transl. into ENGLISH from Arch. Anat. Microscop. (France), v. 30, 1934 p 161–197
(NASA-TT-F-10817) CFSTI: HC$3.00/MF$0.65 CSCL 06C

The morphogenesis and determinism of unequal segmentations in Spiralia (Aplysia, Myzostoma, and Chaetopterus) is described in detail, with discussion of various theories by different authors. Equalization of unequal segmentation, produced by ultraviolet irradiation, centrifugation, freezing, and narcotization, applied at the moment of division, during maturation, or even to the virgin ovum, resulted in the development of duplicitas. The mechanism of unequal segmentations was found to be unrelated with either unequal division of the centrosome, asymmetric special structures of the achromatic spindle, or intervention of dyschronism. The hypothesis for this mechanism postulates a differing distribution and condensation of substances, analogous to that of the polar cytoplasm and offering a certain resistance to cytodieretic processes. These substances would be germinal localizations, thus explaining the link between unequal segmentation and morphogenesis. Author

N67-25047* Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
STORAGE OF BIOLOGICAL SAMPLES
T. M. Fraser Washington, NASA, May 1967 31 p refs
(Contract NASr-115)
(NASA-CR-781) CFSTI: $3.00 CSCL 06C

The possibilities of prolonged storage of biological samples taken during orbital flight are examined. It is assumed that the Apollo-type spacecraft will have one crew member trained in the necessary sampling and storage techniques, and that the mission will be of 15, 30, 45, or 90 days duration. Test materials and sources are listed, showing the parameters for serum or plasma, urine, whole blood, feces, and sweat. Such storage techniques as unprocessed, chemical preservation, refrigeration, freezing, lyophilization or vacuum freeze drying, and drying are discussed. Tabulated data are presented to indicate the acceptable duration of storage under different circumstances for standard clinical laboratory techniques, and the minimum storage requirement for different flight durations. It is pointed out that even for the 15-day mission all forms of storage will be required. M.G.J.

N67-25049*# General Technical Services, Inc., Yeadon, Pa.
ANATOMY AND DC CHARACTERISTICS OF THE ARTERIAL SYSTEM WITH AN INTRODUCTION TO ITS AC CHARACTERISTICS
A. S. Iberall Washington, NASA, May 1967 28 p refs
(Contract NASw-1066)
(NASA-CR-770) CFSTI: HC $3.00/MF $0.65 CSCL 06P

Three topics relating to the physics of the arterial system are discussed: the quantitative anatomy, geometry, and topology; the calculation of average peripheral resistance; and the pulsatile flow (AC) characteristics of the system. An updated version of Green's tabulation of arterial parameters is presented; the table is shown to be consistent in its geometric properties with the DC resistance characteristics of the arterial bed, and the internal volume available to blood. An important application of the internal geometry of the arterial system is considered to be the development of the transmission dynamics of AC flow. The actual regulated state of the terminal resistance found in clinical observation is also discussed. M.G.J.

N67-25073*# Michigan Univ., Ann Arbor. Dept. of Psychology.
OPTIMAL LEARNING IN DETECTION SITUATIONS
Semiannual Status Report
Wilson P. Tanner, Jr. Apr. 1967 7 p refs
(Grant NGR-23-005-159)
(NASA-CR-66350; Rept.-07814-2-P) CFSTI: HC $3.00/MF $0.65 CSCL 05H

The main ideas behind two distinct models that have been proposed to describe pre-asymptotic changes in performance are presented. It is pointed out that in a simple detection task the input conditions to the observer have been generated under two experimental manipulations. The task of the observer is to identify which of these two manipulations was performed on each trial. The first model of psychophysical learning, called the variable-bias theory, is based on the notion that the cutoff on the observer's decision axis varies from trial to trial. The second theory, or the variable sensitivity theory, states that the true likelihood ratio of sensory events is not perfectly known to the observor. The conceptual differences between the models are discussed, and it is noted that it is very difficult to obtain experimental evidence to choose between them by using current psychoacoustical procedures. Mention is also made of research being conducted in other aspects of this subject. L.E.W.

N67-25074* Massachusetts Inst. of Tech., Cambridge. Man-Vehicle Control Lab.
HELICOPTER CONTROL: A MULTI-LOOP MANUAL CONTROL SYSTEM
George R. Friedman (M.S. Thesis) Jun. 1967 112 p refs
(Grant NsG-577)
(NASA-CR-83740; MVT-67-2) CSCL 05H

The human operator's performance in a high order, multi-loop task, typified by the helicopter, is studied using the method of average responses. This method permits a time domain, transient input analysis. A cascade model configuration for the human operator is proposed. In this configuration, the first human operator model controls attitude. This model is identical to that of the single-loop model for the same dynamics and consists of a lead time constant of 5 seconds, a neuromuscular lag of .1 second, and a pure time delay of .28 seconds. The attitude reference for the attitude control loop is provided by a second cascade human operator model consisting of a one second lead operating on the position error. A general programming system for average response experiments is described. Author

IAA ENTRIES

A67-23919 •
DNA-AGAR ANNEALING OF RESIDUAL DNA AFTER DEGRADATION BY IONIZING RADIATION.
J. Swez and E. C. Pollard (Pennsylvania State University, Biophysics Dept., University Park, Pa.).
Radiation Research, vol. 29, Nov. 1966, p. 475-482. 9 refs.
Grant No. NsG-324.

Comparative study of the degree of reannealing occurring in normal and ionization-degraded DNA entrapped in agar. It is found that, although the degraded DNA fragments may be altered with respect to the size of the normal DNA fragments, the DNA remaining in the culture after degradation possesses the same capacity to reanneal. It is concluded, moreover, that the DNA is degraded randomly, with no part being preferentially selected for degradation.
A.B.K.

A67-23989 •
MECHANISM AND PATTERN OF HUMAN CEREBROVASCULAR REGULATION AFTER RAPID CHANGES IN BLOOD CO_2 TENSION.
William Shapiro, Albert J. Wasserman, and John L. Patterson, Jr. (Virginia, Medical College, Dept. of Medicine, Richmond, Va.).
Journal of Clinical Investigation, vol. 45, no. 6, 1966, p. 913-922. 29 refs.
Research supported by the Richmond Area Heart Association; Grant No. NsG-156-61.

Measurement of the pattern of change in cerebral blood flow (CBF) during a series of alterations in blood CO_2 tension to obtain information concerning the mechanism of control of the cerebral circulation during such interventions. The technique employed for determining the quantity of change in CBF from the control value was that of continuously or intermittently determining cerebral arteriovenous oxygen differences. Studies were performed on normal male volunteers. The data demonstrate the existence of hysteresis between arterial CO_2 tension and CBF during stepwise elevations and depressions of this tension above the control, in contrast to an essentially linear correlation of CBF with the simultaneously obtained jugular venous CO_2 tension. Hysteresis between arterial CO_2 tension and CBF was not observed during reductions and elevations of the CO_2 tension in the hypocapnic range.
F.R.L.

A67-23990 *
THE DISPERSION OF WAVES IN BLOOD VESSELS.
Max Anliker and James A. Maxwell (NASA, Ames Research Center, Environmental Biology Div., Moffett Field; Stanford University, Dept. of Aeronautics and Astronautics, Stanford, Calif.).
IN: BIOMECHANICS SYMPOSIUM; AMERICAN SOCIETY OF MECHANICAL ENGINEERS, WINTER ANNUAL MEETING, NOVEMBER 30-DECEMBER 1, 1966, PAPERS.
Edited by Y. C. Fung.
New York, American Society of Mechanical Engineers, 1966, p. 47-67. 14 refs.
Research supported by the National Academy of Sciences; NSF Grant No. GK-47.

Study of dispersion phenomena associated with waves propagating in blood vessels, which phenomena are potential measures of the distensibility of the vessels and other cardiovascular parameters. The vessels are assumed to behave like thin-walled circular cylindrical shells filled with an inviscid compressible fluid. The vessel wall is assumed to have isotropic and homogeneous elastic properties. The waves are described by small three-dimensional displacements of the middle surface of the shell from an equilibrium configuration defined by a mean transmural pressure and an initial axial strain. The fluid motion associated with the waves is considered to be irrotational. The linearized differential equations of motion are based on the shell equations derived by Flügge. The results of a parametric analysis indicate that axisymmetric waves are only mildly dispersive while nonaxisymmetric waves are highly dispersive and exhibit cutoff phenomena. The transmural pressure and the initial axial stretch can have a marked effect on the phase velocities and cutoff frequencies. The effects of the compressibility of the blood are insignificant for waves with frequencies below 1000 cps. The nature and results of in-vivo experiments by Landowne are interpreted in the light of this analysis.
F.R.L.

A67-23991 •
ON BIOELECTRIC POTENTIALS IN AN INHOMOGENEOUS VOLUME CONDUCTOR.
David B. Geselowitz (Massachusetts Institute of Technology, Research Laboratory of Electronics, Center for Communication Sciences, Cambridge, Mass.).
Biophysical Journal, vol. 7, no. 1, 1967, p. 1-11. 18 refs.
National Heart Institute Grant No. HE-08805; National Institutes of Health Grant No. 2 POI MH-04737-06; NSF Grant No. GK-835; Contract No. DA-36-039-AMC-0300(E); Grant No. NsG-496.

Green's theorem is used to derive two sets of expressions for the quasi-static potential distribution in an inhomogeneous volume conductor. The current density in passive regions is assumed to be linearly related instantaneously to the electric field. Two equations are derived relating potentials to an arbitrary distribution of impressed currents. In one, surfaces of discontinuity in electrical conductivity are replaced by double layers and in the other, by surface charges. A multipole equivalent generator is defined and related both to the potential distribution on the outer surface of the volume conductor and to the current sources. An alternative result involves the electric field at the outer surface rather than the potential. Finally, the impressed currents are related to electrical activity at the membranes of active cells. The normal component of membrane current density is assumed to be equal at both membrane surfaces. One expression is obtained involving the potentials at the inner and outer surfaces of the membrane. A second expression involves the transmembrane potential and the normal component of membrane current.
(Author)

A67-24063 •
DETECTING PLANETARY LIFE FROM EARTH.
Dian R. Hitchcock (United Aircraft Corp., Hamilton Standard Div., Biosciences Section, Windsor Locks, Conn.), Peter Fellgett (Reading, University, Dept. of Applied Physical Sciences, Reading, Berks., England), Janine Connes (Centre National de la Recherche Scientifique, Service d'Aéronomie, Observatoire de Meudon, Meudon, Seine-et-Oise, France), Pierre Connes (Centre National de la Recherche Scientifique, Bellevue, Seine-et-Oise, France), Lewis D. Kaplan (California Institute of Technology, Jet Propulsion Laboratory, Space Sciences Div., Pasadena, Calif.), J. Ring (Hull, University, Hull, Yorks., England), and J. E. Lovelock.
Science Journal, vol. 3, Apr. 1967, p. 56-67.

Discussion of new techniques which make possible the detection of extraterrestrial life from the earth's surface. The development of such methods has led to the proposed construction of the world's largest telescope to investigate any possible modification of planetary atmospheres by life. The genesis of multiplex spectrometry and its application to planetary atmospheres is considered, and ways of interpreting the observations are outlined. The construction of a 1000 in. telescope is detailed, and a diagram is given which summarizes the angular resolving power and sizes of some large radio and optical telescopes.
B.B.

A67-24080
SOME RESULTS OF MEDICAL SUPERVISION OF THE STATE OF THE COSMONAUTS P. I. BELYAEV AND A. A. LEONOV DURING TRAINING AND ORBITAL FLIGHT.
I. T. Akulinichev, A. S. Antoshchenko, V. A. Znachko, A. E. Ivanov, V. I. Lebedev, D. G. Maksimov, A. E. Uglov, and G. F. Khlebnikov.
(Kosmicheskie Issledovaniia, vol. 4, Mar.-Apr. 1966, p. 311-319.)
Cosmic Research, vol. 4, Mar.-Apr. 1966, p. 285-291. 6 refs.
Translation.

A67-24081
EFFECT OF SPACE-FLIGHT FACTORS ON WHEAT SEEDS AND PLANTS GROWN FROM THEM.
G. V. Il'ina, N. N. Kuznetsova, S. G. Rydkii, and V. G. Vysotskii. (*Kosmicheskie Issledovaniia*, vol. 4, Mar.-Apr. 1966, p. 320-323.)
Cosmic Research, vol. 4, Mar.-Apr. 1966, p. 292-294. Translation.

A67-24233 *
ENVIRONMENTAL BIOLOGY.
Research supported by the National Institutes of Health, Grant No. GM-06553, NASA, Contract No. NAS5-238, and the U.S. Air Force, Contract No. AF 33(615)-2252.
Edited by P. L. Altman and D. S. Dittmer.
Bethesda, Md., Federation of American Societies for Experimental Biology, 1966. 694 p.
$15.

This handbook - one of the Biological Handbooks series - quantifies the effects of the biological environment for reference purposes. Pertinent information related to the environment of man and other living organisms is presented. Most of the tables, graphs, and diagrams were prepared from the contributing scientists' own collections of data, and from the current literature. The tables are arranged in ten sections according to major environmental factors. Appended to the tables are the names of the contributors, and a list of the literature citations arranged in alphabetical sequence. The table of contents should be used in conjunction with the index: the table of contents to determine the scope of the data for the major environmental factors; the index to locate data for effects on the organism. To facilitate identification, the index includes the taxonomic orders for animals and the families for plants; two appendices provide cross-reference to scientific and common names. The major subdivisions are temperature; radiant energy; sound, vibration and impact; acceleration and gravity; atmosphere and pollutants; atmospheric pressures; gases; water; solutes; and biological rhythms. F.R.L.

A67-24262 *
SELECTION OF SPACE-CABIN ATMOSPHERES.
Emanuel M. Roth (Lovelace Foundation for Medical Education and Research, Dept. of Aerospace Medicine and Bioastronautics, Albuquerque, N. Mex.).
Space Science Reviews, vol. 6, Feb. 1967, p. 452-492. 156 refs.
Contract No. NASr-115.

Consideration of significant factors in the man-machine interaction with reference to the selection of space cabin atmospheres. The most prominent factors are total pressure; partial pressure of oxygen; fire and blast hazard; diluent inert gas factors; humidity and temperature control; carbon dioxide control; toxic contaminants; dusts, aerosols, and ions; circulation of the cabin atmosphere; and the minimization of weight, power, complexity, and cost. All of these factors are interrelated, and each is examined in an attempt to clarify the basic issues and unknowns. F.R.L.

A67-24340 *#
APOLLO ECS MAN-RATED SIMULATION SYSTEMS.
W. B. Tappen (North American Aviation, Inc., Space and Information Systems Div., Downey, Calif.).
Journal of Spacecraft and Rockets, vol. 4, Apr. 1967, p. 452-457. 5 refs.
Contract No. NAS 9-150.

The Apollo environmental control system (ECS) simulation chamber was designed and operated for combined systems evaluation. Quick crew access, controlled repressurization, crew monitoring, and auxiliary oxygen supplies were used to reduce hazards to the test crew. The systems included in the evaluation were those required for life support: environmental control unit, water-glycol cooling system, food and waste management systems, and electrical power distribution systems. Altitude, heat-load, and heat-sink simulators were used to evaluate the capability of the aerospace system to maintain a habitable environment within a mockup of the spacecraft cabin. An operational crew was trained to conduct life support systems evaluations, and a test crew was selected and trained to perform flight crew tasks under simulated conditions. The complete simulator was operated unmanned to provide operational crew training and to evaluate system performance before the aerospace system was operated with men in the test loop. Various short-duration tests led to a 14-day manned test conducted at simulated altitude. (Author)

A67-24626
GAS MIXING EFFICIENCY IN THE HUMAN LUNG.
Gordon Cumming (Birmingham, University, Dept. of Medicine, Birmingham, England).
Respiration Physiology, vol. 2, Feb. 1967, p. 213-224. 11 refs.
Contract No. AF 61(052)-775.

The lung nitrogen clearance curve indicates the concentration of nitrogen in any breath after the start of oxygen breathing. The shape of this curve has been interpreted as representing a regional inhomogeneity of ventilation. By measuring the quantity of nitrogen leaving the lungs in each breath, by means of an analog computer it is possible to draw a curve which shows how much nitrogen remains in the lungs at any point during oxygen breathing. When referred to one litre of lung volume this constitutes the lung nitrogen decay curve. The properties of these two curves differ and it is possible from the latter to make measurements of the extent of incomplete gas mixing in the lungs. Contributions to this incompleteness of gas mixing from regional factors and from stratified inhomogeneity can be identified from the decay curve. In bronchitis, this analysis suggests that the principal defect of gas mixing is due to stratified inhomogeneity due to impairment of gaseous diffusion. (Author)

A67-24629
VISUAL SIMULATION.
Paul T. Kaestner (Photomechanisms, Inc., Huntington Station, N.Y.).
(Society of Photo-Optical Instrumentation Engineers, Seminar on the Human in the Photo-Optical System, New York, N.Y., April 25, 26, 1966, Paper.)
Information Display, vol. 4, Mar.-Apr. 1967, p. 49-54.

Observation that when generating a display from a scale model for the realistic presentation of a view as seen from an aircraft or spacecraft, compromises with the real life situation are inevitable. These occur both in the initial imaging lens and in the final display. Factors such as resolution, light intensity and true perspective influence the imaging characteristics, while problems of parallax and image brightness limit the realism of the display. Fortunately, the choice of the compromises provides acceptable performance for most simulation systems. A typical simulation system is described and illustrated. M.F.

A67-24785 *
SOME ASPECTS OF THE CARDIOVASCULAR AND RENAL CIRCADIAN SYSTEMS.
Franz Halberg, Robert A. Good, and Howard Levine.
Circulation, vol. 34, Nov. 1966, p. 715-717. 16 refs.
U.S. PHS Grants No. 5-K6-GM-13; No. 5-K6-GM-981; Grant No. NsG-517.

General discussion of the 24-hr synchronized circadian rhythm and the desynchronized circadian rhythm. Two case histories are treated, one of which suggests a case where a circulatory rhythm may have become desynchronized from the other physiological rhythms of the same system. It is postulated that knowledge of circadian rhythm disorders may shed light on certain diseases. R.B.S.

A67-24786 *
THE EFFECT OF IONIZING RADIATION ON GENETIC TRANSCRIPTION - ASPECTS OF THE MECHANISM.
Ernest C. Pollard and Thomas F. Barone (Pennsylvania State University, Dept. of Biophysics, University Park, Pa.).
Radiation Research Supplement, vol. 6, 1966, p. 194-200. 16 refs.
Grant No. NsG-324.

Examination of the factors in genetic transcription which are affected by peroxide and by direct radiation effects. The action of ionizing radiation on genetic transcription in cells of E. coli is shown to be of two kinds. One, due to direct radiation effects on the cells, causes a reduction in transcription in a manner related to DNA degradation. This type of action does not affect messenger RNA expression. The other, due to hydrogen peroxide in the medium, causes a halt in transcription, followed by a recovery and a destruction of messenger RNA expression. R. B. S.

A67-24788 *

HEAT STERILIZATION OF ACTIVATED CARBON.

John R. Puleo and Martin S. Favero (U.S. Public Health Service, Communicable Disease Center, Technology Branch, Phoenix, Ariz.).

Biotechnology and Bioengineering, vol. 8, no. 4, 1966, p. 631, 632. NASA Contract No. R-137.

Experimental results showing that activated carbon may be completely sterilized at 135°C for 24 hr or 165°C for 3 hr. Previous tests are treated in which complete sterilization was not achieved due to faulty sterilization techniques. R. B. S.

A67-24937

KNOWN AND UNKNOWN PRINCIPLES OF BIOLOGICAL CHRONOMETRY.

Erwin Bünning (Tübingen, Universität, Botanisches Institut, Tübingen, West Germany).

(New York Academy of Sciences, Conference on Interdisciplinary Perspectives of Time, New York, N.Y., Jan. 17-20, 1966, Paper.) New York Academy of Sciences, Annals, vol. 138, Feb. 6, 1967, p. 515-524. 50 refs. Translation.

Discussion of recent advances in the experimental analysis of temporal order in biological systems. Biological time-measuring processes which have some relation to the temporal order of the environment are discussed. It is noted that certain principles of biological chronometry are beginning to be understood, but enough is known about some of the other principles to allow experimental approaches to be made. It seems advisable to treat these problems not as special botanical, zoological or medical questions, but as problems of general biology. The explanation of such phenomena may be the same in all organisms, and thus a hypothesis applicable only to highly developed species has little chance of being proven valid. M. M.

A67-25011

MANIPULATORS FOR ASTRONAUTS.

W. E. Gray and R. S. Mosher (General Electric Co., Research and Development Center, Mechanical Technology Laboratory, Mechanical Equipment Branch, Schenectady, N.Y.).

Space/Aeronautics, vol. 47, Feb. 1967, p. 104, 106, 108, 110-112.

Outline of recent trends in the development of manipulators for astronauts. The proposed type of manipulator will consist of anthropomorphic mechanical arms and hands connected through a bilateral servo control system to an exoskeletal master station worn like a harness by the human operator. This type of manipulator is advantageous in that it allows the operator's sensory and motor systems to be coupled to the manipulator so closely that the machine in effect becomes a natural extension of the man. R. B. S.

A67-25035

DIURNAL RHYTHM AND FUNCTION DIAGNOSTICS OF PERIPHERAL CYCLE REGULATION [TAGESRHYTHMIK UND FUNKTIONSDIAGNOSTIK DER PERIPHEREN KREISLAUFREGULATION].

K. E. Klein, H. Brüner, R. Finger, K. Schalkhäuser, and H. M. Wegmann (Deutsche Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Bad Godesberg, West Germany).

Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie, vol. 23, 1966, p. 125-139. 25 refs. In German.

Discussion of tests in which the circadian rhythm of cardiovascular responses to active orthostasis and mild physical exercise was examined for healthy subjects between 22 and 55 years of age. Measurements were made every 3 hr during two periods lasting from 9 a.m. to 12 p.m. and 9 p.m. to 12 a.m., respectively. The 24-hr periodicity observed for the heart rate, blood pressure, pulse rate, and heart-rate recovery time confirms the hypothesis by which the sensitivity of the organism to environmental stimuli differs during day and night hours. V. P.

A67-25036

THEORY OF DECOMPRESSION SICKNESS AND ITS APPLICATION TO DIVING TABLES [THEORIE DER DRUCKFALLBESCHWERDEN UND IHRE ANWENDUNG AUF TAUCHTABELLEN].

S. Ruff (Deutsche Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Bad Godesberg, West Germany) and K. G. Müller (Bonn, Universität, Institut für theoretische Physik, Bonn, West Germany).

Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie, vol. 23, 1966, p. 251-292. 13 refs. In German.

Study showing that decompression sickness is caused by gas bubbles in the body tissue, which form from dissolved gas. The foundations for the calculation of these bubbles are examined, and an equation for the bubble size is derived. Only inactive permanent gases not involved in respiration, such as N_2 and He, are of interest. It is seen that the bubble growth is caused by the tension difference of these gases in the tissue and the bubble, the tension in the bubble being roughly equal to that of the ambient atmosphere. The determinant parameter is the ratio of this tension difference to the tension in the bubble. Its time integral is proportional to the bubble size. The considerations are specialized for a simple three-stage decompression and applied to the tables of the U.S. Navy Diving Manual. V. P.

A67-25064

EFFECTS OF IMMOBILIZATION - BEHAVIOURAL AND EEG CHANGES.

John P. Zubek and M. MacNeill (Manitoba, University, Winnipeg, Manitoba, Canada).

Canadian Journal of Psychology, vol. 20, no. 3, 1966, p. 316-336. 36 refs.

Research supported by the Defence Research Board of Canada; NIH Grant No. MHO-8748-01.

Description of two experiments designed to determine the effect of one week of motor activity restriction on the electrical activity of the brain and on intellectual and perceptual-motor processes. The results indicated a post-immobilization slowing of occipital EEG activity (an effect substantially different from that shown by both ambulatory and recumbent control subjects) and the occurrence of various behavioral deficits - in verbal fluency, recall, space relations, cancellation, reversible figures, and color discrimination, due to immobilization alone or resulting from the combined effects of restricted motor activity and the recumbent position. Furthermore, the results indicated no impairment of creative and critical thinking capacity and revealed even an improved visual vigilance. Auditory vigilance, on the other hand, was significantly worse in the recumbent subjects than in the immobilized and ambulatory control subjects. A wide variety of unusual subjective phenomena experienced by the immobilized subjects are noted. V. Z.

A67-25065 *

REINFORCING EFFECT OF AN INFORMATIVE STIMULUS THAT IS NOT A POSITIVE DISCRIMINATIVE STIMULUS.

Derek P. Hendry (Illinois, University, Urbana, Ill.) and John N. Coulbourn (Lehigh Valley Electronics).

Psychonomic Science, vol. 7, no. 7, 1967, p. 241, 242. 5 refs.
U.S. PHS Grant No. GM-14221; Grant No. NsG-189-61.

Description of experiments on pigeons designed to determine the difference between discriminative and informative functions of a stimulus. The results show that a stimulus may become a conditioned reinforcer without being closely associated in time with a reinforcer and without being the occasion for a reinforced response. V. Z.

A67-25170 #
VERTEBRAL FRACTURES IN PILOTS FROM HELICOPTER ACCIDENTS [LE FRATTURE VERTEBRALI DEI PILOTI NEGLI INCIDENTI DA ELICOTTERO].
P. Italiano.
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.-Dec. 1966, p. 577-602. 11 refs. In Italian.

Investigation of three cases of vertebral fractures out of a case history of 79 helicopter accidents. Vertebral fractures from helicopter accidents, like those from aircraft accidents and seat ejections, are located in the dorso-lumbar junction of the spinal column. They show peculiar radiological characteristics from the pathological standpoint. In helicopter accidents, the fractures occurred due to falls of a few yards to the ground; they were more likely if the pilot's body was in a position tilted slightly forward. Recommendations are made for reducing the occurrence of vertebral fractures in helicopter pilots. M. M.

A67-25171 #
PSYCHOPHYSICAL AND PSYCHOSOCIAL FACTORS AS CAUSES FOR REJECTION IN THE PERIOD OF PROFESSIONAL FORMATION OF PILOT TRAINEES IN THE AIR FORCE [SUI FATTORI PSICOFISICI E PSICOSOCIALI COME CAUSA DI ELIMINAZIONE NEL PERIODO DI FORMAZIONE PROFESSIONALE DELL'ALLIEVO PILOTA DELLA A. M.].
M. Strollo.
(Ufficio Internazionale di Documentazione di Medicina Militare, Sessione, 27th, San Marino, Sept. 21-24, 1966, Paper.)
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.-Dec. 1966, p. 603-614. In Italian.

Examination of the psychophysical and psychosocial conditions and factors that bring about the rejection of Italian Air Force pilot trainees, with a view to recovering such trainees. On the basis of the author's personal experience and some general considerations, it is pointed out that a closer relationship between instructors and aeronautical physicians as well as a more intense psychological preparation of these physicians could bring about immediate and long-lasting benefits. M. M.

A67-25172 #
EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF MÜLLER'S MANEUVER ON TOLERANCE OF $-G_z$ ACCELERATION [RICERCHE SPERIMENTALI CIRCA GLI EFFETTI DELLA MANOVRA DI MÜLLER SULLA RESISTENZA ALLE ACCELERAZIONI $-G_z$].
A. Putzulu and P. Rota.
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.-Dec. 1966, p. 615-630. 13 refs. In Italian.

Investigation of the effectiveness of Müller's maneuver (forced inhalation with closed glottis) in increasing tolerance to the effects of negative acceleration in 10 healthy subjects exposed to $-0.91\ G_z$. The results obtained showed that Müller's maneuver improves tolerance to negative G, throughout the maneuver, provided it is properly performed. The usefulness of performing the maneuver during 100%-oxygen breathing, and of preparatory training, is pointed out. M. M.

A67-25173 #
THE PROBLEM OF CONTAMINANTS IN OXYGEN FOR THERAPEUTIC USE [IL PROBLEMA DEI CONTAMINANTI DELL'OSSIGENO PER USO TERAPEUTICO].
V. Iannetti.
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.-Dec. 1966, p. 631-648. In Italian.

Discussion of the necessity of bringing the standards on therapeutic oxygen specified in the official pharmacopeia up to the present status of toxicological knowledge and study of the analytical and industrial possibilities for obtaining high-purity oxygen. Emphasis is placed on the problem of contaminant control in oxygen for breathing in aviation - a problem solved by means of gas-chromatographic analysis. Data on the origin, explosiveness, inflammability, toxicity, and odor of the principal contaminants are given. The gas-chromatographic method is recommended as the most suitable technique for oxygen analysis. M. M.

A67-25174 #
INDICATIONS AND CONTRAINDICATIONS FOR THE TRANSPORTATION OF WOUNDED BY HELICOPTER AND AMBULANCE [INDICAZIONI E CONTROINDICAZIONI AL TRASPORTO DEI FERITI A MEZZO ELICOTTERO E CON AUTOAMBULANZA].
T. Lomonaco (Roma, Università, Scuola di Specializzazione in Medicina Aeronautica e Spaziale, Rome, Italy).
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.-Dec. 1966, p. 649-658. In Italian.

Evaluation of the arguments in favor and against using helicopters and ambulances in the evacuation of casualties. Helicopters can reach sites that may be unapproachable by ambulances because of terrain conditions or enemy war actions and quickly transport casualties to first aid stations. However, their operation is expensive and in-flight emergency medical care by specialists is not always possible. In addition, disadvantages exist due to hypoxia, low barometric pressure, and vibrations. Ambulance operations are much cheaper, and an ambulance can be supplied with medical equipment. The surface vehicle is slow, however, and its movement is often obstructed by road traffic. M. M.

A67-25175 #
PHYSIOLOGICAL PROBLEMS OF MAN'S LIFE IN AN EXTRATERRESTRIAL ENVIRONMENT [SUI PROBLEMI FISIOLOGICI DELLA VITA DELL'UOMO IN AMBIENTE EXTRA-TERRESTRE].
A. Scano (Centro di Studi e Ricerche di Medicina Aeronautica, Rome, Italy).
(Associazione Medici Italiani, Congresso Nazionale, 8th, Rome, Italy, Dec. 15-17, 1966, Paper.)
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.-Dec. 1966, p. 659-679. 44 refs. In Italian.

Discussion of the biological possibility of man's future exploration of the moon and of the principal effects of flight in earth orbit. It is pointed out that the physiological data collected on approximately 30 persons who have so far made space flights point to the possibility of living and operating for periods of a few weeks inside space vehicles with quasi-terrestrial microclimate and of surviving without serious difficulty even outside of these vehicles by means of refined protective garments. M. M.

A67-25176 #
CLOTHING HYGIENE WITH STRESS ON AEROSPACE PROBLEMS. II [L'IGIENE DEL VESTIARIO CON PARTICOLARE RIFERIMENTO AI PROBLEMI AEROSPAZIALI. II].
E. Sulli.
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.-Dec. 1966, p. 681-742. 24 refs. In Italian.

Continuation of a study on aerospace clothing hygiene. The problem of the influence of climate on the selection of protective garments and fabrics is treated. The entire area of the world is divided into six zones, the local climatic conditions of which are considered, together with the physiological responses of living organisms in obtaining and maintaining their vital heat balance. Basic principles applied in using garments in these zones are discussed. M. M.

A67-25653
A PSYCHOPHYSIOLOGICAL ANALYSIS OF ACTIVITY AS A CRITERION OF THE SPECIAL MEDICAL TRAINING OF THE CREW OF THE SHIP "VOSKHOD-2."
E. A. Karpov.
(Kosmicheskie Issledovaniia, vol. 4, May-June 1966, p. 469-481.)
Cosmic Research, vol. 4, May-June 1966, p. 412-422. 12 refs.
Translation.

A67-25654
THE USE OF RADIOPROTECTIVE DRUGS IN SPACE-FLIGHT CONDITIONS.
B. I. Davydov, V. V. Antipov, V. A. Koslov, P. P. Saksonov, and V. S. Shashkov.
(Kosmicheskie Issledovaniia, vol. 4, May-June 1966, p. 482-491.)
Cosmic Research, vol. 4, May-June 1966, p. 423-431. 28 refs.
Translation.

A67-25725
PROLONGED WEIGHTLESSNESS EXPOSURE AND ITS EXPECTED EFFECTS ON MAN.
John M. Lagerwerff (Lockheed Aircraft Corp., Lockheed Missiles and Space Co., Biological Sciences Laboratories, Palo Alto, Calif.).
IN: INSTITUTE OF ENVIRONMENTAL SCIENCES, ANNUAL TECHNICAL MEETING, 13TH, WASHINGTON, D.C., APRIL 10-12, 1967, PROCEEDINGS. VOLUME 2. [A67-25705 12-11]
Mt. Prospect, Ill., Institute of Environmental Sciences, 1967, p. 585-590. 20 refs.

Discussion of the cardiovascular deconditioning and bone demineralization effects resulting from the absence of gravitational forces in space flights. Several problems are treated, including problems unique to female astronauts. Two devices for use as onboard gravity simulators are described. R.B.S.

A67-25727 *
WEIGHTLESSNESS AND MANNED SPACE FLIGHT - MEDICAL DATA TO DATE.
S. P. Vinograd (NASA, Office of Manned Space Flight, Washington, D.C.).
IN: INSTITUTE OF ENVIRONMENTAL SCIENCES, ANNUAL TECHNICAL MEETING, 13TH, WASHINGTON, D.C., APRIL 10-12, 1967, PROCEEDINGS. VOLUME 2. [A67-25705 12-11]
Mt. Prospect, Ill., Institute of Environmental Sciences, 1967, p. 599-603.

Discussion of the effects of space flight on man, with particular reference to the effects of weightlessness. Gemini space-flight medical data showed a reduction of tilt table tolerance, decreased red cell mass, altered plasma volumes, dehydration, decreased bone density, and increased calcium and nitrogen output. It has been impossible so far to demonstrate changes in the electromechanical activity of the heart, otolith function, vestibular disturbance of any kind, hallucinatory phenomena, gastrointestinal disturbance, genito-urinary disturbance, or performance decrement. M. F.

A67-26126 *
STIMULUS-ORIENTED APPROACH TO DETECTION RE-EXAMINED.
Lloyd A. Jeffress (Texas, University, Defense Research Laboratory and Dept. of Psychology, Austin, Tex.).
Acoustical Society of America, Journal, vol. 41, Feb. 1967, p. 480-488. 34 refs.
Navy-NASA-supported research.

Study of the effect of signal duration on detection in the presence of a continuous masking noise, by using several versions of an electrical model of the human auditory system. The model consists of a narrow filter followed by a half-wave rectifier (in some cases a square-law), which in turn is followed by an integrator having a long decay time. The model which best fits human performance consisted of a filter obtained by subtracting the output of a 500-Hz sharp-cutoff, low-pass filter, from another with a 525-Hz cutoff; followed by a linear half-wave rectifier and in turn by an integrator having a 100-msec decay time. Data generated by the model were similar to those of an experiment by Green, Birdsall, and Tanner, where a continuous noise and a gated signal of constant energy were employed. The model predicted that gated noise and signal should show better detection at short durations than continuous noise and gated signal. Experiments with the model - and psychophysical experiments - are described, and conclusions are listed. T.M.

A67-26164 #
THE HUMAN FACTOR IN HIGH ALTITUDE FLYING.
Ramamurthy (Hindustan Aeronautics, Ltd., Aircraft Engineering and Design Div., Bangalore, India).
Aeronautical Society of India, Journal, vol. 18, Nov. 1966, p. 107-112.

General discussion of the physiological effects of high-altitude flights on the human organism, covering respiration, environmental hazards, symptoms of acceleration, fatigue, ambient pressure, and aeroembolism. A decompression chamber for high-altitude simulation experiments, built by the Indian Air Force, is described. V.Z.

A67-26171 •
IMPLANT BIOTELEMETRY AND MICROELECTRONICS.
W. H. Ko and M. R. Neuman (Case Institute of Technology, Cleveland, Ohio).
Science, vol. 156, Apr. 21, 1967, p. 351-360. 34 refs.
Research supported by the Veterans' Rehabilitation Administration, the National Institute of General Medical Sciences, and NASA.

Examination of developments in implant telemetry, associated problems, and the potential of microelectronics. Schematic diagrams are given of popular implant-telemetry transmitters; such transmitters use (1) a piezoelectric crystal as the feedback element in an oscillator, (2) a common-emitter Hartley oscillator, or (3) common-base Hartley and Colpitts oscillators. The principles of operation of single-channel implantable FM transmitters (units K1 through K5) developed at Case Institute of Technology and operating in the 100 to 250-MHz range are evaluated with reference to wiring diagrams, characteristics charts, and performance specifications. Field test results of K5 units using both battery and induction pick-up power supplies and implanted in animals to measure EMG (electromyogram) and ECG signals are analyzed. A system using an AM subcarrier to provide accuracy in long-term measurements of baseline variations has been used to monitor intestinal pressures in dogs and monkeys. Multiplex systems providing more simultaneous channels are noted. Problems associated with implant telemetry and the potential of microelectronics in overcoming these problems are listed. T.M.

LC ENTRIES

A67-80841
MEASUREMENT OF ALVEOLAR PRESSURE
Björn Jonson and Arend Bouhuys (Emory U., School of Med., Dept. of Physiol., Atlanta, Ga., John B. Pierce Found. Lab., and Yale U., School of Med., New Haven, Conn.)
Journal of Applied Physiology, vol. 22, Jun. 1967, p. 1081–1085. 11 refs.
Grants PHS OH 00207 and PHS HE 08326.

Alveolar pressures can be measured over a wide range of airflow rates and lung volumes, using a volume-displacement body plethysmograph with a rebreathing bag to minimize thermal exchange between lung and plethysmograph air (modified Jaeger-Otis method). Suitable plethysmographic volume change (ΔVbox) recordings can be obtained by conditioning both the air in the plethysmograph (at near room temperature) and the gas in the rebreathing bag (at BTPS conditions). Procedures and limitations of this method are discussed.

A67-80842
RESPIRATORY CHANGES IN PLEURAL PRESSURES AT DIFFERENT SITES AND BODY POSITIONS.
Natalio Banchero, Wilhelm J. Rutishauser, Anastasios G. Tsakiris, and Earl H. Wood (Mayo Clin. and Mayo Found., Sect. of Physiol. and Minn., U., Mayo Graduate School of Med., Rochester).
Journal of Applied Physiology, vol. 22, Jun. 1967, p. 1075–1080. 28 refs.
NASA Grant NsG-327, Grants AF 33(659)-8899, NIH H-3432, and AHA CI 10.

Changes in pressures during respiration were measured simultaneously from different sites in the pleural space of eight anesthetized dogs in the supine, left lateral, and prone body positions. Saline-filled, radiopaque catheters connected to strain-gauge manometers were inserted percutaneously into the right pleural space by an air-tight technique, and their tips were placed at ventral and dorsal sites. In six of these dogs, intraesophageal pressure was also recorded. Respiratory pressure amplitude (ΔP = difference between mean end-expiratory and minimal inspiratory pressures) was systematically greater at ventral sites than at dorsal sites in supine, prone, and lateral positions. Values of ΔP in the cephalad portion of the thorax were systematically less than than esophageal values in the supine position but no systematic differences were observed between these two values in the prone position.

A67-80843
EFFECT OF CONTINUOUS PRESSURE BREATHING ON RIGHT VENTRICULAR VOLUMES.
Maylene Wong, Edgardo E. Escobar, Gilberto Martinez, John Butler, and Elliot Rapaport (Calif., U., San Francisco Med. Center, Dept. of Med., Cardiovascular Res. Inst. and San Francisco Gen. Hosp., Cardiopulmonary Lab., Calif.).
Journal of Applied Physiology, vol. 22, Jun. 1967, p. 1053–1060. 29 refs.
Grants PHS HEO-6285, PHS HE-5251, and PHS 2-FO 5TW-605-02.

