AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

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NASA SP-7011(17)

AEROSPACE MEDICINE AND BIOLOGY

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 October, 1965

Scientific and Technical Information Division
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. NOVEMBER 1965

INTRODUCTION

Aerospace Medicine and Biology is a continuing bibliography which, by means of periodic supplements, serves as a current abstracting and announcement medium for references on this subject. The publication is compiled through the cooperative efforts of the Aerospace Medicine and Biology Bibliography Project of the Library of Congress (LC), the American Institute of Aeronautics and Astronautics (AIAA), and NASA. It assembles, within the covers of a single bibliographic announcement, groups of references that were formerly announced in separate journals, and provides a convenient compilation for medical and biological scientists. Additional background details for this publication can be found in the first issue, NASA SP-7011, which was published in July, 1964. Supplements are identified by the same number followed by two additional digits in parentheses.

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:

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b. AIAA entries identified by their *IAA* accession numbers (A65-10000 series); and
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(continued)

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a continuing bibliography NOVEMBER 1965

STAR ENTRIES

N65-30196# Royal Inst. of Tech., Stockholm (Sweden). Speech Transmission Lab.

ACOUSTIC SPECIFICATION OF SPEECH Final Scientific Report (Annual Report, 1964)

C. G. M. Fant 30 Jan. 1965 19 p refs

(Grant AF-EOAR-64-28)

(AFCRL-65-272; AD-615578)

Speech research activities during 1964 centered on studies of speech production and vocal tract characteristics with correlations to speech wave data, and vice versa studies of speech wave data with the underlying physiological structures considered. The predictability of formant patterns through correlation of spectrographic and cineradiographic data was investigated, and a model for speech coarticulation that is tested against cineradiographic data has been proposed. Sine-wave response measurements of the vocal tract transfer functions were used to detail the structure of pole-zero patterns of various sounds and resonance bandwidths. The anatomy of the nasal cavities is reviewed. Also discussed are instrumentation and techniques for inverse-filtering with emphasis on low-frequency noise difficulties and the handling of voice samples with subglottal coupling, as well as the cause of pronounced speech distortions at deep undersea levels. A series-connected terminal analog was successfully employed to synthesize nasal consonants. The motor theory of speech perception is critically evaluated, and some principles of the brain functions are discussed.

G.G.

N65-30215# Joint Publications Research Service, Washington, D. C.

40TH ANNIVERSARY OF THE STATE SCIENTIFIC RESEARCH ROENTGENORADIOLOGICAL INSTITUTE OF THE MINISTRY OF HEALTH RSFSR (1924–1964)

29 Jul. 1965 421 p refs Transl. into ENGLISH of the book "40 Let Gosudarstvennogo Nauchno-Issledovatel'skogo Rentgenoradiologicheskogo Instituta MZ RSFSR (1924–1964)." Moscow, State Sci. Res. Roentgenoradiological Inst. of the Min. of Health RSFSR, 1964 p 2–348

(JPRS-31300; TT-65-31797) CFSTI: $7.20

CONTENTS:

N65-30216 Joint Publications Research Service, Washington, D. C.

RESEARCH INTO ROENTGENOLUMINOPHORES, X-RAY SCREENS AND PHOTOGRAPHIC MATERIALS

A. M. Gurvich *In its* 40th Anniv. of the State Sci. Res. Roentgenoradiological Inst. of the Min. of Health RSFSR 29 Jul. 1965 p 90–95 ref (See N65-30215 19-04) CFSTI: $7.20

The historical development of X-ray screens and photographic materials in the Soviet Union is reviewed. Systematic research into X-ray screens, and particularly the research of a preparative and physiocochemical nature, was begun in 1943. Previously, research in this field was confined chiefly to acceptance tests and the development of methods of instrumented studies of the screens and photographic materials. A method of fabricating zinc-cadmium-sulfide screens for roentgenoscopy was developed in 1943. The technology of intensifying screens remained essentially unchanged until

1950 when a new method was developed for obtaining tungstate luminophores. In recent years special attention has been given to studies of the interaction between halogen fusing agents and sulfide in the presence of atmospheric oxygen. Attention has also been paid to the study of tungstate luminophores. The investigations pertained chiefly to the causes of the afterglow of calcium tungstate, the dependence of its properties on the nature of the fusing agent, and the method of luminophore treatment. Research into the characteristics of X-ray screens which determine image quality and the studies of the physical properties of X-ray screens are also discussed. E.E.B.

N65-30217 Joint Publications Research Service, Washington, D. C.

RESEARCH INTO THE DOSIMETRY OF IONIZING RADIATIONS

A. N. Krongauz *In its* 40th Anniv. of the State Sci. Res. Roentgenoradiological Inst. of the Min. of Health RSFSR 29 Jul. 1965 p 96–100 (See N65-30215 19-04) CFSTI: $7.20

The history of ionizing radiation dosimetry in the Soviet Union is reviewed. Prior to 1928 no Soviet-made dosimeters were availalbe. With the official establishment of the roentgen as a unit of irradiation dose, an apparatus was built for reproducing the roentgen unit. The development of this ionization chamber laid the foundation for the checkups and calibration of the dosimeters used in the nation's medical institutions, as well as for the further development of Soviet-designed dosimeters. An acceptable model was completed in 1932 which played a major role in the development of dosimetry in the Soviet Union. The principle trend in recent years has been in the physico-dosimetric substantiation of radiation therapy methods. Tables, nomograms, and formulas for calculation of absorbed doses in the presence of interstitial and intracavitary use of radioactive isotopes were developed in 1963. E.E.B.

N65-30218 Joint Publications Research Service, Washington, D. C.

RESEARCH INTO EXPERIMENTAL PATHOLOGY AND BIOLOGY

Ye. D. Savchenko *In its* 40th Anniv. of the State Sci. Res. Roentgenoradiological Inst. of the Min. of Health RSFSR 29 Jul. 1965 p 101–109 refs (See N65-30215 19-04) CFSTI: $7.20

The development of research into experimental pathology and biology in the Soviet Union is reviewed. The principal task continues to lie in investigating the biological effect of ionizing radiation on the organism of man and animals, the morphological investigation and comparison of the results produced by applying different methods of radiation therapy to malignant neoplasms, and the determination of the injurious effect of radiation energy on the tissues surrounding the tumor. This is assisted by studies of the sectional material and biopsies, which are performed not only in order to establish the diagnosis and analyze the discrepancies between anatomical and clinico-roentgenological data, but also in order to analyze the subtle structural histological changes that accompany the disease or are a consequence of the effect of ionizing radiation. E.E.B.

N65-30219 Joint Publications Research Service, Washington, D. C.

ROENTGENOTHERAPEUTIC RESEARCH

I. A. Pereslegin *In its* 40th Anniv. of the State Sci. Res. Roentgenoradiological Inst. of the Min. of Health RSFSR 29 Jul. 1965 p 110–127 refs (See N65-30215 19-04) CFSTI: $7.20

The development of X-ray therapy in the Soviet Union for the treatment of cancer is reviewed. Malignant skin tumors, cancer of the larynx, primary lung cancer, metastastic lung tumors, esophageal cancer, mediastinum tumors, stomach cancer, rectum cancer, mammary gland cancer, ovary tumors, malignant bone tumors, blood diseases, uterine cervix cancer, and nononcological diseases are included in the historical review of X-ray therapy. E.E.B.

N65-30220 Joint Publications Research Service, Washington, D. C.

RADIOLOGICAL RESEARCH

A. V. Kozlova *In its* 40th Anniv. of the State Sci. Res. Roentgenoradiological Inst. of the Min. of Health RSFSR 20 Jul. 1965 p 128–145 refs (See N65-30215 19-04) CFSTI: $7.20

A historical review of radiobiology, dosimetry, and the therapeutic uses of radioactive substances in the Soviet Union is presented. By 1937 the first domestic preparations of radium-mesothorium were obtained, and since 1948 artificial radioactive isotopes in the form of filtered preparations with Co^{60}, P^{32}, I^{131}, Au^{198}, Ag^{111}, and Y^{90} have been available. In the first few years the principal problems pertained to the study of the primary mechanism of action of ionizing radiation and the morphological changes induced by different types of radiation. Later, the principal trend of research became the study of the pathogenosis of radiation injuries and the diagnosis and therapy of the acute and chromic diseases induced by total and local irradiation. The problems and development o safety engineering for the handling of radioactive materials are also reviewed. E.E.B.