The end-diastolic volume (EDV) and stroke volume (SV) were measured in the right ventricle of anesthetized dogs during continuous pressure breathing and compared to those taken during breathing at atmospheric pressure. During intratracheal positive-pressure breathing, EDV, and SV decreased and end-diastolic pressure became more positive relative to atmospheric pressure. During intratracheal negative-pressure breathing, EDV enlarged and SV tended to increase; end-diastolic pressure became more negative. During extrahoracic negative-pressure breathing SV decreased, EDV fell, though not significantly, and end-diastolic pressure rose, but insignificantly. Changes in EDV observed during intratracheal positive-pressure breathing and intratracheal negative-pressure breathing were associated with minor shifts in transmural pressure (end-diastolic pressure minus intrapleural pressure) in the expected directions, but during extrathoracic negative-pressure breathing a large increase in transmural pressure took place with the nonsignificant reduction in EDV. It is believed that intrathoracic pressure influences right ventricular filling by changing the peripheral-to-central venous pressure gradient. The cause of the alteration in diastolic ventricular distensibility demonstrated during extrathoracic negative-pressure breathing remains unexplained.

A67-80844
TRAINING OF THE OXYGEN TRANSPORT SYSTEM IN MAN.
Jan Karlsson, Per-Olof Astrand, and Björn Ekblom (Coll. of Phys. Educ., Dept. of Physiol., Stockholm, Sweden).
Journal of Applied Physiology, vol. 22, Jun. 1967, p. 1061–1065. 7 refs.
Swed. Sport Federation, Swed. Delegation for Med. Defence Res., and Swed. Natl. Assn. Against Heart and Chest Diseases supported research.

For six subjects, three well trained and three untrained, an individual speed was determined that brought them to complete exhaustion at the end of the fourth min. of running. On the following days the speed of the treadmill (3° slope) was then decreased without changing the total distance of the run. Oxygen uptake and pulmonary ventilation were measured after one min. and four–five min. of running, respectively; heart rate was continuously registered, and peak values of blood lactic acid were determined. A reduction in speed, up to 3 km./hr. did not decrease the O_2 uptake; a plateau of maximal O_2 uptake was observed. For optimal training of the circulation the load on the O_2 transport system should probably be maximum. Since maximal O_2 uptake can be reached at a submaximal speed, this lower speed may be sufficient and perhaps optimal as a training stimulus.

A67-80845
EFFECT OF GRAVITATIONAL AND INERTIAL FORCES ON PLEURAL AND ESOPHAGEAL PRESSURES.
Wilhelm J. Rutishauser, Natalio Banchero, Anastasios G. Tsakiris, and Earl H. Wood (Mayo Clin. and Mayo Found., Sect. of Physiol., and Minn., U., Mayo Graduate School of Med., Rochester).
Journal of Applied Physiology, vol. 22, Jun. 1967, p. 1041–1052. 43 refs.
NASA Grant NsG-327, Grants AF 33(659)-8899, NIH H-3532, and AHA CI 10.

Seven dogs were exposed to forward, backward, and right and left lateral accelerations for 60 sec. at mean levels of 2.1, 4.3, and 6.7 g. Intrapleural pressures at dorsal (paravertebral), ventral (retrosternal), left, and right sites plus esophageal pressure were measured by saline-filled catheters and $P_{23}D$ Statham gauges. With increasing acceleration, end-expiratory

pleural pressures decreased at sites which, depending on body position, were superior in the thorax and increased at sites which were dependent. Esophageal pressures exceeded pleural pressures interpolated to the same level during all conditions studied. Interpolation of pleural and esophageal pressures to 0 g gave −5.5 and −2.7 cm. H_2O, respectively, independent of body position and site of measurement. It is concluded that differences in pleural pressure recorded at different sites in the thorax are caused by the weight of the thoracic contents and that the resulting pressure imbalances impose a limitation on the levels and durations of acceleration that can be tolerated with safety by animals and man when a given depth of lung is oriented in the direction of the resultant vector of acceleration.

A67-80846
STIMULUS INTENSITY EFFECTS ON VERBAL LEARNING.
Gloria J. Fischer (South Fla., U., Tampa).
Psychological Report, vol. 20, Feb. 1967, p. 75–78. 8 refs.

Nonsense syllables were aurally presented once at constant or variable intensities in SPL (55, 70, and/or 85 db.). Free recall after instruction to learn (INT), to judge intelligibility (IRR), or to listen (INC) was unaffected. Rather, Grice and Hunter's hypothesis that intensity effects in human conditioning are substantially greater in repeated measurements designs (i.e., with variable presentation), was supported only by an insubstantial trend. Serial position curves from the three learning conditions indicated a greater recency than primacy effect in recall, only for IRR. Thus, a recency effect in INC seems contingent rather upon attention being directed away from to-be-relevant aspects on the stimuli than a characteristic of INC, *per se*.

A67-80847
PHYSIOLOGICAL REACTIVITY TO SENSORY STIMULATION AS A MEASURE OF PERSONALITY.
Sybil B. G. Eysenck and H. J. Eysenck (London, U., Inst. of Psychiat., Great Britain).
Psychological Reports, vol. 20, Feb. 1967, p. 45–46.

Six introverts and six extraverts were tested with respect to the increment of salivary activity as a consequence of (a) putting four drops of lemon juice on their tongues and (b) having them swallow four drops of lemon juice. Under condition (a) introverts salivated significantly more than extraverts; under condition (b) extraverts salivated significantly more than introverts. Pavlov's theory of transmarginal inhibition was suggested as a possible explanation of this reversal.

A67-80848
REMOTE RESPONSES OF THE HEMOPOIETIC TISSUE TO THE PROTON AND X-IRRADIATION COMBINED WITH ACCELERATION [OTDALENNYE REAKTSII KROVETVORNOI TKANI NA OBLUCHENIE PROTONAMI I KH-LUCHAMI V KOMBINATSII S GRAVITATSIONNYMI NAGRUZKAMI].
E. I. Zharova, S. A. Khrustalev, T. G. Protasova, B. I. Davydov, V. V. Antipov, P. P. Saksonov, and M. O. Raushenbakh.
Izvestiia Akademii Nauk SSSR, Seriia Biologicheskaia, no. 2, Mar.–Apr. 1967, p. 290–296. 18 refs. In Russian.

The data obtained on mouse experiments allow the conclusion that both proton and x-irradiation serve as a leucomogenic (blastomogenic) factor. The results indicate a necessity of extensive study on remote aftereffects of radiation, combined with acceleration as well as other factors during space flights.

A67-80849
DYNAMICS OF THE BLOOD FILLING OF THE CRANIAL CAVITY AND INTRACRANIAL PRESSURE IN RESPONSE TO TRANSVERSE ACCELERATION OF 40 G [DINAMIKA KROVENAPOLNENIIA POLOSTI CHEREPA I VNUTRICHEREPNOGO DAVLENIIA PRI POPERECHNYKH PEREGRUZKAKH DO 40 ED].
IU. E. Moskalenko, O. G. Gazenko, G. B. Vainshtein, I. I. Kas'ian, and A. A. Shurubura.
Izvestiia Akademii Nauk SSSR, Seriia Biologicheskaia, no. 2, Mar.–Apr. 1967, p. 165–174. 30 refs. In Russian.

Exposure of dogs to transverse acceleration increased the blood return to the cranial cavity and the intracranial pressure. The latitudinal component appearing during acceleration and deceleration of the centrifuge promoted or impaired an increase of the blood filling of the cranial cavity and intracranial pressure. The blood filling of the cranial cavity and intracranial pressure reached a maximum 15–20 g. The baseline values of the recorded functions recovered rather rapidly (5 to 15 min.) even after high acceleration. It is suggested that a combination of latitudinal and transverse components of the linear acceleration may balance the cerebral circulation.

A67-80850
PITCH OF NOISE BANDS.
Arnold M. Small, Jr. and Raymond G. Daniloff (Iowa, U., Iowa City).
Journal of the Acoustical Society of America, vol. 41, Feb. 1967, p. 506–512. 7 refs.

Ten subjects were asked to produce octave judgements, i.e., one octave above and one octave below a standard stimulus, with bands of low-pass and high-pass noise as well as sinusoids. For example, given a specific low-pass noise band as a standard, subjects adjusted the cuttoff frequency of a second low-pass noise band so that its pitch was one octave above that of the standard. Results indicate that bands of noise have a pitch and that the pitch is correlated with cutoff frequency. For low-pass noise, there seemed to be a relatively linear relation between pitch and cutoff frequency from 80- to 10,000 Hz. cutoff, whereas the linear relation for high-pass noise holds only for a restricted frequency range, 600–10,000 Hz. The pitch of both types of noise stimuli degenerates above 10 kHz., possibly because of limited earphone response and a rising threshold of hearing. More difficult to explain is the static and vague pitch of high-pass noise at low cutoff frequencies. A discussion of several mechanisms is included.

A67-80851
RETINAL DAMAGE BY VISIBLE LIGHT.
Robert A. Gorn and Toichiro Kuwabara (Harvard Med. School, Mass. Eye and Ear Infirmary, Howe Lab. of Ophthalmol., Boston).
Archives of Ophthalmology, vol. 77, Jan. 1967, p. 115–118. 14 refs.
Grant NINDB T1 NB 5142-09 and Alcon Eye Res. Found. supported research.

The effect of continuous bright light on the retina of albino rats was studied. It was found that after several hr. of phenomen was found to be reversible. Evidence is presented to show that the deterioration and recovery of the ERG is related to tissue damage and regeneration. Support is given to the theory that the mediating factor in the light damage is chronic visual pigment bleaching.

A67-80852
EFFECT OF FEEDING PROTEIN ON THE RENAL SENSITIVITY TO ANTIDIURETIC HORMONE AFTER WATER DEPRIVATION.
S. L. Rabasa and Frida Bergmann (Inst. de Invest. Med., Rosario, Argentina).
Acta Physiologica Latino Americana, vol. 16, no. 3, 1966, p. 249–256. 13 refs.
Consejo Nacl. de Invest. Cient. y Tecnicas de la Rep. Argentina supported research.

Rats deprived of water during eight days showed a gradual decline of their renal concentrating ability leading to death when the urine osmolarity dropped to 850–1200 mOsm. The tolerance to dehydration was decreased by 2% Na_{Cl} in the diet. The failure to withstand the lack of water is attributable to an exhaustion of ADH in the pituitary and to a fall in the renal sensitivity to ADH, which was 1/4 the normal. This renal component is unaffected by the presence of Na_{Cl} in the diet, in the concentrations studied. The renal sensitivity can be normalized by feeding, on rehydration a high protein diet (40%), but not with a normal protein diet (20%) or with this same diet plus 8.6% urea. The maximal recovery in the sensitivity to exogenous ADH is obtained with a high protein diet without added Na_{Cl}. It is concluded that in this condition, protein is the limiting factor for building the osmotic gradient in the renal medulla. This apparently means that in this case protein acts independently of urea.

A67-80853
CARDIOPULMONARY RESPONSES OF RESTING MAN DURING EARLY EXPOSURE TO HIGH ALTITUDE.
James A. Vogel and Charles W. Harris (Fitzsimons Gen. Hosp., U.S. Army Med. Res. and Nutr. Lab., Physiol. Div., Denver, Colo.).
Journal of Applied Physiology, vol. 22, Jun. 1967, p. 1124–1128. 11 refs.

Sixteen young male subjects were exposed to simulated altitudes of 2,000, 11,000, and 15,000 ft. in a hypobaric chamber and studied at sitting rest after 10, 20, 30, and 40 hr. of exposure. Of those measurements made, only arterial oxygen tension (Pa_{O_2}) changed significantly with time of exposure. Cardiac output rose from 71 at 2,000 ft. to 84 and 123 ml./min. per kg. at 11,000 and 15,000 ft., respectively. This was due to significant increases in heart rate at both higher elevations with no alteration in stroke volume. Mean arterial blood pressure was unaltered and, therefore, peripheral resistance fell concomitant with the rise in cardiac output. Mean Pa_{O_2} for the three altitudes was 94, 63, and 44 mm. Hg; and percent arterial oxygen saturation 99, 92, and 79. Largest changes in Pa_{CO_2} and pH were observed between 2,000 and 11,000 ft. and much less between 11,000 and 15,000 ft. Changes in cardiac output appeared best related to alterations in arterial O_2 content or saturation rather than tension, suggesting a peripheral rather than a central origin for the stimulus for the cardiovascular response to high altitude. The cardiac output response appears to follow an exponential relationship with altitude.

A67-80854
LEFT-RIGHT DIFFERENCES IN TACHISTOSCOPIC RECOGNITION: DIRECTIONAL SCANNING OR CEREBRAL DOMINANCE?.
M. P. Bryden (Waterloo, U., Canada).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1127–1134. 16 refs.

Although both single letters and groups of three letters are more readily identified when they appear in the right visual field, right visual-field superiority on the two tasks is not correlated. Single letters presented in mirror-image orientation are also better identified in the right visual field. These results suggest that hemispheric dominance is more important than directional scanning in determining left-right differences in the recognition of single-letter material.

A67-80855
CONSISTENCY OF INDIVIDUAL PATTERNS OF AUTOKINETIC DIRECTION.
Douglas G. Pearce (Defence Res. Med. Labs., Toronto, Canada).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1119–1123.

Four subjects continuously reported the direction of autokinetic movement during 20 ten-min. sessions. Individual patterns of directional dominance and change in direction over the 20 sessions were assessed by means of the Kendall coefficient of concordance (W). Individual patterns of directional dominance were consistent; the range of values of W for the four subjects was from 0.619 to 0.791. The individual patterns of direction change were generally less consistent; the range of W was from 0.242 to 0.704.

A67-80856
PERFORMANCE DEGRADATION EFFECTS OF INFORMATION LOADING.
A. H. Urmer (Lear Siegler, Inc., Life Sci., Santa Monica, Calif.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1117–1118.

Performance degradation as related to visual information transmission was investigated in a simulated military display system. Five to 18 information variables were presented in durations of 2–10 sec. with rates of 0.6 to 4.0 variables per sec. The results indicated sharp performance decline at a saturation point rather than a gradual decline.

A67-80857
RESPONSE LATENCY AS A FUNCTION OF STIMULUS AFFECT AND PRESENTATION ORDER.
Donald J. Lehr, Bruce O. Bergum, and Thomas E. Standing (Xerox, Fundamental Res. Lab., Rochester, N. Y.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1111–1116. 6 refs.

An experiment was conducted to examine the interrelationships between response-latency, perceived stimulus affect, and stimulus presentation order. Three groups of five subjects each responded to 100 pictorial and verbal stimuli along an ATTRACTIVE–UNATTRACTIVE affect dimension. Overt evaluative responses and response latencies were recorded on paper tape. The results indicated that the relationship between affect and response latency is an inverted U-shaped function with the attractive responses yielding significantly shorter latencies than either neutral or unattractive responses. The order in which stimuli are presented significantly affects both perceived affect and response times. A random order of stimulus presentation results in shorter latencies and greater perceived positive affect than the systematic arrangement of stimuli.

A67-80858
EXTENT, DIRECTION, AND LATENCY OF AUTOKINETIC MOVEMENT AS A FUNCTION OF PLACEMENT OF AN ADJACENT LIGHT.
Timothy G. Sadler, Roy B. Mefferd, Jr., and Betty A. Wieland (Veterans Admin. Hosp., Psychiat. and Psychosomat. Res. Lab., Houston, Tex.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1087–1096. 16 refs.

Four observers drew maps of their autokinetic movement for a central light when it was the only stimulus, and when another light was adjacent to it. Eight directions (at 45° intervals) at each of two distances from the central light (1.27 and 2.54 cm.) were used to yield 16 different placements of the light-pairs. The addition of the second light in any placement resulted in a significant reduction in the amount of movement and an increase in its latency. At either of the distances used, both lights were still viewed in the fovea, and the results did not differ in this respect. The direction of the second light from the central one did not exert a significant influence, however. The results are compatible with the view that autokinesis results from a combination of eye movements and efferent tension.

A67-80859
THREE FORMULAE FOR THE DENSITY-GRADIENT OF STIMULI IN DEPTH PERCEPTION.
Jiei Ogasawara (Tokyo, U., Japan).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1086

These formulas to facilitate certain figures or stimulus patterns representing the density gradient, an important factor in depth perception, for experimental use are presented and discussed. An illustrative figure generated from these formulas is also presented which describes how the latter permit one to draw the expected and exact density-gradient picture.

A67-80860
MOTOR SKILLS BIBLIOGRAPHY: LV. PSYCHOLOGICAL ABSTRACTS, 1966, VOLUME 40, SECOND THIRD.
C. H. Ammons and R. B. Ammons.
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1075–1078. 106 refs.

One-hundred and six selected items on motor skills are listed alphabetically. These include articles dealing with psychomotor performance such as figure drawing, laterality, flight performance, and reaction-time studies.

A67-80861
OPERATOR NOISE IN A DISCRETE SIGNAL DETECTION TASK.
E. H. Brazeal, Jr. (United Aircraft Corp. Res. Labs., East Hartford, Conn.) and T. L. Booth (Conn. U., Dept. of Elec. Eng., Storrs).
(IEEE Symp. on Human Factors in Electron., 7th Minneapolis, May 1966).
IEEE Transactions on Human Factors in Electronics, vol. HFE-7, Dec. 1966, p. 164–173. 6 refs.
Contract Nonr 2512(00).

Man's ability to detect visual signals in noise is investigated. An operator is presented a computer generated two dimensional binary or "dot" display and is asked to indicate the presence or absence of a "signal." Previously developed signal-detectability theory is expanded. A model of the operator as a threshold detector hampered by a Gaussian noise source is developed. The noise source is defined by two parameters–first and second moment operator factors, ϵ and γ. The most important parameter, γ, is investigated experimentally and found to be essentially independent of signal to noise ratio, SNR. This is interpreted to mean that the noise source decrements the actual SNR by two to three db. and that the operator sets a near optimum decision threshold as a function of SNR.

A67-80862
AN INCLUSIVE CLASSIFIED BIBLIOGRAPHY PERTAINING TO MODELING THE HUMAN OPERATOR AS AN AUTOMATIC CONTROL SYSTEM.
R. G. Costello and T. J. Higgins (Wis. U., Dept. of Elec. Eng., Madison).
(IEEE Symp. on Human Factors in Electron., 7th Minneapolis, May 1966).
IEEE Transactions on Human Factors in Electronics, vol. HFE-7, Dec. 1966, p. 174–181. 236 refs.

This paper comprises a bibliography of some two hundred entries, selected from a total collection of almost five hundred references pertaining to the human operator, which are concerned specifically with modeling the human operator as an element in an automatic control system. To enable systematic utilization of the material, the important papers are classed in Section A, the Bibliography Subject Index, under major subheads, and then arranged chronologically within each subject category. Included within these categories are many of the original papers dealing with human operator models, including British and U.S. classified reports produced after World War II, which have since been declassified. Up-to-date private-industry reports, which are generally difficult to learn of or locate, are included, as is a wealth of material stemming from federal agencies, principally NASA. Section B comprises the actual bibliography.

A67-80863
PRELIMINARY RESULTS OF THE LUNAR SURFACE GAMMA RADIATION RECORDED BY THE "LUNA-10" SATELLITE [PREDVARITEL'NYE REZUL'TATY IZMERENII GAMMA-IZLUCHENIIA LUNNOI POVERKHNOSTI NA KOSMICHESKOI STANTSII "LUNA-10"].
A. P. Vinogradov, IU. A. Surkov, G. M. Chernov, F. F. Kirnozov, and G. B. Nazarkina.
Kosmicheskie Issledovaniia, vol. 4, Nov.–Dec. 1966, p. 871–879. In Russian.

The data recorded by the gamma-spectrometer installed on board Luna-10 indicated the following conclusions: (1) The average gamma radiation of lunar soil is approximately equal to terrestrial. (2) 90% of this radiation is produced by bombardment of lunar surface by cosmic rays. (3) The analysis of spectrum indicated the presence of O, Mg, Al, and Si. (4) The variation of gamma irradiation intensity was about 40% between "craters" and "seas". (5) The radiation due to decay of K, Th and U did not exceed 10% and (6) The comparison of products of natural decay of K, Th and U on the moon and that of terrestrial specimens indicated that the lunar rocks could be of the bosalt nature. The data allowed the assumption to presume of the absence of radioactive K, Th and U, similar to terrestrial type. It was not possible to come to any conclusion, on the possibility of existence of meteorites on the lunar surface.

A67-80864
PSYCHOLOGICAL EFFECTS OF DEPRIVATION OF DREAMING SLEEP.
Harold Sampson (Mt. Zion Hosp. and Med. Center, Dept. of Psychiat., San Francisco, Calif.).
Journal of Nervous and Mental Disease, vol. 143, Oct. 1966, p. 305–317. 20 refs.
Grant NIMH MH-05723.

The nightly amount of dreaming sleep of six male, volunteer, college students was drastically reduced for three consecutive nights by each of two methods, dream interruption and partial sleep deprivation. Psychological reaction to the reduced dreaming was studied with three types of data: tape-recorded and transcribed dream reports; field notes maintained throughout the experiment on the subjects' behaviors, conversations, and preoccupations and responses to queries about the daily rounds and moods. Psychometric tests were included such as the D scale of the Minnesota Multiphase Personality Inventory digit span forward and backward, serial subtraction and a word association test. Some subjects developed intense hunger and special food cravings; all reported some increase in appetite during one or both deprivation series. There was, however, no increase in oral responses to a word association list and, in contrast to Fisher's report, no increase in oral imagery in the rapid eye movement (REM) dream fragments obtained on dream interruption nights. Some instances of disturbances in subjects' relationship to reality or feelings of reality were observed and reported. There was a statistically significant increase in aggressive content in (REM) dream fragments as deprivation increased. There was also a statistically significant increase in the amount of manifest distortion in interrupted (REM) dreams as deprivation increased It was tentatively speculated that this change could represent some kind of acceleration of the dream process.

A67-80865
THE EFFECT OF GIBBERELLIC ACID ON THE LESIONS PRODUCED IN GUINEA-PIGS BY SUBLETHAL X-RAY IRRADIATION [VPLYV KYSELINY GIBERELOVEJ NA SUBLETALNE RTG OZIARENIE MORCIAT].
E. Schwartz and V. Laginova.
Bratislavske Lekarske Listy, vol. 46, Oct. 8, 1966, p. 470–477. 10 refs. In Czech.

The results were obtained with gibberellic acid applied to guinea pigs after they had been irradiated with a sublethal dose of X-rays. To evaluate the effect of gibberellic acid on the course of radiation sickness, the following criteria were followed: (1) survival time; (2) over-all weight of the guinea pigs before and after the experiment; (3) the weights of the liver, the kidneys, and adrenals; and (4) bacteriological findings in the lungs. It appeared from the results obtained that gibberellic acid prolonged the survival time and prevented the weight loss of the irradiated animals. The lung parenchyma of the irradiated guinea pigs to which gibberellic acid had been applied showed minimal number of pathogenic bacteria in the lungs in comparison with control animals.

A67-80866
INFORMATIVE TACTILE STIMULI IN THE PERCEPTION OF DIRECTION.
William Schiff, Lane Kaufer, and Sandra Mosak (N.Y. City U., City Coll., New York).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1315–1335. 21 refs.
Grant HEW RD-1571-S.

Three experiments evaluated the efficiency of a special tactile symbol, whose stimuli purportedly specify direction, for use in tactile diagrams for the blind. A tactile form of the conventional visual arrow symbol served as a control symbol. The directional aspects of the stimuli were easily discriminated by both blind and sighted subjects. Either symbol proved effective in simple diagrams, but the special symbol was superior in more complex diagrams, suggesting an interaction effect between symbol type and diagram complexity, appearing in response latency. The special symbol type and diagram complexity, appearing in response latency. The special symbol was preferred by blind subjects in simple and complex diagrams. Various aspects of diagram presentation also proved significant. For blind subjects IQ was negatively related to response time. Sighted subjects provided similar results, suggesting that effects were general. Blind subjects were faster than sighted subjects, tended to make more errors, and required more information about the tasks. The results were discussed considering involvment of cognitive factors and tactile sensitivity factors. General implications for symbolic displays and tactile graphics for the blind were also discussed.

A67-80867
A STUDY BY TELEMETERING ON THE VARIATION OF THE CARDIAC CYCLE AND OF THE RESPIRATORY [SIC] CYCLE DURING MUSCULAR EXERCISE. PART 1. ON THE COURSE OF VARIATION OF THE CARDIAC CYCLE AND OF THE RESPIRATORY CYCLE DURING 100 M OR 400 M RACE RUNNING WITH ALL MIGHT.
Kousaku Noda (Tokushima U., School of Med., First Dept. of Physiol., Japan).
Shikoku Acta Medica, vol. 22, Aug. 1966, p. 617–626. 21 refs. In Japanese.

The electrocardiogram and the respiratory movement during 100 or 400-m dashes was recorded by means of short wave, wireless duplex transmission. During the 100-m. dash, the duration of the cardiac cycle was shortened to 0.36 ± 0.03 sec. Further slight shortening continued even after the end of the running. The number of respirations during 100-m. dash was shortened as much as three times. During the 400-m. dash, the duration of the cardiac cycle was shortened to 0.34 ± 0.02 sec. It arrived at a steady state level after nearly 300 m. The minute fluctuation of the cardiac cycle was caused by the respiratory movement during the running. The breath-holding occurring before the start continued for 0.4 to 4.0 sec. Thereafter, the respiratory cycle was abruptly shortened to 1.2 ± 0.1 sec.

A67-80868
A STUDY BY TELEMETERING ON THE VARIATION OF THE CARDIAC CYCLE AND OF THE RESPIRATORY CYCLE DURING MUSCULAR EXERCISE. PART 2. ON THE COURSE OF VARIATION OF THE CARDIAC CYCLE AND OF THE RESPIRATORY CYCLE DURING JUMPING, THROWING AND PUTTING THE WEIGHT.
Kousaku Noda (Tokushima U., School of Med., First Dept. of Physiol., Japan).
Shikoku Acta Medica, vol. 22, Aug. 1966, p. 627–637. 12 refs. In Japanese.

The electrocardiogram and the respiratory movement during jumping or throwing and putting the weight was recorded by means of short wave, wireless duplex transmission. In the jumping, the shortening of the cardiac cycle was only 0.1 sec., and the recovery was more speedy than in the running. The shortening of the respiratory cycle was only 0.4 to 0.8 sec. during the exercise. In the throwing and putting the weight, the shortening of the cardiac cycle was only about 0.1 sec., and the recovery was more rapid than in the jumping. During the turning or the save running the occurrence of the

respiration was recorded in the whole test cases. The sudden variation of the cardiac cycle at the beginning of the exercise (the jumping or the throwing) was caused in part by the direct reflex from the mobilized muscles. The degree of the variation was dependent upon the strength of load acting upon the mobilized muscles, and was influenced more by leg than arm muscles.

A67-80869
CHANGES IN CONTENTS OF CARBOHYDRATE AND FATTY ACID IN THE CELLS OF CHLORELLA PROTOTHECOIDES DURING THE PROCESSES OF DE- AND REGENERATION OF CHLOROPLASTS.
Mitsuo Matsuka, Hama Otsuka, and Eiji Hase (Tokyo U., Inst. of Appl. Microbiol. and Tokugawa Inst. for Biol. Res., Japan).
Plant and Cell Physiology, vol. 7, Dec. 1966, p. 651–662. 23 refs. Min. of Educ. supported research.

In the present study changes in contents of carbohydrate and fatty acid in *Chlorella protothecoides* cells were followed during processes of "bleaching" and "greening". During "bleaching", the quantity of glucose existing in the insoluble carbohydrate fraction of algal cells increased rapidly and markedly. A considerable increase was also observed in the contents of cells in oleic, linoleic and palmitic acids. It was noted, however, that linoleic acid decreased in quantity during the most active phase of cell bleaching. During the process of "greening", the glucose in the insoluble carbohydrate fraction rapidly decreased, suggesting that it is utilized, as carbon and energy sources, for the chloroplast regeneration. Linoleic acid was found to be synthesized in parallel with formation of chlorophyll. A peculiar pattern of change in contents was observed with oleic and palmitic acids, which was interpreted as being related with the process of cellular division occurring incidentally during the process of greening.

A67-80870
CHANGE OF FATTY ACID COMPOSITION OF CHLORELLA ELLIPSOIDEA DURING ITS CELL CYCLE.
Hama Otsuka and Yuji Morimura (Tokyo U., Inst. of Appl. Microbiol. and Tokugawa Inst. for Biol. Res., Japan).
Plant and Cell Physiology, vol. 7, Dec. 1966, p. 663–670. 10 refs. Min. of Educ. supported research.

The lipids extracted from *Chlorella* cells at different developmental stages were separated by chromatography on silicic acid into "nonpolar" (chloroform-eluate) and "polar" (methanol-eluate) lipid fractions. The lipids were also subjected to florisil chromatography to fractionate neutral glycerides and free-fatty acids. Gas-liquid chromatographic analysis of these fractions has revealed a marked difference in their fatty acid compositions which were found to undergo characteristic changes during the course of algal cell cycle. It was found that the fatty acids in the "nonpolar" lipid (fat) fraction are synthesized during the growth phase in the light and consumed during the process of cellular division.

A67-80871
MECHANICS OF HORIZONTAL MOVEMENT OF THE HUMAN EYE.
D. S. Childress and R. W. Jones (Northwestern U., Bio-Med. Eng. Center and Dept. of Elec. Eng., Evanston, Ill.).
Journal of Physiology, vol. 188, Jan. 1967, p. 273–284. 11 refs.
Grant NIH NB-02165.

The mechanics of the muscle-eyeball system of the humans was re-investigated by careful examination of the motion of the eye after it was mechanically adducted and released by means of a suction contact lens attached to it. Orbital stiffness during adduction was found to be about 1.25 g./deg., which is near the value of 1.2 g./deg. reported for adduction. However, the results also showed that the stiffness decreased to 0.65 g./deg. after approximately 5° of adduction. It was concluded that for horizontal motion the globe could be considered as being in series with an elastic component which had a stiffness of 9.0 g./deg. This series elastic component, arising from the extraocular muscles, muscle tendons, and from other orbital tissue appears to increase in stiffness as muscle innervation increases. The experiments showed that the muscle-eyeball system of the human is heavily damped which confirmed the results. Evidence was presented which indicated that the extraocular muscles were dominant factors in horizontal eye motion.

A67-80872
HYPERBARIC OXYGENATION TO THREE CASES OF HYPOXIA.
S. Hong, C. Lim, M. Lee, H. Yoo, and H. Sin (Presbyterian Hosp., Dept. of Intern. Med., Taegu, Korea).
Korean Journal of Internal Medicine, vol. 10, Jan. 1967, p. 63–66. 37 refs. In Korean.

Two cases of carbon monoxide intoxication and one of barbiturate poisoning with cyanotic state were successfully treated with hyperbaric oxygenation using an inexpensive portable apparatus. As far as carbon monoxide intoxication was concerned, the necessary pressure and duration of hyperbaric oxygenation were within safe limits. The literature was also reviewed.

A67-80873
OPERANT REINFORCEMENT OF AN AUTONOMIC RESPONSE: TWO STUDIES.
Rochelle Johnson Gavalas (Minn. U., U. Hosp., Minneapolis).
Journal of the Experimental Analysis of Behavior, vol. 10, Jan. 1967, p. 119–130. 11 refs.
Grants PHS 5-72-MH-11,225-02 and VRA RT-2.

Two successive studies were conducted to determine the possibility of operant reinforcement of nonspecific galvanic skin resistance responses. In the first study, with five experimental and three control subjects who served for 20 to 30 min. a day for ten days, all experimental subjects learned to emit more nonspecific galvanic skin resistance responses than their *ad hoc* matched controls. In a second study, nine experimental and nine control subjects were matched for first-day levels of reactivity and yoked for operant reinforcement schedules. Significant differences between the two groups were found on the last day of conditioning and during extinction. Six of the nine experimental subjects showed higher cumulative rate curves than their matched and yoked controls. The concomitant measures (basal resistance, heart rate, etc.) all supported this finding. It was suggested that operant reinforcement of autonomic response tends to maintain a certain level of responding in contrast to persistent adaptation in the control group.

A67-80874
CHANGES IN VISUAL ANALYSER DURING COORDINATE MOTION [IZMENENIE SOSTOIANIIA ZRITEL'NOGO ANALIZATORA PRI VYPOLNENII SLOZHNYKH DVIZHENII].
N. G. Medvedeva (All-Union Sci.-Res. Inst. of Phys. Culture, Moscow, USSR).
Teoriia i Praktika Fizicheskoi Kul'tury, vol. 30, Jan. 1967, p. 32–36. In Russian.

Electroencephalograms of various regions of the head and retinograms were studied on men engaged in gun practice in order to study the changes in the entire visual analyzer. The results showed changes in amplitude, frequency, and type of brain waves at various phases of the exercise. In all cases the electrical cerebral activity and functional state of the eye were below normal for five to ten min. after the practice. A depression of metabolic processes was noted at the peripheral areas of the eye. This shift from normal was more pronounced in the beginners than in subjects who had previous gunnery experience.

A67-80875

THE EFFECT OF INDUSTRIAL NOISE ON THE FUNCTIONING OF THE AUDITORY ANALYZER IN WORKING ADOLESCENTS [O VLIIANII PROIZVODSTVENNOGO SHUMA NA FUNKTSIONAL'NOE SOSTOIANIE SLUKHOVOGO ANALIZATORA PODROSTKOV].

L. L. Kovaleva (USSR, Acad. of Med. Sci., Inst. of Hyg. of Children and Adolescents, Moscow).

Gigiena i Sanitariia, vol. 32, Jan. 1967, p. 52–56. 9 refs. In Russian.

The threshold value of auditory acuity and the length of the latent period of the acousticomotor reaction were determined in 80 adolescents, aged 16–18 yr. The finding was that high frequency noise at an intensity level of 95–100 db. had an unfavorable effect on the functioning of the auditory analyser, judging by the fall of the auditory acuity and a change in the neurodynamics. On the action of industrial noise of a lesser intensity (80–85 db.) and of a spectrum with prevalence of lower and medium frequencies, less pronounced changes took place in the auditory analyser. This fact should be taken into consideration on admitting adolescents to work connected with noise.

A67-80876

ON CONTROL ELEMENTS OF ARBITRARY MOVEMENTS [OB ELEMENTAKH UPRAVLENIIA PROIZVOL'NYMI DVIZHENIIAMI].

V. E. Belen'kii, V. S. Gurfinkel', and E. I. Pal'tsev (USSR, Acad. of Sci., Inst. of Biol. Phys., Moscow).

Biofizika, vol. 12, Jan.–Feb. 1967, p. 135–141. 6 refs. In Russian.

Electromyograms of deltoid, back and leg muscles were taken on subjects lifting and lowering an arm under verbal command. It was disclosed that during the latent period of the voluntary arm movement certain muscles of legs and torso showed characteristic activation. This activation began in the torso muscles before the leg muscles and was maintaining the orthostatic balance at the minimum expenditure of energy. If the raising arm met an obstacle a second phase of activation took place in order to adjust to the new distribution of forces to maintain the balance.

A67-80877

THE EFFECT OF VIBRATION ON THE MORPHOLOGIC PATTERN OF ENDOCRINE GLANDS [WPLYW WIBRACJI NA MORFOLOGICZNY ORBAZ GRUCZOLOW DOKREWNYCH].

Ryszard Piechosiński.

Patologia Polska, vol. 17, Oct.–Dec. 1966, p. 561–563. 6 refs. In Polish.

After vibration of frequency 1800/min. and amplitude of six mm. in the vertical and four mm. in the horizontal direction, no changes were found in the thyroid gland or ovaries. The adrenal glands were enlarged, their medullary portion was hyperemic, and the zona fasciculata was slightly enlarged. The changes in the adrenal glands of white mice were attributed to stress connected with vibration.

A67-80878

DEAGGREGATION OF CHLOROPHYLL A BY XANTHOPHYLLS.

S. Aronoff (Iowa State U., Dept. of Biochem. and Biophys., Ames) and Patricia Kirk (NASA, Ames Res. Center, Exobiol. Div., Moffett Field, Calif.).

Nature, vol. 213, Feb. 18, 1967, p. 722.

NSF supported research.

Aggregated solutions of chlorophyll-a in carbon tetrachloride were deaggregated by approximately equimolar amounts of leaf xanthophylls, but not by carotenes. The deaggregation showed itself spectroscopically by loss of the shoulder band on the red side of the red absorption band and an increase in intensity of the latter along with a shift from 668 to 665 nm. The corresponding spectra for b-carotene showed no change over two orders of magnitude of concentration, the strongest having a carotene/chlorophyll ratio of approximately two. Probable isomerization of neoxanthin to two additional compounds resulted from rechromatography in petroleum ether on a sugar column. Of the three only the middle compound on the chromatograph could deaggregate. Without knowing the matrix in which chlorophylls occur *in vivo* it is possible that at the calculated natural concentration (approximately 10^{-1} molar) they may be in a highly aggregated state. It is presumed that xanthophylls in chloroplasts regulate the extent of aggregation of chlorophylls. Chlorophyll-a forms at least two different kinds of dimer, however, and it is clear that the accessory components of the chloroplast can regulate the detailed geometry controlling energy transfer in an energy trapping and biochemical function of the chlorophylls.

A67-80879

VISUAL DISTORTION WITH TWO-COLORED SPECTACLES.

Peter K. Leppmann and Betty A. Wieland (Veterans Admin. Hosp., Psychiat. and Psychosomat. Res. Lab., Houston and Houston U., Tex.).

(Southwestern Psychol. Assn., Conv., Arlington, Tex., Apr. 1966). Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1043–1048. 12 refs.

Observations of visual phenomena by a subject continuously wearing blue-yellow split-half lens for an 11-day period are reported. Color adaptation began on the first day but hue and brightness distortions associated with specific body position continued to be observed. Situational aftereffects of hue, related to body position, continued during the first day after removal of the spectacles, and of brightness for an additional 24 hr.

A67-80880

EFFECT OF WHITE NOISE ON DISINHIBITION OF VERBAL EXPRESSION.

Cooper Holmes and Philip S. Holzman (Menninger Found., Topeka, Kan.).

Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1039–1042.

Grant NIMH MH 07962.

A67-80881

Two groups each composed of ten male subjects were required to tell about an embarrassing situation, in nonsense language, under two conditions: with white noise masking their speech and without white noise. Sixteen of 20 subjects uttered more English words and 18 of 20 talked for a greater length of time in the white noise condition. Latency was not significantly affected by the white noise. The average number of syllables spoken per 15 sec. was significantly greater under white noise, for both groups combined and separately only for the second or replication group. The results are interpreted to indicate a process of disinhibition of speech under white noise.

A67-80881
ACCURACY OF FACING MOVEMENTS EXECUTED WITHOUT VISION.
Bryant J. Cratty and Harriet G. Williams (Calif. U., Los Angeles).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1231–1238. 12 refs.

Fifty-eight university-age men and women were blindfolded and earplugged and asked to execute facing movements of 90°, 180°, and 360°. 90° turns were overestimated, while 180° and 360° turns were underestimated. The accuracy of judgments on this task depended upon the individual making the turn, the direction in which the facing movement was made, and the magnitude of the turn requested.