N65-30221 Joint Publications Research Service, Washington, D. C.

ROENTGENODIAGNOSTIC RESEARCH

I. A. Shekhter and L. S. Rozenshtraukh *In its* 40th Anniv. of the State Sci. Res. Roentgenoradiological Inst. of the Min. of Health RSFSR 29 Jul. 1965 p 146–173 refs (See N65-30215 19-04) CFSTI: $7.20

The history of X-ray diagnostic research in the Soviet Union is presented. The research has been primarily oriented toward investigating the principal problems of clinical practice of Soviet public health. A special place has been occupied by problems of perfecting the methods of the roentgenodiagnosis of different diseases, as well as the development of new, original methods of examination and their introduction into practice. Also, individual roentgenophysiological problems of practical and theoretical importance have been investigated. Roentgenodiagnosis of diseases of the gastro-intestinal tract; roentgenodiagnosis of pulmonary and mediastinal diseases; roentgenodiagnosis of heart diseases, and other roentgenodiagnostic applications are briefly reviewed. E.E.B.

N65-30222 Joint Publications Research Service, Washington, D. C.

RADIODIAGNOSTIC RESEARCH

G. A. Zubovskiy *In its* 40th Anniv. of the State Sci. Res. Roentgenoradiological Inst. of the Min. of Health RSFSR 29 Jul. 1965 p 174–176 ref (See N65-30215 19-04) CFSTI: $7.20

A historical review of the diagnosis and therapy of diseases with radioactive isotopes in the Soviet Union is presented. The study of tissue circulation with radioactive sodium; the diagnosis and therapy of the thyroid with radioactive iodine; and the accumulation of radioactive gold in the lymph nodes are considered. The development of radiodiagnostic methods was slow due to the absence of equipment. It was only after the appearance in recent years of modern sensitive scanners, when it became possible to obtain images of organs and tumors, that the methods of radiodiagnosis and particularly of radioscanning began to be rapidly developed. E.E.B.

N65-30223 Joint Publications Research Service, Washington, D. C.
FLUOROGRAPHIC RESEARCH AND THE INSTITUTE'S ROLE IN ITS DEVELOPMENT
Ye. M. Kagan *In its* 40th Anniv. of the State Sci. Res. Roentgenoradiological Inst. of the Min. of Health RSFSR 29 Jul. 1965 p 177–184 refs (See N65-30215 19-04) CFSTI: $7.20

The historical development of fluorographic equipment and methodology in the Soviet Union is presented. The effort toward the designing and improving fluorographic equipment; developing the organizational forms of fluorography; developing methods of the fluorographic examination of different organs and systems and introducing them into medical practice; and the training of skilled physicians and X-ray laboratory workers for work on fluorography is summarized. The further development of fluorography is inseparably tied to improvements in equipment, the use of high-grade gratings and photographic exposure meters, the development of improved general and special purpose fluorographic installations, the use of electron-optical amplifiers of image brightness, motion picture photography, and television. E.E.B.

N65-30265 Joint Publications Research Service, Washington, D. C.
SOME PROBLEMS OF RADIATION BIOGEOCENOLOGY
N. V. Timofeyev-Resovskiy *In its* Probl. of Cybernetics, No. 12, 1964 22 Jul. 1965 p 310–356 refs Presented at the Session of the United Sci. Council of the Urals Affiliate, Acad. Sci. USSR, 4 Jan. 1963 (See N65-30250 19-10) CFSTI: $7.00

Experimental findings are presented in the field of radiation biology, and a bibliography relating to problems of biosphere radiation is included. The effect of ionizing radiation on the living organism is discussed for different radiation doses, degree of radiation resistance for different species, and responses of the structures and organisms. Buildup factors for fresh water organisms were investigated, and types of radioisotope distributions were considered. Experimental findings indicate that biocenoses affect the concentration, redistribution, and migration of most of the trace elements investigated. M.W.R.

N65-30278# Joint Publications Research Service, Washington, D. C.
CYBERNETIC PRINCIPLES APPLIED IN EDUCATION AND ECONOMICS
26 Jul. 1965 17 p Transl. into ENGLISH from Vestn. Vysshey Shkoly (Moscow), no. 5, May 1965 p 13–25, 87–91 (JPRS-31238; TT-65-31735) CFSTI: $1.00

CONTENTS:

1. USING PROGRESSIVE IDEAS AND METHODS IN TEACHING B. V. Gnedenko p 1–9
2. PROBLEMS OF THE MECHANIZATION OF MANAGEMENT WORK L. G. Petrova p 10–15 (See N65-30279 19-05)

N65-30279 Joint Publications Research Service, Washington, D. C.
PROBLEMS OF THE MECHANIZATION OF MANAGEMENT WORK
L. G. Petrova *In its* Cybernetic Principles Appl. in Educ. and Econ. 26 Jul. 1965 p 10–15 (See N65-30278 19-05) CFSTI: $1.00

A textbook on the mechanization problems of management in industry is reviewed. The book was written especially for students specializing in the mechanization of accounting and planning enterprises of modern industry. The first part of the book relates to the mechanization and automation of management. It examines the process of algorithmic description and measuring of information. The second section of the book treats the problems of organization, technological normalization, and wages at computer establishments. It is observed that the introduction of modern computing techniques together with modern mathematical methods in the field of managerial work in industry cuts down the cost of manufactured products, increases labor productivity, and the more efficient use of productive capacity. It is noted that the book is written on a high scientific, theoretical and methodical level. Tables are well prepared, showing data obtained from the practice of existing industrial enterprises. E.E.B.

N65-30298# Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, Ohio. Behavioral Sciences Lab.
ADJUNCT TO SELF-STUDY FOR AIRCREW REFRESHER TRAINING UNDER OPERATIONAL CONDITIONS IN THE AIR DEFENSE COMMAND
Donald E. Meyer Mar. 1965 31 p
(AMRL-TR-65-83; AD-617775)

Tnis is a report of the development and experimental comparison of a self-study technique with conventional classroom methods as a means of refresher training of Air Crews under operational conditions. The self-study technique consisted of: (1) a comprehensive series of multiple-choice questions covering the subject matter with each question bearing reference to the page and paragraph of a manual containing the detailed information on which the question was based, (2) a punchboard by which students immediately determined whether their answer to each question was correct or incorrect, and (3) the manual to which students referred for information when they chose an incorrect answer to a question. The conclusions are: (1) the preparation and administration of the self-study technique is entirely within the capability of an operational squadron with only a minimum of guidance; (2) in the operational setting, the self-study technique is superior to conventional classroom methods in its effectiveness as a means of refresher training; and (3) students favor the self-study method for refresher training. Author

N65-30316 Autometics, Anaheim, Calif.
MANAGEMENT OF THE HUMAN ELEMENT IN THE PHYSICS OF FAILURE
John F. Beau *In* RADC Phys. of Failure in Electron., Vol. 3 Apr. 1965 p 264–279 (See N65-30300 19-09)

A system for better management of the human element in the physics of failure is described. The system provides for the realization by management, quality control, manufacturing, and engineering that failure causing workmanship defect escapes can be controlled in a routine manner and that such a system is independent of time and personnel changes; allocation of a portion of the reliability budget to escaped workmanship defects and relating it to a quality budget; apportionment of the quality budget to the working level so that workers know what they have to achieve; establishment of a standard for classifying defects in relation to reliability requirements; use of human factors experts to provide assistance; use of an audit system to measure the performance of inspection personnel thereby providing them with knowledge of their performance; and establishment of a practical standard of effectivity for inspection personnel. R.N.A.

N65-30345# Milan Univ. (Italy).
DIAPHRAGM ACTIVITY AND THORACOABDOMINAL MECHANICS DURING POSITIVE PRESSURE BREATHING
Technical Report, 1 Feb. 1962–1 Feb. 1963

Emilio Agostoni Wright-Patterson AFB, Ohio, AMRL, Dec. 1964 20 p refs
(Grants AF-EOAR-62-95; PHS RF-15; NATO-RG-30)
(AMRL-TR-64-141; AD-617741)

The electrical activity of the diaphragm and the mechanical contribution of the thorax and the abdomen through the breathing cycle has been investigated in man during positive pressure breathing (PPB). The electrical activity of the diaphragm persists even at values at which inspiration should be completely passive according to the pressure volume diagram of the thorax and lung. The transdiaphragmatic pressure decreases as the value of PPB increases but is still appreciable at values of PPB at which the inspiration appears to be completely passive by an analysis based on transthoracic pressure measurements alone; the transdiaphragmatic pressure becomes zero only at PPB of about 30 cm H_2O. The persistent activity of the diaphragm during PPB is counterbalanced by an activity of the abdominal muscles in excess of that of the expiratory muscles as given by transthoracic pressure measurements. Owing to the persistence of an abdominothoracic pressure gradient, the venous return and therefore the cardiac output should be less reduced than in the case of a passive inspiration. Author

N65-30346# Hine Labs., Inc., San Francisco, Calif.
THE SIMILAR PHARMACOLOGIC AND TOXIC EFFECTS OF PENTABORANE, DECABORANE, AND RESERPINE
Francis W. Weir, Frederick H. Meyers, Robert H. Arbuckle, and Swanson Bennett Wright-Patterson AFB, Ohio, AMRL, May 1965 23 p refs
(Contract AF 33(657)-11756)
(AMRL-TR-65-49; AD-617691)

This investigation was conducted to establish the mechanism of toxic action of pentaborane (B_5H_9) and decaborane ($B_{10}H_{14}$) preliminary to the study of possible therapeutic or protective agents. The pharmacological effects of pentaborane and decaborane on mice, rats, and dogs were studied and compared to the pharmocological effects of reserpine. The compounds were administered intraperitoneally; pentaborane was also administered by the inhalation route. Conscious dogs showed signs of limitation of sympathetic activity, evidenced by miosis, nictitating membrane relaxation, bradycardia, dilation of superficial vessels, and sedation with easy arousal. Anesthetized dogs showed an initial rise in blood pressure followed by hypotension, bradycardia, and decreased response to tyramine. Reversal of some of these effects occurred following norepinephrine infusions. Spectrofluoremetric analyses of the brains of groups of rats administered any of the three compounds demonstrated depletion of serotonin and norepinephrine. Pentaborane is comparatively more active in producing excitement and convulsions. The boranes closely resembly reserpine in their effects but have a shorter duration of action. Author

N65-30369* Harvard Univ., Cambridge, Mass. Museum of Comparative Zoology.
APPLICATION OF SATELLITES OR HIGH-FLYING AIRCRAFT TO STUDIES OF CETACEANS AND OTHER LARGE MARINE ANIMALS
William E. Schevill *In* Woods Hole Oceanog. Inst. Oceanog. from Space Apr. 1965 p 177–178 (See N65-30350 19-13) CFSTI: HC $7.45/MF $2.25

Suggestions are offered for biological tasks, such as studies of cetaceans and other large marine animals, that might be incorporated into the program of a satellite or aircraft designed for other purposes. Attempts have been made to use radio transmitters as tags to trace the migrations of whales in the western North Atlantic; use of satellites or high-flying aircraft could increase the area covered and improve tracking. The most attractive possibility to date is the use of a transponding whale tag, triggered by radar sweeps from an aircraft or satellite and using either sidelooking or PPI radars. For present applications, however, orbiting receivers are not required; any trans-Atlantic flights or suitably instrumented aircraft are adequate. M.W.R.

N65-30381* Sandy Hook Marine Lab., Bureau of Sport Fisheries and Wildlife, Highlands, N. J.
MARINE BIOLOGY AND REMOTE SENSING
John Clark and Richard B. Stone *In* Woods Hole Oceanog. Inst. Oceanog. from Space Apr. 1965 p 305–312 refs (See N65-30340 19-13) CFSTI: HC $7.45/MF $2.25

Remote sensing from manned orbital spacecraft can be used in marine biology for ecological studies such as measurement of those environmental parameters which most influence distribution, behavior, and abundance of species. Temperature as related to marine fish species and an aerial sea temperature study using an infrared thermometer are discussed. A proposed flight track is illustrated for an infrared survey program in the North Atlantic area which will give more information about the relationship between temperature and migration of schools. Sea surface isotherms are charted for May 1964; the fish schools indicated were thought to be Atlantic mackerel. Simultaneous recordings from a shipboard infrared thermometer and a towed thermistor are illustrated. M.W.R.

N65-30448# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
MODEL OF PARAPSYCHOLOGICAL COMMUNICATION
M. Ryzl 15 Jul. 1965 24 p refs Transl. into ENGLISH from Sdelovaci Technika (Czechoslovakia), no. 8, 1964 p 299–302 (FTD-TT-65-366/1+4; AD-466927)

Three digital numbers (from 000 to 999) were transmitted from one person to another using extrasensual perception (mental telepathy) as the means of telecommunication. The signaled number was coded into sequences of colored cards enclosed in special covers of solid nontransparent material, and handed to the test person until sufficient experimental data was gathered. Analysis of the data indicated that extrasensual perception is applicable as a means of communication. L.S.

N65-30469*# Michigan Univ., Ann Arbor. Office of Research Administration.
[DEVELOPMENT OF ON-LINE MAN–MACHINE SYSTEM PERFORMANCE MEASUREMENT AND DISPLAY TECHNIQUES Letter Progress Report, 1 Mar.–31 May 1965
Robert M. Howe and Richard W. Pew 9 Jul. 1965 34 p refs
(Contract NASr-54(06))
(NASA-CR-64106) CFSTI: HC $2.00/MF $0.50 CSCL 05H

Work is continuing on conduct and analysis of experimental studies of human performance characteristics in manual control tasks and development of facilities and techniques for on-line analysis of human performance data. Experimental studies presented are: (1) Operator Performance in Three-State Relay Control Systems; and (2) Operator Performance with Predictable Input Signals. N.E.A.

N65-30474*# Nevada Univ., Reno.
[AN EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF LOW PRESSURES ON CELLULAR ULTRASTRUCTURE AND CYTOCHEMISTRY IN PLANTS] Semiannual Progress Report, Nov. 1, 1964–Apr. 1, 1965
Hugh N. Mozingo [1965] 25 p refs
(Grant NsG-464)
(NASA-CR-64097) CFSTI: HC $2.00/MF $0.50 CSCL 06C

Francis W. Weir, Frederick H. Meyers, Robert H. Arbucke, and Jesus H. Nemenzo Wright-Patterson AFB, Ohio, AMRL, May 1965 22 p
(Contract AF 33(657)-11756)
(AMRL-TR-65-48; AD-617692)

Investigations were designed to explore mechanisms of toxic action of SDMH, UDMH, and MMH. The acute toxicity to mice of unbuffered SDMH-dihydrochloride is not different from hydrochloric acid. The tenfold difference between the acute toxicity of SDMH at 24 and 168 hours for mice is not seen in rats or dogs. The degree and time course of liver damage in mice is such that it is probably responsible for the delayed deaths seen in this species. Prophylactic treatment with aminooxyacetic acid provided protection to rats against the lethal effects of UDMH, but not against the effects of MMH. The mechanism and site of action of UDMH (1,1-dimethylhydrazine), MMH (methylhydrazine), and SDMH (1,2-dimethylhydrazine) were investigated. Discrete localized lesions produced in specific areas of the otherwise intact brain stem by suction or electrolytic destruction modify or abolish UDMH-induced convulsions in dogs. The area from which these convulsions arise has been localized to a ventral mid-collicular site. Author

N65-31146*# National Aeronautics and Space Administration. Washington, D. C.
PHARMACOLOGY OF THE CORONARY CIRCULATION
V. N. Kaverina Sep. 1965 209 p refs Transl. into ENGLISH of the book "Farmakologiya Koronarnogo Krovoobrashcheniya" Moscow, Medgiz, 1963
(NASA-TT-F-336) CFSTI: HC $6.00/MF $1.25 CSCL 06O

Pharmacological action on the coronary circulation is reviewed. The investigation is based on published material relating to the effects of pharmacological substances on blood circulation in the heart; information on the physiology of the blood circulation; the results of research on the influence of adrenomimetic, cholinergic, ganglion blocking agents, phenothiazine derivatives, analgesics, nitrites, and nitrates on the cardiac blood vessels; and the data on clinical tests of the new vasodilator chloracizin. The two-phase nature of the action of epinephrine and norepinephrine on the cardiac vessels is reported. Also, acetylcholine and carbachol were found to be capable of dilating the coronary vessels but not of improving the cardiac blood supply owing to hypotonia. The effect of ganglion-blocking agents on blood circulation in the heart depends on the relationship between their influence on the tone of the coronary vessels and blood pressure. Further, the effect of analgesics on the cardiac blood supply is due not to their direct action on the coronary vessels but to their capacity to inhibit the reflexes of these vessels. E.E.B.