A67-80882
MOTOR SKILLS BIBLIOGRAPHY: LVI. PSYCHOLOGICAL ABSTRACTS, 1966, VOLUME 40, THIRD THIRD.
R. B. Ammons and C. H. Ammons.
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1223–1226. 103 refs.

References (103) to research on motor skills are listed alphabetically.

A67-80883
AN ANALYSIS OF AGE AND OTHER FACTORS RELATED TO MAXIMUM OXYGEN UPTAKE.
Wilhelm von Döbeln, Irma Åstrand, and Arne Bergström (Natl. Inst. of Occupational Health, Kungliga Gymnastiska (Centralinst., Aeromed. Lab. and Res. Inst. of Swed. Natl. Defence, Stockholm, Sweden).
Journal of Applied Physiology, vol. 22, May 1967, p. 934–938. 15 refs. Natl. Swed. Council for Building Res., Swed. Building Ind. Work Res. Found., and Swed. Med. Res. Council supported research.

Eighty-four male construction workers aged 30–70 yr. were tested once at submaximal and maximal loads on a bicycle ergometer. Submaximal and maximal heart rates and maximal oxygen uptake ($\dot{V}_{O_2}$) were measured. The prediction of max $\dot{V}_{O_2}$ from the other variables was analyzed by a fitting procedure using a modified least-square criterion. The best equation gave a SEE of 8.4%. The equation is presented and discussed.

A67-80884
MAXIMUM OXYGEN UPTAKES OF COLLEGE SWIMMERS.
John R. Magel and John A. Faulkner (Mich. U., Dept. of Phys. Educ., Ann Arbor).
Journal of Applied Physiology, vol. 22, May 1967, p. 929–933. 17 refs.
Grant NIH GM 12554.

The maximum oxygen uptake of 26 highly trained college swimmers was measured during treadmill running, tethered swimming, and free swimming. In the treadmill test, five-min. runs were made at seven m.p.h. up increasing grades. The tethered-swimming test consisted of three-min. swims during which increasing weights were supported. The free-swimming test included a warm-up followed by six maximum 50-yd. swims during which increasing weights were supported. The free-swimming test included a warm-up followed by six maximum 50-yd. swims during which energy expenditure was measured. For maximum oxygen uptake during tethered swimming, the test-retest correlation of 0.93 and the lack of a significant difference with a paired t analysis indicated good reproducibility. No significant difference was observed between the mean maximum oxygen uptake during treadmill running (4.20 liters/min.). The correlation coefficient was 0.85. The pulmonary ventilation and respiratory exchange ratio were significantly lower and oxygen extraction was significantly higher swimming tethered than running. The correlation coefficient between maximum oxygen uptake swimming tethered and swimming free was 0.90. The mean aerobic capacity swimming free (4.39 liters/min.) was significantly greater than the mean obtained swimming tethered (4.27 liters/min.), possibly due to a training effect.

A67-80885
WORK AND EFFORT.
H. C. Burger, L. J. Koopman, and P. Van Loon (State U., Dept. of Med. and Physiol. Phys., Phys. Lab., Utrecht, The Netherlands).
Journal of Applied Physiology, vol. 22, May 1967, p. 913–922. 14 refs.

Physiological reactions of pulse pressure R_p, oxygen consumption R_{O_2} and pulse frequency R_f to exercise were studied as a function of time and of force and displacement. The experiments were performed with three male subjects by using a calibrated bicycle ergometer with which the load could be measured and the values of torque T and revolutions n per min. corresponding with the physical quantities force and displacement, could be chosen independently. It was found that the reactions R_p, R_{O_2}, and R_f as a function of time could be described by a linear differential equation of the first order from which the recovery time was derived. For the reactions R_p, R_{O_2}, and R_f occurring during an exercise of two min., the relative dynamic, static, and kinetic contributions to the effort could be expressed as a function of force and displacement according to an analytical method. The efficiency of the O_2 consumption was also determined.

A67-80886
METABOLIC AND CIRCULATORY ADJUSTMENTS TO UNSTEADY-STATE EXERCISE.
Robert Gilbert, J. Howland Auchincloss, Jr., and Gerhard H. Baule (N. Y. State U., Upstate Med. Center, Dept. of Med., Syracuse and Syracuse U., Dept. of Elec. Eng., N. Y.).
Journal of Applied Physiology, vol. 22, May 1967, p. 905–912. 16 refs.
Grants PHS H-2800 and 1-K3-HE-19,414.

A study was made of breath-to-breath oxygen transfer at the alveolar-capillary membrane, cardiac output, and peripheral oxygen uptake during the first five min. of treadmill exercise and recovery in normal human subjects. Oxygen transfer and cardiac output were measured directly; peripheral oxygen uptake was derived from these with the aid of a mathematical model. During exercise all three parameters had a very rapid initial rise, a slower secondary rise, and achieved a steady state in 1.5–3 min. Recovery period responses were similar but slightly slower.

A67-80887
ROLE OF VENTILATION IN MAINTAINING CARDIAC OUTPUT UNDER POSITIVE-PRESSURE BREATHING.
J. C. Cruz, P. Cerretelli, and L. E. Farhi (N. Y. State U., Dept. of Physiol., Buffalo).
Journal of Applied Physiology, vol. 22, May 1967, p. 900–902. 17 refs.
Contract AF 33(615)1095; Grants PHS H-7229 and I-FO5-TW-683.

Simultaneous measurements of ventilation ($\dot{V}E$) and cardiac output ($\dot{Q}$) were obtained in normal subjects breathing either at ambient pressure or against a positive pressure (PPB) of 5, 10, or 25 cm. H_2O. When this pressure is increased, $\dot{Q}$ tends to decrease. This may however be masked by concomitant changes in $\dot{V}E$. When the latter is constant at ten liters.min.$^{-1}$, $\dot{Q}$ decreases by approximately 0.2 liter.min.$^{-1}$ for each additional cm. H_2O of PPB. Therefore, at this ventilatory level, ϵ PPB of 30–35 cm. H_2O would be associated with a $\dot{Q}$ value of zero. At any level of PPB an increase in $\dot{V}E$ results in an increase in $\dot{Q}$. This increase is 0.3 liter.min.$^{-1}$ per liter.min.$^{-1}$ change in $\dot{V}E$ when frequency of breathing is constant, but only 0.15 when frequency is increased, which may indicate that the tidal volume per se may be involved.

A67-80888
HEMODYNAMIC CHANGES DURING SLEEP.
Ibrahim M. Khatri and Edward D. Freis (Georgetown U., School of Med., Depts. of Med. and Physiol. and Veterans Admin. Hosp., Washington, D. C.).
Journal of Applied Physiology, vol. 22, May 1967, p. 867–873. 11 refs.

Cardiac output, mean arterial pressure, central venous pressure, and the digital plethysmogram were recorded during electroencephalogram-monitored sleep. In sleep without rapid eye movements (REM) mean arterial pressure and cardiac output were reduced from the level recorded during the resting awake state. The fall in cardiac output was associated with a reduction in heart rate rather than in stroke volume. Vasodilation occurred in the digits with decreased amplitude of alpha and beta waves but total peripheral resistance remained essentially unchanged. Central venous pressure fell slightly in stages III and IV sleep. During REM sleep arterial pressure and heart rate usually rose while changes in cardiac output were variable. Digital vasoconstriction occurred in nearly all instances. The results indicated that the level of sympathetic vasomotor activity had an important influence on the circulatory changes observed during the various stages of sleep.

A67-80889
EXCITABILITY CHANGES OF THE INTRAGENICULATE OPTIC TRACT FIBRES PRODUCED BY ELECTRICAL STIMULATION OF THE VESTIBULAR SYSTEM.
P. L. Marchiafava and O. Pompeiano (Pisa U., Physiol. Inst. and Natl. Res. Council, Neurophysiol. Center, Italy).
Pflügers Archiv für die gesamte Physiologie, vol. 290, Aug. 2, 1966, p. 275–278. 13 refs.
Grant NINDB NB 02990-05.

Repetitive stimulation of the VIIIth nerve or of the medial and descending vestibular nuclei increases the excitability of the intrageniculate optic fibers ending with a time course typical for presynaptic inhibition.

A67-80890
VESTIBULAR INPUT TO THE LATERAL GENICULATE NUCLEUS DURING DESYNCHRONIZED SLEEP.
O. Pompeiano and A. R. Morrison (Pisa U., Physiol. Inst. and Natl. Res. Council, Neurophysiol. Center, Italy).
Pflügers Archiv für die gesamte Physiologie, vol. 290, Aug. 2, 1966, p. 272–274. 7 refs.
Grants NINDB NB 02990-05 and I F 10 NB 1294-01 NSRB.

The enhancement of the integrated activity in the lateral geniculate nucleus during the rapid eye movements of the desynchronized sleep is due to ascending volleys originating from the medial and descending vestibular nuclei.

A67-80891
DETERMINATION OF BODY TEMPERATURE BY INFRARED EMISSION.
R. Bowling Barnes (Barnes Eng. Co., Stanford, Conn.).
Journal of Applied Physiology, vol. 22, Jun. 1967, p. 1143–1146. 9 refs.

Like every object above absolute zero, human skin emits infrared as an exponential function of its temperature. Measurement of the emitted infrared leads to a determination of the skin's temperature. In static ambients, objects come to thermal equilibrium and their surface temperatures are determined by heat flow to the surface and heat losses from the surface. Heat flow to the skin is governed largely by local vascularities and the proximity of body organs exhibiting high metabolism. Losses are caused by evaporation, convection, conduction, and an excess of infrared emission over absorption. If losses are small, skin temperature approaches body temperature. Even in static ambients, exposed skin areas, such as the forehead, lose heat by radiation and stabilize at temperatures somewhere between that of the body and the surround. In the external auditory canal, losses by convection, conduction, and evaporation are minimal. Each canal wall area exchanges infrared radiation with an area similar to itself. In such a case, the skin temperature should approach body temperature. Instrumentation is described for measuring this temperature and evidence presented that it tracks closely that which is measured orally.

A67-80892
AN ANALOG COMPUTER ANALYSIS OF REGIONAL DIFFUSING CAPACITY IN AIRFLOW OBSTRUCTION.
Benjamin M. Lewis and Brian Bork (Wayne State U., School of Med., Depts. of Med. and Detroit Gen. Hosp., Mich.).
Journal of Applied Physiology, vol. 22, Jun. 1967, p. 1137–1142. 16 refs.
Grants NHI HE-02379-10 and NHI 3-K6-HE-2182-05; Detroit Gen. Hosp. Res. Corp. supported research.

Fifteen subjects with airflow obstruction rebreathed a mixture of Ne, CO, and C_2H_2 in air for 30–45 sec. Five samples were taken from the rebreathing bag of inspiration and the changes of Ne and CO concentration with time in these subjects were analyzed in terms of a two- or three-region electrical analog of the lung by altering the parameters of the model to duplicate, successively, neon mixing and CO absorbtion of each patient. Values thus obtained show that regional diffusing capacity is apparently proportional to regional volume and clearly not proportional to regional ventilation. Because a two-compartment lung oversimplifies nature, because the model cannot deal with stratified inhomogeneity or sequential ventilation without distorting regional volume and ventilation, because diffusing regions may not coincide with ventilating regions, and because CO concentration is insensitive to changes in diffusing capacity in very poorly ventilated

regions, proportionality of diffusion capacity to lung volume is not established. Total diffusing capacity can be measured by rebreathing when uneven ventilation is moderate, but not when severe.

A67-80893
OBJECTIVE QUANTITATIVE TESTS OF SPATIAL HALLUCINATIONS IN MONKEYS.
Leonard A. Cohen (Albert Einstein Med. Center, Res. Labs., Philadelphia, Pa.).
Journal of the Albert Einstein Medical Center, vol. 15, Jan. 1967, p. 89–95. 9 refs.

Spatial disorientation of an organism in a state of hallucination was measured quantitatively and objectively by observing the performance of specialized motor activities of primates. Hallucinogens were administered to the monkeys. Low dosages of hallucinogens produced definite spatial disorientation with subnormal performance by the animals. High dosages incapacitated the animals so that they would not respond to test equipment. Studies for determining the mechanism of hallucinogenic disorientation involved: (1) tests for normal orientation, (2) interruption of the cervical component of orientation by aseptic surgical procedure and measurement of orientation, and (3) LSD (d-lysergic acid diethylamide) administration to operated monkeys and additional spatial orientation testing. Results imply that hallucinogens affect the central physiologic mechanism for orientation. Objective tests were not useful for measuring severe disorientation, and a subjective-pseudoquantitative test had to be substituted. This demonstrated the need for orientation tests which automatically stimulate the subject for the desired response to be measured, without requiring the conscious participation of the subject. A brief description of equipment for future tests followed.

A67-80894
SOME SERUM ENZYME CHANGES IN DOGS SUBMITTED TO MODERATE IMPACTS [COMPORTAMENTO DI ALCUNE ATTIVITA' ENZIMATICHE DEL SIERO IN CANI SOTTOPOSTI AND URTI DI MODESTA ENTITA'. NOTA I].
G. Paolucci (Centro di Studi e Ric. di Med. Aeron. e Spaziale, Ispettorato di Sanita' Aeron., Rome, Italy).
(Soc. Ital. di Med. del Traffico, III Congr., Rome, Jun. 6–8, 1966). Rivista di Medicina Aeronautica e Spaziale, vol. 29, Jul.–Sep. 1966, p. 427–441. 7 refs. In Italian.

Some serum enzymes (transaminases and dehydrogennases were studied in dogs submitted to about four negative-g impacts. The dogs didn't show any visible damage; enzymes remained in normal value ranges. Nevertheless they increased immediately after the impact, and decreased in the two successive days. From the third to the seventh day the enzymes returned gradually to their original values.

A67-80895
SOME SERUM ENZYME CHANGES COMPARED TO PATHOLOGICAL FINDINGS IN RAT DUE TO HIGH AND VERY SHORT TRANSVERSE ACCELERATION. III. IMPACTS IN LATERAL AXIS [COMPORTAMENTO DI ALCUNI ENZIMI SIERICI NEL RATTO IN RAPPORTO ALLE LESIONI ANATOMOPATOLOGICHE PROVOCATE DA DECELERAZIONI TRASVERSALI DI NOTEVOLE ENTITA' E BREVISSIMA DURATA. NOTA III. IMPATTI SECONDO GLI ASSI LATERO-LATERALI].
G. Lalli and G. Paolucci (Centro di Studi e Ric. di Med. Aeron. e Spaziale, Ispettorato di Sanita Aeron., Rome Italy).
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Jul.–Sep. 1966, p. 412–426. In Italian.

Rats were exposed to lateral axis impacts to evaluate changes of serum enzymes and their correlation to pathological damages due to deceleration. It was concluded that: (1) Rat tolerance to the studied deceleration is remarkably larger than that reported in a previous investigation. (2) The lung underwent severe damage (the right one in right to left impact, the left one in left to right impact). Hemorrhagic phenomena prevailed in other organs. Liver microinfarcts were observed periodically. Large pulmonary hemorrhages caused death in the animals. All the serum enzymes studied in survived animals increased significantly, 15–16 hr. after impact, especially at the highest decelerations considered (900 g). Increases of sorbitol dehydrogenase (about 15 times the normal values) and glutamic-oxalacetic transaminase (four to five times) were observed. Increases of glutamic pyruvic transaminase, aldolase, malic and lactic dehydrogenase (two to three times) were also observed. These increases originate mainly from the liver, in which damage is very small and often unremarkable. Therefore these increases don't support the prognosis of the lesions, that is, mainly depending on the lung hemorrhages.

A67-80896
INTRAOCULAR TENSION IN HYPOXIA. A TONOMETRIC RESEARCH [IL TONO OCULARE IN IPOSSIA INDAGINI TONOGRAFICHE].
R. Neuschler and R. Palombi (Rome U., Ocular Clin., Italy).
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Jul.–Sep. 1966, p. 402–411. 16 refs. In Italian.

Intraocular tension in hypoxia was studied in 20 subjects. A constantly increased tension was observed. To investigate the reason for this increase 14 out of these 20 subjects were exposed to a tonographic study. Increasing production of aqueous humor, decrease of its defluxion, decrease of defluxion resistance, and decrease of sclera rigidity were observed.

A67-80897
THE INFLUENCE OF 6 DAYS SOJOURN IN MOUNTAINS ON HUMAN EFFICIENCY.
V. Doležal, J. Luxa, J. Svačinka, R. Rybàk, Z. Zemanovà, L. Samek, and K. Cermàk (Charles U., Fac. of Med., Inst. of Sport Med. and Inst. of Aviation Med., Prague, Czechoslovakia).
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Jul.–Sep. 1966, p. 383–401. 15 refs.

Responses to physical stress at 1500 m. altitude in High Tatra mountains were investigated in altitude acclimatized and non-acclimatized subjects. Each day the subjects climbed to 2500 m. altitude, for eight-ten hr. Before and after acclimatization the subjects underwent a step test, having their respiratory and circulatory status determined. They were also exposed to a pressure breathing test. Before and after this test some substances in urine specimens were studied. These biochemical determinations were repeated daily during the sojourn in altitude. A decrease of heart rate, after acclimatization, at rest, was observed. Respiratory and circulatory responses to exercise did not change significantly. Biochemical data, determined in pressure breathing test, show a decrease of human response to this physical stress, after the sojourn in altitude.

A67-80898
EMOTIONAL SYMPTOMATOLOGY AND SUBJECTIVE STRESS IN ISOLATED PAIRS OF MEN.
William W. Haythorn, Irwin Altman, and Thomas I. Myers (Natl. Naval Med. Center, Naval Med. Res. Inst., Bethesda, Md.).
Journal of Experimental Research in Personality, vol. 1, Dec. 1966, p. 290–305. 22 refs.
Contract Nonr-2285(04).

Thirty-six Navy recruits were run in dyads, half under conditions of isolation and half control. Dyads were organized to satisfy a 3×3 Greco-Latin square design on four personality characteristics, need achievement, need affiliation, need dominance and dogmatism, such that homogeneous high, heterogeneous and homogeneous low compositions on each personality characteristic occurred. Isolated dyads lived and worked in a small room for ten days with minimal outside contact. Controls slept and ate in regular Navy facilities but otherwise followed the same task and work schedule as isolation groups. At the end of the experiment subjects indicated their reaction to isolation on a subjective stress scale and an emotional symptomatology questionnaire. Results confirmed hypotheses that (a) social isolation is stress-inducing; and (b) stress is a function of interpersonal needs, with dyads having both men high on dominance experiencing more stress than those heterogeneous in dominance, and those dyads heterogeneous in achievement showing more stress than homogeneous groups. The results indicate the importance of group composition to functioning in isolated environments, and perhaps to other stressful situations.

A67-80899
RAPID EYE MOVEMENT CYCLE IN REAL TIME.
Gordon G. Globus (Boston U., School of Med., Div. of Psychiat., Mass.).
(Assn. for Psychophysiol. Study of Sleep, Meeting, Gainesville, Fla., Mar. 26, 1966).
Archives of General Psychiatry, vol. 15, Dec. 1966, p. 654–659. 19 refs. Boston U. and Boston Psychoanal. Soc. supported research.

The hypothesis that D-state rapid eye movement (REM) sleep followed a cycle in real time was tested using two subjects during 38 and 48 naps, respectively. Time of sleep onset (stage II sleep onset) varied as the independent variable, and time of D-onset (state I-REM sleep onset) was the dependent variable. In both subjects there were intervals of progressively later time of sleep onset when the associated time of D-onset tended to remain constant. This suggests that the occurrence of D-state varies as a function of real time. Implications that the D-state occurs cyclically throughout the 24 hr. and is unrelated to sleep *per se* are discussed; rather, it is suggested that sleep is a time when the organism is quiet enough for the usual indices of D-state to be measured. The hypothesis is proposed that D-state emergence is a function of coterminous neurophysiologic and egostructural factors acting upon a cycle in real time.

A67-80900
ALVEOLAR PRESSURE, AIRFLOW RATE, AND LUNG INFLATION IN MAN.
Arend Bouhuys and Björn Jonson (Emory U., School of Med., Dept. of Physiol., Atlanta, Ga., John B. Pierce Found. Lab., and Yale U., School of Med., New Haven, Conn.).
Journal of Applied Physiology, vol. 22, Jun. 1967, p. 1086–1100. 34 refs.
Grants PHS OH 00207 and PHS HE 08326.

Transairway pressure (Paw = Palv–Pao), flow rate ($\dot{V}$), and thoracic gas volume (TGV_{Palv}) were measured simultaneously in five healthy subjects, at up to maximal flows and over nearly the full vital capacity, during rebreathing at BTPS conditions. Isovolume pressure-flow (IVPF) curves and volume-flow ($V\dot{V}$) diagrams were obtained. The constants in equations describing Paw-$\dot{V}$ relations (Rohrer and Ainsworth and Eveleigh) were obtained at different lung inflations. IVPF points are not unique under some conditions: (1) during inspiration Raw depends on preinspiratory volume (Raw higher during inspirations from near residual volume); (2) during expiration considerable IVPF variability occurs at near-maximum flows. The latter phenomenon is discussed in terms of optimal and suboptimal Paw-V relations, depending on volume and flow history as well as on sudden pressure transients in the dynamically compressed airway segment. Histamine inhalation caused marked, dose-related, changes of expiratory IVPF points at small TGV, in the absence of dyspnea. Variations in static recoil pressure of lungs largely account for between-subject variation of "relative conductance" (standardized for lung size), and for Gaw changes with lung inflation within subjects. Instantaneous expiratory power may exceed 50 watts during forced expiration.

A67-80901
SLEEP IN THE PIGEON.
V. Tradardi (Pisa U., Ist. di Fisiol. and C.N.R. Gruppo Operativo di Neurofisiol. and Gruppo Nazl. di Med. Sper., Pisa, Italy).
Archives Italiennes de Biologie, vol. 104, Dec. 1966, p. 516–521. 11 refs.
Grant AF-EOAR-63-9 and Rockefeller Found. supported research.

On a set of 15 adult pigeons the occurrence of "deep sleep" was tested (through behavioral and electrophysiological controls). Two phases of sleep can be easily dissociated: (1) a phase covering most of the sleep period, which is characterized by motionless posture, slow, high-voltage electroencephalographic pattern, and by an electromyogram (EMG) activity of neck muscles less intense than during wakefulness but not absent altogether: and (2) a phase occurring repeatedly but for only a few seconds duration, which is characterized by falling of the head (produced by a further decrease of EMG activity of neck muscles, which, however, never reaches the null level in the cat), by a series of three-eight waves in the electrooculogram record due to ocular movements; and finally by low voltage fast EEG waves. This latter phase is being considered as corresponding to "deep sleep" of mammals. A discussion is presented on the particular features of this latter phase of sleep in pigeons.

A67-80902
RADIOPROTECTIVE EFFECT OF TOPICALLY APPLIED DIMETHYL SULFOXIDE ON MICE.
W. S. Moos and S. E. Kim (Ill. U., Dept. of Radiol., Chicago).
Experientia, vol. 22, Dec. 15, 1966, p. 814–815. 7 refs.

Previous studies of the protective properties of dimethyl sulfoxide (DMSO) have been mostly concerned with parenteral administration. The effect of topically applied DMSO was examined in male mice, 50–60 days old. Radiation exposure was with X-rays, and total dosages ranged between 700 and 760 r. The three major experimental directions were: (1) DMSO or H_2O treatment before and after radiation; (2) DMSO or H_2O treatment before radiation; and (3) DMSO or H_2O treatment after radiation. Results of this study (observation of mortality rates) indicate that: (1) DMSO applied

topically prior to lethal amounts of X-rays offered considerable protection. (2) Application of DMSO after irradiation did not alter survival significantly from that of control mice. (3) A single treatment with DMSO for one or five min. before irradiation was as effective in providing protection as daily immersions.

A67-80903
EFFECT OF CO_2 AND HCN ON THE QUINONE HILL REACTION WITH ANABAENA VARIABILIS.

Robert N. Ammeraal and Birgit Vennesland (Chicago U., Dept. of Biochem., Ill.).

Archives of Biochemistry and Biophysics, vol. 117, Nov. 1966, p. 429–436. 16 refs.
Grant PHS GM 08735.

The effect of CO_2 and HCN on the quinone Hill reaction with cell suspensions of the blue-green alga, *Anabaena variabilis,* is similar to that previously reported for *Plectonema boryanum;* that is, the Hill reaction is inhibited by HCN, and the inhibition can be relieved by CO_2. Cell-free particles prepared from Anabaena show a similar response to HCN and CO_2 with quinone and other Hill reagents. A comparison was made of the effect of varying HCN and CO_2 concentrations on the quinone Hill reaction with cells and with cell-free particles of Anabaena, and the reversibility of these HCN and CO_2 effects was demonstrated.

A67-80904
CORTICAL AUDIOMETRY: AN OBJECTIVE METHOD OF EVALUATING AUDITORY ACUITY IN AWAKE AND SLEEPING MAN.

D. Thane R. Cody, Donald W. Klass, and Reginald G. Bickford (Mayo Clin. and Mayo Found., Rochester, Minn.).

(Am. Acad. of Ophthal. and Otolaryngol., 71st Ann. Session, Chicago, Oct. 16–21, 1966).
Transactions American Academy of Ophthalmology and Otolaryngology, vol. 71, Jan.–Feb. 1967, p. 81–91. 5 refs.
Grants NIH NB-6306 and NB-2056.

Cortical audiometry is an objective method of determining auditory acuity by finding the intensity of tones at which averaged evoked responses from the cerebral cortex recorded at the cranial vertex first appear. This test accurately established the air-conduction threshold of hearing for the tones 500, 1,000 and 2,000 c.p.s. in awake humans from two mo. to 77 yr. of age. Subjects with normal hearing and various types and degrees of hearing loss have been tested. During sleep the vertex response has a much longer latency. Although cortical audiometry has been unreliable during light sleep, it is accurate when the subject is in a moderately deep or a very deep stage of sleep (according to behavioral and electroencephalographic criteria). No significant difference in the vertex response has been found in subjects of different ages.

A67-80905
HYPOXIA AND THE HEART ULTRASTRUCTURE WITH SPECIAL REFERENCE TO THE PROTECTIVE ACTION OF THE CORONARY DRUG PERSANTIN.

B. B. Lozada and R. P. Laguens (Salvador Med. School, Dept. of Physiol., Buenos Aires and Dept. of Invest. Cient., La Plata, Argentina).

(Inter-Am. Congr. of Cardiol., VII, Montreal, Canada, Jun. 1964). Cardiologia, vol. 49, Suppl. I, 1966, p. 33–43. 17 refs.

Two groups of dogs, one without Persantin and one with, breathing 6% O_2 at sea level were studied. Group without Persantin showed gross structure alteration, mainly located in the mitochondria that appear swollen, lacking christae and some seemed like vacuoles. Group with Persantin showed no alteration, but sometimes isolated mitochondria showed swollen aspect. No clear explanation can be drawn. Some considerations about the metabolic action of Persantin are given.

A67-80906
A FURTHER NOTE ON THE TIME COURSE OF CORTICAL FACILITATION AFTER PHOTIC STIMULATION.

A. Cavaggioni, M. H. Goldstein, Jr. and D. H. Friedman (Johns Hopkins U., School of Med., Biomed. Eng., Baltimore, Md.).

Archives Italiennes de Biologie, vol. 104, Dec. 1966, p. 503–510.
Grant NIH NB 01543.

The time course of enhancement of the cortical shock evoked response after photic stimulation was studied in some detail in cats. Computers were employed to determine stimulus timing and to process the data. The enhancement is greatest in the interval between 40 and 100 min. after the onset of the photic stumulus. The light evoked response displays an early positive deflection, followed by a negative wave which occupies roughly this same interval. The period of greatest enhancement and the negative wave of the light evoked response may be disassociated by using 0.05 sec. flashes. The time-course of enhancement is considerably lengthened, yet the light evoked response waveform is not greatly affected. Following administration of Nembutal the period of enhancement accompanying the primary response is sharpened, and another narrow enhancement period is associated with the secondary response. The enhancement accompanying the secondary response is greater than that accompanying the primary response.

A67-80907
ENHANCED EXCITABILITY OF INTRA-GENICULATE OPTIC TRACT ENDINGS PRODUCED BY VESTIBULAR VOLLEYS.

P. L. Marchiafava and O. Pompeiano (Pisa U., Ist. di Fisiol. and C.N.R., Gruppo Operativo di Neurofisiol. and Gruppo Nazl. di Med. Sper., Pisa, Italy).

Archives Italiennes de Biologie, vol. 104, Dec. 1966, p. 459–479. 64 refs.
Grant NIH NB 02990-05.

The effects of conditioning electric stimulation of the VIIIth nerve and the vestibular nuclei upon excitability of the central terminals of the optic nerve fibers were examined in cats under light pentobarbital anaesthesia. No facilitatory effect occurred on single shock stimulation of the VIIIth nerve, at least for the level of anaesthesia used. The effect appeared actually when the repetition rate of the conditioning tetanus reached about 200/sec. It further increased by increasing frequency of stimulation. Repetitive stimulation of vestibular nuclei of either sides also increased the amplitude of the antidromic response recorded from the right optic nerve on single shock, stimulation of the ipsilateral or contralateral LGN. The time course of this effect was similar to that elicited by repetitive stimulation of the VIIIth nerve. The points responsible for these effects were localized in the medial and descending vestibular nuclei. Stimulation with the same parameters of the superior and lateral vestibular nuclei was ineffective. There were also points localized in the region of the medial longitudinal fasciculus as well as in the brain stem reticular formation which also gave positive results.

A67-80908

VESTIBULAR INFLUENCES DURING SLEEP. IV. FUNCTIONAL RELATIONS BETWEEN VESTIBULAR NUCLEI AND LATERAL GENICULATE NUCLEUS DURING DESYNCHRONIZED SLEEP.

A. R. Morrison and O. Pompeiano (Pisa U., Ist. di Fisiol. and C.N.R., Gruppo Operativo di Neurofisiol. and Gruppo Nazl. di Med. Sper., Pisa, Italy).

(Assn. for Res. in Nervous and Mental Disease, Meeting, New York, Dec. 3–4, 1965).

Archives Italiennes de Biologie, vol. 104, Dec. 1966, p. 425–458. 108 refs.

Grants PHS NB 02990-05 and I F10 NB 1294-01 NSRB.

The overall activity of the lateral geniculate nucleus (LGN) was recorded in cats during different backgrounds of sleep and wakefulness, before and after bilateral destruction of the vestibular nuclei. While the type I LGN waves could be related only with isolated ocular movements, type II waves appeared synchronously with the large bursts of rapid eye movement (REM). Bilateral lesion of the medial and descending vestibular nuclei abolished not only the REM but also type II LGN waves; while type I waves still remained, suggesting the presence of vestibular and extravestibular inputs to LGN. The functional significance of these inputs during desynchronized sleep was discussed. The number and the duration of the episodes of desynchronized sleep were also reduced by the vestibular lesion. On the contrary type I LGN waves were observed more frequently and for longer periods of time during synchronized sleep. Thus the vestibular nuclei may be necessary for the normal manifestation of the tonic aspects of desynchronized sleep.

A67-80909

INFLUENCE OF THE DIFFERENT ANTIBIOTICS UPON THE COURSE AND OUTCOME OF THE ACUTE RADIATION SICKNESS IN WHITE RATS [VLIIANIE NA RAZLICHNITE ANTIBIOTITSI VURKHU PROTICHANETO I IZKHODA NA OSTRA LUCHEVA BOLEST U BELIIA PLUKH].

Tsv. Sp. Aleksandrov, Iv. Nikolov, D. Krustanov, and T. Tinev.

Rentgenologiia i Radiologiia, vol. 5, no. 1, 1966, p. 45–48. 13 refs. In Bulgarian.

The authors investigated the survival rate of rats irradiated with X-ray D 36/30 and D 85/30 by a 12 day treatment with different antibiotics. They have followed up the influence of the applied antibiotics upon the organ tissue catalase, which decreased considerably. The authors found maximal therapeutic results and the greatest survival rate in the irradiated animals by treatment with different tetracycline preparations, while least results were obtained with sintomycin and erytromycin which coincided with their activating ability upon the catalase activity.

A67-80910

EFFECTS OF PHYSIOLOGICAL AND CLINICAL FACTORS ON RESPONSE TO HEAT.

Douglas H. K. Lee and Austin Henschel (Public Health Serv., Div. of Occupational Health, Cincinnati, Ohio).

Annals of the New York Academy of Sciences, vol. 134, Feb. 28, 1966, p. 743–749.

A description is presented of a mode of approach to the problem of presenting information on the probable reaction of exposed persons to various thermal combinations under a variety of physiological and clinical states, using several criteria of physiological significance. Used are mathematical expressions of heat exchange, the concept of relative strain, and certain rather broad criteria of effect (comfort-discomfort, distress sensation, pathological developments, water requirements, etc.). The actual use of the scheme consists of three steps: (a) from the appropriate table determination is made of any adjustment to the actual air temperature needed to compensate for other than standard values assigned to metabolic rate, air movement, radiant heat, or clothing; (b) with adjusted value for air temperature and whatever measure of humidity is being used (wet bulb temperature, relative humidity, or vapor pressure) the psychrometric chart is entered and the corresponding value of relative strain read off; and (c) from the chart of effects appropriate to the person under consideration, the probable effects indicated for the value of relative strain are read off.

A67-80911

THYROCALCITONIN AND ITS ROLE IN CALCIUM HOMEOSTASIS.

A. D. Care, T. Duncan, and D. Webster (Aberdeen U., Dept. of Chem. Pathol. and Rowett Res. Inst., Great Britain).

Journal of Endocrinology, vol. 37, Feb. 1967, p. 155–167. 20 refs. Med. Res. Council supported research.

Hypercalcemic perfusion of the pig thyroid *in situ* produced a systemic hypocalcemic response which reached its maximum after about two hr. perfusion and which persisted for as long as the hypercalcemic stimulus was applied. Thyroid venous plasma from a gland so perfused, when cross-transfused into a second pig, caused a hypocalcemic reaction similar to that produced by the intravenous injection of porcine thyrocalcitonin preparations. A hypocalcemic response to hypercalcemic perfusion of the thyroid, similar to that seen in intact pigs, occurred in parathyroidectomized pigs, provided that the initial plasma calcium level was maintained by suitable calcium supplement to the diet. Hypocalcemic perfusion of the thyroid, in either intact or parathyroidectomized pigs, resulted in a rise in the systemic plasma calcium concentration, although this rise was only consistently observed when the systemic plasma calcium level was already low as a result of thyrocalcitonin secretion. It is suggested that the secretion of thyrocalcitonin is controlled by a negative feedback mechanism operating through the plasma calcium concentration, and that because of the rapidity of its release, action and elimination, relative to parathyroid hormone, thyrocalcitonin acts as a fine regulator of calcium homeostasis.

A67-80912

TIME TAKEN TO CHANGE THE SPEED OF A RESPONSE.

Margaret A. Vince and A. T. Welford (Cambridge U., Psychol. Lab., Great Britain).

Nature, vol. 213, Feb. 4, 1967, p. 532–533.

Reaction time to a signal (S_2) arriving during the reaction time to a previous signal (S_1) is longer than when S_2 arrives well after the reaction to S_1, advancing the theory (single-channel hypothesis) that arrival of S_1 raises a "gate" which is not lowered until reaction to S_1 has ended. An experiment was conducted whereby subjects were presented with red and blue vertical lines at irregular intervals of 2-3 sec. Group A responded to the blue line slowly and to the red line rapidly. Group B made normal responses to the blue lines as rapidly as possible and occasional responses to red lines at leisure. Group C responed as Group A except when a red line occurred, they stopped their movement and paused before returning to baseline. The results suggest an important refinement of the single-channel hypothesis. The central processes

following S_1 were concerned with initiation of a phased pattern of muscular action, which was modified in response to S_2. The extent of this modification was different for groups A and B. The latter, in order to slow a movement down, changed the pattern of muscular intervention substantially, bringing antagonists into play in order to arrest the rapid motion. For group A, speeding up seemed to involve intensification of the pattern already in operation. Group C should have behaved like group B, but possibly the subject whose performance was like that of group A managed to discontinue his movements instead of actively arresting them. Therefore, it is suggested that the decision process protected by the "gate" is the initiation of a fresh pattern of action. Thus a signal to bring other muscles into play is excluded, while signals conveying instructions to increase or reduce the activity of those already in action can get through.

A67-80913
ENZYME ACTIVITY IN HIGH MAGNETIC FIELDS.
W. Haberditzl (Humboldt U., Inst. of Phys. Chem., Berlin, East Germany).
Nature, vol. 213, Jan. 7, 1967, p. 72–73. 9 refs.
Clarendon Lab. (Mullard Cryomagnetic Lab., Great Britain supported research.

To study the magnetocatalytic effect of L-glutamic dehydrogenase (GDH) the following reaction catalyzed by GDH was used: 2-oxoglutarate+ammonia+reduced nicotinamide-adenosine dinucleotide⇄glutamate + nicotinamide-adenine dinucleotide+water. Temperatures ranged between 20–25°C. In the case of catalase the influence of magnetic field on activity was determined by the catalytic decomposition of hydrogen peroxide. The experiments were carried out both in a uniform magnetic field (variation of 3% over the sample length of 4 cm.) and in a non-uniform field (variation of 30% over 4 cm.). From the tabulated results it appears that for GDH while in a uniform field the decrease in activity fluctuated about 5% and 12%, in a non-uniform field it reached very high values. Appreciable increases in catalase activity in the magnetic field were observed, especially for non-uniform fields.

A67-80914
RESPIRATORY RESPONSE TO CARBON DIOXIDE IN MAN.
S. Lahiri, H. P. Chattopadhyay, Ashis Sinha, and P. C. Karmakar (Presidency Coll., Dept. of Physiol., Calcutta, India).
Nature, vol. 213, Jan. 28, 1967, p. 393–394.
Indian Council of Med. Res. and U. Grants Comm. supported research.

A respiratory investigation with Bengal Indians was made using the expression $V=D\ (P_ACO_2-B)[1+A/(P_AO_2-C)]$, where B (mm. of Hg P_ACO_2) is the intercepts of these lines produced to P_ACO_2 (atmospheric pressure of carbon dioxide) axis at zero ventilation, the asymptote D (1./min./mm. of Hg P_ACO_2) is the slope of the line in the complete absence of hypoxia and the parameter C gives a critical value of P_AO_2 when the slope of the $\overline{V}$–P_ACO_2 line approaches infinity and A (mm. of Hg O_2) describes the curvature of the hyperbola. Average values from 6 subjects for parameters with their standard errors where: B, 36.0±0.3 mm. of Hg CO_2; A, 23.2±1.7 mm. Hg O_2; C, 30.9±9.0 mm. of Hg O_2; D, 1.60±0.16 1./min./mm./Hg CO_2. In another series of experiments on 16 subjects $\overline{V}$, P_ACO_2 lines were determined by breathing CO_2 in pure O_2. When the upper linear part of the response was taken into account the mean slope of the lines was 1.97±0.31 1./min./mm. of Hg CO_2 and the extended intercept on the PCO_2 axis was 35.2+0.6. The value of D was smaller than the slope of the $\overline{V}$, P_ACO_2 line on O_2 at 1 atmosphere. The body weights of the subjects ranged from 41 to 82 kg., and the oxic slope was 1.10 to 3.92. There was no correlation between body weight and response to CO_2. Observation on one Sherpa (Himalayan highlander) and one European at sea level whose oxic slopes of $V.P_ACO_2$ lines were 1.30 and 3.72, respectively, demonstrated significant difference in CO_2 response in different groups of subjects, if not a racial effect.

A67-80915
WEIGHT LOSS IN MEN IN SPACE.
Paul Webb (Webb Associates, Yellow Springs, Ohio).
Science, vol. 155, Feb. 3, 1967, p. 558–560. 8 refs.
NASA Contracts NASr-115 and RC 65-005.