N65-31179*# Martin Co., Baltimore, Md.
DESIGN STUDY FOR LUNAR EXPLORATION HAND TOOLS
First Quarterly Report
Donald S. Crouch Jan. 1965 36 p refs
(Contract NAS9-3647)
(NASA-CR-65092; ER-13766) CFSTI: HC $2.00/MF $0.50 CSCL 05E

The purpose of this report is to present the results of the first three months work performed for the Design Study of Lunar Exploration Hand Tools. A review of current authoritative interpretations of lunar surface geology and environment was conducted and the need for a portable, battery-powered specimen sampling tool was established. Preliminary lunar gravity simulator tests were performed to define the optimum size for the power tool. Basic design criteria were established, a battery power pack was selected, motor and mechanism approaches were determined, and an integrated configuration envelope was defined. Author

N65-31185*# Beckman Instruments, Inc., Fullerton, Calif. Scientific and Process Instruments Div.
ELECTROENCEPHALOGRAPH SIGNAL CONDITIONERS
Final Report
23 Apr. 1965 68 p ref
(Contract NAS9-3456)
(NASA-CR-65099) CFSTI: HC $3.00/MF $0.75 CSCL 06B

Electroencephalograph signal conditioner systems intended to perform during spacecraft launch, orbit, reentry, and impact are described. In addition to the physical and electrical specifications for the equipment, the performance requirements are detailed for numerous environmental conditions. Analytical discussions of common mode rejection and recovery time are given. Signal conditioners met all test specifications during high temperature, salt spray, pressure, oxygen atmosphere, acceleration, sand and dust, acoustic noise, shock, and endurance tests. The difficulties encountered in electrical interference, low temperature, humidity, immersion, and vibration tests are discussed along with the adjustments made to satisfy the project requirements. J.M.D.

N65-31199# RAND Corp., Santa Monica, Calif.
INTRINSIC CONTROL OF BODY FLUID AND ELECTROLYTE DISTRIBUTION AND URINE FORMATION
J. C. De Haven and N. Z. Shapiro Jul. 1965 142 p refs
(Contract AF 49(638)-700; Proj. RAND)
(RM-4609-PR; AD-467099)

Mathematical models are used to examine certain physiological hypotheses that appear to explain some of the ways in which the human body controls fluid and electrolyte distribution over time. Special attention is given to the contribution of renal excretion to this control. A simple model intended to predict compositional changes in the several body compartments is shown and the predictive abilities of larger models that encompass much of the present knowledge of the chemical detail of the body's physiological compartments are described. Various methods are presented for introducing time into these models. R.N.A.

N65-31206# Stanford Research Inst., Menlo Park, Calif.
EXPLORATIONS IN THE AUTOMATION OF SENSORIMOTOR SKILL TRAINING
Douglas C. Engelbart and Philip H. Sorensen Port Washington, N. Y., Naval Training Device Center, May 1965 83 p refs
(Contract N61339-1517)
(NAVTRADEVCEN-1517-1; AD-619046)

Some problems of automating sensorimotor skill training were explored with a system served by a CDC 160-A computer. *Ss* were trained to transmit 31 alphanumeric characters on 5-key chord keysets. Training conditions varied response prompting (cueing) and confirmation (feedback). Prompting stimuli were (1) lights (automated visual), (2) air jets (automated tactile), (3) reference sheets (nonautomated). Some *Ss* received feedback; others received none. Discriminability of automated prompts were also compared. Throughout experimentation, the computer controlled all presentations and recorded individual performance. No reliable group differences were found in terminal speed or accuracy among groups trained under different prompting conditions. The group trained with tactile prompts was least variable in response speed but most variable in response accuracy. Feedback signals aided code learning regardless of prompting. Discrimination tests favored visual over tactile prompts; tactile stimuli were difficult for most *Ss* to discriminate. Author

N65-31211# Joint Publications Research Service, Washington, D. C.
THE ROLE OF HEREDITY AND CHROMOSOMAL DISEASES IN ANALYSIS OF THE GENETIC EFFECTS OF RADIATION

* Physiological and ultrastructural studies continued on *Avena sativa* to determine the biochemical and biophysical events leading to cytomembrane rupture by exposure to low pressure. Growth chamber experiments were programmed to isolate the environmental factors responsible for a decrease in lethal exposure time to low pressure during the winter. Plants were grown for 16 to 18 days in different cycles and results show that survival time is independent of the photoperiod but dependent on temperature cycle. An experiment was designed to alter cellular permeability by applying decenylsuccinic acid to determine whether a permeability change would affect ultrastructural membrane deterioration under reduced pressure. Acid sprayed prior to exposure to low pressure had no effect on plant survival time. Plants intermittently watered with acid showed a slight increase in ability to resist low pressure effects. Descriptions and results of other investigations are presented and include studies on mineral deficiency, root removal, alcohol determinations, tissue dehydration, and alpine plants. R.N.A.

N65-30480*# Beckman Instruments, Inc., Fullerton, Calif. Special Projects Div.
WEARABLE, WIRELESS OXIMETER Final Progress Report
Robert R. Pintar 11 Jan. 1965 9 p Revised
(Contract NAS2-1362)
(NASA-CR-64080; TM-194) CFSTI: HC $1.00/MF $0.50 CSCL 06L

The oximeter development program was proposed because it was thought that certain improvements, such as the use of interference filters and improved dilation, would overcome many of the difficulties experienced with past ear oximeters. The development was based on the premise that the narrow band optical filters, together with good dilation, would provide accurate results that would be repeatable between individuals. The narrow band optical interference filters would minimize the errors, due to spectral changes in lamp, differences in skin pigments or changes in the absorption characteristics of the blood. Improved dilation would result in a field of view which consisted primarily of arterial blood. This is very important, as the presence of venous blood would cause errors in the output; especially if the relative amounts of venous and arterial blood varied from time to time, or from person to person. The possibility that the device could also be used to make blood pressure measurements was based on the idea that the blood volume in the ear lobe would be a function of the blood pressure. The IR channel of the oximeter would be used for this measurement since this channel responds to blood volume only and, unlike the red channel, does not respond to changes in blood oxygen. Author

N65-30489# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON THE TEMPERATURE LIMIT OF ARTIFICIALLY COOLING THE ORGANISM OF MAMMALS
K. P. Ivanov and I. P. Pavlov 18 May 1965 7 p refs Transl into ENGLISH from Priroda (Moscow), no. 8, 1959 p 93-94
(FTD-TT-65-74/1+2; AD-617146)

This report discusses mechanisms involved in supercooling mammals and subsequently restoring them to normal body temperature without physiological damage. A discussion is presented on the experiments performed by R. Andjus who reported that it is possible to artificially cool mammals (white rats) to one or zero degrees centigrade with subsequent restoration of vital functions without altering their normal physiology. An attempt to made to explain the vital mechanism which occurred in the animals during the experiments. A discussion of the physiological activities that occur in hibernating animals is presented. N.E.A.

N65-30496# School of Aerospace Medicine, Brooks AFB, Tex. Aerospace Medical Div.
NEW ELECTRONIC INSTRUMENTATION IN DENTISTRY. AN EVALUATION OF MINIATURE CARDIOVASCULAR AND PSYCHOGALVANIC SKIN RESPONSE MONITORING DEVICES
Jack L. Hartley Dec. 1964 12 p refs
(SAM-TR-64-90; AD-460761)

The two instruments evaluated in this clinical study of over 200 patients have been employed and found to be potential aids to the practice of dentistry, establishing better rapport and presenting considerably more information on the physiologic activity of the patient than is routinely available. These instruments did not come between the doctor and his patients; on the contrary, they assisted the doctor in gaining more empathy for the patients, which is essential to successful treatment. Author

N65-30503# Naval Radiological Defense Lab., San Francisco, Calif.
DOSIMETRY FOR LARGE ANIMAL EXPERIMENTS USING MULTIPLE Co^{60} SOURCES AND 1 MVP X RAYS
Cirel K. Menkes 21 Apr. 1965 23 p refs
(USNRDL-TR-842; AD-464281)

A quadrilateral configuration of four movable uncollimated Co^{60} sources with a total activity of 9000 curies was used to obtain exposure measurements in air and depth doses in a masonite phantom for radiation experiments involving sheep. The depth dose distribution in the phantom in the four source exposure is compared to distributions obtained using a single collimated Co^{60} source four times in succession to simulate the four source array and exposure geometry, and to 1 Mvp X-rays in a bilateral exposure. Distributions of the quadrilateral gamma and X-ray exposures differed quantitatively by no more than 5% throughout the phantom thickness. Ionization measurements were made in outdoor pens built to house one hundred sheep individually during chronic low-level exposures ranging from 500 mR/hr to 4 R/hr. Exposure rates at the two rows of pens were varied by using several source arrangements. Bilateral depth dose distributions in a sheep phantom exposed in the pens showed that the radiation from the uncollimated sources at the distances of the pens was less penetrating than from a collimated Co^{60} source at a closer distance (corrected for inverse square effect), and more penetrating than from 1 Mvp X-rays except at the phantom surfaces. Author

N65-30506# Chicago Univ., Ill. Air Force Radiation Lab.
STUDIES ON THE RADIOPROTECTIVE ACTION OF SODIUM NITRITE IN MICE
Andrew T. Hasegawa and H. D. Landahl Brooks AFB, Tex., School of Aerospace Med., May 1965 14 p refs
(Contract AF 41(609)-1693)
(SAM-TR-65-13; AD-466469)

Polarographic measurements on the oxygen tension in the spleen and vena cava of mice after injection of 200 mg./kg. of sodium nitrite showed that the oxygen levels decreased to relatively low levels in about 20 minutes. Methylene blue administered at this time protected the mice against nitrite lethality. Methemoglobin concentration and nitrite levels in the blood, plasma, and spleen measured at different times after nitrite injection showed both levels increased with time. Injection of 200 mg./kg. of nitrite 20 minutes before x-ray exposure afforded protection against radiation lethality, the dose-reduction factor being 2.35. Protection was reduced when nitrite-treated mice were irradiated in less than 20 minutes postinjection or when a smaller dose of nitrite was used. This decrease

in protection can be correlated with the oxygen-tension values, which were not as low under these conditions. Protection was also reduced when the nitrite-treated mice were irradiated at 1 atmosphere of oxygen, and almost completely eliminated when they were irradiated at 4 atmospheres of oxygen. At 1 atmosphere of oxygen the average spleen oxygen tension was close to normal, but the oxygen tension in the vena cava was low. At 4 atmospheres of oxygen both the spleen and vena cava oxygen-tension values were above normal. Under these conditions, both the methemoglobin concentration and the nitrite level were high, while the protection was low, corresponding to a reduction in dose of 15%. It was found that the relative effectiveness of radiation ($\gamma = 1/DRF$) in all the situations could be calculated from $\gamma = (0.38 + 0.62x)/(1 + 0.15N)$, where N is 1 or 0 depending on the presence or absence of treatment with nitrite; and x, the average of the spleen and vena cava oxygen-tension values, is set equal to 1 whenever it is greater than 1. Author

N65-30512# System Research, Ltd., Richmond (England).
A STUDY OF GROUP DECISION MAKING AND COMMUNICATION PATTERNS UNDER CONDITIONS OF STRESS AND OVERLOAD, WHEN THE PARTICIPANTS ARE PERMITTED TO FUNCTION AS A SELF-ORGANISING SYSTEM Quarterly Technical Status Report, 1 Jan.–31 Mar. 1965
[1965] 11 p ref
(Contract DA-91-591-EUC-3607)
(QTSR-1; AD-617473)

The effects of stress and overload on group decision making and on communication patterns are discussed. Group system modification to vary the independent subject loading was accomplished by a variable noise facility and the positional cueing facility. Steps were also taken to introduce a third decision maker; a computer program simulating another individual. Third party cueing could double accuracy but is dependent on the individual differences in this role. Investigation of aversive stimuli to increase stress showed that group behavior becomes more erratic with a proficiency decrease of 5%, and with a 20% mean variance increase. The use of aversive stimuli to increase group performance in order to avoid shocks was also studied. This was subject-dependent varying with the equity of the shock received during performance. Probability distribution tables were calculated. W.M.R.

N65-30534# Northwestern Univ., Evanston, Ill.
AUDITORY FUNCTION OF THE HEARING IMPAIRED Formal Progress Report No. 1
Tom W. Tillman 15 Jun. 1965 36 p
(Contract AF 41(609)-2643)
(AD-465819)

This report covers progress made on the audiological research project. The work accomplished is summarized in the following sections: (1) personnel; (2) equipment; (3) related activities; (4) results of research; and (5) plans for future investigations. N.E.A.

N65-30559# North American Aviation, Inc., Downey, Calif. Space and Information Systems Div.
FEASIBILITY STUDY OF PERSONNEL IDENTIFICATION BY SIGNATURE VERIFICATION Final Report, 15 Jul.–19 Dec. 1964
A. J. Mauceri Griffiss AFB, N. Y., RADC, Apr. 1965 98 p refs
(Contract AF 30(602)-3493)
(SID-65-24; RADC-TR-65-33; AD-617615)

The Feasibility Study of Personnel Identification by Signature Verification consists of the acquisition of signature samples from test subjects utilizing an instrumented writing device. The signature samples are then analyzed statistically for relatively invariant indices used to establish identity. When these identity patterns are established, the system is capable of differentiating automatically, with a high degree of accuracy, between two or more subjects. The instrumentation of the writing device, establishment of indices, and the analysis program represent the major primary development areas. Author

N65-30567* Tennessee Univ., Memphis. Inst. of Clinical Investigation.
ADDENDUM TO SUMMARY PROGRESS REPORT, 1 AUG. 1962–31 OCT. 1963
Richard H. Overman Mar. 1964 84 p refs
(Contracts AT(40-1)-283; AT(40-1)-1375; AT(40-1)-1642)
(TIP-20979, Addend.)

Certain physiological and biochemical responses of normal and X-irradiated dogs to protracted, induced muscular contraction were studied *in vivo*. The experimental animals were given a single whole-body X-irradiation exposure of 700 or 800 r and increased muscular activity of the hind legs was induced three to four days post-irradiation through stimulation of the sciatic nerve. Tracings of the leg movements were recorded together with observations of blood flow, blood pressure, and analyses of blood and muscle samples. The following differences due to muscular contraction were observed in the irradiated animals: (1) No sodium accumulation and decreased potassium content in the contracting muscle as in normal working muscles, indicating alteration of the ionic transfer mechanism through radiation; (2) a general increased rate of blood flow to the stimulated muscle; (3) significantly higher utilization of muscle phospholipids and increase in muscle water; and (4) reduced cholesterol concentration and elevated potassium content in the liver. G.G.