Men returning from orbital flights have lost from 2 to 6% of their body weights. Similar losses occur during simulated weightlessness; blood normally pooled in dependent parts returns to the circulation, increasing central blood volume and causing excretion of water which is not replaced during flight.

A67-80916
VENUS: ATMOSPHERIC EVOLUTION.
Margaret O. Dayhoff, Richard V. Eck (Natl. Biomed. Res. Found., Silver Spring, Md.), Ellis R. Lippincott (Md. U., Dept. of Chem., College Park), and Carl Sagan (Harvard U. and Smithsonian Astrophys. Obs., Cambridge, Mass.).
Science, vol. 155, Feb. 3, 1967, p. 556–558. 22 refs.
NASA Contract 21-003-002, NASA Grants 21-002-059 and NGR 09-015-023.

Because of the high temperatures prevailing in the lower atmosphere of Venus, its chemistry is dominated by the tendency toward thermodynamic equilibrium. From the atomic composition deduced spectroscopically, the thermodynamic equilibrium composition of the atmosphere of Venus is computed, and the following conclusions drawn. (1) There can be no free carbon, hydrocarbons, formaldehyde, or any other organic molecule present in more than trace amounts. (2) The original atomic composition of the atmosphere must have included much larger quantities of hydrogen and a carbon/oxygen ratio ≤ 0.5. (This ratio is now almost precisely 0.5.) (3) The present atomic proportions of the atmosphere of Venus are so unique that an evolutionary mechanism involving two independent processes seems necessary, as follows. Water, originally present in large quantities, has been photodissociated in the upper atmosphere, and the resulting atomic hydrogen has been lost in space. The resulting excess oxygen has been very effectively bound to the surface materials. (4) There must be some weathering process, for example, violent wind erosion, to disturb and expose a sufficient quantity of reduced surface material to react with the oxygen produced by photodissociation.

A67-80917
AMPLITUDE MEASUREMENT OF THE SLEEP ELECTRO-ENCEPHALOGRAM.
Harman W. Agnew, Jr., James C. Parker, Wilse B. Webb, and Robert L. Williams (Fla. U., Coll. of Arts and Sci., Dept. of Psychol. and Coll. of Med., Dept. of Psychiat., Gainesville).
Electroencephalography and Clinical Neurophysiology, vol. 22, Jan. 1967, p. 84–86. 9 refs.
Grant AF-AFOSR-395-65.

Amplitude measurements were made on the sleep electroencephalogram (EEG) of seven subjects for two successive nights. The correlations between increases in amplitude and

visually scored sleep stages were high. The EEG amplitude varied systematically throughout the night, following a pattern which has been previously reported for the stages of sleep. This parallel presents the possibility of developing an objective method for scoring the sleep EEG to replace current qualitative scoring techniques.

A67-80918
NEUROPHYSIOLOGICAL EVIDENCE FOR A DIFFERENTIAL ORGANIZATION OF THE MESENCEPHALIC RETICULAR FORMATION.
M. Bonvallet and A. Newman-Taylor (Hosp. Henri-Rousselle, Lab. de Neurophysiol., Paris, France).
Electroencephalography and Clinical Neurophysiology, vol. 22, Jan. 1967, p. 54–73. 39 refs.
Grant AF EOAR 64-51.

A systematic exploration of the reticular activating system (RAS) was carried out to study the possibility to elicit selectively either the immediate phasic component or the delayed tonic component of the reticular response to brief stimulation, previously described. The whole extent of the reticular formation and of the posterior hypothalamus was stimulated point by point with short lasting trains of repetitive pulses in *encéphale isolé* cats under Flaxedil. All the recorded responses were compared, using EEG desynchronization, inhibition of the pupillo-constrictor tone and inhibition of a polysynaptic cranial reflex as indicators of the duration of recticular activation. The electrical responses evoked by somesthetic and auditory stimuli in the reticular regions differentiated during the stimulation experiments were also compared. The results indicate the critical importance of the rostro-pontine reticular activating structures for the production not only of sustained cortical arousal, but also for sustained reticular discharges influencing motor and vegetative activities. They also give evidence of a functional differentiation of a small reticular area in the anterior mesencephalon, which appears to be implicated only in the modified transmission of very short lasting reticular influence.

A67-80919
PHYSIOLOGICAL CORRELATES OF STEADY POTENTIAL SHIFTS DURING SLEEP AND WAKEFULNESS. II. BRAIN TEMPERATURE, BLOOD PRESSURE, AND POTENTIAL CHANGES ACROSS THE EPENDYMA.
Robert H. Wurtz (Washington U., School of Med., Depts. of Neurol. and Physiol., St. Louis, Mo.).
Electroencephalography and Clinical Neurophysiology, vol. 22, Jan. 1967, p. 43–53. 22 refs.
Grants NIH MH 10293-01, NIH NB 04513-02, and NIH 5T 1 NB-5240.

Brain temperature and steady potential (SP) were recorded simultaneously from both cortical surface and white matter in cats. Both on awakening from slow wave sleep on entering into desynchronized sleep from slow wave sleep there was a rise in brain temperature at the same time the SP shifted negatively. On return to slow wave sleep, temperature preceded SP in return to previous levels. Since the polarity and amplitude of the potential changes during desynchronized sleep were approximately the same whether the shift was recorded between cerebrospinal fluid and an extracerebral point or between a point in brain and an extracerebral reference, it was concluded that the SP shifts did not arise across the ependymal lining. A decrease in blood pressure was recorded with the onset of desynchronized sleep, but there was either no change or a slight rise in blood pressure on awakening from slow wave sleep. The lowering of blood pressure in anesthetized cats produced SP shifts which were of opposite polarity to the SP shifts accompanying the decrease of blood pressure during desynchronized sleep. Both because of this polarity reversal and because of the frequent independence of SP shifts and blood pressure changes during sleep and wakefulness, it was concluded that blood pressure changes do not produce the SP shifts during the sleep-wakefulness cycle. It was suggested that the SP changes in sleep and wakefulness might reflect changes in blood flow and, ultimately changes in metabolic activity of the brain.

A67-80920
ADAPTATIONS OF MUSCLE TO VARIOUS EXERCISES.
Edward E. Gordon, Kasimierz Kowalski, and Martha Fritts (Michael Reese Hosp. and Med. Center, Div. of Phys. Med. and Rehabil., Chicago, Ill.).
(Am. Med. Assn., 115th Ann. Conv., Chicago, Jun. 28, 1966). *JAMA,* vol. 199, Jan. 9, 1967, p. 103–108. 22 refs.
Grant NIAMD AM-08776.

Evidence from the literature indicates that the effect of repetitive, low force exercise (running) on muscle constituents differs from that of brief, forceful activity (weight lifting). The present experiments in adult running rats showed a trend toward increase in concentration of sarcoplasmic proteins; in weight lifting, there was an increase in concentration of actomyosin. These findings also confirmed the previous observations that increased performance and gross hypertrophy are not invariable concomitants. These basic findings are yet to be applied.

A67-80921
SOME EFFECTS OF SLEEP LOSS ON MEMORY.
Harold L. Williams (Okla. U. School of Med., Norman), Charles F. Gieseking (Walter Reed Army Inst. of Res., Washington, D. C.), and Ardie Lubin (U.S. Navy Med. Neuropsychiat. Res. Unit, San Diego, Calif.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1287–1293. 11 refs.

Immediate recall of word lists showed significant impairment after one night of sleep loss. Since the subject was required to write down each word immediately after its presentation, the deficit was not due to failure of sensory registration. With 24-hr. delayed testing, a picture-recognition test did not show significant deficit after one night of sleep loss. Performance on this test was impaired, however, after a night of recovery sleep. These results imply that moderate sleep loss causes deficit in formation of the memory trace rather than in storage or retrieval functions and that this effect is probably independent of the physiological lapses (brief periods of sleep) which affect vigilance and sensory registration.

A67-80922
PERCEPTION BIBLIOGRAPHY: XXXVIII. PSYCHOLOGICAL ABSTRACTS, 1927, VOLUME 1.
R. B. Ammons and C. H. Ammons.
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1263–1266. 103 refs.

An alphabetical listing of 103 articles and books dealing with perception and closely related subjects is presented.

A67-80923
PRACTICE OF SPEEDED RESPONSE IN RELATION TO AGE, SEX, AND SET.
Jack Botwinick and Larry W. Thompson (Duke U., Dept. of Psychiat., Durham, N. C.).
Journal of Gerontology, vol. 22, Jan. 1967, p. 72–76. 8 refs. Grants PHS MH-08244, HD-01325, 5153, and HD-00668.

Simple auditory reaction time (RT) was examined as it changed with continued performance, and these changes were compared between two age groups of adult men and women. Furthermore, these relationships were investigated in the context of preparatory RT set. There were three conditions of preparatory set: a regular 0.5-sec. preparatory interval (PI) a regular 15.0-sec. PI, and an irregular series of four PIs (0.5, 3.0, 6.0, and 15.0 sec.). With the short regular interval condition, elderly people improved with practice and younger people did not. With the long, 15.0-sec. regular PI, young women became differentially slower with continued practice. With irregular series, depending upon the specific method of analyzing the data, sex as well as age and sex interactions were statistically significant with respect to the effects of practice. It was concluded that for meaningful measurement of RT, and for meaningful theories of the loss of speed with age, the role of practice in relation to both age and sex of subject must be considered very carefully in the context of the condition of preparatory set.

A67-80924
SYNTHETIC RESIN-INDUCED SKIN DISEASES IN TRANSPORTATION [HAUTERKRANKUNGEN DURCH SYNTHETISSCHE HARZE IM VERKEHRSWESEN].
G. Moch.
Verkehrsmedizin und ihre Grenzgebiete, vol. 13, Dec. 1966, p. 496–504. 36 refs. In German.

It is reported on the occurrence of skin diseases caused by synthetic resins among workers of various transportation branches. In any case the resin (macromolecule) not the temper has been found out to be the allergen. Correspondingly all patients showed a very short latency; the period from the first contact with the epoxy resin up to the occurrence of the first skin findings lasted one year at the latest. While the skin changes very often healed already after two or three months, the allergic reaction to epoxy resin could be demonstrated by flap tests still after two yr. The cause of the diseases was imperfect means of the protection of labor; to begin with, workers have worked without protection, safety overalls were defective or insufficient, thus it could happen that between resin and skin it came to a contact on the wrists, in spite of their wearing safety gloves. Considerable risk in handling resin is shown, pathogenesis is discussed, and safety measures are described in details that must be observed absolutely.

A67-80925
GRADIENTS OF PHYSIOLOGICAL AROUSAL IN PARACHUTISTS AS A FUNCTION OF AN APPROACHING JUMP.
Walter D. Fenz and Seymour Epstein (Mass. U., Psychol. Dept., Amherst).
Psychosomatic Medicine, vol. 29, Jan.–Feb. 1967, p. 33–51. 10 refs.
Grant NIMH MH 01293.

Continuous recordings of skin conductance, heart rate, and respiration rate were obtained from experienced and novice parachutists during a sequence of events leading up to and following a jump. While novice jumpers showed a sharp rise in physiological activity up to final altitude, experienced jumpers produced an inverted V-shaped curve-i.e., an initial rise was followed by a decline. It was concluded that with repeated exposure to threat, expanding gradients of activation and of inhibition develop, the latter with steeper slope. The early rise in activation provides an automatic signal of danger, while the inhibitory reaction prevents the arousal from becoming excessive, thus providing a highly adaptive mechanism for the mastery of threat.

A67-80926
CASUALTY EVACUATION WITH HELICOPTER AND MOTOR-AMBULANCE. INDICATIONS AND CONTRA-INDICATIONS [INDICAZIONI E CONTROINDICAZION CONTROINDICAZIONI AL TRASPORTO DEI FERITI A MEZZO ELICOTTERO E CON AUTOAMBULANZA].
T. Lomonaco.
(CRI, Simp., Rome, Oct. 15, 1966).
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.–Dec. 1966, p. 649–658. In Italian.

The writer compares advantages and danger of helicopter and motor-ambulance in casualty evacuation. The former vehicle, in respect to the latter, can reach sites unapproachable because of ground conditions or enemy war actions, and transport casualty to first aid stations rapidly. Nevertheless its operation is expensive and inflight emergency medical care by specialized staff is not always possible. Moreover there are some contra-indications due to hypoxia, barometric low pressure and vibration, that, although avoidable partially, restrict evacuation of some casualties. Motor-ambulance operations are cheaper in general. The motor-ambulance can be furnished with better medical facilities, and contraindications to evacuation are less than using the helicopter. In confront to this one, the motor-ambulance is much more slow, and its movement is obstructed often by road traffic. Use of vertical take-off and landing (VTOL) aircraft is anticipated in the future, and it will be the most suitable vehicle for rapid and comfortable evacuation.

A67-80927
THERAPEUTIC OXYGEN CONTAMINANTS. REMARKS AND PROPOSALS [IL PROBLEMA DEI CONTAMINANTI DELL'OSSIGENO PER USO TERAPEUTICO. OSSERVAZIONI E PROPOSTE].
V. Iannetti.
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.–Dec. 1966, p. 631–648. In Italian.

After a survey of regulations on therapeutic oxygen reported in the Official Pharmacopeia, necessity is stressed of updating these regulations to the present status of toxicology and analysis and industrial technical capabilities. Particular emphasis is placed on the problem of contamination control in oxygen used by flying personnel, solved by the AF Chemotechnological Laboratory by means of gas-chromatographic analysis. The paper reports data on origin, explosiveness, flammability, toxicity and odor of the main contaminants. The gas-chromatographic method is proposed as the most suitable technique of oxygen analysis.

A67-80928
EFFECTS OF MULLER MANEUVER ON TOLERANCE TO -G_z ACCELERATION. AN EXPERIMENTAL RESEARCH [RICERCHE SPERIMENTALI CIRCA GLI EFFETTI DELLA MANOVRA DI MULLER SULLA RESISTENZA ALLE ACCELERAZIONI -G_z].
A. Putzulu and P. Rota (Centro di Studi e Ric. di Med. Aeron. e Spaziale, Ispettorato di Sanita' Aeron., Rome, Italy).
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.–Dec. 1966, p. 615–630. 13 refs. In Italian.

Efficiency of the Mller maneuver (forced inspiration with closed glottis) in increasing tolerance to the effects of negative acceleration has been investigated in ten healthy subjects, being exposed to -0.91 G_z, by means of a tilt table. During the tests the writers studied infrared transmittance through auricle of the ear (showing topical circulatory situation), arterial oxygen saturation-while breathing air and 100% oxygen-, negative intrapulmonary pressure (obtained with the maneuver) and electrocardiogram record. The records obtained show that the Müller maneuver improved tolerance to negative G during the maneuver, provided that it is properly carried out. Usefulness of performing the maneuver during 100% oxygen breathing, and of preventive training is pointed out.

A67-80929
VISUAL ILLUSIONS ASSOCIATED WITH ACCELERATION.
Donald G. Pitts (School of Aerospace Med., Aerospace Med. Div., Brooks AFB, Tex.).
(Am. Acad. of Optometry, Ann. Meeting, Chicago, Dec. 12, 1965). *American Journal of Optometry and Archives of American Academy of Optometry,* vol. 44, Jan. 1967, p. 21–33. 32 refs.

A definition and description of the oculogyral and oculogravic illusions are given. Differences between these two illusions serve to emphasize that different divisions of the vestibular system are responsible for each illusion. The importance of these illusions in maintaining spatial orientation for pilots has been stressed. Good instrument discipline appears to afford the best method of minimizing these illusory effects. It is concluded that satisfactory theoretical explanations as to the cause of the illusion have not been reached. Correlation of psychophysical data with recommended electrophysiological research appears to afford the most direct route in approaching an acceptable theoretical hypothesis.

A67-80930
TRACKING A VARIABLE RATE OF MOVEMENT.
E. C. Poulton (Med. Res. Council, Appl. Psychol. Res. Unit, Cambridge, Great Britain).
Journal of Experimental Psychology, vol. 73, Jan. 1967, p. 135–144. 8 refs.
Brit. Med. Res. Council supported research.

Matching and nulling a variable rate of movement using a position display were compared with tracking the same input function presented as a size of displacement on a rate or speedometer display. Position and rate control systems were used with both pursuit and compensatory display modes in a random-group design involving 70 subjects. Control groups tracked normally with the position display. In all conditions rate tracking using the position display produced reliably ($p<.01$) more mean rate error than displacement tracking with the rate or speedometer display, and was hardly better than the control conditions. The data suggested that in rate tracking the subject must have responded primarily to changes in length, rather than to rate of movement. The order of the display was found to interact with the order of the control system ($p<.001$), each control being more compatible with the display of the same order. The pursuit display mode resulted in a better performance than the compensatory mode ($p<.001$).

A67-80931
ALTERED REACHING FOLLOWING ADAPTATION TO OPTICAL DISPLACEMENT OF THE HAND.
Aglaia Efstathiou, Joseph Bauer, Martha Greene, and Richard Held (Mass. Inst. of Technol., Cambridge).
Journal of Experimental Psychology, vol. 73, Jan. 1967, p. 113–120. 13 refs.
NASA Grant NsG-496 and Grants AF-AFOSR 354-63, NIMH M-7642; Rockefeller Found. supported research.

Shifts in reaching for a visible target generalize to nonvisible targets. Such shifts should all be of equal magnitude if, as has been claimed, they result from a changed felt position of the adapted arm. Contrary to this expectation, reaching for the contralateral hand yielded shifts smaller than those obtained in reaching for a visible target and no shift was found for relocating a remembered position of the adapted arm. These results implicate two independent modes of reaching: one based upon the matching of arm movements with potential head orientations towards a target, the other dependent upon the felt position of the arm. The former is changed by adaptation, the latter is unchanged and constrains the shifts produced by the former.

A67-80932
THE EFFECT OF LOW FREQUENCY ULTRASONIC AND HIGH FREQUENCY SOUND WAVES ON WORKERS [O VLIIANII NIZKOCHASTOTNYKH UL'TRAZVUKOVYKH I VYSOKOCHASTOTNYKH ZVUKOVYKH KOLEBANII NA ORGANIZM RABOTAIUSHCHIKH].
V. K. Dobroserdov (Min. of Health, F. F. Erisman Moscow Res. Inst. of Hyg., RSSR).
Gigiena i Sanitariia, no. 2, Feb. 1967, p. 17–21. 14 refs. In Russian.

The paper contains findings of observations carried out over persons subjected to the action of low frequency ultrasonic and high frequency sound waves. The author investigated the auditory sensitivity to frequencies of 150,000, 14,000, 10,000 and 4,000 c.p.s., the latent period of oculomotor and auditomotor reactions and the vestibular apparatus by means of stabilography. The findings were that the ultrasonic waves of an intensity of 120 db. are physiologically active and may not be permitted in the industry; however, ultrasonic waves of an intensity of 100 db. produced no significant shifts in the investigated physiological functions. The effect produced by the high frequency sound was much more pronounced than that of the ultrasonic waves. The author supposes that the disturbances of health of workers result from the action of ultrasonic waves and that of noise prevailing in the industry.

A67-80933
APPARENT BRIGHTNESS OF A ROTATING ARC-LINE AS A FUNCTION OF SPEED OF ROTATION.
Gordon Stanley (Western Australia U., Nedlands).
Acta Psychologica, vol. 26, Jan. 1967, p. 17–21.

Fifty-two subjects were required to adjust the brightness of a center fixation line to equal that of the apparent brightness of an arc line viewed at a distance from the fixation point subtending an angle of 12° to the eye. Adjustments were made when the arc-line was stationary and rotating at speeds of 30, 45, 60 and 75 r.p.m. It was found that brightness enhancement occurred with increase in speed. This result was interpreted as supporting Ansbacher's account of distortion in the perception of moving arc-lines.

A67-80934
DECISIONS INVOLVING RISK IN DYADS.
Y. Rim (Technion–Israel Inst. of Technol., Haifa).
Acta Psychologica, vol. 26, Jan. 1967, p. 1–8. 16 refs.

The present study's main aim was to find whether two subjects discussing six problems involving risk would arrive at more risky decisions, as do subjects in most groups of three, four or five. It was found that only 14 out of 26 pairs of subjects arrived at more risky decisions, whereas 11 pairs arrived at more cautious decisions. It may be concluded that the more risky decisions after group discussion in groups three, four or five, is due to an interaction between personality traits of the participants and group processes, the latter lacking or being much reduced in two-person discussions. Other findings of this investigation were: (a) The more familiar or meaningful a problem is to a subject, the more inclined will he be to take a cautious decision. (b) In pairs arriving at more cautious decisions after discussion, a significant difference in intelligence scores between the members was found, the initially cautious subjects being more intelligent than the initially risky ones. (c) In pairs arriving at more risky decisions after discussion, a tendency was found for the initially more risky subjects to be significantly more extravert than the initially more cautious ones. (d) There is a slight non-significant tendency for initially risky subjects in pairs arriving at risky decisions, and initially cautious subjects in pairs arriving at cautious decisions, to want more information before arriving at decisions.

A67-80935
NEUROCHEMICAL AND BEHAVIORAL EFFECTS OF ISOLATION-REARING IN THE DOG.
H. C. Agrawal, M. W. Fox, and W. A. Himwich (Galesburg State Res. Hosp., Thudichum Psychiat. Res. Lab., Galesburg, Ill.).
Life Sciences, vol. 6, Jan. 1, 1967, p. 71–78. 23 refs.

Puppies (from four to five weeks of age) reared in partial isolation for one week showed behavioral abnormalities, being hyperactive with diffuse reactions. Significant changes also occurred in the concentration of free amino acids in the subcortical areas. These changes were most marked in glutamic acid and GABA, but also appeared in the glutamine and aspartic acid levels.

A67-80936
EXERCISE AND SLEEP PATTERNS IN COLLEGE ATHLETES.
Frederick Baekeland and Richard Lasky (N. Y. State U., Downstate Med. Center, New York City).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1203–1207. 21 refs.
Grants NIH 5-K3-MH-23,901 and 5-R01-MH-10088.

Visua, state-of-sleep analysis of the sleep electroencephalograms of ten college athletes under three different conditions of exercise suggests a general positive relationship between exercise and the amount of slow-wave (delta) sleep in a night's sleep as well as a stress effect of exercise obtained in the evening.

A67-80937
SIZE CONSTANCY AND EMMERT'S LAW OF APPARENT SIZES.
Gordon Stanley and J. J. Furedy (Ind. U., Bloomington).
Australian Journal of Psychology, vol. 18, Dec. 1966, p. 266–270. 11 refs.

Boring asserted that Emmert's law of the apparent size of after-images held only under conditions of size constancy. In Phase I of the present experiment 28 male subjects made paired-comparisons judgments of the after-image size and of the distance of the projection field at seven distances ranging from 18 to 126 in. In Phase II, 14 male subjects made similar size and distance estimates using direct-images which subtended the same retinal angle as that subtended by the after-image inducing stimulus. Although size constancy obtained, the paired-comparisons scale for apparent after-image size showed Emmert's law to fail as distance increased beyond 90 in.

A67-80938
CONTEXT AND MOVEMENT AS FACTORS INFLUENCING HAPTIC ILLUSIONS.
R. Over (Otago U., Dunedin, New Zealand).
Australian Journal of Psychology, vol. 18, Dec. 1966, p. 262–265. 7 refs.
U. Grants Comm. supported research.

A haptic illusion is obtained when blindfolded subjects are required to trace along the raised contours of an illusion figure. In the present experiments it is asked whether haptic judgments of an illusion figure are influenced by the extent of the finger movements involved in inspection of the figure or by contextual tactile stimulation. The possible effects of these two variables have been unconfounded by requiring subjects to make finger movements over the same extent during inspection irrespective of whether the length being judged was presented alone or was adjacent to a longer contour. An illusion was obtained only when contextual tactile stimulation was present. The bearing of the data on some current theories of illusions is discussed.

A67-80939
PROPHYLACTIC EFFECT OF MARINAMYCIN AGAINST IONIZING RADIATION.
Momoe Soeda, Michiko Ootomo, and Mieko Ome.
(Japan. Chemotherapy, 12th Gen. Meeting, Jun. 11, 1964). *Nippon Acta Radiologica*, vol. 26, Dec. 25, 1966, p. 1208–1212. 7 refs.

Mice were exposed to 100 to 200 r by X-ray irradiation, and leukopenia developed within one week, while those given Marinamycin two hr. before irradiation caused leukocytosis instead of leukopenia. Control mice exposed to 700 r by CO^{60} irradiation could survive for at least 35 days, but the survival rate was 40 to 60%. Mice exposed to 800 r were all dead within 13 days. Marinamycin, one new anti-leukopenic agent showed no appreciably beneficial effect to enhance the survival rate of irradiated mice, when given in an adequate dose. In the present stage of preparation, the dosage ranging from 25 to 50 gamma should be thought to be adequate for an adult mouse, and the maximum effect would be expected when given within two to three days after exposure.

A67-80940
PROTECTIVE EFFECT OF MEG, AET, SEROTONIN AND PHENYLEPHRINE AGAINST BONE MARROW INJURY FOLLOWING WHOLE-BODY IRRADIATION OF MICE.
Haruo Nakatsuka, Hironobu Ochi, Tetsuo Fujimura, Keiji Kagawa, Akira Yamashita, and Nobuyuki Yasuda (Osaka City U., School of Med., Dept. of Radiol., Japan).
Nippon Acta Radiologica, vol. 26, Nov. 25, 1966, p. 993–998. 31 refs. In Japanese.

The protective effects of aminoethylisothiuronium (AET), mercaptoethylamine (MEA), serotonin, and phenylephrine on the bone marrow injury following whole-body irradiation of mice were studied. The nucleated bone marrow cell counts

of femurs of mice were used as a measurement index of the bone marrow damage. The MEA, AET, serotonin and phenylephrine had a marked protective effect and gave a dose reduction factors ranging from 1.5–2.5. These compounds also markedly enhanced the recovery of the bone marrow damage.

A67-80941
PERCEIVED DISTANCE AND THE CLASSIFICATION OF DISTORTED PATTERNS.
Michael I. Posner, Ralph Goldsmith, and Kenneth E. Welton, Jr. (Wis. U., Madison).
Journal of Experimental Psychology, vol. 73, Jan. 1967, p. 28–38. 18 refs.
Grant NSF GB2701 and Wis. U. supported research.

This work is a continuation of efforts to develop a psychophysics of form similarity appropriate to the study of concept learning. Five configurations of dots (Triangle, Diamond, M, F, and Random) were studied. The psychophysical functions relating perceived distance from the original to each level of distortion were linear. The level of distortion was calculated from the statistical rule generating the distortions and expressed in terms of uncertainty. It also reflected the mean distance that each dot actually gravitated over random samples of the rule. The perceived distance between any pair of distortions increased with the level of the more distorted from the original. The level of distortion of a sample of patterns was related to the rate at which subjects learned a common response to that sample. Rate of learning in classifying these patterns, like multivariate concept learning, is a function of the uncertainty within a category.

A67-80942
A SIX CHANNEL PHYSIOLOGICAL TELEMETRY SYSTEM.
R. B. Robrock II and W. H. Ko (Case Inst. of Technol., Cleveland, Ohio).
IEEE Transactions on Bio-Medical Engineering, vol. BME-14, Jan. 1967, p. 40–46. 5 refs.
Vocational Rehabil. Admin. supported research.

A six channel FM/FM physiological telemetry system was designed to measure two surface temperatures, an internal temperature, the respiration rate, and position and muscle spasm of a paralyzed patient. The system has since been adapted to permit the measurement of pulse rate. Tunnel-diode subcarrier oscillators operating from a constant-current source provided excellent temperature and long-term stability while permitting a complete transmission package with size $0.6 \times 2.5 \times 2.5$ in. and weight 15 gm. A compatible transistorized receiving system was also constructed.

A67-80943
EFFECT OF EXPERIMENTAL WATER RESTRICTION ON BRAIN WATER.
Lawrence F. Jelsma and J. Donald McQueen (Johns Hopkins U., School of Med. and Baltimore City Hosp., Div. of Neurol. Surg., Md.).
(Southern Neurosurg. Soc., 17th Ann. Meeting, Charleston, S. C., Mar. 28, 1966).
Journal of Neurosurgery, vol. 26, Part 1, Jan. 1967, p. 35–40. 25 refs.
Grants PHS NB-01246-07 and NB-24850-02; Md., Heart Assn. supported research.

Dehydration was produced by 24- to 96-hour periods of water restriction in dogs. A significant decrease in brain water, muscle water, and body weight occurred and correlated roughly with a significant increase in plasma solute concentration. The loss of brain water was biphasic whereas the loss of muscle water was linear. During the first 24 hours of dehydration, comparable percentages of water were withdrawn from brain and muscle. With longer periods of dehydration, a smaller per cent of water was withdrawn from brain than from muscle. The mechanism for the limited loss of brain water was not clear. The amount of water withdrawn from the brain (1%) after 24 hours correlated well with that removed by using clinical doses of hypertonic agents. Severe increases in plasma tonicity were not necessary to achieve this cerebral dehydration. After dehydration, hemorrhages were not noted grossly, and residual cerebral blood was not increased.

A67-80944
PERICARDIAL PRESSURE DURING TRANSVERSE ACCELERATION IN DOGS WITHOUT THORACOTOMY.
Natalio Banchero, Wilhelm J. Rutishauser, Anastasios G. Tsakiris, and Earl H. Wood (Mayo Clin. and Mayo Found., Rochester, Minn.).
Circulation Research, vol. 20, Jan. 1967, p. 65–77. 29 refs.
(NASA Grant NsG-327, Grants AF 33(567)-8899, NIH H-3532, FR-00007, and AHA CI 10.

Intrapericardial pressures were recorded in anesthetized dogs studied without thoracotomy. Animals were studied before, during, and after one-min. exposures to transverse accelerations that ranged from 1g (normal gravitational environment) to 7g when in the supine ($+g_x$), prone ($-g_x$), left decubitus ($+g_y$), and right decubitus ($-g_y$) positions. Four additional animals were studied at 1g only while in these same body positions. Pressures also were recorded from both atria, right ventricule, aorta, esophagus, and the potential pleural space. Mean end-expiratory intrapericardial pressure varied directly with the vertical height of the recording site in the thorax during all conditions studied, as would be expected in a hydrostatic system. Transpericardial pressures were not significantly different from zero at all levels of acceleration studied. Transmural left and right atrial pressures were independent of the height of the recording site in the thorax and were unchanged during exposures to transverse accelerations that ranged from plus to minus $7g_x$.

A67-80945
HUMAN HEART WEIGHT AT HIGH ALTITUDE.
Herbert N. Hultgren and Harry Miller (Stanford U., School of Med., Dept. of Med., Cardiol. Div., Palo Alto, Calif.).
Circulation, vol. 35, Jan. 1967, p. 207–218. 22 refs.
Contract DA-49-193-MD-2274 and San Mateo Heart Assn. supported research.

The weight of the right ventricle, left ventricle, and septum determined in 98 hearts of high-altitude (12,300 ft.) residents in Peru and in 86 hearts from sea level in the continental United States revealed that right ventricular hypertrophy is no greater at high altitude than at sea level in the stillborn-newborn infant heart. Right ventricular weight relative to total heart weight at high altitude exceeds that at sea level beginning about 30 days after birth and reaches a plateau at 56 days. Thereafter the degree of relative right ventricular hypertrophy changes only slightly through the adult yr. No evidence was found of postnatal atrophy of the right ventricle either at sea level or high altitude nor of septal hypertrophy accompanying the right ventricular hypertrophy in high altitude. The degree of right ventricular hypertrophy was moderate and variable, and corresponded to the moderate, variable pulmonary hypertension previously demonstrated in high altitude residents. Since total heart weights are similar at high altitude and sea level and since high-altitude subjects have a smaller body size, the heart weight/body weight ratio is probably greater in the high altitude subject.

A67-80946
PHYSIOLOGICAL PROBLEMS OF MAN LIVING IN EXTRATERRESTRIAL ENVIRONMENT [SUI PROBLEMI FISIOLOGICI DELLA VITA DELL'UOMO IN AMBIENTE EXTRATERRESTRE].
A. Scano (Centro di Studi e Ric. di Med. Aeron. e Spaziale, Ispettorato di Sanita' Aeron., Rome, Italy).
(Nazl. dell' Assoc. Med. Ital. della Stampa, 8th Congr., Rome, Dec. 1966).
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.–Dec. 1966, p. 659–679. 44 refs. In Italian.

Physiological data recorded on about 30 individuals, having carried out space flights, show the feasibility of living and working, for a few weeks period, in a space vehicle, with quasi-terrestrial microclimate, and surviving, by means of perfect protective garments. Life of man on the Moon requires the solution of similar, but quantitatively different problems. In fact absence of atmosphere on the Moon requires the use of airtight shelters or pressure suits, that must give a better thermic protection than space suits, because of the high soil temperature during the lunar day, and the large heat dispersion by irradiation, during the long night. Transition from extended weightlessness (3 to 4 days) to fall deceleration, can possibly determine transient hypodynamia and tendence to collapsing, already observed in astronauts after having come back to Earth. The reduced Moon gravity should be tolerated without troubles. Special goggles will be used because of the high brilliance of sun-lit objects. Absence of aerial perspective, of light and shade effects, of known dimension references will make evaluation of distances and observation of ground characteristics hard and illusory.

A67-80947
EFFECTS OF NICOTINE ON HEART RATE STUDIED BY DIRECT PERFUSION OF SINUS NODE.
Reginald A. Nadeau and Thomas N. James (Montreal U., Dept. of Physiol., Quebec, Canada and Henry Ford Hosp., Sect. on Cardiovascular Res., Detroit, Mich.).
American Journal of Physiology, vol. 212, Apr. 1967, p. 911–916. 18 refs.
Med. Res. Council, Canada, PHS, and Mich. Heart Assn. supported research

In 26 dogs after pentobarbital anesthesia, the heart was exposed and the sinus node artery cannulated. Nicotine base solutions were injected into the sinus node in concentrations ranging from 0.01 to 100 μg./ml. No systemic effects were obtained from concentrations below 100 μg./ml. With 1.0 and 10 μg./ml., both slowing and acceleration of the heart were observed. The slowing was abolished by intranodal atropine and the acceleration by intranodal propranolol and intranodal hexamethonium. Nicotine also inhibited the effects of electrical stimulation of the cervical vagus nerve without modifying the response to intranodally injected acetylcholine. The heart rate response to stellate ganglion stimulation was not abolished by nicotine.

A67-80948
MEMBRANE IONIC CONDUCTANCES DURING REST AND ACTIVITY IN GUINEA PIG ATRIAL MUSCLE.
H. A. Fozzard and William Sleator (Washington U., School of Med., Depts. of Physiol. and Med., St. Louis, Mo.).
American Journal of Physiology, vol. 212, Apr. 1967, p. 945–952. 33 refs.
Grants PHS NB-00937 and HE-09010.

Relative membrane resistance measurements were made with two microelectrodes in guinea pig atria during normal action potentials and during the action of acetylcholine and epinephrine. One microelectrode was used to record the intracellular potential and the other for injection of constant current pulses during diastole and at various times during the action potential. The contribution of chloride to membrane currents was estimated by measurement of membrane resistances after replacement of chloride by acetylglycine. The apparent membrane resistance increased during the plateau of the atrial action potential in a manner similar to that seen in Purkinje fibers. On the basis of certain reasonable assumptions, calculations of the changes in sodium conductance and potassium conductance (gK) were carried out resulting in the approximate time courses of these conductances during action potentials. The implications of these measurements for the mechanism of plateau formation were discussed. The previously shown effect of acetylcholine on gK was confirmed in this preparation, and further observations were made as to its mechanism. Epinephrine was shown to increase membrane resistance, consistent with a decrease on potassium conductance.

A67-80949
STEREOSCOPIC DEPTH AND BINOCULAR RIVALRY.
Kenneth N. Ogle and Janice M. Wakefield (Mayo Clinic and Mayo Found., Sect. of Biophys., Rochester, Minn.).
Vision Research, vol. 7, Jan. 1967, p. 89–98. 19 refs.
Grant NINDB NB-1852.

The possible inhibition or suppression of stereoscopic depth perception in the presence of binocular rivalry was studied in carefully conducted experiments in which stereoscopic thresholds were determined. With the use of vertical lines and small details as stereoscopic stimuli, no evidence of differences in stereoscopic thresholds between rivaling and nonrivaling backgrounds could be found. Subjectively, it appeared that the presence of vertical lines, and those in positions to give rise to stereoscopic depth, seemed more to inhibit the rivalry.

A67-80950
A NOISE-ATTENUATING ENCLOSURE FOR AUDIOMETER EARPHONES.
R. R. A. Coles (Roy. Naval Med. School, Hants, Great Britain).
British Journal of Industrial Medicine, vol. 24, Jan. 1967, p. 41–51. 29 refs.

Noise-excluding earphones may be subdivided into circumaural earphones and noise-attenuating earphone enclosures. Two versions of 'Otocups', an example of the latter subdivision, were evaluated in a series of experiments and in comparison with a conventional type of earphone (Telephonics TDH-39 receiver in a MX-41/AR cushion). The experiments involved a comparison of auditory threshold, artificial-ear measurements, test-retest reliability, and pure-tone attenuation. The second version of 'Otocups' was considered sufficiently reliable for most purposes and to have practical applications in industrial and clinical audiometry when proper booths are not possible on account of cost, weight, or space factors.

A67-80951
SERUM CHOLESTEROL CONCENTRATIONS DURING PHYSICAL TRAINING AND DURING SUBSEQUENT DETRAINING.
Donald E. Campbell (Tex. U., Austin) and Treve B. Lumsden (Eastern Ore. Coll., La Grande).
American Journal of Medical Sciences, vol. 253, Feb. 1967, p. 155–161. 38 refs.
Contract PHS PH 62-346.

This study investigated the influence of physical training and subsequent discontinued activity on serum cholesterol concentrations with additional concern directed to diet, body weight and morphological configuration. Initially, volunteer young adult males were measured for body configuration according to the Behnke technique to determine a subgroup classification of slim, muscular, or obese. Fifteen subjects were selected from these subgroup categories to become participants in two treatments. Treatment I consisted of running on a motor driven treadmill for three hr. a week for ten weeks. Treatment II was then begun and extended for another ten weeks. During Treatment II the subjects discontinued running and remained physically inactive. No significant variations in body weight or diet were discernable. Utilizating the two-way analysis of variance no significant differences between groups or treatments resulted for the serum cholesterol concentrations. However, significant interaction F values were found which suggested that the treatment effects varied from subgroup to subgroup. When the simple effects were computed, a significant treatment difference was found for the obese group but not for the muscular or slim groups.

A67-80952
OXYGEN TRANSFER BY THE LUNG.
J. B. West (London, Postgraduate Med. School., Dept. of Med., Great Britain).
International Anesthesiology Clinics, vol. 4, Spring 1966, p. 13–22; discussion, p. 22–26. 10 refs.

The transport of oxygen was viewed by examination of the gradual fall in the partial pressure of oxygen in the body. Some causes of arterial hypoxemia were found to be alveolar hypoventilation, failure of the pulmonary capillary blood to equilibrate with the oxygen tension in alveolar gas, arterial blood that does not pass through ventilated areas of the lung, ventilation-perfusion ratio imbalance, and possible impairments involving diffusion within the airways. In measurements of diffusion made in an isolated dog lung, labelled liquids were inhaled and incomplete diffusion in the alveoli was observed. Studies involving the diffusion within the airways may be made increasingly in the future as a possible factor limiting oxygen transfer in some types of lung disease. Also, the possibility of inhaling liquids may be important in the distant future in space travel and in diving to great depths. A discussion followed.