N65-30572# Institutt for Atomenergi, Kjeller (Norway).
ACTIVATION ANALYSIS OF IODINE IN BIOLOGICAL FLUIDS
J. B. Dahl, O. Johansen, and E. Steinnes Dec. 1964 9 p refs
(KR-80)

A method for activation analysis of iodide in biological fluids has been developed. The method is based on adsorption of iodide on an anion exchange resin, neutron activation of the resin, elution of the induced iodine-128 and separation from other activities by solvent extraction. The method has been used to determine iodide in human urine and is found useful at iodide concentrations down to 0.0004 ppm in volumes not exceeding about 250 ml when applying a flux of about $3 \cdot 10^{12} n/cm^2$ sec. The method is applicable in general for determination of inorganic iodine in aqueous solutions. Author

N65-30597# Federal Aviation Agency, Oklahoma City, Okla. Office of Aviation Medicine.
SURVIVAL OF HIGH-VELOCITY FREE-FALLS IN WATER
Richard G. Snyder Apr. 1965 15 p refs
(AM-65-12)

Forty-four cases of free-falls survived by individuals impacting water environments under conditions of high velocity (50 to 116 ft/sec, corrected for aerodynamic drag) have been intensively investigated and analyzed. Ages varied from 7 to 80 years and the study included 34 males and 10 females. The falls occurred in 17 states, mainly over a 3-year period, and included all known survivals of water impact at over 50 ft/sec. It was found that the most survivable body orientation, by a factor of five to seven, is a feet-first impact in which critical velocity for human survival was approximately 100 ft/sec. No correlation of velocity with degree of injury was found, although distinct patterns of injury were shown. Factors believed to influence human survival tolerances are discussed. Author

N65-30629# Air Force Systems Command, Kirtland AFB, N. Mex. Air Force Weapons Lab.
PROTON ABSORPTION IN DOSE-EQUATED MATERIALS Technical Report, 1 Sep.–1 Dec. 1964
Joseph F. Janni Apr. 1965 183 p refs
(AFWL-TR-65-3; AD-616703)

This report presents theoretically calculated values of the ionization interaction for protons in numerous materials and compares these values with those of tissue and bone. This has been done so that possible dosimetric media may be compared and evaluated for dose equivalency. Results for the linear energy transfer have also been included. The proton energies are considered from .5 Mev to 1000 Mev. The K and L shell effects upon the stopping power equation have been included. The calculation approach and the resultant tabulations are presented in detail for over seventy different materials. Author

N65-30630# Bunker-Ramo Corp., Canoga Park, Calif.
HUMAN ENGINEERING SUPPORT: PILOT FACTORS PROGRAM Final Summary Report
21 May 1965 20 p
(Contract AF 33(615)-2214)
(AD-616765)

The report covers the four general activity areas. These areas are characterized by a common plan of approach: (1) technical direction and furnishing of project equipments by the Flight Control Division; (2) installations and maintenance of project equipment by the Lear-Siegler engineering support group; (3) development of instrument flying procedures and inflight conduct of studies by the Instrument Evaluation Section; and (4) development of measurement techniques, data collection, reduction, and analysis by the Bunker-Ramo support group. Each of the four areas is discussed as an entity, with the problems and progress of the individual area placed in context. The appendices contain chronological accounts of: presentations to members of the interested flying community, including demonstration flights in PI-FAX aircraft. Author

N65-30631# Kansas State Univ., Manhattan. Dept. of Psychology.
SYMPOSIUM ON THE ROLE OF MACROMOLECULES IN COMPLEX BEHAVIOR Final Report
John Gaito [1964] 108 p Symp. held at Kan. State Univ., 20-22 Apr. 1964
(Grant Nonr(G)-00060-64)
(AD-616622)

Several papers on the role of nuclei acids and other macromolecules in complex behavior are presented. The articles include a cellular approach to adaptive processes in the nervous system, a chemically specified molecular mechanism underlying excitation in a nerve, macromolecular conformation changes as possible information processing mechanisms, antibody formation and immunological memory, a review of the role of RNA in information storage in the nervous system, nucleic acids and brain function, RNA and memory, and the structure of memory. R.N.A.

N65-30632# North American Aviation, Inc., Columbus, Ohio
IMAGE QUALITY ENHANCEMENT Final Report, Dec. 1962–Feb. 1964
Robert W. Brainard and George N. Ornstein Apr. 1965 63 p refs
(Contract AF 33(616)-7996)
(AMRL-TR-65-28; AD-616895)

A technique for enhancing the quality of imagery was investigated. The technique consists of obtaining a video signal from a transparency and adding to this signal its first and/or second derivative(s). The efficacy of the technique was evaluated by comparing imagery produced by the video signal and its derivative(s) with imagery produced by the video signal alone. The imagery investigated consisted of standard test patterns and aerial photographs. The processed test patterns were quantitatively analyzed to determine the resolution, contrast and acutance of the imagery. The results indicate: (1) differentiation enhances image quality, as indicated by the resolution, contrast and acutance metrics, (2) greatest enhancement is produced by operations which include second-order differentiation, and (3) the least enhancement is produced by first-order differentiation. The aerial photographic imagery shows the same enhancing effects as those obtained with the test patterns. Author

N65-30682# Joint Publications Research Service, Washington, D. C.
INVESTIGATION OF THE LOGICAL SOLUTION TO THE PROBLEM OF DIGIT IDENTIFICATION
A. M. Parachev 6 Aug. 1965 14 p refs Transl. into ENGLISH from Vopr. Psikhologii (Moscow), no. 3, May-Jun. 1965 p 113-123
(JPRS-31440; TT-65-31936) CFSTI: $1.00

A psychological research method using trajectories of a probing hand and reasoning for analyzing processes of recognition is presented. Results of experiments conducted according to this method are cited and the means of constructing a theoretical model of the process of recognition are considered. R.N.A.

N65-30711# Joint Publications Research Service, Washington, D. C.
TREATMENT OF DISORDERS OF THE NERVOUS SYSTEM BY ELECTRICALLY INDUCED SLEEP
K. O. Ivanov-Muromskiy 2 Aug. 1965 12 p Transl. into ENGLISH from the publ. Splyachyy Mozok (Kiev), 1964 p 64–76
(JPRS-31347; TT-65-31844) CFSTI: $1.00

The history of sleep therapy for disorders of the central nervous system is reviewed, and the use of electricity for producing sleep in the treatment of human injury and sickness is discussed in detail. Also, the use of ultrahigh frequency electromagnetic radiation for the production of sleep is considered. An example is given of 350 patients in different stages of hypertonia treated with electrically-induced sleep. The result was a reduction in arterial pressure, improvement in sleep, and restoration of working capacity in 211 and restoration of working capacity without reduction of blood pressure in 118. The therapeutic effect was insignificant in only 8% of the patients. The therapeutic effect of electrosleep was also clearly manifested in combination with certain medicines. The use of electrosleep for the protection of brain cells against preoperative and postoperative effects is also discussed. The disadvantages and hazards of electrical and electromagnetic therapy are recognized. E.E.B.

N65-30730*# National Aeronautics and Space Administration, Washington, D. C.
COORDINATION OF MAN'S VOLUNTARY MOVEMENTS UNDER SPACE FLIGHT CONDITIONS
L. V. Chkhaidze Aug. 1965 118 p refs Transl. into ENGLISH of the book, "Koordinatsiya Proizvol'nykh Dvizheniy Cheloveka v Usloviyakh Kosmicheskogo Poleta" Moscow, Izd. "Nauka," 1965
(NASA-TT-F-355) CFSTI: HC $4.00/MF $0.75 CSCL 06S

The author presents the problems encountered in movement coordination of man in a changed gravitational field, such as will be experienced in space flights. Simulation of inertial forces occurring in accelerations, as well as flights of manned artificial earth satellites, made it possible to establish the experimental conditions for solving these problems. Author

N65-30745# Presbyterian-St. Lukes Hospital, Chicago, Ill. Div. of Pathology.
AN EVALUATION OF INTRAVENOUS HYPERTONIC UREA IN EXPERIMENTAL CEREBRAL EDEMA
Raymond A. Clasen, Pauline M. Cooke, Sylvia Pandolfi, George Carnecki, and George Bryar Brooks AFB, Texas, School of Aerospace Med., Jul. 1964 18 p refs
(Contract AF 41(657)-360)
(SAM-TDR-64-18; AD-603052)

Experiments were performed on monkeys to evaluate therapy for alleviating the effects of cerebral hemorrhage and edema. Areas of hemorrhagic necrosis were produced in the brains of monkeys by freezing. Intravenous hypertonic urea was administered 5 hours after injury, and tests were made 1 hour later to determine its effect. The cerebrospinal fluid pressure of the monkeys increased after production of the lesion and decreased after the administration of hypertonic urea. This decrease in pressure was not associated with any chemical evidence of a decrease in edema in the damaged hemisphere but was believed to be the result of dehydration of the undamaged hemisphere. The role of intravenous urea in general neurologic disorders is not well defined, but all the factors of intracranial pathology and physiology should be considered in determining its merits. Author

N65-30826# Bryn Mawr Coll., Pa. Dept. of Biology.
ENZYME INDUCTION AND CORTISONE PROTECTION IN ENDOTOXIN-POISONED MICE AT 25° C COMPARED WITH THAT AT 5° C
L. Joe Berry and Dorothy S. Smythe Fort Wainwright, Alaska, Arctic Aeromed. Lab., Jan. 1965 20 p refs
(Contract AF 41(609)-1764)
(AAL-TDR-64-8; AD-615107)

Mice housed at 25° C are protected by cortisone against endotoxin lethality when the hormone is given at the same time as the poison, but not an hour or two later. This is not true of mice housed at 5° C. Activity of liver tryptophan pyrrolase is lowered by endotoxin and elevated by cortisone only in animals at normal temperatures. R hen endotoxin and hormone are given concurrently, normal enzyme activity is maintained, but activity decreases when the hormone injection is given an hour or more after endotoxin. Actinomycin D, ethionine, 2-thiouracil, and 8-azaguanine (inhibitors of protein synthesis) when given in sublethal amount: potentiate endotoxin, prevent cortisone protection against endotoxin, and block the hormonal induction of tryptophan pyrrolase. Chloramphenicol has none of these effects. Mice infected with *Salmonella typhimurium* have lower than normal tryptophan pyrrolase activity and a smaller induction of enzyme by cortisone 18 hours postinfection than do normal mice or mice 42 hours postinfection. This occurs only at 25° C. Author

N65-30839*# National Academy of Sciences—National Research Council, Washington, D. C.
BIOLOGY AND THE EXPLORATION OF MARS Summary and Conclusions
Apr. 1965 23 p refs
(Contract NASr-239)
(NASA-CR-64337) CFSTI: HC $1.00/MF $0.50 CSCL 06F

The scientific foundations and merits of undertaking a biological exploration of Mars were examined. The origin and nature of life, and the possibility of life on Mars is discussed. Avenues of approach to the exploration of the planet, the timing and strategy of the explorations, and avoiding the contamination of the planet are considered. It is recommended that Mars be explored biologically. L.S.

N65-30840*# Naval Air Development Center, Johnsville, Pa. Aeronautical Computer Lab.
ANALOG POWER SPECTRAL DENSITY ANALYSIS OF ELECTRORETINOGRAM DATA
A. Futterweit and J. G. Dahms 10 Nov. 1964 66 p ref Sponsored by NASA
(NASA-CR-64330; NADC-AC-6411; AD-455878) CFSTI: HC $3.00/MF $0.75 CSCL 06S

A technique for performing analog power spectral density analyses on physiological data is presented. Electroretinograms (ERG) were made in which the change in voltage between the corneal surface of the eye and a reference location on the head were measured continuously in response to visual stimulation by a contact lens electrode on the eye. The visual stimulation was provided by a regularly flashing light. The ERG's provided a means to measure visual deficit, and an indication of changes in physiological functions which may underlie the visual deficit. The analog techniques used in analyzing the ERG data are described, and power spectral density plots are included for the analog and digital methods. Comparison of the two systems shows close correlation of results, thereby demonstrating the versatility and accuracy of the analog spectral density analysis. R.W.H.

N65-30847*# Northrop Space Labs., Hawthorne, Calif.
INVESTIGATION OF PEROGNATHUS AS AN EXPERIMENTAL ORGANISM FOR RESEARCH IN SPACE BIOLOGY Progress Report, 1 Apr.–30 Jun. 1965
J. J. Gambino and R. G. Lindberg [1965] 16 p ref
(Contract NASw-812)
(NASA-CR-64315; NSL-64-29-7) CFSTI: HC $1.00/MF $0.50 CSCL 06F

Routine observation data on the reproductive activities of 160 female *Perognathus longimembris* over a 5 month period are reported. Heteromyid breeding techniques resulted in 48 laboratory conceived litters, yielding a total of 158 pocket mice. Observation and selective pairing of females in full estrus with males with enlarged testes resulted in copulation and conception approximately 20% of the time. It was concluded that the reproductive cycles in laboratory maintained pocket mice coincide with the natural breeding season as judged by ecological and field collection data. G.G.

N65-30853# Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, Ohio. Biomedical Lab.
APPLICATION OF GAS EXPANSION TO FLUID CIRCULATION DEVICES IN MANNED SPACE ASSEMBLIES Technical Report, Jun.–Aug. 1964
D. A. Keating Apr. 1965 17 p
(AMRL-TR-65-26; AD-616699)

The power required to circulate fluids for various pressure drops and flow rates, and the power obtained from isentropic expansion of habitable gases for manned space assembly application have been investigated. The results demonstrate the feasibility of using habitable gases, stored under pressure, as potential energy sources to power fluid circulation devices. These findings indicate that significant weight savings can be obtained using the gas expansion technique to furnish the required power of fluid circulation as compared to using other power sources, such as batteries. Author

N65-30887# School of Aerospace Medicine, Brooks AFB, Tex. Aerospace Medical Div.
THE EFFECT OF 2 MEV X-RAYS ON WHOLE-BODY IRRADIATED PRIMATES. THE RADIATIONS OF SPACE I Technical Report, 1 Jan.–1 Oct. 1964

Glenn V. Dalrymple, Ian R. Lindsay, and John J. Ghidoni Mar. 1965 27 p refs
(SAM-TR-65-9; AD-466468)

One-hundred four primates (*Macaca mulatta*) were irradiated with graded single exposures of 2 Mev x-rays; and $LD_{50/30}$ of 670 ±20 (S.E.) rads was estimated. Hematologic studies performed over a 90-day postirradiation period revealed no essential difference from previously described results. Serum lactic dehydrogenase (LDH) levels were significantly increased during the first 4 days postirradiation, but they subsequently returned to normal ranges by the 7th day. Levels of alkaline phosphatase and leucine aminopeptidase were unchanged over the 90-day observation period. Clinical changes occurring during the postirradiation period were characteristic of the hematologic death, with the exception of a single animal which died from typical gastrointestinal injury. Examination of tissues obtained post mortem strongly suggests that sepsis was the immediate cause of death. Author

N65-30902# India. Dept. of Atomic Energy, Bombay. Atomic Energy Establishment Trombay.
STRONTIUM-90 CONTENT OF FOOD SAMPLES IN INDIA Data Summary through 1963
S. J. S. Anand, V. R. Chandrasekaran, S. B. Hingorani, L. U. Joshi, R. N. Khandekar et al Sep. 1964 17 p refs
(AEET-AM-40)

Data are summarized on strontium^{90} in liquid milk samples collected from Bombay and 27 other stations in India, and food grain and vegetable samples collected from various markets in Bombay. The sampling, measurement, and chemical procedures for determining the strontium^{90} content are discussed and the results are tabulated. R.N.A.

N65-30920*# Solid State Radiations, Inc., Los Angeles, Calif.
THE DEVELOPMENT OF A PERSONNEL DOSIMETRY SYSTEM FOR APOLLO Eleventh Quarterly Progress Report
H. S. Katzenstein Jan. 1965 19 p
(Contract NASw-415)
(NASA-CR-65071) CFSTI: HC $1.00/MF $0.50 CSCL 06B

A mechanical design and packaging concept was completed for the subminiaturized dosimeter. All circuits were proven in breadboard operation and did not employ components which could not be included in the mechanical design. The effort in circuit design was considered complete, and the remainder of the effort was devoted to completion of the package with performance and environmental testing of the resulting dosimeters. R.W.H.