A67-80953
THE ROLE OF BARORECEPTORS AND OF BLOOD PRESSURE IN THE REGULATION OF SLEEP AND WAKEFULNESS.
W. Baust and H. Heinemann (Heidelberg U., Physiol. Inst., West Germany).
Experimental Brain Research, vol. 3, Feb. 6, 1967. p. 12–24. 36 refs.
Deut. Forschungsgemeinschaft. supported.

The sleep wakefulness pattern was studied in unrestrained cats with chronically implanted electrodes over ten day periods. After five days the carotid sinus nerves were cut bilaterally. After the denervation the total duration of sleep and wakefulness remained unchanged. The only difference which could be observed was an increase of the number of short-lasting phases of wakefulness occurring during synchronized sleep. If the carotid sinus and depressor nerves were cut, the total duration of synchronized sleep was significantly diminished. Short-lasting rises of blood pressure were produced by an occlusion of the thoracic aorta or by strong rapid injections of saline. These mechanically produced elevations of blood pressure were immediately followed by an arousal. If the blood pressure was raised over a period of one or two hr. by vasopressin, a marked increase of the number and the total duration of wakefulness was observed. A fall in blood pressure was produced by stimulation of the peripheral stump of the vagus. If the stimulus was applied during relaxed wakefulness, electroencephalogram synchronization with behavioral signs of sleep occurred simultaneously with the fall in blood pressure. It is concluded that the monotonous synchronous inflow from the baroreceptors is at least in part responsible for the onset and maintenance of synchronized sleep. The hypothesis is put forward that two feed backs, one through the baroceptor discharge and another one through the blood pressure, are influencing the regulation of sleep and wakefulness.

A67-80954
HYPOXIA IN MAN.
J. B. L. Howell (Manchester Roy. Infirmary U., Dept. of Med. Great Britain).
International Anesthesiology Clinics, vol. 4, Spring 1966, p. 27–36; discussion, p. 36–39. 21 refs.

Hypoxia in the disease state is discussed. A need for definite criteria for the existence of tissue hypoxia is recognized in order for rational O_2 therapy to be achieved. Various approaches which have been made to establish these criteria are: (1) blood lactate, pyruvate and excess lactate concentration, (2) serum levels of tissue enzymes, and (3) venous P_{O_2}. These are three main mechanisms by which a reduction in oxygen flow to tissue may occur in disease. These are: (1) reduction in blood flow, (2) reduction in normal arterial oxygen content, and (3) reduction in arterial oxygen capacity. The level of arterial saturation at which tissue hypoxia will occur will depend upon the cardiac output. It is suggested that the margin between the appearance of lactic acid and actual cellular damage is not very great. Hypoxia has a role in maintaining tissue oxygenation by its effects upon the circulation and upon ventilation. Results which involved ventilatory responses to CO_2 while breathing oxygen and to two grades of exercise while breathing air and oxygen in a subject with obstructive airway disease indicated that during muscular exercise, the increased ventilation could be attributed entirely to the arterial hypoxemia; without hypoxemia, ventilation was regulated entirely by the P_{CO_2} or cH^+. Increased oxygen flow to the tissues as treatment for hypoxia may be brought about by: (1) increasing the circulation rate, (2) increasing the O_2 content of the blood, or (3) by increasing the amount of functioning hemoglobin. Hypoxemia does not necessarily imply tissue hypoxia; failure to recognize this may lead to unnecessary therapy, and in the case of acute or chronic chest disease may be disastrous in its consequences. A discussion followed.

A67-80955
EXTREME PROBABILITIES IN LEARNING AND DECISION MAKING.
Lowell M. Schipper (Pa. State U., University Park).
Journal of Experimental Psychology, vol. 73, Jan. 1967, p. 149–151.

In a multiple probability-learning situation subjects received 120 massed trials on each of three probabilities. Subjects in Treatment I were trained with probabilities 0, .50, .90; in Treatment 2 with 0, .50, 1.00; in Treatment 3 with .10, .50, .90; and Treatment 4 with .10, .50, 1.00. One hundred per cent curves of acquisition were not markedly different in shape from 90% curves, and 0% curves were not markedly different from 10% curves. When subjects subsequently were required to combine whatever information had been learned about these probabilities, they did so using the most extreme probabilities in a manner not unlike that for the 10% and 90% probabilities.

A67-80956
HEAT-PROTECTIVE VENTILATED JACKETS: A COMPARISON OF HUMID AND DRY VENTILATING AIR.
G. W. Crockford and D. E. Lee (London School of Hyg. and Trop. Med., M.R.C. Environ. Physiol. Res. Unit, Great Britain).
British Journal of Industrial Medicine, vol. 24, Jan. 1967, p. 52–59.

A comparison was made between humid and dry air for ventilating a heat-protective jacket. At sensible cooling capacities of 4.5 kcal./min. and above, humid and dry air provided equal protection. At sensible cooling capacities of 4 kcal./min. and above, the subject achieved thermal equilibrium within 65 min. with both humid and dry air, but below this value humid ventilating air is associated with elevated sweat rates and a failure to achieve thermal equilibrium within 65 min.

A67-80957
FURTHER INVESTIGATIONS ON THE EVALUATION OF EXPOSURE TO NITROBENZENE.
Jerzy Piotrowski (Inst. of Occupational Med., Dept. of Ind. Toxicol., Lódź, Poland).
British Journal of Industrial Medicine, vol. 24, Jan. 1967, p. 60–65. 12 refs.
Polish Acad. of Sci. and Min. of Health supported research.

Metabolic studies were performed on men exposed to nitrobenzene vapour under experimental conditions. Absorption was estimated by the analysis of urine for p-nitrophenol. About half as much vapour was absorbed through the skin as through the lungs. In inhalation studies that accumulation of nitrobenzene in the course of repeated exposures was investigated. It was found that p-nitrophenol was excreted in the urine in increasing amounts on successive days of exposure, reaching, by the end of a week, levels approximately two and one-half times as high as on the first. The specificity of the p-nitrophenol test on urine was studied using rats. Of all nitro-compounds investigated only chloronitrobenzenes, especially the ortho-isomer, gave interfering compounds in the urine. o-Chloronitrobenzene gave lower results than nitrobenzene by a fact of three.

A67-80958
THE WATER EXCHANGE AND POLYURIA OF RATS DEPRIVED OF FOOD.
S. D. Morrison, C. Mackay, Eleanor Hurlbrink, Jane K. Wier, M. Susan Nick, and Florence K. Millar (Glasgow U., Inst. of Physiol., Great Britain, E. I. du Pont de Nemours and Co., Haskell Lab. for Toxicol. and Ind. Med., Newark, Del. NIH, Natl. Cancer Inst., Lab. of Physiol., Bethesda, Md.).
Quarterly Journal of Experimental Physiology and Cognate Medical Sciences, vol. 52, Jan. 1967, p. 51–67. 20 refs.
Glasgow U., supported research.

Male and female rats void a greatly increased volume of dilute urine for the first one or two days of deprivation of food with water allowed. The polyuria is not dependent on an increase of water intake and occurs unless intake falls to about 5 g./day. The polyuria also occurs when food intake is restricted to 1/3 normal but not on restriction to 2/3. Almost 2/3 of the excess urine not attributable to increased water intake could be accounted for as water absorbed from diminishing gut contents; the remainder may be derived from depletion of other labile pools of body water. The volume of urine can be restored to control levels and the concentration partially restored by simultaneous deprivation of food and water or by treatment with Pitressin. On more prolonged deprivation of food with water allowed, urine concentration approached control levels by day four-six. On prolonged restriction of food, water turnover remained high, and urine remained dilute for at least six days; concentration could be restored by Pitressin. It is concluded that the dilute urine of food deprivation and restriction is the result of a self-imposed water diuresis. The high water turnover represents, by the criterion of the potential concentrating ability of the kidney, and inefficiency of water regulation.

A67-80959
PRESENTATION TIME AND FREE RECALL.
Nancy C. Waugh (Harvard Med. School, Cambridge, Mass.).
Journal of Experimental Psychology, vol. 73, Jan. 1967, p. 39–44. 14 refs.
Grants NIH MH-05120-02 and MH-08119-01.

Two experiments on the immediate free recall of unrelated words are reported. The major results were as follows: the number of items retained from a list increases as a function of the total amount of time taken to present the list. It is independent of the number of different items presented. The probability that a given word will be recalled increases in direct proportion to the total number of seconds for which it is presented. It does not matter how this time is distributed within a list.

A67-80960
THE VISUAL-EVOKED CORTICAL RESPONSE IN NIGHT BLINDNESS.
Ronald S. Fishman (Fla. U., Dept. of Ophthalmol., Gainesville).
American Journal of Ophthalmology, vol. 62, Dec. 1966, p. 1166–1170. 12 refs.
Grants NIH NB 04896-03 and NB 05597-02.

Visual-evoked cortical responses were elicited from two patients with severe night blindness. Unlike the electroretinogram, the visual-evoked response reflects photopic activity primarily and, especially, the photopic function of the cone-dense retina at the posterior pole. Therefore, it is potentially a useful objective test of macular function.

A67-80961
THE RELATIONSHIP BETWEEN CHANGES IN SERUM LEVELS OF GROWTH HORMONE AND MOBILIZATION OF FAT DURING EXERCISE IN MAN.
M. Hartog, R. J. Havel, G. Copinschi, J. M. Earll, and B. C. Ritchie (Calif. U., San Francisco Med. Center, Dept. of Med., Metab. Res. Unit, Cardiovascular Res. Inst., San Francisco).
Quarterly Journal of Experimental Physiology and Cognate Medical Sciences, vol. 52, Jan. 1967, p. 86–96. 36 refs.
Grants PHS HE-06285 and AM-09615.

Mobilization of fat into the blood, evidenced by increased plasma levels of glycerol, was detectable five-ten min. after healthy men in the post-absorptive state began to exercise on a bicycle ergometer at a work load of 400 Kgm./min. Plasma levels of immunoreactive human growth hormone (IRHGH) did not change until after 20 min. of exercise, rose rapidly until 60 min. and then began to fall. No detectable fall in plasma level of glucose preceded the rise in IRHGH. These results are incompatible with a major role for growth hormone in mobilization of fat during such exercise. When subjects were given nicotinic acid before exercising, fat mobilization was blocked, but the pattern of increase in levels of IRHGH was not altered during the first hr. of exercise. IRHGH levels continued to increase until exercise was stopped and then fell more slowly than in control subjects. The rise in IRHGH during exercise does not, therefore, depend upon prior mobilization of fat, but such mobilization may inhibit its continued secretion.

A67-80962
PERCEPTUAL QUANTIFICATION OF CONDITIONAL DEPENDENCY.
Dwight E. Erlick and Robert G. Mills (Aerospace Med. Res. Labs., Wright-Patterson AFB, Ohio).
Journal of Experimental Psychology, vol. 73, Jan. 1967, p. 9–14. 13 refs.
AFSC supported research.

Accuracy of subject's estimates of the correlation between two variables whose actual statistical relationship (Pearsonian r) varied from +1.0 to −1.0 was investigated. Sequences of 20 X, Y coordinates of a correlation scatterplot were presented by means of two pointers. Fourteen subjects varying in knowledge of statistics furnished the data. Results indicate: (a) greater accuracy in estimating positive correlations, (b) positive bias of estimates when sequence includes a few large and many small deviations vs. all intermediate deviations, (c) general bias by naive subjects toward positive estimates. It is concluded that subject's estimates appear to correspond to a simple summation-of-discrepancies-between X and Y rather than a squared discrepancy model underlying statistical correlation. Equations are derived for predicting subject's responses based on relative weights of and frequencies in the various cells of the correlation array.

A67-80963
ON THE REPEATABILITY OF SUBMAXIMAL WORK TESTS AND THE INFLUENCE OF BODY POSITION ON HEART RATE DURING EXERCISE AT SUBMAXIMAL WORK LOADS.
R. Hellström and A. Holmgren (Karolinska Sjukhuset, Mil. Med. Exam. Center and Hosp. for Infectious Diseases, Clin. Physiol. Lab., Stockholm, Sweden).
Scandinavian Journal of Clinical and Laboratory Investigation, vol. 18, 1966, p. 479–485. 14 refs.
Swed. Natl. Assn. against Heart and Chest Diseases supported research.

Work tests employing submaximal loads in the sitting position were performed on two separate days within a week in 56 healthy young men. There was no significant difference in heart rate during exercise between the first and second test. The repeatability of W_{170} (work load at heart rate 170), and the heart rate at 900 k.p.m., was 4.9 and 4.0%, respectively, expressed at the standard error of the single determination. Work tests were performed in the sitting and the supine position on two different days, within a week, in 49 healthy young men and 12 healthy young women to study the influence of posture on the heart rate during exercise. There was on the average no significant difference in performance (heart rate per work load) sitting and supine in the male group, but an almost significant difference–the heart rate in supine position being lower–in the female group. The scatter was, however, large and the investigation is consistent with the individual presence of marked postural influence–as has earlier been shown in certain pathological cases–which may be a contributary cause of low exercise tolerance in the sitting position in such cases.

A67-80964
ADRENERGIC BETA-RECEPTOR BLOCKADE AND THE EFFECT OF HYPERVENTILATION ON THE ELECTROCARDIOGRAM.
C. Furberg and C.-F. Tengblad (Umea U., Dept. of Clin. Physiol. and Centrallasarettet, Depts. of Clin. Physiol. and Psychiat., Vänersborg, Sweden).
Scandinavian Journal of Clinical and Laboratory Investigation, vol. 18, 1966, p. 467–472. 18 refs.

T-wave inversions on the electrocardiogram (EEG), induced by hyperventilation, have been studied in eight psychiatric patients without signs of heart disease. These ECG changes were in all cases abolished by an adrenergic beta-receptor blockade caused by propranolol. In two of the investigated cases the T-wave inversions were unchanged after injection of atropine. The investigations gave no support to the concept that the reaction is a vagal reflex. The abolition of the T-wave inversions of hyperventilation reported to occur after Pro-Banthine is probably due to the blocking effect of this agent on the sympathetic ganglia.

A67-80965
STIMULUS PARAMETER CONSIDERATIONS AND INDIVIDUAL DIFFERENCES IN CUTANEOUS SENSITIVITY TO ELECTROPULSE STIMULATION.
R. L. Brown, R. A. Spern, K. Schmitt, and A. Solomon (George Washington U., Human Resources Res. Office, Washington, D. C.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1215–1222. 12 refs.
Army Dept. supported research.

The two experiments described were concerned with defining the optimal parameter values for an electropulse stimulus and the extent of subject differences. In Experiment I, touch and pain threshold variations were established on 12 subjects as a function of pulse number (1, 4, 8) and pulse duration (0.5, 1.0 msec.). Significant support was obtained for use of a single pulse of 0.5, 1.0 msec.). Significant support was obtained for use of a single pulse of 0.5-msec. duration. In Experiment II, touch and pain thresholds were obtained on 20 subjects coincident with body region and session variation. The abdomen and chest appear to be ideal electrode sites. Subject differences over time were discussed.

A67-80966
KINESTHETIC AFTEREFFECT, A MEASURE OF KINESTHETIC AWARENESS.
Robert S. Hutton (Calif. U., Los Angeles).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1165–1166. 5 refs.

It was hypothesized that scores on similar tests for kinesthetic awareness (KA) and kinesthetic aftereffects (KAE) should correlate negatively. Fifty seven male university students were administered tasks (perceptual-motor) designed to measure KA and KAE. Low inter-test Pearsonian correlation coefficients indicated negligible relationships between the two tasks. Further investigation is suggested since the correlation values fell in the posited direction.

A67-80967
EFFECT OF TEMPERATURE ON PACEMAKER ACTIVITY OF RABBIT SINUS NODE.
Shunichi Yamagishi and Toyomi Sano (Tokyo Med. and Dental U., Inst. for Cardiovascular Diseases, Bunkyo-ku, Japan).
American Journal of Physiology, vol. 212, Apr. 1967, p. 829–834. 17 refs.

The effect of temperature on the membrane potential of the true pacemaker of the rabbit sinus node was investigated and compared with that of latent pacemakers and atrial fibers. The amplitude of the true pacemaker action potential was constant between 34 and 42°C., and it declined above 42°C. On the other hand, the slow diastolic depolarization and maximal rate of rise of the action potential increased consistently until 43°C. For latent pacemakers and atrial fibers, the action potential diminished above 40 and 36°C., respectively. In the

action potential of the true pacemaker, the slopes of the different phases had the following Q_{10} values: upstroke 2.7, plateau 4.7, final repolarization 2.6, and slow diastolic depolarization 3.2. The durations of the slow diastolic depolarization and of the action potential were changed equally at all temperature levels examined. Conduction velocity in the sinus nodal area increased with an increase in temperature, even if that in the atrium stopped. Moreover, it was more sensitive to temperature change than that in the atrium.

A67-80968
INFLUENCE OF PHYSICAL ACTIVITY ON THE STRENGTH OF KNEE LIGAMENTS IN RATS.
C. M. Tipton, R. J. Schild, and R. J. Tomanek (Iowa U., Exercise Physiol. Lab., Iowa City).
American Journal of Physiology, vol. 212, Apr. 1967, p. 783–787. 22 refs.

The relationship between physical activity and the strength of the medial collateral ligament was investigated with normal and hypophysectomized rats. Animals were assigned to groups designated as controls, single exercise period, repeated exercise periods (trained), trained-detrained, immobilized, tenectomized, hypophysectomized-trained, and hypophysectomized-trained plus growth hormone. Results were expressed in units of separation force (SF), separation force-to-body weight ratio (SFR), and centimeters of ligamentous elongation. The findings indicated that a single exercise bout had no appreciable influence on SF results, but that repeated periods of exercise will significantly strengthen knee ligaments. The same tendency prevailed with the detrained group. Ligaments from tenectomized and immobilized animals had SF values lower than their controls; however, only the latter finding had statistical significance. Force-elongation curves showed that the normal trained animals had more elongation at a given force than nontrained animals. It was postulated that the changes associated with training were occurring at the attachment site between the ligament and the bone.

A67-80969
EFFECT OF STARVATION ON HYALURONIC ACID AND EXTRACTABLE PROTEIN IN SKIN OF MICE.
Harry Sobel, Martinez J. Hewlett, Silvio Hoshek, and Ira M. Sacker (Calif. U., School of Public Health, Los Angeles; St. Joseph Hosp., Burbank; and Veterans Admin. Hosp., Aging Res. Lab., Sepulveda).
American Journal of Physiology, vol. 212, Apr. 1967, p. 773–776. 16 refs.
Grants PHS AM-05955-03.

When a substantial loss of carcass nitrogen was induced in mice by starvation, there was a significant reduction of hyaluronic acid and chondroitin sulfate contents and also of extravascular albumin in the skin. The isolated hyaluronic acid from the starved animals exhibited a change in its characteristics so that when solutions containing albumin flowed through it, less albumin was retained and more passed through. The findings suggested that starvation resulted in loss in the quantity of extravascular plasma protein present in the skin, and that this could be causally related to the simultaneous decrease of hyaluronic acid.

A67-80970
EFFECT OF STELLATE GANGLION BLOCKADE ON THE HYPERPNEA OF EXERCISE.
J. H. Eisele, B. C. Ritchie, and J. W. Severinghaus (Calif. U., Med. Center, Cardiovascular Res. Inst. and Dept. of Anesthesia, San Francisco).
Journal of Applied Physiology, vol. 22, May 1967, p. 966–969. 12 refs.
Grants PHS 5-K6-HE-19,412, HE 06285, and 5T1-GM-63.

Experiments were done in man to determine whether part of the hyperpnea of exercise might relate to sympathetic activation or alteration of carotid body chemoreceptors. Four untrained young males exercised at 800 kg.-m./min. for ten-min. warm up and control runs before and after bilateral blockade of the stellate ganglia with 1.5% lidocaine. Expired ventilation, end-tidal carbon dioxide tension (P_{CO_2}), and electroencephalogram were continuously recorded, and arterial P_{CO_2}, oxygen tension, and pH were determined twice before exercise, during the fourth and ninth min. of exercise, and the third min. of recovery. The average base excess at rest and during the ninth min. of exercise before block was +1.2 and −2.7, and after block was +1.5 and −3.3. There were no significant ventilatory changes in the control period, steady state, or recovery period before and after blockade. At the start of exercise, each subject showed a delay in the onset of hyperpnea after blockade.

A67-80971
DIAPHRAGM AND ABDOMINAL MUSCLE RESPONSES TO ELEVATED AIRWAY PRESSURES IN THE CAT.
Beverly Bishop (N. Y. State U., Dept. of Physiol., Buffalo).
Journal of Applied Physiology, vol. 22, May 1967, p. 959–965. 11 refs.
WADC supported research.

This is a study of respiratory muscle responses in a Dial anesthetized cat when the pressures during inspiration and expiration are elevated independently. The results demonstrate that the abdominal muscles respond selectively to pressure opposing expiration whereas diaphragm activity depends on the pressures during both inspiration and expiration. (a) Electromyograms show that abdominal muscle activity increases in proportion to the pressure applied during expiration regardless of the pressure during inspiration. In contrast, diaphragm activity is progressively augmented by a pressure opposing expiration but this augmentation is depressed if lung inflation is aided by positive pressure during inspiration (b) Whenever expiration is opposed, throax and lung volume is increased in spite of the abdominal contractions, but continuous pressure inflates the thorax more than a pressure elevated only during expiration. (c) For a given pressure opposing expiration, tidal volume is decreased equally by pressure breathing and by expiratory loading. Since the thoracic inflation is different in the two procedures, tidal volume seems to be determined by the pressure opposing expiration rather than lung volume. (d) Vagotomy abolishes abdominal respiratory activity under all conditions as well as the inhibition of the diaphragm caused by positive pressure during inspiration but does not interrupt the diaphragm augmentation in response to a pressure opposing expiration.

A67-80972
SURFACE AREA OF THE CAT.
John A. Vaughan and Thomas Adams (FAA, Office of Aviation Med., Civil Aeromed. Inst., Physiol. Lab., Oklahoma City, Okla.).
Journal of Applied Physiology, vol. 22, May 1967, p. 956–958. 13 refs.

Measurements of whole body surface area segmented into 12 regions were made on 42 freshly killed cats (420–5,850 g. body weight) by covering the shorn skin with cloth adhesive tape and measuring the area of each outlined region with a compensating planimeter. The relationship between total body surface area (BSA) and body weight (body wt.) is expressed by the equation: BSA ($cm.^2$) = 388.4 body wt. ($kg.^{0.}$) + 896.5; (r = 0.95). Since the proportional areas of some of the regions were found to change with body mass, calculations of average skin temperature (average T_s) using summed regional temperature–surface area products must also consider animal size per se. Proportioning factors are presented for accurate calculation of average T_s independent of absolute body mass. Since the ears play an important convective role in whole body temperature regulation in this species, the observation that this area represents 6.3% of the total surface area of the young animal (500–1,500 g. body wt.) but only 3.1% in the large adult (3,500–6,000 g. body wt.) may be interpreted in terms of thermoregulatory lability and capability as a function of animal size.

A67-80973
DISTURBANCE OF HEART RHYTHM DURING RECOVERY FROM EXERCISE IN MAN.
C. T. M. Davies and J. M. M. Neilson (London School of Hyg. and Trop. Med., Environ. Physiol. Res. Unit, and Edinburgh U., Dept. of Med. Phys., Great Britain).
Journal of Applied Physiology, vol. 22, May 1967, p. 943–946. 5 refs.

The large rhythmical fluctuations which occur in the heart rate after exercise have been studied experimentally in ten healthy subjects. Contrary to previous findings it has been shown that the phenomenon is respiratory in origin and therefore an exaggerated form of sinus arrhythmia. The greater part of the effect is probably due to bursts of vagal activity, reinforced from receptors in various sites sensitive to blood pressure.

A67-80974
LOCAL EFFECT OF TEMPERATURE ON SKIN EVAPORATIVE WATER LOSS.
Marilyn J. Huheey, and Thomas Adams (FAA, CAMI, Physiol. Lab. and Okla. U., Med. School, Dept. of Physiol., Oklahoma City, Okla.).
Journal of Applied Physiology, vol. 22, May 1967, p. 939–942. 17 refs.

The influences of water vapor pressure gradient, axon reflex, and direct thermal stimulation of sweat glands on skin surface water loss were defined in terms of skin temperature (T_s). Skin surface evaporative water loss (EWL) was measured as a function of T_s (32–44°C.) from maximally (peripheral nerve stimulation) and minimally (denervation or atropinization) sweating skin of the hind foot pad in the anesthetized cat. An increased vapor pressure gradient (P_{HOH}) accounted for the increased skin surface EWL in maximally, but not in minimally, sweating skin when a value analogous to skin hydraulic conductance (EWL/P_{HOH}) was computed. Since the linear rate of increase of EWL with increasing T_s was not altered by atropinization (compared to othe minimally sweating states), the concepts of an axon "reflex" involvement in this response is not supported. The effect of epidermal hydration on the rate of skin surface water evaporation was indicated by the differences in the slopes of EWL versus T_s for minimally and maximally sweating skin. Changes in water vapor pressure gradient and mechanical properties of the skin as well as epidermal hydration characteristics account for the increased skin surface EWL rates due to direct, local heating of denervated skin.

A67-80975
SLEEP DEPRIVATION: THE CONTEXT OF CONSCIOUSNESS.
Gary O. Morris and Margaret Thaler Singer (Natl. Inst. of Mental Health, Adult Psychiat., Bethesda, Md.).
Journal of Nervous and Mental Disease, vol. 143, Oct. 1966, p. 291–304. 35 refs.

Drowsy states are altered states of consciousness, characterized by primary changes in attention, thinking and interest. In light drowsiness focal attention occurs only with deliberate, painful effort. In moderate drowsiness attention is desultory and passive, while interest is most easily directed to vivid stimuli. Integration of meanings on various levels is not possible. In severe drowsiness there is little or no conscious direction of attention. External stimuli are reacted to apathetically, if at all, but highly charged subjective events like visual hallucinations may occur. Each level of drowsiness is accompanied by the characteristic range of secondary changes in memory, perception, orientation and affect expression. Hypotheses are presented which facilitate the prediction of subjective changes of individuals during drowsiness from prior psychological tests, and increase the understanding of the subjective events during drowsiness. The release of the primary process during drowsiness and the frequent occurrence of visual hallucinations while auditory hallucinations were absent, caused reflection on the tie between primary process thinking and visual thinking, and comparison of hallucinations in sleep deprivation and schizophrenia. These reflections led to some clarification, but also raised further questions.

A67-80976
THE INFLUENCE OF VIBRATION ON CARBOHYDRATE METABOLISM [WPLYW WIBRACJI NA PRZEMIANE WEGLOWODANOWA].
Andrzej Tarnawski.
Patologia Polska, vol. 17, Oct.–Dec. 1966, p. 565–569. In Polish.

In white rats subjected to vibration, blood sugar levels, blood sugar curves with and without glucose loading, adrenaline and insulin tests, blood levels of lactic acid and glycogen content of the liver and skeletal muscles were determined. These indices of carbohydrate metabolism revealed distinct deviations from normal: lowered blood sugar levels, lower blood sugar curves after vibration, diminished hyperglycemic action of adrenaline, longer periods of hypoglycemia after insulin, raised levels of lactic acid, and depletion of the glycogen stores in the liver and muscles.

A67-80977
STIMULATION SEEKING DURING SENSORY DEPRIVATION.
Seward Smith and Thomas I. Myers (Naval Med. Res. Inst., Bethesda, Md.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1151–1163. 22 refs.

Thirty-six volunteer Naval enlisted men underwent isolation for 48 hr. during a study of conditions of "relaxation." Each subject spent 24 hr. alone in dark quiet sensory deprivation (SD) and 24 hr. in a control condition (C) providing a virtual stimulus cafeteria. The amount of time the subject listened to a boring stock market report during one hr. each day was used as an index of stimulation-seeking need. Significantly more listening occurred while subjects were in the SD than in the C condition. Stimulation-seeking results were compared with various pre-isolation predictor tests, criterion measures during isolation and with post-isolation reports of isolation symptomatology.

A67-80978
PERCEPTION BIBLIOGRAPHY: XXXVII. PSYCHOLOGICAL INDEX NO. 33, 1926.
C. H. Ammons and R. B. Ammons.
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1147–1150. 79 refs.

Seventy-nine books and articles dealing with perception and related fields are listed alphabetically.

A67-80979
ORDER OF PRESENTATION, DURATION AND LATENCY OF SPIRAL AFTEREFFECT.
Maria A. Panagiotou and William A. Roberts (Vassar Coll., Poughkeepsie, N. Y.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1139–1146. 7 refs.

In Experiment I the duration and latency of contracting and expanding spiral aftereffect (SAE) illusions were measured for alternating and consistent orders of presentation with one-min. intervals between trials. The duration of the illusion was shorter under the alternating order than under the consistent order, and this effect was attributed to the carry-over of neural aftereffects from one trial to the next. In Experiment II order of presentation was again investigated with intertrial interval varied from one to five min. The results revealed two types of inhibitory effects: (1) a general inhibitory effect produced when one illusion of either type follows another illusion of either type and (2) a specific inhibitory effect which occurs only when successive illusions are of opposite direction. Latency appears to be inversely related to duration.

A67-80980
HUMAN PERFORMANCE AND BASAL SKIN CONDUCTANCE IN A VIGILANCE-TYPE TASK WITH AND WITHOUT KNOWLEDGE OF RESULTS.
John Coules and Donald L. Avery (Electron. Systems Div., Decision Sci. Lab., Bedford, Mass.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 2, p. 1295–1302. 18 refs.

This study showed no trends between reaction time and interstimulus intervals and reaction time and time blocks under knowledge of results or no knowledge of results. An ABC X S variance design of reaction time scores showed only knowledge of results by subjects was statistically reliable. The source of this variance was attributed to sex differences. Results showed that under knowledge of results fast mean reaction time (males) was associated with high skin conductance. For females slow mean reaction time was associated with low conductance. Under the no knowledge of results condition, females showed slower mean reaction time than males. Their conductance scores showed significantly greater variability without knowledge of results than under the knowledge condition. Males under no knowledge show mean conductance scores as those under knowledge of results. However, their mean reaction time scores under the no knowledge condition were significantly lower than under knowledge of results. It is concluded that males, contrasted with females, respond differentially to knowledge and no knowledge of results in simple reaction time studies. As males show high conductance and females high variability in conductance under no knowledge of results, an inhibition-reinforcement theory for vigilance tasks appears inadequate.

A67-80981
QUANTITATIVE CHARACTERISTICS OF RAT RECOVERY AFTER TOTAL AND LOCAL GAMMA-IRRADIATION [KOLICHESTVENNAIA KHARAKTERISTIKA VOSSTANOVLENIIA POSLE TOTAL'NOGO I LOKAL'NOGO GAMMA-OBLUCHENIIA KRYS].
M. P. Domshlak, N. G. Darenskaia, and V. G. Gorlov (USSR, Min. of Health, Inst. of Biophys., Moscow).
Radiobiologiia, vol. 7, Jan.–Feb. 1967, p. 59–62. 10 refs. In Russian.

Mathematical treatment of results of experiments with rats exposed to various doses of gamma radiation led to a conclusion that recovery of the organism after radiation sickness, caused either by total body or partial exposure, followed an exponential curve. The total or local exposure to a biologically equivalent dose led to the analogous course of recovery with statistically indistinguished periods of half-recovery. The speed of recovery in both cases was the same. The calculated irreversible component under these conditions was equal to $10 \pm 5\%$.

A67-80982
AET (BR. HBR) INFLUENCE ON CENTRAL NERVOUS SYSTEM OF ANTENATALLY IRRADIATED RATS [VLIIANIE AMINOETILIZOTIURONIIA BR. HBR (AET) NA TSENTRAL'NUIU NERVNUIU SISTEMU ANTENATAL'NO OBLUCHENNYKH KRYS].
M. B. Gol'dberg (USSR, Acad. of Sci., Inst. of Higher Nervous Activity and Neurophysiol., Moscow).
Radiobiologiia, vol. 7, Jan.–Feb. 1967, p. 82–86. 16 refs. In Russian.

The protective effect of AET (aminoethylisothiuronium bromide-hydrobromide) on the central nervous system of rats against ionizing radiation was studied by the method of the conditioned reflexes to visual and auditory stimuli. Histological sections of the brain cortex were also prepared. The irradiation was performed antenatally. The results showed that AET caused the weakening of the excitation processes thus preventing damage to the central nervous system.

A67-80983
ACTION OF CHEMICAL RADIOPROTECTORS UNDER THE CONDITIONS OF FRACTIONATED IRRADIATION. IV. RADIOPROTECTIVE EFFECT BY INJECTION OF RADIOPROTECTORS DURING IRRADIATION [DEISTVIE SREDSTV KHIMICHESKOI ZASHCHITY V USLOVIIAKH FRAKTSIONIROVANNOGO OBLUCHENIIA. IV. PROTVOLUCHEVOI EFFEKT PRI VVEDENII PROTEKTOROV V PROTSESSE OBLUCHENIIA].
S. P. IArmonenko (USSR, Acad. of Med. Sci., Inst. of Hyg. Labor, and Prof. Diseases, Moscow).
Radiobiologiia, vol. 7, Jan.–Feb. 1967, p. 100–104. 24 refs. In Russian.

Antiradiation drugs were injected intraperitoneally in mice during the exposure of animals to various doses (150 r–675 r) of X-ray radiation. The drugs used were monosodium-β-aminoethylthiophosphate (cytophos) and 5-metoxitriptamine chlorohydrate (mexamine), which were injected in two doses; 1.5 mg. and 7 mg. per animal. The effectiveness of the radiation and the drugs were judged by survival and the number of karyocytes in the bone marrow of the femur. The analysis of bone marrow two days after the irradiation of animals who received the drugs separately or in combination with the other showed that mexamine was more

effective than cytophos; and the combination of both gave a maximal effect, regardless of the amount of radiation received. The decrease of the post-exposure aplasia of the marrow must be considered in the treatment of radiation injury by autotransplantation of marrow. These drugs could be used as prophylactic measure in spacecraft accidents and exposure to unexpected solar flares.

A67-80984
VISUAL MEMORY OF CAPITAL LETTERS.
Teodor Künnapas (Psychol. Labs., Perception and Psychophys. Unit, Stockholm, Sweden).
Reports from the Psychological Laboratories, University of Stockholm, no. 215, Sep. 1966, p. 1–8, 7 refs.
Swed. Council for Social Sci. Res. supported research.

The similarity of the visual memory of nine capital letters was studied by the direct multidimensional ratio scaling and by the method of similarity analysis. Three factors, 'E' 'O', and 'I' were found which were exactly the same as in perception of these capitals, and with nearly identical loadings.

A67-80985
CONSIDERATIONS OF USING MODELS IN BIOENGINEERING [CONSIDERAZIONI SULL'USO DI MODELLI IN BIOINGEGNERIA].
M. Arabia, G. Cavallari, and P. G. Paleani-Vettori (C.N.E.N., Centro Studi Nuc. Casaccia, Lab. di Elettronica and Lab. di Radiobiol. Animale, Rome, Italy).
(Intern. Congr. of Elettronica, XIII, Rome, Jun. 15–20, 1966). Rivista di Medicina Aeronautica e Spaziale, vol. 29, Jul.–Sep. 1966, p. 442–458. 18 refs. In Italian.

Model of a system or its function is defined including representations of its known characteristics and properties. Mathematic and analogic models are considered the most useful representations, as they allow concepts and ideas being associated. The three examples reported, a fluidodynamic model of an arterial trunk, a formal neuron, according to McCulloch, a model of artificial pancreas, indicate the utility of models to study both biology and engineering. Also evidence is presented indicating that modelling is related to organ function rather than its anatomy.

A67-80986
ON THE INTERCOMMUNICATION OF CONTENT CHANGES OF PROTEINS, VITAMINS AND MINERAL SUBSTANCES IN THE BLOOD OF IRRADIATED RABBITS [O VZAIMOSTVIAZI IZMENENII V SODERZHANII BELKOV, VITAMINOV I MINERAL'NYKH VESHCHESTV V KORVI OBLUCHENNYKH KROLIKOV].
A. I. Nikolaev, G. S. Suleimanova, and F. G. Mukhtarova (UzbekSSR, Min. of Health, Sci.-Res. Inst. of Roentgenol., Radiol., and Oncol., Tashkent).
Radiobiologiia, vol. 7, Jan.–Feb. 1967, p. 48–50. In Russian.

Rabbits receiving 300–2,000 r of X-ray irradiation showed various changes in the behavior of certain metabolites. The blood proteins were not as severely affected as minerals and vitamins. Very likely, the organism's tissue repair begins at the most important links which require great quantities of organic compounds and inorganic components, thus depleting both reserves. Particularly affected was the content of potassium, calcium and phosphorus.

A67-80987
VERTEBRAL FRACTURES OF PILOTS IN HELICOPTER ACCIDENTS [LE FRATTURE VERTEBRALI DEI PILOTI NEGLI INCIDENTI DA ELICOTTERO].
P. Italiano.
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.–Dec. 1966, p. 577–602. 11 refs. In Italian.

After a survey of the most frequent causes of helicopter accidents, and an analysis of his own cases, the writer describes vertebral fractures of 3 cases in 79 helicopter accidents. Vertebral fractures in helicopter accidents, as the ones from aircraft accidents and ejection escape, are located in the dorso-lumbar junction of column. They show peculiar radiological characteristics, depending on their pathogenesis. In helicopter accidents the fractures are determined by slight forward tilted position, usually assumed by the pilot body, in controlling the vehicle. Fatigue in helicopter flight is also reviewed, stressing the importance of vibration.

A67-80988
PSYCHOPHYSIC AND PSYCHOSOCIAL FACTORS AS CAUSES OF REJECTION, IN THE PROFESSIONAL FORMATION PERIOD OF A CANDIDATE PILOT OF THE AIR FORCE. GENERAL CONSIDERATIONS [SUI FATTORI PSICOFISICI E PSICOSOCIALI COME CAUSA DI ELIMINAZIONE NEL PERIODO DI FORMAZIONE PROFESSIONALE DELL'ALLIEVO PILOTA DELLA A. M. CONSIDERAZIONI GENERALI].
M. Strollo.
(Ufficio Intern. di Doc. di Med. Mil., XXVII Session, San Marino, Sep. 21–24, 1966).
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.–Dec. 1966, p. 603–614. In Italian.

The professional training of a military pilot takes some months and is accomplished through flight activity, solo or with instructor, up to obtaining pilot and military licences. In the Air Force rejections are noted with remarkable frequency, that depend on a few causes that give generally adverse judgments, and therefore removal. These causes generally recorded are a generic evaluation of professional inaptitude, physical unfitness, etc. A close examination of psychophysic and psychosocial conditions is considered by the writer as useful in preventing unnecessary rejections.

A67-80989
COMPUTERS IN PHYSIOLOGICAL ANALYSIS AND SIMULATION.
William M. Stauffer (Utah U., Dept. of Biophys. and Bioeng., Div. of Anesthesiol., Salt Lake City).
Clinical Pharmacology and Therapeutics, vol. 8, Jan.–Feb. 1967, p. 194–200.

Physiological problems demand the capacity for handling analogue data as well as for providing answers from calculations in "real-time." The biocomputation facility of the University of Utah has been designed for these problems. This system permits simultaneous usage from several remote stations. Problems which have utilized this system include: the distribution of transit times for dye in the circulatory system, beat-to-beat calculation of cardiac output, heart rate, stroke volume, and other parameters from the aortic pulse pressure, image processing of radiopaque dye injections, and an electrocardiographic diagnosis program.

A67-80990
OCULAR AND CUTANEOUS SIDE EFFECTS AFTER PROLONGED CHLORPROMAZINE TREATMENT.
George M. Gombos (Rothschild Hadassah U. Hosp., Jerusalem, Israel) and Paul E. Yarden (Kfar Shaul Govt. Mental Hosp. and Work Village, Jerusalem, Israel).
American Journal of Psychiatry, vol. 123, Jan. 1967, p. 872–874. 7 refs.

Corneal and lens opacities were studied in psychotic patients receiving prolonged chlorpromazine treatment. The lesions occurred more frequently in patients on high doses and in those to whom chlorpromazine had been administered for periods longer than five years. Lens side effects were more numerous than corneal. However, findings do not support Mathalone's assumption that lens changes precede corneal involvement. In 21 patients, the lens only was affected; in 12 patients the cornea only was involved; in 15 patients both lens and corneal opacities existed. Acute photosensitivity with redness and swelling of the exposed parts was present in approximately 21% of the whole group, but it seemed possible that many more patients had suffered from it in the past. No correlation between the present skin side effects and the ocular lesions was found. The damaging local effect of undue and repeated exposure to solar radiation was assumed to be responsible for the production of the numerous ocular side effects in this population. Subjects did not complain of visual disturbances, and no derangement of visual acuity was noted.

A67-80991
A PSYCHIATRIC "BACK-UP" SYSTEM FOR SELECTION OF SPACE CREWS.
Carlos J. G. Perry (School of Aerospace Med., Aerospace Med. Sci. Div., Psychiat. Branch, Brooks AFB, Tex.).
(Aerospace Med. Assn., Ann. Meeting, Las Vegas, Nev., Apr. 18, 1966).
American Journal of Psychiatry, vol. 123, Jan. 1967, p. 821–825. 11 refs.

Personality factors in Astronaut selection are becoming especially important on the eve of space missions of extended duration. But psychiatric selection is fraught with imperfections and inadequacies. To compensate for these, the author presents a "back-up" system which involves the psychiatrist in a step-ladder type of monitoring of space crews during their training. Direct contact between psychiatrist and crew member is minimized; the system makes primary use of flight surgeons.

A67-80992
TURNOVER OF CATECHOLAMINES IN ACTIVE AND HIBERNATING GROUND SQUIRRELS.
Paul R. Draskoczy and Charles P. Lyman (Harvard Med. School Depts. of Parmacol. and Anat., Boston, Mass.).
(Am. Soc. for Pharmacol. and Exptl. Therap., Fall Meetings, 1964 and 1965).
Journal of Pharmacology and Experimental Therapeutics, vol. 155, Jan. 1967, p. 101–111. 31 refs.
Grants PHS 5 RO1 NB 04939, PHS GM 05197, and PHS GM 05611.

The turnover of endogenously labeled norepinephrine and epinephrine was studied in different tissues of active and hibernating ground squirrels. The animals were injected with dl-3,4-dihydroxy-phenylalanine-H^3 to label the catecholamine stores and the rate of fall of specific activity of endogenously labeled norepinephrine and epinephrine was taken as an index of the turnover of these amines in different organs. In the active state the turnover rate of catecholamines was highest in the brown adipose tissue, and it was lowest in the adrenal medulla. In the heart and brain the rate of fall of specific activity of catecholamines was similar. In hibernating ground squirrels the turnover rates of norepinephrine and epinephrine were greatly diminished in all organs studied, indicating a considerably reduced sympathetic activity. The highest turnover rate in this state was observed again in the brown adipose tissue. The turnover of norepinephrine and epinephrine in the brain stopped completely from the very beginning of hibernation when the temperature of the animal was still in the normal range, suggesting that the lack of function of central adrenergic neurons might in some way initiate hibernation, rather than simply be a consequence of it.

A67-80993
ETHANOL-INDUCED HYPOGLYCEMIA. I. THE ACUTE EFFECTS OF ETHANOL ON HEPATIC GLUCOSE OUTPUT AND PERIPHERAL GLUCOSE UTILIZATION IN FASTED DOGS.
Amanda Lochner, Johan Wulff, and Leonard L. Madison (Tex. U., Southwestern Med. School, Dept. of Internal Med., Dallas).
Metabolism, vol. 16, Jan. 1967, p. 1–18. 49 refs.
Grant PHS AM-4236 and Upjohn Co. supported research.

Sixteen experiments were performed on dogs with chronic end-to-side porta-caval shunts fasted two to three days to determine the acute effects of ethanol on hepatic glucose output and peripheral glucose utilization. In eight additional studies the effects of ethanol on splanchnic glucose output was determined in nonshunted healthy mongrel dogs fasted a similar period of time. Ethanol administered at mean rates varying from 0.029 to 0.183 mM/Kg./min. produced 65% fall in mean hepatic glucose output and 26% inhibition of peripheral glucose output exceeded the inhibition of peripheral glucose utilization. Splanchnic glucose balance during ethanol infusion also decreased significantly in dogs fasted for two to three days. These data show that ethanol-induced hypoglycemia is entirely the consequence of a decrease in the hepatic release of glucose. Its occurrence in glycogen-depleted starved dogs supports the hypothesis that ethanol inhibits hepatic gluconeogenesis, decreases hepatic release of glucose and thereby produces hypoglycemia.

A67-80994
MMPI PROFILE CHANGES DURING AN EIGHTEEN-DAY CONFINEMENT STUDY.
Neal M. Burns (Honeywell, Inc., Systems and Res. Center, Minneapolis, Minn.) and Floyd W. Ayres (Am. Rehabil. Inst., Minneapolis, Minn.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 877–878.

Minnesota Multiphasic Personality Inventory profiles of two male subjects before and after a simulated manned lunar experience indicated changes associated with the stressful experience.

A67-80995
ON THE ORIENTATION OF MAN IN COSMIC SPACE.
A. A. Leonov and V. I. Lebedev.
(Kosmicheskie Issledovaniia, vol. 3, Nov.–Dec. 1965, p. 940–945).
Cosmic Research, vol. 3, Nov.–Dec. 1965, p. 780–784. 25 refs. Translation.

The psychophysiological mechanisms of the orientation of man are analyzed in the conditions of the Earth's force of gravity, in flights on jet airplanes with the reproduction of

weightlessness, in the conditions of orbital flights, and in the exit of man from the ship into cosmic space. It is shown that disorientation was not observed for cosmonaut A. A. Leonov in exit from the spacecraft into cosmic space. The conclusion is drawn that for future flights with exit from the ship into cosmic space for a longer time and to a greater distance it will be required to accomplish more thoroughly the medical selection and the all-round preparation of cosmonauts.

A67-80996
INVESTIGATION OF THE RENAL FUNCTION OF THE CREW OF THE COSMIC SHIP "VOSKHOD".
Yu. V. Natochin, M. M. Sokolova, V. F. Vasil'eva, and I. S. Balakhovskii.
(Kosmicheskie Issledovaniia, vol. 3, Nov.–Dec. 1965, p. 935–939).
Cosmic Research, vol. 3, Nov.–Dec. 1965, p. 775–779. 8 refs. Translation.

The water-excretory function of the kidneys of the members of the crew of the cosmic ship "Voskhod" was investigated by the water-loading method. At the end of the second day after the flight the ability of the body to excrete rapidly water drunk on an empty stomach was disturbed. These changes were evidently associated with disturbances of the endocrine regulation. No damage to the renal tissue could be demonstrated after the flight.

A67-80997
CLOTHING HYGIENE WITH PARTICULAR REFERENCE TO AEROSPATIAL PROBLEMS. I. GENERAL PHYSICAL AND PHYSIOLOGICAL PRINCIPLES [L'IGIENE DEL VESTIARIO CON PARTICOLARE RIFERIMENTO AI PROBLEMI AEROSPAZIALI (PARTE PRIMA: PRINCIPI GENERALI FISICI E FISIOLOGICI)].
E. Sulli (Rome U., Ist. di Igiene and Ispettorato di Sanita' Aeron., Italy).
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Jul.–Sep. 1966, p. 459–515. 41 refs. In Italian.

A survey is presented of research performed on clothing hygiene. Physical characteristics and functional properties of fabrics and textile fibers are discussed in relation to hygienic and physiological requirements in particular living situations. Some methods to study physiological parameters are considered, especially dealing with heat conduction through the fabrics, the surrounding air, radiating energy, fabric behavior due to water vapor and wind, as well as methods for studying the thermal insulation of clothes. Some particular points are discussed related to a critical environment of extreme cold.

A67-80998
CHANGES IN HYDROGENASE ACTIVITY DURING THE SYNCHRONOUS GROWTH OF SCENEDESMUS OBLIQUUS D_3
Susumu Yanagi and Tsutomu Sasa (Kyushu U., Fac. of Sci. Dept. of Biol., Fukuoka, Japan).
Plant and Cell Physiology, vol. 7, Dec. 1966, p. 593–598. 11 refs.

A fairly good synchronization of Scendesmus cells was obtained by transferring the cells grown in a medium containing a low concentration of iron into a medium containing a relatively high concentration of iron. During the synchronous culture in the mineral medium, a good parallelism between the average cell volume and hydrogenase activity was observed. Effect of glucose on the development of the hydrogenase activity was variable depending on the stage of algal growth. Iron is essential for the development of the hydrogenase activity and glucose supplementary.

A67-80999
STUDIES ON THE PHYSIOLOGY OF THE HIBERNATING HEDGEHOG. 4. CEREBRAL FREE AMINO ACIDS IN HIBERNATING AND NON-HIBERNATING ANIMALS.
Rolf Kristoffersson, Antti Ahlström, and Paavo Suomalainen (Helsinki U., Dept. of Physiol. Zool., Finland).
Annales Academiae Scientiarum Fennicae, Series A, IV. Biologica, 104, 1966, p. 3–9. 26 refs.
Natl. Res. Council for Sci. supported research.

The free γ-aminobutyric acid (GABA), aspartic acid, glutamic acid and glutamine content of cerebral tissue of hibernating and non-hibernating hedgehogs was studied. The results indicate that in hibernating animals the γ-aminobutyric acid content was increased, while glutamic and aspartic acids decreased and glutamine remained unchanged. The glutamic acid content was also analyzed during the after spontaneous arousal processes, and in aroused animals was found to be elevated to the level observed in non-hibernating animals.

A67-81000
SCIENCE AND TECHNOLOGY IN SPACE NURSING.
James C. Syner (Fitzsimons Gen. Hosp., U.S. Army Med. Res. and Nutr. Lab., Denver, Colo.).
AORN Journal, vol. 5, Jan. 1967, p. 71–75.

The fundamental procedures of science and technology which will influence the form and content of clinical nursing in the space era have been described. The assertion has been made that the profession must establish the ability to move in parallel with the science and technology of the times. The systematic adoption of at least five fundamental procedures are regarded as forming the basis of a state of readiness for the new requirements of our space age. The aim of the five procedures is to provide an ever progressing objective technology with which to describe the strategies of nature, and to develop precise counter strategies when the survival and prosperity of man are threatened. Acquiring objective technology in our medical practice will not conflict with our moral codes for the upholding of human values.

A67-81001
TOLERANCE OF THE FACIAL BONES TO IMPACT.
Voigt R. Hodgson (Wayne State U., Biomech. Res. Center, Detroit, Mich.).
American Journal of Anatomy, vol. 120, Jan. 1967, p. 113–122.

A study of the tolerance of the facial bones to blunt impact has been conducted for the purpose of determining the mechanics and important parameters affecting fracture. Such information is urgently needed for the safe design of vehicles and protective equipment, and would serve a useful purpose as an aid in the diagnosis and treatment of facial injuries. Word to date has been concentrated around the zygomatic bone because of its amenability to mathematical analysis and susceptibility to damage due to its relative fragility and prominence. The force to fracture the bone has been found to be time dependent. For example, high forces up to 1,000 lb. can be tolerated for extremely short time durations of three msec. or less. Impacts lasting beyond four msec. produce fracture

near 200 lb. These figures are for a one in. square area, and it has been found that for impulses lasting longer than four msec. the tolerance of the zygomatic bone can be raised by a factor of 150 to 250% if the load is distributed over the entire bone. A linear fracture around one zygomatic bone has been found not to affect the structural integrity of the opposite side of the face, which has been very useful in comparing parameters on the same cadaver. In comparing the impact strength of three facial bones on each of four cadavers, the frontal bone has been found to tolerate a force three or four times higher than the mandible and zygomatic bone which are about equal.

A67-81002
PROPERTIES OF BODY SEGMENTS BASED ON SIZE AND WEIGHT.
Wilfrid Taylor Dempster and George R. L. Gaughran (Mich. U., Dept. of Anat., Ann Arbor and Ohio State U., Dept. of Anat., Columbus).
American Journal of Anatomy, vol. 120, Jan. 1967, p. 33–54. 30 refs.
Contract AF 18(600)-43, Grants NIH GM-07741-06 and VRA RD-216 60-C.

Values are presented for body constants based on a study of nine male white cadavers of normal appearance and average build. The limb data are supplemented by a further analysis of 11 upper and 41 lower limbs. Techniques used in the study form standard procedures that can be duplicated by subsequent workers. Each cadaver was measured, weighed, and somatotyped. Joints were placed in the midposition of the movement range and the body was frozen rigid. Joint angles were bisected in a systematic dismemberment procedure to produce unit segments. These segment lengths were weighed, measured for linear link dimensions, and analysed for segment volumes. The segment centers of mass were located relative to link end points as well as in relation to anatomical landmarks. Finally, each segment was dissected into its component parts and these were weighed. The specific gravity of each body part was calculated separately. Data are expressed in mean values together with standard deviations and, where available, are correlated and evaluated with other values in the literature.

A67-81003
EFFECTS OF STEADY AND CYCLIC HYPOTHALAMIC THERMAL STIMULATION IN UNANESTHETIZED CATS.
John W. Sundsten (Wash. U., Med. School, Dept. of Biol. Struct., Seattle).
Journal of Applied Physiology, vol. 22, Jun. 1967, p. 1129–1134. 38 refs.
Grant NINDB NB-05432; Wash. State Initiative 171 Res. Funds supported research.

The preoptic-anterior hypothalamus (POAH) of unanesthetized cats was thermally stimulated with chronically implanted Peltier thermodes. Steady or cyclic warming and cooling caused ear vasodilation and vasoconstriction, respectively. Temperature thresholds were stable within 0.5°C. There were variations, however, in the form of the vasomotor responses. Rectal temperatures were decreased by warming and increased by cooling the POAH, shivering occurred which could be readily inhibited by rewarming the POAH. Behaviorally, the animals assumed different postures according to the direction of thermal stimulation. These data demonstrate the effectiveness of the Peltier thermode and constitute supportive evidence for the thermal sensitivity of the POAH.

A67-81004
TRAINING FOR PERCEPTUAL SKILLS.
J. Annett (Hull U., Dept. of Psychol., Great Britain).
Ergonomics, vol. 9, Nov. 1966, p. 459–468. 11 refs.
D.S.I.R. supported research.

Three perceptual tasks, the estimation if visual 'numerousness', visual acuity and the audiotry detection of a signal in noise, were used to show the effects of various kinds of training. Comparisons were made between simple practice, knowledge of results, cuing techniques and the use of easier material. Cuing was found to be equivalent to, or better than, knowledge of results, and training on easy material was least successful. It is tentatively concluded that the reinforcement paradigm is not appropriate for these perceptual skills and that a simple association principle is adequate.

A67-81005
THE EFFECT OF ETHANOL INGESTION ON SEROTONIN-C^{14} METABOLISM IN MAN.
A. Feldstein, H. Hoagland, H. Freeman, and O. Williamson (Worcester Found. for Exptl. Biol., Shrewsbury, Mass.).
Life Sciences, vol. 6, Jan. 1, 1967, p. 53–61. 31 refs.
Grant PHS MH-07243; Ittleson Family Found. and Scot. Rite Comm. for Res. in Schizophrenia (Natl. Assn. for Mental Health) supported research.

Low doses of ethanol ingested prior to serotonin-C^{14} in man significantly decreased formation of urinary 5-HIAA-C^{14}. The decreased formation of 5-HIAA-C^{14} was dependent upon the dose and time of administration of ethanol and was related to the blood alcohol level. It was suggested that ethanol increased NADH and decreased NAD such that 5-hydroxyindoleacetaldehyde-C^{14} derived from the serotonin-C^{14} was preferentially converted to 5-hydroxytryptophol-C^{14} with a concomitant decrease in 5-HIAA-C^{14}.

A67-81006
THE HUMAN FACTOR IN HIGH ALTITUDE FLYING.
Ramamurthy (Hindustan Aeron. Ltd., Aircraft Eng. and Design Div., Bangalore, India).
Journal of the Aeronautical Society of India, vol. 18, Nov. 1966, p. 107–112.

The human factor in flying must receive as much attention as technical advances and constructional designs, and research involving psychological and psychiatric problems are of great importance. A physiological consideration of respiration and oxygen requirement is included, as well as discussion on the composition and some physical properties of air. The need for supplemental oxygen and body pressurization is brought about by low total pressure, low O_2 partial pressure, and low temperature. Fear and apprehension also increase oxygen requirements. The effects of acceleration on circulation with accompanying "greying out" and "blacking out" are also discussed. Fatigue is a major symptom of frequently repeated accelerations, and fatigue may lead to lack of enthusiam, disinterest resulting in inaccuracy, and deterioration in the quality of work and ability to perform appointed missions. Fatigue is the result of both physiological and physical strains, and fear may contribute greatly to the development of fatigue. A pilot suffering from fatigue may not have complete control of the aircraft and with his confidence shaken, may further lose control. Medical aspects of high altitude flying include the physical effect involving changes in air pressure and solubility of gases in body fluids and aeroembolism which leads to lack of blood, unconsciousness, and death. Some factors used to combat these problems are sealed cabins, emergency oxygen supplies, special clothing and masks, and utilization of a decompression chamber in determining the fitness of trainees for high altitude flying.

A67-81007
ELECTROPHYSIOLOGIC STUDIES DURING SCANNING AND PASSIVE EYE MOVEMENTS IN HUMANS.
Donald F. Scott (Minn. U., Mayo Graduate School of Med., Rochester) and Reginald G. Bickford (Mayo Clinic and Mayo Found., Rochester, Minn.).
Science, vol. 155, Jan. 6, 1967, p. 101–102.
Grants NIH NB-3225 and NB-2056.

It was demonstrated in man that mechanically induced shifts of the retinal image without change in total luminous flux evoke a parieto-occipital electrical response (lambda waves). The technique provides a simple method of quantifying responses in the visual system without complication by voluntary movements and their associated readiness potentials. The observation contradicts the view that lambda waves are directly concerned with mechanisms preventing blur during eye movement.

A67-81008
FURTHER EVIDENCE ON SECONDARY TASK INTERFERENCE IN TRACKING.
Merrill Noble, Don Trumbo, and Frank Fowler (Kan. State U., Manhattan).
Journal of Experimental Psychology, vol. 73, Jan. 1967, p. 146–149.
NASA Grant NsG 606.

Two experiments indicate that: (a) presence of a second task throughout training in pursuit tracking resulted in a learning as well as a performance decrement at either transfer or retention tests, and (b) the locus of the interference appears to be in the selection of an overt response for the second task, since a "covert" response condition did not lead to a decrement in either task, nor, when divested of any response selection requirement, did an overt response condition interfere with tracking performance.

A67-81009
MONOCULAR AND BINOCULAR AFTEREFFECTS OF CHROMATIC ADAPTATION.
Russell L. DeValois (Ind. U., Psychol. Dept., Bloomington) and Jan Walraven (Inst. for Perception, Soesterberg, Netherlands).
Science, vol. 155, Jan. 27, 1967, p. 463–465. 6 refs.
NSF supported research.

Supersaturated greens seen after long-wavelength adaptation depend upon contrast from the continuing afterdischarge of bleached "red" receptors in the surround, rather than merely upon inactivation from bleaching of "red" receptors in the test spot area. When test spot and bleach field coincide spatially, supersaturated greens are not seen. Since color mixing but not contrast was found binocularly, color contrast must be a retinal phenomenon.

A67-81010
EFFECTS OF STIMULUS MEANINGFULNESS, METHOD OF PRESENTATION, AND LIST DESIGN ON THE LEARNING OF PAIRED ASSOCIATES.
John H. Wright (Va. Polytech. Inst., Blacksburg).
Journal of Experimental Psychology, vol. 73, Jan. 1967, p. 72–77. 7 refs.

Each of 200 subjects learned by either the anticipation or recall method of presenting paired associates (PA) two 8-pair PA lists in which stimulus meaningfulness (M) was manipulated within subjects in either an unmixed-list or mixed-list design, following which response-stimulus (R-S) recall and stimulus-recognition tests were given. Second-list performance was superior to 1st-list performance and high-M performance was superior to low-M performance. Unmixed 1st-list performance was clearly superior under the recall method, whereas unmixed 2nd-list performance was slightly better under the anticipation method. The recall method produced fewer after errors than the anticipation method in the learning of mixed lists. Significant anticipation-recall x M interactions for unmixed list after errors, unmixed-list stimulus recognition, and for both partial errors and omission errors in unmixed-list R-S recall, suggested that stimulus-learning requirements may be greater under the anticipation than under the recall method.

A67-81011
A PRIMACY EFFECT IN SUBJECTIVE PROBABILITY REVISION.
Cameron R. Peterson and Wesley M. DuCharme (Mich. U., Ann Arbor).
Journal of Experimental Psychology, vol. 73, Jan. 1967, p. 61–65. 11 refs.
Contract AF 19(628)-2823 and Grant PHS 1 F2 MH-12,012 01.

Two experiments presented subjects with sequences of data that first favored one hypothesis, and then changed to favor a second hypothesis. After each datum subjects became more or less sure of which hypothesis was correct. They reflected this change of opinion with probability estimates, which were compared with probabilities calculated by means of Bayes's theorem. Estimated probabilities changed from favoring the second hypothesis later than did corresponding Bayesian probabilities. Data that occurred early in a sequence influenced subjects more than did later data—a primacy effect. This result agrees with those of comparable experiments on impression formation.

A67-81012
VISUAL REACTION TIMES ON A CIRCLE ABOUT THE FOVEA.
W. H. Payne (Wash. State U., Depts. of Psychol. and Inform. Sci., Pullman).
Science, vol. 155, Jan. 27, 1967, p. 481–482. 6 refs.

Reaction times to a dim photopic stimulus were measured on a circle about the fovea, 15° from the line of direct vision. Large variations in reaction time were found on various half meridians and were interpreted as reflecting the distribution of retinal receptors.

A67-81013
DOPAMINE PROTECTS MICE AGAINST WHOLE-BODY IRRADIATION.
Kedar N. Prasad and Melvin H. Van Woert (Rochester U., School of Med. and Dentistry, Dept. of Radiation Biol. and Biophys. and Brookhaven Natl. Lab. Med. Res. Center, Upton N. Y.).
Science, vol. 155, Jan. 27, 1967, p. 470–472. 7 refs.
AEC supported research.

Injection of dopamine before whole-body X-irradiation of mice resulted in 80% survivors whereas no irradiated controls survived; injection after exposure had no effect. D, l-Dihydroxphenylalanine, the precursor of dopamine, had no effect on survival when injected either before or after irradiation.

A67-81014
TRANSITION EFFECTS IN THREE-CHOICE REACTION WITH VARIABLE S-R MAPPING.
L. H. Shaffer (Med. Res. Council, Appl. Psychol. Res. Unit, Cambridge, Great Britain).
Journal of Experimental Psychology, vol. 73, Jan. 1967, 101–108. 5 refs.

Three experiments examined response time in a three-choice task using variable stimulus-response mapping. Experiment I used self-paced trials and examined reaction time as a function of trial transition and of practice. Experiment II used self-paced trials and introduced a variety of conditions of advance information corresponding to an earlier two-choice experiment. Experiment III replicated Experiment II but used discrete trials. Comparing the results of Experiments II and III showed that subjects were both slower and made less use of advance information with self-paced than with discrete trials. Comparing the results with those in the earlier two-choice task revealed marked differences in the transition effects and it is not yet clear how these can be reconciled.

A67-81015
CONDITIONS OF CUE SELECTION IN THE ACQUISITION OF PAIRED-ASSOCIATE LISTS.
Leo Postman and Rose Greenbloom (Calif. U., Berkeley).
Journal of Experimental Psychology, vol. 73, Jan. 1967, p. 91–100. 6 refs.
Contract Nonr 222(90); NSF and NIH supported research.

The amount and positional distribution of letter-cue selection in paired-associate learning were investigated. Two types of list composed of trigram-digit pairs were used. The stimulus terms were easy to pronounce (EP) in one, and hard to pronounce (HP) in the other. After learning the criterion, different groups were tested for digit recall with one of four classes of cues: first letter of trigram, second letter, third letter, whole trigram. Those tested with single letters were also required to reproduce the missing stimulus letters. When subject failed to reproduce additional letters but recalled the digit, single-letter selection was inferred. The level of stimulus-letter reproduction was considerably higher for EP than HP items. There was little selection in conditions EP, but a substantial amount in conditions HP which was largely limited to first letters.

A67-81016
VISUAL DETECTION AND RECOGNITION OF TARGETS WITH VARIOUS DEPENDENCY CONTRASTS IN MICRO-STRUCTURE.
E. Rae Harcum (William and Mary Coll., Williamsburg, Va.).
Journal of Experimental Psychology, vol. 73, Jan. 1967, p. 155–159.

This study corroborates previous work concerning the detection and recognition of forms having various degrees of dependency between adjacent black and white units of surface microstructure, presented against similarly varied backgrounds. Detection and recognition of eight forms increased in frequency when the difference between dependencies within target and background increased. Generally, increased dependency within the target improved accuracy of performance. Intermediate dependency in the background resulted in fewest detections and recognitions, whereas perfect dependency produced the most detections and recognitions.

A67-81017
INFLUENCE OF SIGNAL PROBABILITY DURING PRE-TRAINING ON VIGILANCE DECREMENT.
W. P. Colquhoun and A. D. Baddeley (Med. Res. Council, Appl. Psychol. Res. Unit, Cambridge, Great Britain).
Journal of Experimental Psychology, vol. 73, Jan. 1967, p. 153–155.

The role of pretest expectancy in vigilance decrement was re-examined in a replication of an earlier experiment, with signals presented in the auditory, rather than the visual, mode. Decrements observed paralleled those obtained previously, and were analyzed in terms of the theory of signal detectability.

A67-81018
COMPARISON OF TACTILE AND AUDITORY TIME JUDGMENTS.
Rudolph H. Ehrensing and William T. Lhamon (Cornell U., Med. Coll., Ithaca, N. Y. and N. Y. Hosp., New York City).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 929–930. 8 refs.

Subjects adjusted variable auditory and tactile durations to equal standard durations in the opposite mode. No differences between auditory and tactile time judgments were observed.

A67-81019
PERCEIVED BRIGHTNESS AS A FUNCTION OF DURATION OF DARK-ADAPTATION.
Goesta Ekman, Jan Hosman, and Ulf Berglund (Stockholm U., Psychol. Lab., Sweden).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 931–943. 20 refs.
Contract AF 61(052)-878 and Swed. Council for Social Sci. Res. supported research.

The increasing brightness of white light perceived at constant luminance in the course of dark-adaptation was measured by means of a direct psychophysical scaling method. The same trend was found for all six luminance levels of the experiment. It could be characterized as composed of two functions, both growing at a decelerated rate and intersecting at about eight minutes. A further analysis revealed that the empirical trend could be represented by the sum of two logarithmic functions of time.

A67-81020
AROUSAL PROPERTIES OF RED VERSUS GREEN.
Glenn D. Wilson (Canterbury U., Christchurch, New Zealand).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 947–949.

Twenty subjects were each exposed for 60 sec. to five red and five green slides in alternating order. Two electrodermal measures, conductance level and galvanic skin response (GSR) were taken. Results support the hypothesis that red is a more "arousing" color than green, the effect being particularly apparent in the GSR data ($p < .002$).

A67-81021
PERCEPTION BIBLIOGRAPHY: XXXV. PSYCHOLOGICAL INDEX NO. 31, 1924.
C. H. Ammons and R. B. Ammons.
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 731–734. 109 refs.

One-hundred and nine articles and books dealing with perception and closely related fields are listed alphabetically.

A67-81022
TWO EXPERIMENTS ON PERCEIVED SIZE OF COINS.
Daniel Landis, James M. Jones (Franklin Inst. Res. Labs., Philadelphia, Pa.), and Joan Reiter.
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 719–729. 12 refs.

Two experiments on the perception of coins and like-sized discs were performed. Within each study, size, type of object being judged, and mode of presentation were manipulated. Each experiment used a different apparatus to obtain the size judgments. Results indicated (a) size rather than value was the primary determinate of overestimation; (b) larger coins are overestimated more than their like-sized discs; the reverse is true of smaller coins; (c) mode of presentation is significant with larger sizes; (d) the phenomenon is stable over pronounced differences in apparatus and population; (e) either distortion of per cent overestimation scores can be used as primary data; and (f) sex of subject is a negligible factor. Results indicate that overestimation of coins and discs should be considered as a perceptual phenomenon rather than in terms of "need".

A67-81023
ISOLATION TOLERANCE AND THE SENSORY SATIATION HYPOTHESIS.
R. D. Francis (U. Coll., Wollongong N.S.W., Australia).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 701–702.

From a group of 22 subjects tested for toleration time by immersion, 12 subjects were selected, six from either toleration time extreme. Their upper auditory thresholds for stimulus intensity were determined. Those who stayed long had significantly higher thresholds than those who did not. Twelve new subjects were isolated and a new determination made embracing all subjects. The results were in the same direction and at the same significance level. Two explanations are given, both involving the satiation concept.

A67-81024
PERFORMANCE AND PHYSIOLOGICAL AROUSAL DURING TWO VIGILANCE TASKS VARYING IN SIGNAL PRESENTATION RATE.
Robert M. Stern (Pa. State U., University Park).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 691–700. 14 refs.
Contract Nonr 908 (15).

This study compares vigilance performance and level of arousal of two groups of subjects differing in the signal presentation rate they received. It was hypothesized that a group receiving relatively infrequent signals would be overaroused and would perform at a lower level primarily because they would be responding to irrelevant stimuli. Basal skin resistance and muscle potentials indicated that, as hypothesized, the Infrequent subjects were more highly aroused than the Frequent subjects. Performance data indicated that the Infrequent group made a smaller percentage of correct detections and a much greater number of false alarms than the Frequent group.

A67-81025
GENETIC RESEARCH IN SPACE [GENETICHESKIE ISSLEDOVANIIA V KOSMOSE].
G. P. Parfenov.
Kosmicheskie Issledovaniia, vol. 5, Jan.–Feb. 1967, p. 140–155. 150 refs. In Russian.

A review of world literature on genetic research in space between 1930 and 1965 is presented. It covers the early experiments conducted in balloon flights by suborbital rockets and spacecraft. The use of microorganisms, plants and animals *in vivo* and *in vitro* are discussed. A brief analysis of data received in this period is presented. An extensive bibliography is also included.

A67-81026
VISUAL FACTORS AFFECTING TRANSFER OF TRAINING FROM A SIMULATED TO A REAL CONTROL SITUATION.
M. Hammerton and A. H. Tickner (Med. Res. Council, Appl. Psychol. Res. Unit, Cambridge, Great Britain).
Journal of Applied Psychology, vol. 51, Feb. 1967, p. 46–49. 7 refs.

Three experimental groups, each of 12 subjects, were trained to control a trolley moving on a miniature railway so as to carry out an acquisition task. They were trained using (a) a TV display, (b) a cathode ray tube (CRT) with correctly scaled photographic transparency, (c) CRT with out-of-scale transparency, and (d) plain CRT. A control group of 12 subjects trained on the real trolley *ab initio*. These conditions produced markedly different transfer ($a>b>c>d$) both initially and with a savings measure. In six of twelve comparisons made, differences were highly significant ($p<.05$); in four they were significant ($p<.05$) and in two not significant. A further experimental group (12 subjects), using a TV display, and trained to carry out a pursuit task, also showed very good transfer. Conclusions are: ideal simulation must take account of both (a) adequate background texture and (b) accurate depth scaling. Absence of (a) can produce stimulus compounding; absence of (b) leads to misestimations.

A67-81027
RESPIRATORY CHANGES AT AUDITORY AND VISUAL THRESHOLDS.
Clyde L. Rousey and Willard E. Reitz (Menninger Found., Topeka, Kan. and Western Ontario U., London, Canada).
Psychophysiology, vol. 3, Jan. 1967, p. 258–261. 8 refs.
Grant PHS MH 18,999-01.

Length of respiratory cycles was monitored while human subjects were presented with (1) auditory and (2) visual stimuli varying in intensity. The phenomenon of greatest slowing in respiration occurring at the subject's auditory threshold was demonstrated. However, no consistent relationship was demonstrated between length of the respiratory cycle and visual threshold.

A67-81028
NOCTURNAL EEG-GSR PROFILES: THE INFLUENCE OF PRESLEEP STATES.
B. K. Lester, N. R. Burch, and R. C. Dossett (Okl. U., School of Med., Oklahoma City and Baylor U., Coll. of Med., Houston, Tex.).
Psychophysiology, vol. 3, Jan. 1967, p. 238–248. 17 refs. Grants NIMH M-6076(A) and M-5079.

The number of nocturnal galvanic skin responses-(GSRs) varied widely between the electroencephalograph (EEG) stages of sleep as well as from night to night and from person to person. As others have found, non-specific GSR occurred much more frequently during stage IV than other EEG stages, and were rare in stage rapid eye movement (REM). However, night-to-night variation and individual differences were related to the presleep state of the person. In general, electrodermal activity increased in all EEG stages as daytime stress increased, being especially great on nights preceding important school examinations. The nocturnal EEG profile was also related to the presleep state, the percentage of stage IV decreasing as daytime stress increased. The percentage of stage REM showed no systematic relation to stress. The occurrence of GSR "storms" during slow-wave sleep is consistent with the notion of release of cortical or other inhibitory influences during this state, but another mechanism is needed to explain the fact that presleep stress increases the frequency of GSR in all stages of sleep, while simultaneously decreasing the percentage of slow-wave sleep.

A67-81029
AGE AS A FACTOR IN THE RESPONSE TO THYROCALCITONIN SECRETION.
A. D. Care and T. Duncan (Aberdeen Roy. Infirmary and Rowett Res. Inst., Bucksburn, Great Britain).
Journal of Endocrinology, vol. 37, Jan. 1967, p. 107–108. Med. Res. Council supported research.

The thyroid of sheep of different ages was perfused with hypercalcemic blood and the extent of the hypocalcemic response at the end of two hr. was measured. All sheep used were gonadectomized with exception of one ewe. The hypocalcemic response was significantly smaller in sheep more than one yr. old. Hypercalcemic perfusion of the thyroid in three goats, six-nine mo. old weighing 26–33 kg., caused an average fall of 15% in the systemic plasma calcium concentration, similar to that found in sheep of comparable age. Hypocalcemia, induced by thyrocalcitonin, usually developed more rapidly in the young than in the older animals; this was noted in the time-course of the response to intravenous injection of ovine thyrocalcitonin into gonadectomized sheep, aged 18 mo. The maximum effect occurred about one hr. after that in lambs. It is suggested that the target organ response to thyrocalcitonin may decrease with increasing age, a phenomenon which, if confirmed, would diminish the therapeutic usefulness of thyrocalcitonin in the aged. The effect of age may outweigh that of species.

A67-81030
THE EFFECTS OF STRESS ON THE GROWTH RATE AND FOOD AND WATER INTAKE OF RATS.
F. J. Imms (U. Coll., Dept. of Pharmacol., London, Great Britain).
Journal of Endocrinology, vol. 37, Jan. 1967, p. 1–8. 19 refs.
Med. Res. Council supported research.

The effects of four types of stress (daily subcutaneous injection of 0.9% NaCl solution, a forced choice, water gavage, and surgical trauma) on the growth rate, food and water intake, and water excretion of rats have been investigated. These stresses caused a slowing of growth which was apparently not associated with decreased food and water intakes. There were, however, some changes in water excretion which varied with the type of stress. Since food consumption was unchanged during stress whereas the rate of growth decreased, it is concluded that the rate of oxidative metabolism was increased.

A67-81031
THE EFFECTS OF HYPOXIA UPON HUMAN PERFORMANCE AND THE ELECTROENCEPHALOGRAM.
J. Ernsting (R.A.F. Inst. of Aviation Med., Farnborough, Hants, Great Britain).
International Anesthesiology Clinics, vol. 4, Spring 1966, p. 245–255; discussion, p. 255–258. 23 refs.

The effects of mild and moderate hypoxia upon human performance have been reviewed. It is suggested that in this respect one of the more satisfactory measures of the intensity of hypoxia in mild and moderate hypoxia is the oxygen tension in the cerebral venous blood. Original observations and the results of other investigators suggest that in the steady state there is no impairment of cerebral function until the cerebral venous oxygen tension is reduced to about 32 mm. Hg. A reduction of the cerebral venous oxygen tension to 27–29 mm. Hg produces an easily detectable reduction of performance, while performance deteriorates very rapidly below an oxygen tension of 21–23 mm. Hg and unconsciousness supervenes when the cerebral venous oxygen tension is reduced to 17–19 mm. Hg. In severe transient hypoxia it is possible to obtain quantitative relationships between the pattern of change of the alveolar oxygen tension and the effects upon the electroencephalogram. Further investigations are required before these relationships can be fully defined. A discussion followed.

A67-81032
INTERACTION OF THE AUDITORY AND VISUAL SENSORY MODALITIES.
A. E. Brown (Lockheed Res. Labs., Palo Alto, Calif.) and H. K. Hopkins (Agnews State Hosp., Res. Dept., San Jose, Calif.)
Journal of the Acoustical Society of America, vol. 41, Jan. 1967, p. 1–6. 11 refs.
Calif. Dept. of Mental Hyg. supported research.

The general observation that dual sensory input enhances signal detectability is of considerable interest from the information-processing standpoint. Previous experiments on the effects of intersensory interaction were concerned primarily with an observer's performance on a vigilance task. These studies have not produced results that are sufficiently precise to define the extent and manner of sensory interaction. This study is concerned with obtaining precise measurements of interaction occurring between auditory and visual sensory-information-processing networks. Separate auditory and visual threshold functions are determined and analyzed in terms of signal-detection theory. A bisensory threshold function is also determined, using equated stimuli levels derived from the individual sensory functions. The results of the bisensory test are compared to a theoretically derived curve based on the hypothesis of probabilistic adding and are found to have good correspondence.

A67-81033
PHONEMIC ANALYSIS OF CONSONANTS IN HELIUM SPEECH.
Russell L. Sergeant (U.S. Naval Submarine Med. Center, Auditory Res. Div., U.S. Naval Submarine Base, Groton, Conn.). *(Am. Speech and Hearing Assn., Ann. Conv., San Francisco, Nov. 21–24, 1964).*
Journal of the Acoustical Society of America, vol. 41, Jan. 1967, p. 66–69. 12 refs.

A phonemic-confusion matrix for speech in a helium atmosphere was constructed for use in predicting intelligibilities of specially constructed vocabularies for such environments. There is a marked similarity between helium speech and speech in air when intelligibility according to linguistic classification is observed. However, unaccountable differences do exist between the two breathing media for ranked intelligibilities of specific consonants.

A67-81034
TECHNIQUE FOR CORRECTING HELIUM SPEECH DISTORTION.
W. R. Stover (HRB-Singer, Behavioristics Lab., State College, Pa.).
Journal of the Acoustical Society of America, vol. 41, Jan. 1967, p. 70–74. 6 refs.

Some qualitative data on the nature of the speech distortion caused by respiration of a helium-oxygen atmosphere are presented. Previous corrective-processing techniques are discussed, and an advanced technique that overcomes their disadvantages is described. The experimental system is based upon time-domain speech-processing methods and is capable of retaining the natural pitch rate of the speaker's voice while correcting the formant shifts caused by the helium-rich atmosphere. This system uses digital-processing methods and is capable of operating on continuous speech in on-line applications. It promises a practical solution to the problem of providing normal voice communication in a helium environment.

A67-81035
ACCUMULATION THEORY OF BINAURAL-MASKED THRESHOLDS.
K. D. Schenkel (Tech. Hochschule Stuttgart, Inst. für Nachrichtentechn., West Germany).
Journal of the Acoustical Society of America, vol. 41, Jan. 1967, p. 20–31. 15 refs.
Deut. Forschungsgemeinschaft supported research.

Two models describing binaural-masked thresholds (the delay-line model and the EC model) are checked by extended experiments. They prove only a limited validity. Therefore, a new model, the accumulation model, is proposed, one that does not use any delay at all and that is, therefore, able to process interaural differences on a more general basis. It is in full agreement with former calculation schemes for monaural-masked thresholds. This model explains all effects in binaural-masked thresholds known so far. Binaural-masked thresholds computed according to this model are in good agreement with experimental data.

A67-81036
CRITICAL BAND IN BINAURAL DETECTION.
B. E. Mulligan, M. J. Mulligan, and J. F. Stonecypher (Ga. U., Dept. of Psychol., Athens).
Journal of the Acoustical Society of America, vol. 41, Jan. 1967, p. 7–12. 29 refs.
NIH supported research.

In order to account for binaural improvements in detection on the basis of interaural phase shifts, or time deviations, it is necessary to assume that the "critical band" is a sinusoid-like process and that corresponding processes from the two ears interact. Support for this assumption is reported for several binaural conditions. It was found that neither interaural level nor bandwidth differences matter so long as the levels within the critical bands at the two ears are unaffected. Detection at one ear is affected only by a narrow band of frequencies at the opposite ear, thus confirming the assumption of a band-limited binaural interaction. Experiments were carried out with three different maskers: a narrow-band noise, a medium-band noise, and a medium-band noise with a gap in it. The narrow-band masker was as effective as the medium-band masker. The noise with a gap in it, however, produced a minimal release from masking when added at the nonsignal ear. These findings are discussed within the context of those of earlier investigations.

A67-81037
DERMO-GALVANIC POTENTIAL AND ARTERIAL OSCILLOGRAPHY IN CASE OF VESTIBULAR IRRITATION UNDER STRESS CONDITIONS [KOZHNO-GAL'VANICHESKII POTENTSIAL I ARTERIAL'NAIA OSTSILLOGRAMMA PRI VESTIBULIARNOM RAZDRAZHENII V USLOVIIAKH STRESSA].
B. TS. Ol'shanskii.
Latvijas Psr Zinatnu Akademijas Vestis, no. 3, 1967, p. 124–129. 35 refs. In Russian.

A stress of short duration resulted in increased heart function and a rise of humeral artery tone in 52 persons. Under these conditions the vestibular irritant caused a moderate intensification of heart function and a drop of humeral artery vascular tone in persons displaying tolerance; while in other persons a more pronounced intensification of heart function and vascular tone increase were observed. In the first group the electrodermal response was either without change or increased slightly. In the second group it was decreased.

A67-81038
SPACE SUITS.
Matthew I. Radnofsky.
International Science and Technology, no. 62, Feb. 1967, p. 32–39.

No longer is the major problem of designing a space suit simply one of constructing a garment that can be pressurized successfully. With astronauts expected to be out exploring the moon one of these days, suits must be built with joints that move easily enough to permit climbing around on rugged terrain. This requires keeping the suit volume constant at all times, thereby ensuring that minimum work is done on the enclosed gas. The traditional approach is via the so-called soft suit, which is constructed mainly of rubberized fabric. A variety of ingenious bellows and bladder arrangements have been devised to prevent it from ballooning the joints. Problems still remain, however, and in an attempt to overcome them some designers have turned to "hard" suits of metal and plastic, and others to various hybrid suits. Out of such space-age garment-making will undoubtedly come not one suit but a whole wardrobe for tomorrow's astronauts.

A67-81039
THE PHYSIOLOGICAL ADAPTATION OF UNILATERAL SEMICIRCULAR CANAL INACTIVATION.
Hyman Zuckerman (McGill U., Dept. of Physiol., Aviation Med. Res. Unit, Montreal, Canada).
McGill Medical Journal, vol. 36, Feb. 1967, p. 8–13.

This project was designed to investigate quantitatively physiological adaptation in the cat to plugging (functional obstruction to fluid circulation) of one horizontal semicircular canan as manifest by the oculomotor response to rotational stimulation. Normal unanaesthetized cats were subjected to a range of oscillatory rotational stimuli, their heads fixed to the rotating platform, with the horizontal canals in the plane of rotation. The same cats were then subjected to similar stimuli at intervals after unilateral obstruction of the canal. As opposed to unilateral labyrinthinectomy, this procedure does not interfere with ampullary afferent innervation presumably leaving the steady state condition unimpaired. The results showed a consistent fall in gain of the overall vestibulo-ocular response by a factor of two in post operative animals. All stimuli were conducted in absolute darkness. Over the three-four week required for functional post operative adaptation of the animal, there was no significant corresponding change in the oculomotor response to vestibular stimulation.

A67-81040
ORIENTATION AND NAVIGATION IN SPACE-TIME.
Siegfried Gerathewohl.
Annals of the New York Academy of Sciences, vol. 138, Feb. 6, 1967, p. 504–514. 11 refs.

Orientation and navigation in space-time take place on several levels of interaction of man and environment. Corporocentric orientation occurs in the immediate surrounding space which serves ad homogeneous background for all human perception in space and time. Domocentric orientation leads to geometric space and mathematical time concepts based on axioms and logical deductions. Geocentric and heliocentric orientation and, particularly, flight navigation, need the relativistic space-time concept, which provides useful parameters in science and advanced technology; for example, in relativistic rocket mechanics. There is no "paradox" in applying relativity theory to the understanding of time and to the solving of space flight problems. It has been known for more than half a century that the concepts of absolute space and universal time are inadequate to the modern construct of the universe. They have been replaced by the concept of a four-dimensional entity. This is completely unrelated and unbiased by the question of whether the velocity of light can be attained or exceeded. For computations concerning orbital and interplanetary flight trajectories, the application of relativistic principles proves useful. The purpose of the discussion was to make familiar principles and to point out how relativistic phenomena, such as time delay, time dilation, and hyperbolic motion are accepted as real parameters by the young science of astronautics.

A67-81041
THE ADDITIVITY OF VALUES OF ENERGY EXPENDITURE OF SIMULTANEOUSLY PERFORMED SIMPLE MUSCULAR TASKS.
R. B. Andrews (Calif. U., Los Angeles).
Ergonomics, vol. 9, Nov. 1966, p. 507–515.
Calif. U., Los Angeles supported research.

A study was carried out to compare the sum of independently determined net rates of energy expenditure for two or three simple muscular tasks and the net rate of energy expenditure for the simultaneous performance of the same tasks. Three simple tasks were used: one-armed cranking of an ergometer, one-armed static pulling aginst resistance, and walking. Eight configurations respresenting all possible combinations of the simple tasks were examined. The results showed that for seven of the eight configurations, the sum of the net rates of energy expenditure for the simple tasks significantly exceeded the net rate of energy expenditure for simultaneous performance. For four of these configurations, the discrepancy was 20% or larger. The results are discussed in terms of kinesiology, i.e. the science of movement of the body, and their implications for both work design and possible systems of standard metabolic data.

A67-81042
PHYSIOLOGICAL COST AND AIR FLOW RESISTANCE OF RESPIRATORY PROTECTIVE DEVICES.
S. H. Thompson and B. J. Sharkey (Mont. U., Human Performance Lab., Missoula).
Ergonomics, vol. 9, Nov. 1966, p. 495–499. 9 refs.

Using one of three respiratory protective devices or a 'no mask' control, five male subjects were tested at grades of 0, 5 and 10% and a constant speed of 3.5 m.p.h. for a total of twelve tests per man. Exercise heart rates and recovery oxygen consumption values were recorded. Air flow resistance values were determined in laboratory bench tests. The resistance of the devices did not significantly alter the exercise pulse rates but did significantly increase the recovery oxygen consumption, particularly at the higher work levels. Recovery oxygen consumption values and the air flow resistance figures were positively related at the higher levels of work. It is suggested that the relationship offers further support for the use of laboratory bench tests as estimator of the added physiological burden imposed on the wearer.

A67-81043
AEROBIC CAPACITY AND PHYSIOLOGICAL FITNESS OF AUSTRALIAN MEN.
J. G. Allen (New South Wales Div. of Occupational Health, Ergonomics Group, Sydney, Australia).
Ergonomics, vol. 9, Nov. 1966, p. 485–494. 15 refs.

The aerobic capacities and physiological fitnesses of 321 Australian men were determined by a sub-maximal bicycle ergometer test. The results are for use when evaluating the physiological cost of work in industrial processes. The survey revealed that fitness was independent of occupation but was dependent upon age. Participation in regular moderate sports had little effect on fitness, but intensive sporting training was associated with overweight, but underweight did not result in superior fitness. Some fitness figures from other countries are quoted.

A67-81044
THE EFFECT OF INITIAL POINTER POSITION RELATIVE TO THE CONTROL ON DIRECTIONAL RELATIONSHIPS IN THE PRESENCE OF TWO CONFLICTING STEREOTYPES.
J. O. Thylén.
Ergonomics, vol. 9, Nov. 1966, p. 469–474. 5 refs.

A variable liable to affect display-control relationships is treated in this article. It is shown that the strength of the stereotype known as Warrick's Principle, the expectation that a pointer will move in the same direction as that part of the control nearest to the display, is reduced as the pointer is set off to either side of the control knob. In an arrangement with the knob above a horizontal display this reduction may cause a reversal of an operator's expectation of directional relationship at a pointer position not very far from the knob. It is maintained, however, that this effect of pointer position is not likely to influence expectation in an unambiguous arrangement of display and control.

A67-81045
ORGAN WEIGHTS AND WATER LEVELS OF THE RAT FOLLOWING REDUCED FOOD INTAKE.
J. M. Peters and Eldon M. Boyd (Queen's U., Dept. of Pharmacol., Kingston, Ontario, Canada).
Journal of Nutrition, vol. 90, Dec. 1966, p. 354–360. 10 refs.
Med. Res. Council, Canada supported research.

The effect of anorexia on the weights and water levels of body organs was determined. Ninety-two adult female albino rats of a Wistar strain were divided into groups which were subjected to various daily restrictions of food intake that resulted in a loss of body weight up to 40% at the end of two weeks when they were killed and autopsied. At autopsy the wet weight and water content of the following organs were measured: adrenal glands, brain, cardiac stomach, pyloric stomach, small bowel, cecum, colon, heart, kidneys, liver, lungs, muscle, ovaries, skin, spleen, salivary glands, thymus gland, and residual carcass. Up to 20% loss of body weight, the effects of starvation were of a minor nature. At 30 to 40% gastric ulcers and a stress reaction appeared, and most organs had lost considerably dry weight and gained water; but only brain showed no changes in weight.

A67-81046
BINOCULAR RIVALRY AS A FUNCTION OF INCONGRUITY IN MEANING.
Hiroshi Ono, Albert H. Hastorf (Stanford U., Dept. of Psychol., Calif.), and Charles E. Osgood (Ill. U., Inst. of Comm. Res., Urbana).
Scandinavian Journal of Psychology, vol. 7, no. 4, 1966 p. 225–233. 13 refs.
Grant NSF-GS-718.

This is the third of a series of three papers dealing with semantics of facial expressions. The purpose of this experiment was to determine whether the ratings of two stimulus inputs on semantic differential scales would predict the experience of binocular rivalry. The stimuli used were five full-face photographs of a man expressing different emotions. These stimuli were rated on the semantic differential, and all possible pairs of these stimuli were used as stereograms. It was hypothesized that semantically incongruous stimulus inputs would lead to binocular rivalry and that congruous ones would lead to an absence of rivalry. The hypothesis was supported.

A67-81047
A PARADOX IN THE PERCEPTION OF LUMINANCE GRADIENTS. I.
Sten Sture Bergström (Uppsala U., Dept. of Psychol., Sweden).
Scandinavian Journal of Psychology, vol. 7, no. 4, 1966, p. 209–224. 20 refs.
Swed. Council for Social Sci. Res. supported research.

Under certain conditions subjects looking at a luminance gradient report a physically darker part of the gradient to be brighter than an adjacent area of higher luminance. This brightness paradox was studied in a series of experiments using a magnitude estimation method. The main results were that both the changing sign of the second derivative of the luminance function (Mach's hypothesis) and the higher or lower luminance of an adjacent area (McDougall's drainage theory) were critical conditions for the appearance of the paradox. In the present study none of these conditions per se resulted in a brightness paradox.

A67-81048
'MOVING ROAD SIMULATOR'–A MACHINE SUITABLE FOR THE STUDY OF SPEED PHENOMENA INCLUDING MOTION AFTER-EFFECT.
G. G. Denton (Min. of Transport, Road Res. Lab., Harmondsworth, Middlesex, Great Gritain).
Ergonomics, vol. 9, Nov. 1966, p. 517–520.

Since vision plays a very large and important part in the overall skill of driving a vehicle, it is worth while to attempt to simulate much of the visual task in the laboratory. This note describes a machine which is capable of simulating some of the visual aspects of driving. By treating motion 'after-effect' as a compensatory tracking task, it appears that reasonably accurate measurement of this phenomenon as a function of time and stimulus magnitude is possible. Technical details of the system are given and some of its possible uses are discussed.

A67-81049
INTEGRATION OF SEMICIRCULAR CANAL ACTIVITY.
Jun-ichi Suzuki and Bernard Cohen (Mound Sinai Hosp., Dept. of Neurol., New York City, N. Y.).
Journal of Neurophysiology, vol. 29, Nov. 1966, p. 981–995. 18 refs.
Grant NINDB NB-00294; Smith, Kline and French Labs. and Dazian and Abramson Found. supported research.

In sleeping or anesthetized cats steady stimulation of semicircular canal nerves produced a typical sequence of contraction in eye muscles. Tension curves usually increased in convex, straight, and finally, concave fashion. Changes in the rate of contraction were analyzed. After the onset of stimulation, contraction rate increased linearly for a variable period of time. As stimulation continued, contraction rates approached some maximum value which was linearly related to the frequency of stimulation. Contraction rates then fell exponentially. The value of maximum contraction rate was related to the logarithm of the frequency and duration of stimulation. These curves and relationships are described by equations derived from summating rising and falling processes with separate time constants. These time constants decreased as the rate of stimulation increased. These findings suggest that within limits the central neural organizations responsible for sustained ocular deviations induced by ampullary nerve stimulation, caloric stimulation, or angular acceleration initially integrate the incoming ampullary nerve activity, that the product of this integration is an output in contraction rate or eye velocity proportional to the input stimulus, and that the rate of accumulation of excitation is a function of the frequency, i.e., intensity of stimulation.

A67-81050
THE IMPORTANCE OF COLLATIVE-AFFECTIVE AND INTENSIVE AROUSAL POTENTIAL IN STEREOSCOPICALLY INDUCED PERCEPTUAL CONFLICT.
Ingvar Bokander (Lund U., Psychol. Lab., Sweden).
Scandinavian Journal of Psychology, vol. 7, no. 4, 1966, p. 234–238. 11 refs.

In perceptual conflict of the binocular rivalry type the object field with the greatest collative-affective or intensive arousal potential will dominate. The interaction between these two factors is such that the brighter field will dominate over the fainter whether there is greater or equal collative-affective arousal potential in one of the object fields in relation to the other. Discussion is centered around the question of whether eventual eye dominance can be eliminated through relative changes in the light intensity of the two object fields.

A67-81051
DISCHARGE PATTERNS OF SINGLE GENICULATE NEURONS DURING THE RAPID EYE MOVEMENTS OF SLEEP.
Emilio Bizzi (Washington U., Dept. of Zool., St. Louis, Mo.).
Journal of Neurophysiology, vol. 29, Nov. 1966, p. 1087–1095. 32 refs.
Grant NIH NB-01602.

Using a microelectrode technique, records were obtained from 53 units in the lateral geniculates of ten unrestrained cats. Sixty-eight per cent of the units fired impulses in bursts during rapid eye movement (REM) sleep. Twelve per cent of geniculate cells decreased their firing rate. Monophasic waves appearing in the lateral geniculate body during the phase of sleep have been correlated with the unitary discharge. Similar results were obtained in blind cats. The phasic increase in the discharge of geniculate neurons is considered to be the consequence of an extraretinal input timed to occur during REM sleep.

A67-81052
A MECHANISM OF CENTRAL COMPENSATION OF VESTIBULAR FUNCTION FOLLOWING HEMILABYRINTHECTOMY.
Wolfgang Precht, Hiroshi Shimazu, and Charles H. Markham (Max-Planck-Inst. für Hirnforsch., Neuroanat. Abt., Frankfurt am Main-Niederrad, West Germany).
Journal of Neurophysiology, vol. 29, Nov. 1966, p. 996–1010. 28 refs. Max-Planck-Ges. supported research.

Following unilateral destruction of the labyrinth in the cat, postural abnormalities and postrotatory nystagmus were observed in the acute stage (3–4 days after operation) and in the compensated stage (30–45 days after operation). After these observations, extracellular microelectrode recording of vestibular type I and type II neuron activities was performed under decerebrate and decerebellate condition without anesthesia. All characteristics of field potentials in the ipsi- and contralateral vestibular nuclei after single shock of the intact vestibular nerve showed no significant difference from those of normal cats. The recovery of fairly symmetric control of ocular movements induced by rotation was explained by reappearance of spontaneous activity of type I neurons on the destroyed side and by the highly developed inhibitory influence from the intact labyrinth.

A67-81053
AN IMPROVED MAN–MACHINE INTERFACE FOR THE DRIVER-VEHICLE SYSTEM.
Robert E. Fenton (Ohio State U., Dept. of Elec. Eng., Comm. and Control Systems Lab., Columbus).
IEEE Transactions on Human Factors in Electronics, vol. HFE-7, Dec. 1966, p. 150–157. 9 refs.
Ohio Dept. of Highways, Columbus supported research.

A control stick with a built-in tactile aiding device was tested in a simulated car-following situation. The tactile device gave the driver of a following car information—headway and relative velocity—concerning the state of a lead car. Experimental results (relative velocity and headway variance) with the simulator were compared with those obtained using conventional automobile controls in a similar situation. Sizeable reductions in these quantities, 55 and 85 percent, respectively, were obtained when the tactile display was partially quickened. Some evidence indicated that the driver behaved as an amplifier when using such a display.

A67-81054
THE EFFECT OF MINOR ALCOHOL STRESS ON DECISION PROCESSES IN A STEP-TRACKING TASK.
C. B. Gibbs (Defence Res. Med. Labs., Downsview, Ontario, Canada).
IEEE Transactions on Human Factors in Electronics, vol. HFE-7, Dec. 1966, p. 145–150. 18 refs.

Twenty men were tested in step-input tracking. Minor stress was imposed by moderate alcohol dosage and an incompatible directional relation between control and display. Some target movements demanded a response in an improbable direction and posed a choice between long delay in response and a movement in the wrong direction. The duration of response latency (rl) and the number of directional errors revealed a subject's preference for accuracy or speed and his ability to estimate probabilities. Directional errors, rl, and eye movements were recorded before and after drinking, when breathanalyzer (ba) readings were zero, and at 0.05% and 0.1% ba levels, which may be produced in a man weighing 160 lb. by drinking two and four 12 oz. bottles of beer, respectively. Alcohol caused a progressive increase in rl and errors ($p<0.01$); there was no evidence for a threshold below which alcohol has no adverse effect. The test emphasized the markedly different effects of the same alcohol dosage on the skill of different subjects, but habitual drinkers obtained no undue advantage on the test. The task was learned quickly and extensive practice did not reduce the discriminatory power of the test. The effects of a dose producing a 0.05% ba reading were not significantly different in an ascending or descending series of levels of intoxication. The alcohol dosages tested had no significant effect on simple reaction time.

A67-81055
A "CRITICAL" TRACKING TASK FOR MANUAL CONTROL RESEARCH.
H. R. Jex, J. D. McDonnell, and A. V. Phatak (Systems Technol., Inc., Hawthorne, Calif.).
IEEE Transactions on Human Factors in Electronics, vol. HFE-7, Dec. 1966, p. 138–145. 21 refs.
NASA Contract NAS2-2288 and Contract AF 33(615)-2826.

A "critical" tracking task is developed in which a human operator is required to stabilize an increasingly unstable first-order controlled element up to the critical point of loss of control. Servo theory and operator describing function measurements are used to validate the basic assumptions, and an automatically paced critical task mechanization is described. The results show that the task does constrain the operator's behavior as intended, and that the critical instability depends primarily on the operator's effective time delay while tracking. A number of applications for the critical task are reviewed, including secondary workload research, control and measurement of operator and controlled element gain, and display research.

A67-81056
DIFFERENTIAL GAMES AND MANUAL CONTROL.
Sheldon Baron (NASA, Electron. Res. Center, Cambridge, Mass.).
IEEE Transactions on Human Factors in Electronics, vol. HFE-7, Dec. 1966, p. 133–137. 5 refs.

Variational methods are used to solve a particular pursuit-evasion differential game. The problem involves the determination of optimal strategies for both the pursuer and evader. The performance measure is the miss distance at some fixed terminal time. Both pursuer and evader have limited control

energy. The performance of a trained research pilot, for both single and two-axis control tasks is compared with that of the optimal pursuer. State vector display and "quickened" display are discussed. The results suggest that differential game problems could be quite useful in the study of manual control.

A67-81057
SIMPLE DEVICE FOR OBTAINING SYNCHRONOUS CULTURES OF ALGAE.
A. Lafeber and C. L. M. Steenbergen ("Vijverhof", Hydrobiol. Inst., Nieuwersluis, The Netherlands).
Nature, vol. 213, Feb. 4, 1967, p. 527–528.

A description, with schematic representation, is presented of a thermostat device containing two culture vessels for obtaining synchronous cultures of algae. To synchronize the cultures a method is used in which a random culture is subjected to regular alternation of light and dark periods of adequate duration. The cultures are illuminated by four fluorescent lamps through each of the two longest sides of the water bath giving a light intensity of 15,000 lux from each side. To get more light and a spectrum resembling the Sun, a high pressure mercury lamp is placed over each culture, giving from above a light intensity of 5,000 lux in the center of the thermostat. Placing three thermostats between the lamps enables the use of three different temperatures and also the culture of six different organisms at the same time under the same light conditions to yield about 900 ml. of a dense suspension from each bottle. Completely synchronized cultures were obtained with this simple device of *Scenedesmus obliquus, Ankistrodesmus falcatus* and *Chlorella vulgaris* at temperatures between 25°C. and 30°C. using Lorenzen culture solution, and 14 hours of light.

A67-81058
A QUEUEING MODEL OF MANY-INSTRUMENT VISUAL SAMPLING.
Jaime R. Carbonell (Bolt Beranek and Newman Inc., Cambridge, Mass.).
(IEEE Symp. on Human Factors in Electron., 7th, Minneapolis, May 1966).
(IEEE Transactions on Human Factors in Electronics, vol. HFE-7, Dec. 1966, p. 157–164. 14 refs.
Contract NASA NAS-1-5059.

The task of a pilot (namely of a high performance jet plane) sampling the information given to him by the instruments on his panel is discussed. A model that attempts to explain and match the behavior of pilots under actual flight conditions is presented. This model is based on the concept of the different instruments competing for the attention of the pilot. Some may be unimportant under a given flight condition, but many should be looked at, the urgency of doing so being measured by the risk incurred if the corresponding value is beyond a certain theshold. Costs are assigned to each instrument; at each sampling instant the decision as to what instrument to look at is based on comparing for the different instrument the combined effect of both the probability of exceeding the threshold and a cost of exceeding that threshold. Effectively, the instruments queue for the pilot's attention; the instrument with the highest priority at each instant is then served (looked at).

A67-81059
REDUCTION-OXIDATION POTENTIAL OF BLOOD AS A FUNCTION OF PARTIAL PRESSURE OF OXYGEN.
Hanus J. Grosz and Barbara B. Farmer (Ind. U., School of Med., Inst. of Psychait. Res., Indianapolis).
Nature, vol. 213, Feb. 18, 1967, p. 717–718.

An investigation demonstrated the relationship between the redox measurements of the blood and the partial pressure of oxygen in the blood under known conditions of pH and temperature. The experiments indicated that: (a) there was a positive, but not quite linear relationship between redox measurements and partial pressure of oxygen; (b) this relationship was not constant and varied greatly with certain experimental manipulations of the blood sample; (c) a steady partial pressure of oxygen was associated with a steady redox measurement; (d) complete deoxygenation of the blood initiated a steady, progressive decline in redox values which ordinarily did not reach a steady state for at least ten hours; and (e) the value of the final steady state was accurately predicted from a redox measurement taken in the presence of oxygen. It appeared that redox measurements of the blood must be made in conditions of complete deoxygenation and in known conditions of temperature and pH. Redox investigations carried out *in vivo* or in the presence of oxygen, are likely to be of doubtful value.

A67-81060
THE SPECIFICITY RESPONSE TO STRESSFUL STIMULI.
Donald Oken, Helen Heath, William Shipman, Iris Goldstein, Roy R. Grinker, and James Fisch (Michael Reese Hosp. and Med. Center, Inst. for Psychosomat. and Psychiat. Res. and Training, Chicago, Ill.).
Archives of General Psychiatry, vol. 15, Dec. 1966, p. 624–634. 20 refs.
Grants NIMH M 5519 and IMHF 1711.

The question of whether there is specific patterning of the physiological responses to different types of stimuli was studied. Data are presented on the effects, in 33 subjects, of exposure to a one-min. white noise stimulus followed later by a five-min. situation of simulated danger which induced overt anxiety. The noise produced a fall in diastolic blood pressure and rises in all other physiological variables. The anxiety stress was associated with rises in all the physiological measures to an extent which exceeded the response to the white noise. It was suggested that the two responses differ only in magnitude, and it was explained that even the fall in diastolic pressure below baseline is consistent with such an interpretation. Specificity of patterning, therefore, is not confirmed by these data. Both stimuli can be viewed as producing the same stress response, the anxiety situation being only more potent than the noise stimulus.

A67-81061
BIORHYTHMS AND VISUAL RESOLVING POWER.
Lucia Ronchi and Francesco Schupfer (Arcetri, Ist. Nazl. di Ottica, Florence, Italy).
Atti della Fondazione Giorgio Ronchi e Contributi dell' Istituto Nazionale di Ottica, vol. 21, Sep.–Oct. 1966, p. 624–631. 14 refs.
Contract AF 61(052)-850.

The data recorded by one of us in 1943, during the course of a long-lasting experiment are examined, in the frame of the modern conception of retinal biorhythms. Twenty subjects lived 100 days viewing monocularly (both with right and left eyes) and were measured for visual accuracy in recording with precision instruments. The hypothesis of randomness is rejected, by applying the non-parametric runs test.

A67-81062
BONE FRACTURES PRODUCED BY HIGH VELOCITY IMPACTS.
Donald F. Huelke, Lynn J. Buege, and James H. Harger (Mich. U., Dept. of Anat., Ann Arbor).
American Journal of Anatomy, vol. 120, Jan. 1967, p. 123–131. 14 refs.
Grants PHS AC-00196 and RF-05383-04.

The effects of high velocity impact to the distal end of 122 human femurs were studied using one-quarter in. steel spheres as projectiles, with impact velocities from 500 to 700 ft./sec. In the lower velocity range, a "drill hole" fracture was produced with low energy expenditure, and the diameter of this type of fracture was increased as a function of increasing velocity. At the higher impact velocities the bone exploded with a violent radial displacement of the material surrounding the missile path, similar to the cavitation effect often seen in soft tissues. At increasing impact velocities, increasing amounts of energy were expended in producing the fracture.

A67-81063
EXPERIMENTAL STUDY OF THE DISTURBING EFFECT OF AIRCRAFT NOISE [EXPERIMENTELLE UNTERSUCHUNGEN UBER DIE STORWIRKUNG VON FLUGZEUGLARM].
Etienne Grandjean, Etienne Perret, and Anselm Lauber (Eidg. Tech. Hochschule, Inst. für Hyg. und Arbeitsphysiol., Zürich, Switzerland).
International Zeitschrift für angenwandt Physiologie, vol. 23, Dec. 8, 1966, p. 191–202. 5 refs. In German.

The discomfort experienced by students exposed to airplane noises was recorded on magnetic tape. During 18 periods, students hearing altogether 128 airplane noises, gave for each noise a score between one and six according to their subjective evaluation of the discomfort they experienced. The discomfort increases almost linearly with the auditory level expressed in db(A) or in perceived-noise levels; this is true of the two auditory spectra studied (DC-8 and Caravelle). It also increases with the duration of noises. For identical noise levels, expressed in db(A), the acoustical spectrum with high pitch predominance (Caravelle's landing) led to a stronger discomfort than the spectrum with low pitch predominance (taking-off of the DC-8). The discomfort was the same during periods with five or six airplane noises as during periods with ten or eleven. The repetition of the same noises led to a low but significant decrease in the discomfort experienced.

A67-81064
THE RELATION BETWEEN ARTERIAL AND ENDTIDAL CARBON DIOXIDE PRESSURE DURING ARTIFICIAL BREATHING, AT REST AND DURING EXERCISE [DIE BEZIEHUNG ZWISCHEN ARTERIELLEM UND ENDEXSPIRATORISCHEM KOHLENDIOXYDDRUCK BEI KUNSTLICHER BEATMUNG, BEI RUHE UND BEI VERSCHIEDENEN LEISTUNGSSTUFEN].
Jürgen Stegemann (U. Köln, Inst. für normale und pathol. Physiol., West Germany).
Pflügers Archiv für die gesamte Physiologie, vol. 292, Oct. 26, 1966, p. 140 150. 26 refs. In German.

The relationship between the mean arterial CO_2-pressure (p_aCO_2) and the end tital CO_2-pressure (p_ACO_2) was measured in six male students at rest and at exercise up to 15 mkp./sec. and in dogs which were artificially ventilated. In the investigated range, the difference between arterial and end tidal CO_2 pressure was always positive. Its absolute value depended on the value of p_aCO_2. In men the difference was about 4 mm. Hg when p_aCO_2 was 30 mm. Hg, became smaller with increasing pCO_2 and reached 0, when pCO_2 was more than 52 mm. Hg. Similar results were found in dogs, the absolute values of the a–A difference, however, were smaller.

A67-81065
ELECTROLYTE VARIATIONS DURING DEEP HYPOTHERMIA. IV. THE COLD SWELLING OF THE BRAIN DURING HIBERNATION [ELEKTROLYTVERANDERUNGEN IN TIEFER HYPOTHERMIE. IV. DIE KALTESCHWELLUNG DES GEHIRNS BEIM WINTERSCHLAFER].
W. Brendel, H. J. Reulen, P. Aigner, and K. Messmer (Chir. U.-Klin., Abt. für exptl. Chr., München, West Germany).
Pflügers Archiv für die gesamte Physiologie, vol. 292, Oct. 26, 1966. p. 83–89. 19 refs. In German.
Deut. Forschungsgemeinschaft supported.

Hibernators (Glis glis) were cooled to colonic temperatures near 0°C. in an ice water bath for one and one-half hr. during the summer and during the hibernating state. Cerebral Na, K and H_2O contents were determined. Such marked cooling during the summer produced an increase of 0.61 ml./100 g. fresh weight in O_2 content, of 10.29 mval/kg. dry weight in sodium content and of 29.53 mval/kg. dry weight in potassium content. During the winter the water content remained unchanged, the sodium content decreased by 5.12 mval./kg. dry weight and the potassium content by 23.69 mval./kg. dry weight. When cardiac activity was artificially interrupted in the winter at body temperatures below 10°C., there was again an increase in H_2O by 1.02 ml./100 g. fresh weight, of sodium by 29.21 mval./kg. dry weight and of potassium by 19.19 mval./kg. brain weight. Thus, during the summer, hibernators develop cold induced brain swelling at low body temperatures which does not occur during the winter with the circulation intact. This cold swelling is thought to be caused by an inhibition of active cation transport. This has been discussed in relation to earlier results on hypothermic rats and dogs.

A67-81066
THE RELATIVE MERITS OF THE STEP TEST, BICYCLE ERGOMETER, AND TREADMILL IN THE ASSESSMENT OF CARDIO-RESPIRATORY FITNESS.
R. J. Shephard (Toronto U., School of Hyg., Dept. of Physiol. Hyg., Canada).
Internationale Zeitschrift für angenwandte Physiologie, vol. 23, Dec. 8, 1966, p. 219–230. 31 refs. In German.
Dept. of Natl. Health and Welfare, Ottawa and Ontario Heart Found. supported research.

Step test, bicycle ergometer and treadmill tests for the prediction of aerobic work capacity were compared in ten young men. Individuals with a large aerobic capacity were less efficient in the performance of both tasks; this was apparently attributable to unmeasured anaerobic components of metabolism. Oxygen consumption at a given rate of external work decreased in step, bicycle, and treadmill tests as each task was learned. Oxygen consumption during the first definitive test of each type could be predicted from the work rate without systematic error. The variance of this prediction decreased with learning, but remained consistently greater for the treadmill than for step and bicycle tests. On grounds of reliability and convenience, the step test seems the method of choice for the prediction of aerobic work capacity. With all three test procedures, the aerobic work capacity could be predicted with a much smaller coefficient of variation if the oxygen consumption used in this prediction was measured rather than estimated from the work rate.

A67-81067
EFFECT OF UNILATERAL HYPOXIA ON THE DISTRIBUTION OF PULMONARY BLOOD FLOW IN MAN.
Nobuaki Asai, Mausong Tzen, Toshiro Tanaka, Takayoshi Kai, Eiji Tanae, Masakiyo Nakagawa, Yanosuke Sagawa (Kyoto U., Tuberc. Res. Inst., Dept. of Surg., Japan), and Kanji Torizuka (Kyoto U. Hosp., Central Clin. of Radio Isotope Div., Japan).
Acta Tuberculosea Japonica, vol. 16, Sep. 1966, p. 9–20. 22 refs.

Unilateral pulmonary hypoxia was induced in human subjects by means of divided ventilation using Carlens tubes. A decrease in pulmonary blood flow in the hypoxic lung was demonstrated by the lung scanning method using I^{131} MAA. The response occurred without accompanying systemic hypoxic or pulmonary arterial pressure rise. The response occurred only when PA_{O_2} was lower than PV_{O_2}. The flow reduction was the result of a pulmonary blood flow shift from the hypoxic to the hyperoxic lung area due to regional vasoconstriction in the hypoxic lung area.

A67-81068
A MORPHOLOGICAL STUDY ON PULMONARY VASCULAR RESPONSE TO UNILATERAL HYPOXIA IN GUINEA PIG.
Toshiro Tanaka, Mausong Tzen, Nobuaki Asai, Takayoshi Kai, Eiji Tanae, Masakiyo Nakagawa, and Yanosuke Sagawa (Kyoto U., Tuberc. Res. Inst., Dept. of Surg., Japan).
Acta Tuberculosea Japonica, vol. 16, Sep. 1966, p. 21–33. 23 refs.

The results of experiments concerning the response of the vascular bed in the regional hypoxic lung of guinea pigs by morphological observation using Staub's rapid freezing method with liquid nitrogen were: (1) marked narrowing of the lumen and thickening of the muscle layer of the small pulmonary artery were observed at the level of bronchioli of 150 to 300 microns in diameter in hypoxic lungs; (2) no dimensional changes could be detected around the pulmonary capillary and vein in the hypoxic lung; and (3) in the control lung, no morphological changes could be demonstrated throughout the whole vascular bed as were observed in the hypoxic lung. Several theories concerning the constrictive response of the pulmonary artery were given, but no conclusive results have been obtained.

A67-81069
EEG RESPONSES TO LIGHT FLASHES DURING THE OBSERVATION OF STABILIZED AND NORMAL RETINAL IMAGES.
D. Lehmann, G. W. Beeler, Jr., and D. H. Fender (Presbyterian Med. Center, Inst. of Visual Sci., San Francisco and Calif. Inst. of Technol., Pasadena).
Electroencephalography and Clinical Neurophysiology, vol. 22, Feb. 1967, p. 136–142. 15 refs.
Grants NIH NB 06038 and NIH NB 03627.

The electroencephalogram (EEG) potential evoked by repetitive 3.2/sec. flashes of light to the right eye was measured in six subjects; at the same time the left eye viewed various continuously presented targets, both in normal and in stabilized vision. The following observations were made: (1) In stabilized vision, no significant change could be detected in the amplitude of the evoked potential during periods of clear visibility or of spontaneous fade-out. Thus, the changes in the state of central nervous system activity, indicated by low voltage fast EEG during periods of image visibility versus alpha activity during periods of fade-out, are not reflected by the evoked responses. (2) The presentation of a structured target to the left eye in normal vision reduced the amplitude of the potential evoked by flahses to the right eye. If the same target was stabilized on the retina, there was less reduction in the amplitude of the potential evoked by flashes to the right eye. If the same target was stabilized on the retina, there was less reduction in the amplitude of the evoked potential. The greater reduction of amplitude of the evoked potentials during observation of the target in normal vision compared with the reduction measured during stabilized vision is interpreted as resulting from increased loading of the higher levels of the visual system in the former case; in this condition, fewer elements are available to participate in the evoked response to unpatterned light.

A67-81070
CHANGES IN VISUAL RECOVERY FUNCTIONS AND UNIT ACTIVITY PRODUCED BY FRONTAL AND TEMPORAL CORTEX STIMULATION.
D. N. Spinelli and Karl H. Pribram (Stanford U., Palo Alto, Calif.).
Electroencephalography and Clinical Neurophysiology, vol. 22, Feb. 1967, p. 143–149. 12 refs.
Contract DA-49-193-MD-2328 and Grant PHS MH-03732.

Chronic electrical stimulation of the frontal cortex of awake monkeys enhanced the recovery functions recorded from electrodes implanted in the striate cortex. The effect is opposite to that obtained when the inferotemporal cortex is stimulated in this fashion. Further, unit activity at cortical and geniculate stations (recorded from cats) was, as rule, reciprocally influenced by frontal and temporal cortex stimulation. Such a reciprocal effect was not obtained at the optic nerve level where the effects of the cortical stimulation, though marked, were indistinguishable from one another. Observations of the effect of such stimulations on unit activity in the lateral geniculate nucleus suggest that inferotemporal cortex stimulation influences the background activity of the unit.

A67-81071
EFFECTS OF STIMULATION OF THE SUPERIOR COLLICULUS AND LATERAL THALAMUS ON VISUAL EVOKED POTENTIALS.
Thomas S. Brown and Luis A. Marco (Ill. State Psychiat. Inst., Psychophysiol. Lab., Chicago).
Electroencephalography and Clinical Neurophysiology, vol. 22, Feb. 1967, p. 150–158. 26 refs.
Grants PHS B-3691 and PHS MH 10791-01.

The effects of conditioning stimulation of both the superior colliculus and lateral thalamus on visual evoked potentials were studied in locally anesthetized immobilized cats. Stimulation of the superior colliculus resulted in a selective reduction of the peak to peak amplitude of the primary component of the evoked photic potential recorded at the visual cortex, but no reduction occurred in the response at subcortical visual pathway levels. Stimulation of the lateral thalamus produced an increase in amplitude of the evoked photic potential. Stimulation of either the colliculus or the thalamus resulted in an increased amplitude of the cortical response to a single optic tract shock. It was hypothesized that the superior colliculus and mesencephalic reticular formation are functionally related and that the effects of stimulation of these structures on cortical neurons are mediated by an undetermined pathway. The effect of thalamic stimulation was hypothesized to occur by means of a mutually facilitatory convergence of inputs on a common neuronal pool in the visual cortex.

A67-81072
CARBOHYDRATES AND WATER BALANCE.
Walter Lyon Bloom (Piedmont Hosp., Ferst Res. Center, Atlanta, Ga.).
American Journal of Clinical Nutrition, vol. 20, Feb. 1967, p. 157–162. 36 refs.
Grant PHS 5 R01 HE05301-07.

The effects of carbohydrate on water balance has been confirmed repeatedly by various workers. Both fasting and controlled diets have been used in the studies. It has been demonstrated that carbohydrate metabolism is intricately involved in the regulation of salt and water metabolism. Only carbohydrates produced salt retention and its associated water retention. Carbohydrates play an important role in the conservation of water and salt in men who are without food or sufficient water as would occur in a survival situation. Carbohydrate in excess of that which can be derived from protein catabolism exerts a regulatory function in salt and water metabolism. A new homeostatic level is achieved in the absences of exogenous carbohydrate, as long as fat is available in addition to protein as a source of energy. A discussion is given concerning the mechanism of action of the effects of carbohydrates on salt and water, but the final answer to that problem has not yet been presented.

A67-81073
EFFECTS OF TRANSMISSION DELAY AND ACCESS DELAY ON THE EFFICIENCY OF VERBAL COMMUNICATION.
Robert M. Krauss and Peter D. Brickler (Bell Telephone Labs., Inc., Murray Hill, N. J.).
Journal of the Acoustical Society of America, vol. 41, Feb. 1967, p. 286–292. 11 refs.

Two experiments were performed to investigate the effects of transmission delay and access delay, respectively, on the efficiency with which speakers verbally encoded information for transmission in a two-person communication task. Both experiments employed echo-free four-wire voice circuits in an attempt to isolate each delay effect and to avoid the delayed echo effect found in commercial circuits. In the first experiment, three values of pure roundtrip transmission delay were used: no delay, 0.6 sec., and 1.8 sec. Using 14 pairs of male subjects in each condition, it was found that, whereas 1.8 sec. of transmission delay deleteriously affected the efficiency of communication, subjects performed as efficiently using the 0.6 sec. delay circuit as with no delay. In the second experiment, three values of access delay were used: no delay, 0.25 sec., and 1.8 sec. Ten pairs of male subjects and ten pairs of female subjects were run in each condition. The effect of access delay was found to be different for the two sexes. Access delay of 1.8 sec. had a greater effect on males than on females, whereas at 0.25 sec. delay female performance was impaired slightly and male performance not at all. With no delay, male and female performance did not differ. These results are supported by data based on subjects' responses to a postexperiment questionnaire. The findings are discussed in terms of their relevance to problems encountered in two-way voice communication over long transmission paths.

A67-81074
FREQUENCY DISCRIMINATION FOLLOWING EXPOSURE TO NOISE.
John F. Brandt (Fla. U., Dept. of Speech, Commun. Sci. Lab., Gainesville).
(Acoust. Soc. of Am., 69th Meeting, Washington, D. C., Jun. 2–5, 1965).
Journal of the Acoustical Society of America, vol. 41, Feb. 1967, p. 448–457. 37 refs.

Measures of threshold and frequency discrimination were obtained at 1000, 2000, and 4000 Hz before and after exposure to wide-band noise. Two test-stimulus SPL's (sound-pressure levels) were used during the postexposure discrimination measures such that stimuli were presented at 10 or 40 dB SL (sensation level) *re* TTS_3 (temporary threshold shift). The SPL remained constant throughout recovery during each experimental session. When test stimuli were equated in terms of SL, no differences between pre- and post-exposure jnd's (just-noticeable differences) were noted at 40 dB SL or greater at any frequency. At low stimulus SL's (10–20 dB), however, a differential effect on the jnd occurred owing to noise exposure that was not explainable in terms of TTS. At 4000 Hz (where maximum TTS occurred), there was little difference between pre- and post-exposure jnd's. At 2000 Hz, a 10% impairment in the jnd existed in the latter stages of recovery. At 1000 Hz (no TTS), the post-exposure jnd's were about 40% greater than pre-exposure jnd's and independent of recovery time. A paradox thus exists at low SL's between amount of threshold shift and frequency discrimination.

A67-81075
STIMULUS-ORIENTED APPROACH TO DETECTION RE-EXAMINED.
Lloyd A. Jeffress (Tex. U., Dept. of Psychol. and Defense Res. Lab., Austin).
Journal of the Acoustical Society of America, vol. 41, Feb. 1967, p. 480–488. 34 refs.
NASA and U.S. Navy Ship Systems Command supported research.

The present paper is a reexamination of some of the conclusions of an earlier one. It is motivated by some new insights resulting from attempts to replicate experiments with human observers, through the use of an electrical model of the auditory system. It is concerned primarily with the effect of signal duration on detection in the presence of a continuous masking noise. The model, of those tried, that best fits human performance consisted of a bandpass filter obtained by subtracting the output of a 500-Hz sharp-cutoff, lwo-pass filter from another having a cutoff of 525 Hz. The filter was followed by a linear half-wave rectifier and it, in turn, by an integrator having a 100-msec. decay time. The integrator can be thought of as a device that takes a running average of its input. The probability-density distributions for N and SN yielded by the model lie between the Rayleigh–Rice distributions on the one hand and a pair of normal distributions of unequal variance on the other. The exact shape of the two distributions depends upon both the bandwidth of the filter employed and the time constant of the averager.

A67-81076
PHYSIOLOGICAL CORRELATES OF STEADY POTENTIAL SHIFTS DURING SLEEP AND WAKEFULNESS. I. SENSITIVITY OF THE STEADY POTENTIAL TO ALTERATIONS IN CARBON DIOXIDE.
Robert H. Wurtz and Juan J. O'Flaherty (Washington U., School of Med., Depts. of Neurol. and Physiol., St. Louis, Mo.).
Electroencephalography and Clinical Neurophysiology, vol. 22, Jan. 1967, p. 30–42. 18 refs.
Grants NIH MH 10293-01, NIH NB 04513-02, and NIH 5 T 1 NB-5240.

Spontaneous changes in the CO_2 concentration of alveolar air (as an indicator of the pCO_2 of arterial blood) were recorded simultaneously with the steady potential (SP) changes occurring during the sleep-wakefulness cycle in cats and dogs.

During desynchronized sleep, alveolar CO_2 decreased by 0.1–0.4% in cats and by 0.3–1.0% in dogs. The decrease in CO_2 concentration occurred at the same time as the negative SP shift recorded between the brain and an extracerebral point. During wakefulness CO_2 also decreased. With arousal sufficient to produce an SP shift, it was not possible to obtain accurate measurements of alveolar CO_2, but on return to slow wave sleep the alveolar CO_2 showed an increase as the SP returned to previous slow wave sleep levels. The pCO_2 of venous blood from dorsal sagittal sinus in dogs showed a decrease during both alert wakefulness and desynchronized sleep. Inhalation of CO_2 by unanesthetized, unrestrained cats and dogs produced a positive SP shift even when the increase in CO_2 concentration was nearly as small as the changes occurring spontaneously during the sleep-wakefulness cycle. The SP shifts produced by application of CO_2 were, therefore, of the magnitude and polarity which would be expected if the changes in alveolar CO_2, and therefore arterial pCO_2 contributed to the production of the SP shifts occurring during the sleep-wakefulness cycle. However, it was suggested that whereas the changes in pCO_2 of arterial blood may contribute to the production of the SP shift, the spontaneous arterial pCO_2 changes probably are not primarily responsible for the SP changes observed during the sleep-wakefulness cycle.

A67-81077

DISCRIMINATING AMONG STATES OF CONSCIOUSNESS BY EEG MEASUREMENTS. A STUDY OF FOUR SUBJECTS.

Donald O. Walter, J. M. Rhodes, and W. Ross Adey (Calif. U., Brain Res. Inst. and Depts. of Physiol. and Anat., Los Angeles).

Electroencephalography and Clinical Neurophysiology, vol. 22, Jan. 1967, p. 22–29. 6 refs.

NASA Contract 9-1970, NASA Grant NsG 237-62, Contracts AF 49(638)-1387, ONR 233(91), Grants PHS NB02591 and PHS FR-3.

Intensity of activity, mean frequency, equivalent bandwidth, and coherence values in four frequency ranges ("δ, θ, χ, β") were calculated for four channels of electroencephalogram (EEG) recorded from each of four normal adult human males, in five experimental situations, including periods of rest and of attention. When the records from each subject were separately analyzed, and the four parameters for best discriminating his own records were applied, a higher proportion of records was correctly categorized; the parameters chosen only partially overlapped those chosen for the simultaneous discrimination. Thus an objective method of identifying parameters of the EEG which are important in distinguishing subjects' responses to differing situations has shown its value for developing criteria applicable to many individuals; it has also shown that individuals differ substantially in the list of parameters most distinguishing for their own records.

A67-81078

THE ORIENTING REFLEX DURING WAKING AND SLEEPING.

Laverne C. Johnson and Ardie Lubin (U.S. Navy Med. Neuropsychiat. Res. Unit and San Diego State Coll., Calif.).

Electroencephalography and Clinical Neurophysiology, vol. 22, Jan. 1967, p. 11–21. 25 refs.

Grants NSF GB 922 and NSF GB 3961; U.S. Navy Bur. of Med. and Surg. supported research.

A three-sec. tone was presented at 30–45 sec. intervals to seventeen subjects before sleep and during all night sleep sessions. For twelve of these subjects, 20 tones were presented during a day-awake session. The following components of the orienting reflex (OR) to the tone were measured: electroencephalogram, heart rate, respiration rate, electro-dermal, and finger plethysmogram. All measures habituated during the awake sessions. With sleep onset there was a return of the OR for all variables, but the magnitude of the restored OR differed for each variable. There was little, if any, habituation of the OR during sleep. While the smallest OR response was generally during one-rapid eye movement, heart rate was a striking exception. The presence of a stimulus-evoked K complex was associated with increased responsiveness in all autonomic variables, but presence of eye movement bursts was associated with decreased cardiovascular response to the tone.

A67-81079

THE EFFECT OF VARIATIONS IN TOTAL SLEEP TIME ON THE OCCURRENCE OF RAPID EYE MOVEMENT SLEEP IN CATS.

James Ferguson and William Dement (Stanford U., School of Med., Dept. of Psychiat., Palo Alto, Calif. and Veterans Admin. Hosp., Menlo Park, Calif.).

(Assn. for Psychophysiol. Study of Sleep, 5th, Ann. Meeting, Washington, D. C., Mar. 1965).

Electroencephalography and Clinical Neurophysiology, vol. 22, Jan. 1967, p. 2–10. 34 refs.

Grants PHS MH 08185 and PHS 1-K3-MH 5804.

Cats with chronically implanted electrodes were maintained on rigidly enforced schedules of daily total sleep time, each schedule lasting from 5 to 19 consecutive days. The percentage of rapid eye movement (REM) sleep was highest when daily total sleep time was smallest. The restriction of NREM sleep was questionable when wakefulness was enforced by means of a treadmill since slow waves appeared in the electroencephalogram of the cats during behavioral wakefulness. However, with additional efforts to ensure full arousal during a second run, REM sleep was still favored by the cats when the opportunity to sleep was greatly reduced.

A67-81080

EFFECTS OF IN VIVO HYPEROXIA ON ERYTHROCYTES. V. CHANGES OF RBC GLYCOLYTIC INTERMEDIATES IN MICE AFTER IN VIVO OXYGEN UNDER HIGH PRESSURE.

Bert W. O'Malley and Charles E. Mengel (Duke U., Durham, N. C. and Ohio State U., Depts. of Med., Columbus).

Blood, vol. 29, Feb. 1967, p. 196–202. 23 refs.

Contract Nonr-495(30), Grants PHS CA-08702 and PHS CA-08699.

During prehemolytic exposure of mice to 100% oxygen, changes in glycolytic intermediates were observed. Red cell ATP and hexosemonophosphate compounds were increased and fructose 1,6-diphosphate, triose-phosphates, ADP and TNP were decreased. These changes were not affected by splenectomy or tocopherol status of the animals.

A67-81081

VISUAL ADAPTATION TO GRADUAL CHANGE OF INTENSITY.

S. M. Anstis (Cambridge U., Psychol. Lab., Great Britain).

Science, vol. 155, Feb. 10, 1967, p. 710–712.

The eye can adapt to the rate of change of brightness. After exposure of the eye to a light that grows gradually brighter, a steady light appears to grow gradually dimmer, and vice versa. A field containing shading gives larger aftereffects than a spatially uniform field.

A67-81082
NORMAL VALUES FOR ARTERIAL BLOOD pH, CARBON DIOXIDE TENSION AND CONTENT, AT AN ALTITUDE OF 5,750 FEET.
H. I. Goldman, S. Zwi, N. W. Levin, A. H. Rubenstein, D. P. Stables, A. W. W. van As, and G. A. Elliott (Johannesburg Hosp. and Witwatersrand U., Dept. of Med., Cardio-Pulmonary Res. Unit of Council for Sci. and Ind. Res., South Africa).
South African Medical Journal, vol. 41, Feb. 4, 1967, p. 97–101. 33 refs.

Twenty healthy male medical students were studied to establish normal values for arterial pH and P_{CO_2} in residents at an altitude of 5,750 ft. in the recumbent position. Measurements of pH and P_{CO_2} were made on arterialized capillary blood and arterial blood. Carbon dioxide tension was estimated by sampling of end-tidal air and rebreathing, but there were no sampling of end-tidal air and rebreathing, but there were no significant differences in the results obtained by the different techniques. Arterial pH was 7.398 and P_{CO_2} 35 mm. Hg at 38°C. The influence of posture on the arterial P_{CO_2} is considered. The effect of high altitude on respiration and the mechanisms of adaptation are discussed in relation to our observations. Mention is made of clinical applications.

A67-81083
COMPARISON OF VISUAL SEARCH BY PILOTS AND HIGH SCHOOL STUDENTS.
Ronald A. Erickson (U.S. Naval Ordnance Test Sta., China Lake, Calif.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 923–928.

Data were obtained on the search time required by high school senior boys to find a target in structured, abstract displays presented at three visual noise levels. It was found that the rank ordering of performance on the three noise levels was the same for these 12 subjects as for 22 Navy pilots tested earlier. Also, the students had effectively the same absolute performance as the pilots. This study provided the basis for the decision to use high school senior boys in future laboratory experiments of this type when pilots were not available. Data were also obtained from the 12 subjects on four foveal-acuity tests. The scores on three of the tests showed significant correlation with one another. Scores on the fourth test (Bausch and Lomb checkerboard) did not correlate significantly with scores from any of the other three.

A67-81084
EXPERIMENTAL STUDY OF ADAPTATION TO VISUAL REARRANGEMENT DERIVING FROM AN ORGANISMIC-DEVELOPMENTAL APPROACH TO COGNITION.
Jill E. Rierdan and Seymour Wapner (Clark U., Worcester, Mass.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 903–916. 42 refs.
Grants NIMH MH-00348 and NSF GE 8122.

Visual and tactual-kinesthetic indications of apparent verticality and apparent body position under erect posture were made by 16 subjects prior to, following, and during the course of adapting to a 20° clockwise rotation of the visual field. Subjects adapted under one of two conditions: a "body-directed" condition where subjects viewed and were directed to their body, and an "object-directed" condition where subjects viewed and were directed toward objects. Significant changes in apparent verticality and apparent body position were found in both the visual and tactual-kinesthetic modalities. In the visual modality and the relative location of apparent verticality and apparent body position varied dependent upon the directedness of the adaptation condition. The results are interpreted within an organismic-developmental theory.

A67-81085
SENSATION OF DEPTH WITH ONE OR TWO EYES.
Gerald V. Barrett and Thomas R. Williamson (Goodyear Aerospace Corp., Akron, Ohio).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 895–899. 7 refs.

References in the literature indicate that perception of depth with two eyes is decidedly better than with one eye but there is no empirical evidence to support such statements when the effect of suggestion is controlled. The quality of depth of a three-dimensional scene was judged by 15 subjects, using a paired-comparison technique. The vision in one eye was occluded without subject's being informed so that the effect of suggestion was controlled. Subjects judged the quality of depth to be significantly better when viewing the scene binocularly than when viewing it monocularly. However, there were marked differences and the monocularly-viewed scene was judged to have equal or better quality of depth on approximately 30% of the trials.

A67-81086
PERCEPTION BIBLIOGRAPHY: XXXVI. PSYCHOLOGICAL INDEX NO. 32, 1925.
R. B. Ammons and C. H. Ammons.
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 879–882. 106 refs.

In this listing are 106 items in which perceptual processes and materials are discussed.

A67-81087
SCANNING: A PRINCIPLE OF REALITY CONTACT.
Philip S. Holzman.
(Am. Psychol. Assn., New York City, 1957).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 835–844. 14 refs.
Grant NIH M-1182.

On the basis of results of earlier experiments, scanning had been defined as a system principle of cognitive behavior that represents individual differences in the investment of attention in objects. This formulation explained that, in earlier experiments, accuracy of size estimation was associated with responsiveness to relatively peripheral aspects of perceptual fields in a size estimation test. The present experiment demonstrates that accuracy in size estimation predicts the amount and quality of incidental recall in two test situations. The study extends the definition of extreme scanning to describe a relatively stable disposition to attend to tasks intensely and in a focused manner, yet with extensive coverage of relatively incidental aspects of the field. The relevance of this cognitive control of scanning to need-cognition experiments and its possible relationship to the defense mechanism of isolation is noted.

A67-81088
PATHS OF SEEN MOTION AND MOTION AFTEREFFECT.
Shigemasa Sumi (Keio U., Japan).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 1003–1008. 8 refs.

When two small light spots moved successively and independently in straight lines, the apparent path of the second light was seen as curving in direction opposite to that of the motion of the first light. The effect of the first motion on the apparent path of the second light was considered a motion aftereffect. The phenomenal displacement of the apparent path was measured in all of subjects' drawings and used as the index of the aftereffect. The effect depended on the direction of motion and the included-angle of the tracks.

A67-81089
CHANGE IN PHENOMENAL LOCATION AND PERCEPTION OF MOTION.
Leonard Brosgole (U.S. Naval Training Device Center, New Groton, Conn.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 999–1001.

The question was raised as to whether relative displacement is necessary in order for object motion to be visually perceived. An illusory figure was created which, when stroboscopically presented, caused an objectively stationary target to appear as though it were changing location. This was sufficient to generate an apparent movement in the target. It was, therefore, concluded that the necessary condition for visually perceived movement is a change in phenomenal location rather than relative displacement.

A67-81090
PHYSIOLOGICAL RESPONSE SPECIFICITY, AROUSAL, AND TASK PERFORMANCE.
John A. McNulty and William J. Noseworthy (Dalhousie U., Halifax, Canada).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 987–996. 23 refs.
Grant NRC, Canada APT-86.

Two groups of 25 subjects were given three different tasks to perform: (1) a verbal paired-associate learning task, (2) a pursuit rotor task, and (3) a finger dexterity task. One group performed the tasks under high arousal (electric shock) and the other under low arousal (no shock). A number of physiological measures, including muscle tension, heart rate, skin resistance, and blood pressure, were also recorded. On the basis of these physiological measures, each subject was classified according to the physiological function in which he showed the greatest relative activity over the three tasks. This was done in order to determine whether subjects most active physiological index was related in any systematic way to his task performance. Results showed that neither arousal condition nor most active index was related to performance on the verbal learning task. On the two motor tasks, however, performance was, in general, better under high arousal than under low arousal, and, in addition, varied with subject's most active physiological index. It appears, therefore, that subject's typical mode of channelling activation may influence his performance on certain tasks.

A67-81091
EFFECTS OF REGULAR AND IRREGULAR SIGNAL PATTERNS UPON SKIN CONDUCTANCE AND REACTION TIME.
John L. Andreassi.
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 975–978. 5 refs.
PHS supported research.

An experiment was conducted to study the effects of stimulus patterning upon reaction time (RT) performance and palmar skin conductance (PSC) of one subject over a period of 10 consecutive days. The main findings were that: PSC was significantly more variable with an irregular signal pattern than with a regular one, RTs were significantly faster with the regular pattern than with a non-significant trend in which high PSC values were associated with fast RTs and low PSC values with slow RTs. The results were discussed in terms of wider variations in arousal produced by irregularly occuring signals and greater learning with regular signals.

A67-81092
FACTORS INFLUENCING THE VISUAL DETECTION AND RECOGNITION OF LOW-ALTITUDE AIRCRAFT.
A. D. Wright (George Washington U., Human Resources Res. Office, Washington, D. C.).
(Southwestern Psychol. Assn., Meeting, Arlington, Tex., Apr. 21–23, 1966).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 950.

Men using binoculars tested their ability to detect low-flying propeller and jet aircraft. The differential effect of binoculars and offset of 650 m. and 1400 m. from the flight path was due to changes in early warning accuracy and the visibility of the jet smoke trial. These factors interacted with the binocular use, offset and differences in aircraft.

A67-81093
INFLUENCE OF HYDROCORTISONE ON ERYTHROPOIESIS OF NORMAL AND IRRADIATED RATS [VLIV HYDROKORTIZONU NA ERYTROPOEZU NORMALNICH A OZARENYCH KRYS].
T. Trávníček, J. Neuwirt, V. Janoušek, P. Broulík, J. Táborský, and E. Táborská.
Sborník Lékařský, vol. 68, Apr. 1966, p. 109–112. In Czech.

Seventy-two male rats were divided into four equal groups. The first group served as a control. One mg. hydrocortisone acetate per 100 g. body weight was administered daily to the rats in the second group. The animals of the third and fourth groups were exposed to a single whole-body dose of 600 r, and the animals of group four were given hydrocortisone in the same manner as group two. On the third, seventh and fourteenth day in each group, six rats were killed and examined. The following results were obtained: Hydrocortisone reduced within 14 days the body-weight of experimental rats, did not stimulate erythropoiesis in normal rats, and caused a deterioration of erythropoiesis in irradiated rats. Changes in the number of red cells after hydrocortisone on the first days of administration were probably due to changes in the distribution and circulation of blood.

A67-81094
STUDIES ON BIOLOGICAL EFFECTS OF MICROWAVE RADIATION (SECOND REPORT) INVESTIGATION OF SHIELDING EFFECT OF CONCRETE, LAUAN AND GLASS AGAINST MICROWAVE RADIATION.
Hiroshi Ikeda (Nagoya U., School of Med., Dept. of Radiol., Japan).
Nippon Acta Radiologica, vol. 26, Jun. 25, 1966, p. 284–288. 11 refs. In Japanese.

In order to know the shielding effect of the material on the microwave radiation, concrete 40×40×5 cm. in colum, 40×40×10 cm., lauan wood 40×40×1, 40×40×2, 40×40×3, 40×40×4, 40×40×5, 10 cm. and glass 40×40×0.3 cm., 40×40×0.5, 40×40×0.8 cm. were examined. Intensity of 43.4 mw./cm.^{2}

was irradiated with the microwave generator emanating 2450±50 megacycles continuous wave, which was manufactured by Tokyo-Shibaura Electr. Co. The rates of penetration of microwave shown by concrete and lauan in colum of 40×40×10 cm. were 0.8% and 13% respective. Fourty-nine% was obtained from glass 40×40×0.8 cm. in colum. Concrete showed good rates in shielding effect.

A67-81095
AN OPTICAL ILLUSION USED AS A SUBJECTIVE TEST FOR ACCOMMODATION.
Lucia Ronchi.
Atti della Fondaztione Giorgio Ronchi e Contributi dell' Istituto Nazionale di Ottica, vol. 21, Sep.-Oct. 1966, p. 615-623. 16 refs.
Contract AF 61(052)-850.

At the cross-point of a pair of stripes, a bright flashing spot is perceived, provided the thickness of stripes ranges, from 0.9'-2.2'. When thickness exceeds 2.3', no flashing spot is perceived, if the eye is focussed at the target plane. When thickness ranges from 6' through 7.6', it is sufficient to throw the eye out-of-focus a few tenths of a diopter and cause a quite evident bright spot at the cross point. Thus, if the target is placed at the viewing plane, the observer may be aware of the fact whether his eye is or is not at focus at a given time on the basis of the absence or presence of the bright spot. This target is advantageous in that it covers a rather limited portion of the useful space; in addition, it represents a critical test, since the depth-of-focus of the eye is minimum when determined with the aid of a target consisting of overlapping contrast borders.

A67-81096
FREQUENCY ANALYSIS OF ELECTROENCEPHALOGRAPHIC RHYTHMS IN HUMANS EXPOSED TO HIGH INTENSITY INTERMITTENT AUDITORY INPUTS.
Robert Plutchik (Hofstra U., Hempstead, N. Y.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 955-962. 12 refs.
Contract Nonr-2252(01).

Through binaural earphones, ten subjects were presented with intermittent auditory stimuli ranging from three to fifteen p.p.s. at intensities from 100 to 130 dB. Electroencephalograms (EEG) were taken and the occipital or temporal output was analyzed with a frequency analyzer. Only one of ten subjects showed EEG following at most input frequencies. When the data from every subject were combined, it was discovered that the introduction of auditory inputs at 10 p.p.s. produced an inhibition of the 10 c.p.s. alpha rhythm. The data imply a limited interaction between the visual and auditory modalities.

A67-81097
MOTOR SKILLS BIBLIOGRAPHY: LIV. PSYCHOLOGICAL ABSTRACTS, 1966, VOLUME 40, FIRST THIRD.
C. H. Ammons and R. B. Ammons.
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 963-966. 107 refs.

This bibliography contains 107 selected items on motor skills listed alphabetically. Included are papers on reaction time, teaching body movement and manual dexterity.

A67-81098
INFLUENCE OF 19-NORTESTOSTERONEPHENYLPROPIONATE (SUPERANABOLON) ON ERYTHROPOIESIS OF NORMAL AND IRRADIATED RATS [VLIV 19-NORTESTOSTERONFENYLPROPIONATU (SUPERANABOLONU) NA ERYTROPOEZU NORMALNICH A OZARENYCH KRYS].
T. Trávníček, J. Neuwirt, V. Janoušek, P. Broulik, J. Táborský, and E. Táborská.
Sborník Lékařský, vol. 68, Apr. 1966, p. 105-108. 7 refs. In Czech.

Seventy-two male rats were divided into four equal groups. The first group served as a control. The rats of the second group were given 2.5 mg. 19-nortestosterone phenylpropionate (Superanabolon) per 100 g. body-weight. The animals of the third and fourth groups were exposed to a single whole-body dose of 600 r, and the animals of group four were also given Superananbolon. On the third, seventh, and fourteenth day in every group, six rats were killed and examined. There was no evidence that Superanabolon had a marked influence on erythropoiesis of normal male rats or on the restoration of erythropoiesis of irradiated animals.

A67-81099
COMPARATIVE EFFECTS OF AGE, SEX, AND DRUGS UPON TWO TASKS OF AUDITORY VIGILANCE.
Gilbert L. Neal and Richard G. Pearson (FAA, Office of Aviation Med., Civil. Aeromed. Inst., Oklahoma City, Okla.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 967-974. 19 refs.

Two auditory vigilance tasks were evaluated for their sensitivity and operator performance characteristics: (a) one required subjects to monitor a sequence of single-digit numbers and record the occurrence of prescribed digit sets; (b) the second involved monitoring periodic tones and detecting signals of increased duration. Subjects were eight young males, eight young females, and eight older males, and all received three drugs involved in the design during separate one-hr. watches. Both tasks showed comparable decrement with time but did not differ significantly in terms of mean signal detection. Data trends suggested women to be poorer monitors than men but failed to reveal expected age-related decrement. A depressant (Benadryl) increased false positive responses and, with female subjects produced significantly poorer signal detection on the tone task. Vigilance decrement was less under an analeptic (Dexedrine), as compared to placebo, but not significantly so.

A67-81100
VARIATION IN HEAT PRODUCTION DURING ACUTE EXPOSURE OF MEN AND WOMEN TO COLD AIR OR WATER.
E. R. Buskirk (Pa. State U., Inst. for Sci. and Eng., Lab. for Human Performance Res., University Park).
Annals of the New York Academy of Sciences, vol. 134, Feb. 28, 1966, p. 733-742. 51 refs.
Grant NIH AM08311.

An updating is presented of a previous review on the metabolic responses of men and women to cold (Buskirk et al, 1963) principally to illustrate the wide variation in results achieved in studies conducted to date. A compilation of results obtained from cold exposure studies are tabulated with the following factors listed by one or more investigators as having a modifying impact on the metabolic response to cold: repeated natural exposure, repeated chamber exposure, ethnic

background, physical conditioning, prior exposure to heat, age, sex, food, alcohol, season, carbon dioxide, hypoxia, oxygen, thyroid, and diurnal variation. It is stressed that when studies of human adaptability to cold are made the large variation among individuals in any population be considered since this variation may be larger the leaner the group studied.

A67-81101
VISUAL PERFORMANCE IN THE EMPTY FIELD AND IN PARTIALLY STRUCTURED FIELDS. III. TASK INVOLVING VERNIER ACUITY.
Mario Conticelli (Florence U., Inst. of Psychol., Italy) and Ercole M. Gloric (Pisa U., Ocular Clin., Italy).
Atti della Fondazione Giorgio Ronchi e Contributi dell' Istituto Nazionale di Ottica, vol. 21, Sep.–Oct. 1966, p. 605–614. 6 refs.
Contract AF 61(052)-850.

Subjects were required to perform a long-lasting visual task in an empty field and in partially structured fields. The times needed to perform correctly the task, in either case, have been compared. It was found that even a small structuring target like a thick dark stripe, whatever its length, may "fill-in" the empty field, in that it reduced the impairment in performance produced by the exposure to the uniform stimulus. When the structuring target was reduced to a point, strong individual differences were noticed. Finally, a long structuring stripe, exposed throughout all the session, was found to produce the same benefit on visual performance as the same line introduced from time to time, when "required" by the subject. The factors responsible for impairment in the empty field are discussed.

A67-81102
EFFECTS OF STIMULUS DURATION ON THE DETECTION OF SINUSOIDS ADDED TO CONTINUOUS PEDESTALS.
Barry Leshowitz and David H. Raab (N. Y. City U., Brooklyn Coll., Dept. of Psychol.).
Journal of the Acoustical Society of America, vol. 41, Feb. 1967, p. 489–496. 10 refs.
NSF and PHS supported research.

The effect of stimulus duration on the detection of sinusoids added to continuous pedestals was investigated in two studies. Gated 1000-Hz. sinusoids were added in phase with continuous pedestals in the presence of a steady background noise at durations between 10 and 500 msec. Plots of signal intensity necessary for approximately 75%-correct detections as a function of duration revealed enhanced detectability and an intensity-duration reciprocity factor of 14 dB. per log unit of time. In the second experiment, signal energy was held constant as duration of the probe was varied between 10 and 100 msec., and the proportion of correct responses was measured in a two-interval forced-choice procedure. Marked improvement in detectability obtained as signal duration was increased. When increment energy was held constant, discriminability remained unchanged in the face of a 10-dB. decrease in signal energy. After correcting an energy-detection model for internal noise, the model accurately predicted the proportion of correct responses. Finally, it is argued that a description of detection data in terms of increment energy renders results obtained with pedestals simpler and more understandable.

A67-81103
DIRECTION OF ROTATION AND DECAY OF THE SPIRAL AFTEREFFECT.
C. G. Costello (Calgary U., Canada).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 779–782. 12 refs.

Previous findings have suggested that there are a number of differences between the expansion spiral aftereffect and the contraction spiral aftereffect. A neurophysiological hypothesis has been proposed to account for these differences. A more simple explanation in terms of quality of fixation was investigated in the present study. In order to test the fixation hypothesis, use was made of Spigel's observation that an interval of darkness following exposure to a rotating spiral was in some way associated with a delay of the decay of the aftereffect. It was predicted on the basis of the previous findings that (a) an interval of darkness introduced following rotation of the spiral would result in a significant delay of the decay of the aftereffect. On the basis of the fixation hypothesis it was predicted (b) that there would be no significant difference between the expansion aftereffect and the contraction aftereffect in the delay of the decay of the aftereffect produced by post-rotation darkness. Prediction (a) was confirmed but not Prediction (b), casting doubt on the fixation hypothesis.

A67-81104
HYPERVENTILATION EFFECT ON NECKER CUBE REVERSAL AND DURATION OF SPIRAL AFTEREFFECT.
Donald E. Targonski and Daniel J. Baer (Boston Coll., Mass.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 783–786. 10 refs.

To evaluate the effects of hyperventilation on Necker cube reversal and duration of spiral aftereffect, 42 males were each tested subsequent to no-, slow-, and rapid-hyperventilation. A significantly ($p < .01$) greater number of Necker cube reversals and significantly ($p < .05$) shorter durations of spiral aftereffect occurred subsequent to both slow and rapid hyperventilation conditions. It is proposed that hyperventilation reduces the effectiveness of the perception of both illusions.

A67-81105
EFFECTS OF SLEEP DEPRIVATION ON A VISUAL FIGURAL AFTEREFFECT.
A. W. Pressey (Manitoba U., Canada) and H. Kelm (Saskatchewan U., Canada).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 795–800. 8 refs.

On the basis of Koehler and Wallach's concept of "permanent homogeneous satiation" it was predicted that a visual figural aftereffect would decrease following prolonged sleep deprivation. Measurements of figural displacement were obtained from seven subjects after 12, 30, 60 and 72 hr. of deprivation and also after eight hr. of sleep. The results showed that lack of sleep decreased displacement immediately after inspection and produced counter displacement, i.e., attraction of the test figure, 30 and 60 sec. after inspection. The relevance of the findings to research on figural aftereffects in atypical individuals such as schizophrenics and retardates was discusses.

A67-81106
DURATION AND INTENSITY OF VOCALIC ELEMENTS AS PHYSICAL CORRELATES OF ACOUSTIC STRESS.
Allen C. Busch (AF Systems Command, Electron. Systems Div., Decision Sci. Lab., Bedford, Mass.) and Donald Eldredge (Northeastern U., Boston, Mass.).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 801–802.

This experiment attempted to clarify the effects of the cues of duration and intensity of the vocalic element under conditions of acoustic stress (S/N ratio). Graphic recordings of the vocalic elements were used to determine intensity and duration ratios. The results show that duration and intensity are both used as cues under conditions of acoustic stress and that under high levels of acoustic stress intensity is a more effective cue than duration.

A67-81107
STRENGTH OF GRIP FOLLOWING DIFFERENT STAGES OF SLEEP.
Robert B. Tebbs and David Foulkes (Wyo. U., Laramie).
Perceptual and Motor Skills, vol. 23, Dec. 1966, Part 1, p. 827–834. 17 refs.
Grant NSF GS-860.

Twenty subjects (10 sensitizers and 10 repressers) were awakened four times at rapid eye movement (REM)-sleep onset on one night and four times during NREM sleep on another. Strength of grip on arousal from REM sleep was consistently but insignificantly lower than that on NREM nights. Decrement from presleep strength of grip was significant for sensitizers but not for repressers.

A67-81108
HYPERBARIC OXYGEN AND THE SIGNIFICANCE OF INCREASED CEREBRAL OXYGEN AND CARBON DIOXIDE TENSIONS.
P. B. Bennett (R. N. Physiol. Lab., Alverstoke, Hants, Great Britain).
International Anesthesiology Clinics, vol. 4, Spring 1966, p. 41–55; discussion, p. 55–62. 68 refs.

Whether hyperbaric oxygen toxicity is due to an increased cerebral P_{O_2} or P_{CO_2} is still in dispute. Polarographic oxygen and Severinghaus P_{CO_2} electrodes were used to measure the cortical P_{CO_2} and P_{O_2} in anesthetized cats (Chloralose 45–50 mg./kg.) exposed to increased partial pressures of oxygen alone or in the presence of argon, nitrogen and helium at normal and increased venitlation rates. There was a significant increase in both cortical P_{CO_2} and P_{O_2} depending on the nature of the inert gas present. Argon/oxygen induced the highest increase in P_{CO_2} but the lowest P_{O_2}, whereas the helium/oxygen caused the lowest P_{CO_2} but the highest P_{O_2}. Hyperventilation caused a fall in both P_{CO_2} and P_{O_2} which probably accounts for its protective capacity. The times to oxygen convulsions in rats at 80 lb./in.^{2} oxygen compared with those also in the presence of 200 lb./in.^{2} argon, nitrogen or helium were decreased by argon/oxygen and nitrogen/oxygen, whereas the helium caused a slight increase or no change. It is concluded that blood and alveolar P_{CO_2} and P_{O_2} measurements do not necessarily correlate with cerebral tissue measurements and that the principal cause of oxygen toxicity is the increased cerebral P_{CO_2}. A discussion followed.

A67-81109
CLOTHING HYGIENE WITH PARTICULAR REFERENCE TO AEROSPACE PROBLEMS. II. CLOTHING AND CLIMATE [L'IGIENE DEL VESTIARIO CON PARTICOLARE RIFERIMENTO AI PROBLEMI AEROSPAZIALI. (PARTE SECONDA: IL VESTIARIO IN RAPPORTO AL CLIMA)].
E. Sulli (Rome U., Ist. di Igiene and Ispettorato di Sanita' Aeron., Italy).
Rivista di Medicina Aeronautica e Spaziale, vol. 29, Oct.–Dec. 1966, p. 681–742. 24 refs. In Italian.

Clothing hygiene is discussed in relation to the climatic conditions to which the individual is exposed. The world is divided into six zones with specific climates. Physiological responses of living organisms to these climatic variations to obtain and maintain their essential thermic balance are presented. Basic principles being applied in using garments in these zones are also discussed.

A67-81110
INTERRELATIONSHIPS BETWEEN BLOOD OXYGEN TENSIONS AND CEREBRAL BLOOD FLOW.
D. Gordon McDowall (Roy. Infirmary U., Dept. of Anaesthetics, Glasgow, Great Britain).
International Anesthesiology Clinics, vol. 4, Spring 1966, p. 205–214; discussion, p. 214–219. 19 refs.

Dogs were exposed to arterial oxygen tensions of 30 to 1200 mm. Hg., and blood flow was measured with Krypton-85. It was indicated that oxygen had a direct constrictive action on the cerebral blood vessels. This effect can, however, be overridden by the profound vasodilatatory action of tissue hypoxia. In the presence of impairment of cerebral cortical flow the administration of hyperbaric oxygen leads to a return of the oxygen uptake of the cerebral cortex to normal levels. A discussion followed.

Subject Index

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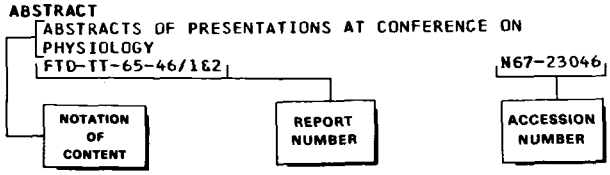

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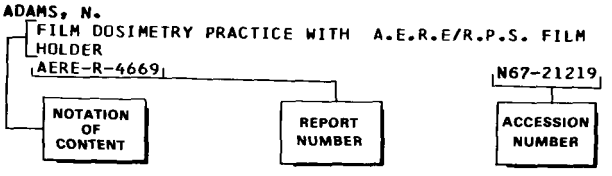

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