N65-30921*# Solid State Radiations, Inc., Los Angeles, Calif.
THE DEVELOPMENT OF MEDICAL AND BIOLOGICAL SEMICONDUCTOR DETECTORS Eighth Quarterly Progress Report
F. P. Ziemba Apr. 1964 7 p
(Contract NASw-415)
(NASA-CR-65072) CFSTI: HC $1.00/MF $0.50 CSCL 06B

A prototype dosimeter for manned space flight missions was developed and consisted of such components as: (1) an 8-cubic mm lithium-drifted silicon nuclear particle detector; (2) a low-noise, charge-sensitive preamplifier; and (3) a pulse height integrator employing an electrochemical cell as an integrator. Readout was accomplished by a battery powered readout register that provided direct readout in terms of proton dose in rads. A performance of the unit was verified with 30 MeV protons from the University of Southern California accelerator which qualitatively verified the previously calculated dose calibration. This represented the completion of the breadboard feasibility demonstration phase of the total effort of developing a self-contained, miniaturized dosimeter for space environment. R.W.H.

N65-30927# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
INTRAOCULAR PRESSURE DURING CHANGING ENVIRONMENTAL PRESSURE IN ANIMAL EXPERIMENTS
E. Marre and N. Tiedt 6 Jul. 1965 21 p refs Transl. into ENGLISH from Arch. Ophthalmol. (Berlin), no. 166, 1964 p 462–474
(FTD-TT-65-307/1+2+4; AD-466561)

An explanation is given of the physiological basis for the relationship between the intraocular pressure and the external pressure. The intraocular pressure was studied in rabbits in connection with spontaneous respiration and in dead animals when the environmental pressure was suddenly lowered or increased. The method, operation, and test arrangement for carrying out the experiment is described, and the mathematical formulation of the transscleral pressure is included. Graphs illustrate the change in the transscleral pressure as a function of the environment pressure in both living and dead animals. Contradictions with other works are discussed along with reasons and possible solutions. Among the conclusions reached are: (1) A linear relationship exists between the environmental pressure and the transscleral pressure. (2) Initial intraocular pressures that are high do not result in any difference in the steepness of the transscleral pressure. (3) The linear relationship is the same in living and dead animals. C.T.C.

N65-30934# Bell Helicopter Co., Fort Worth, Tex.
CONTACT ANALOG SIMULATOR EVALUATIONS: ALTITUDE AND GROUNDSPEED JUDGMENTS
Billie A. Abbott and Dora J. Dougherty Mar. 1964 119 p refs
(Contract Nonr-1670(00); Proj. Janair)
(D228-421-015; AD-467203)

This report summarizes work which was accomplished during the first phase of evaluation of the JANAIR vertical display. The purpose of this study was to determine the accuracy with which altitude and groundspeed could be interpreted from the existing display. The display presentation was "open loop" i.e., no control task was required of the experimental subjects. Pertinent applied maneuver variables were presented. These included heading, groundspeed, rate of turn, vertical speed and altitude. The influence of the test variables are discussed. Recommendations are made for use and redesign of this type of display. Author

N65-30951*# National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY A Continuing Bibliography
Jul. 1965 135 p
(NASA-SP-7011(13)) CSCL 06E

N65-31001# California Univ., Livermore. Lawrence Radiation Lab.
A SCHEMATIC VIEW OF THE ORIGIN OF LIFE
Roger G. Hart 11 Jun. 1965 18 p refs
(Contract W-7405-ENG-48)
(UCRL-14254)

A general scheme is proposed for the origin of life. There are six stages presented: (1) sequence propagation; (2) sequence transcription; (3) dual transcription; (4) the chromosome-messenger; (5) metabolism; and (6) protoplasm. The first

four are marked by successive degrees of specialization, which allow the polymers to function more efficiently in their own replication. These stages occur in shallow water, where a variety and abundance of monomer molecules exist in energetic states that favor polymerization. In the last two stages, the supply of activated monomers in free solution was depleted, and the polymers acquired means of obtaining them from other precursors. R.W.H.

N65-31004# Joint Publications Research Service, Washington, D. C.
EFFECT OF ELECTROMAGNETIC RADIATIONS ON LIVING ORGANISMS
A. Presman 10 Aug. 1965 17 p Transl. into ENGLISH from Nauka i Zhizn' (Moscow), no. 5, May 1965 p 82–88 (JPRS-31501; TT-65-31997) CFSTI: $1.00

The photosynthesis in plants, the photochemical reactions in man and animals, and the absorption and emission of infrared rays were reviewed. Artificial sources of radiation for treatment in medicine and agriculture were used to stimulate the growth of plants and animals. It was shown that in people who were systematically irradiated with centimeter waves of small intensity, certain physiological functions were disrupted: the heart rate was reduced, the blood pressure dropped, and the nervous system became exhausted. Irradiation with short waves evoked orientational reactions in single-celled organisms. The amoebas stretched out parallel or perpendicular to the electric force lines. The ciliate and flagellate organisms began to move in the direction of the electric force lines. Low-frequency impulses of electric and magnetic fields were observed around the sensory nerve of a frog, and low-frequency magnetic impulses were observed in the vicinity of a human heart. R.W.H.

N65-31008*# National Aeronautics and Space Administration. Manned Spacecraft Center, Cape Canaveral, Fla.
GEMINI LAUNCH VEHICLE PILOT SAFETY PROGRAM–AMR
El Segundo, Calif., Aerospace Corp., 2 Oct. 1963 39 p Prepared jointly with Aerospace Corp., Revised
(Contract AF 04(695)-169)
(NASA-TM-X-56714; TOR-169(3126)-19; Rev. 1) CFSTI: HC $2.00/MF $0.50 CSCL 05E

The coordination, documentation, procedures, inspections, and responsibilities of the quality assurance program are defined. All aspects of the flight readiness effort are given and include the composition, responsibilities, authority, and activities of the teams involved. The flight safety review procedure is also included. C.T.C.

N65-31022# India. Dept. of Atomic Energy, Bombay. Health Physics Div.
PHYSIOLOGICAL NORMS IN INDIAN ADULTS—DATA ON TOTAL BODY WEIGHT AND WEIGHTS OF TWELVE BODY ORGANS
K. Venkataraman, V. M. Raghunath, K. Santhanam and S. Somasundaram 1964 67 p refs
(AEET(HP)-Th-21)

Data on total body weight and the weights of individual body organs were collected from post-mortem records of about 20 hospitals. Only cases of accidental and instantaneous death were included. In every case taken into consideration, post-mortem examination indicated that the person was in normal health at the time of the accident and that death was caused by the accident. The autopsy was performed within 24 hours following death. The mean weights of total body and individual organs are tabulated. It was observed that there was significant effect on the weights of the organs and total body weight because of the difference in sex, age, and location of the hospital. E.E.B.

N65-31038# Joint Publications Research Service, Washington, D. C.
TRANSLATIONS OF BIOPHYSICS AND PHYSIOLOGY
13 Aug. 1965 27 p refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 162, no. 3, 1965 p 688–693 (JPRS-31547; TT-65-32043) CFSTI: $1.00

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N65-31039 Joint Publications Research Service, Washington, D. C.
ON THE BIOLOGICAL EFFECTS OF HIGH ENERGY PROTONS
P. P. Saksonov, V. V. Antipov, V. S. Shashkov, B. L. Razgovorov, G. F. Murin et al *In its* Transl. of Biophys. and Physiol. 13 Aug. 1965 p 1–5 refs (See N65-31038 19-04) CFSTI: $1.00

The relative biological effectiveness of protons in comparison with gamma rays was analyzed using various tests characterizing the vital activity and heredity of the cell or organism. The experiments showed that for protons with energies of 660 and 120 MeV, the relative biological effectiveness with respect to DL_{50} for mice and rats was about 0.7. Clinical observations of animals also showed the somewhat lesser effectiveness of protons in comparison with gamma rays. The same results were obtained upon conducting a comparative analysis of chromosomal disturbances in the cells of the bone marrow of mice, in the growth of seeds in higher plants, and in determining recessive sex-associated and dominant lethal mutations in *Drosophila melanogaster*. Tests on mice were conducted to study the radiation protective effect of cystamine dichlorohydrate, aminoethylisothiuronium dihydrobromide (AET), serotonine, creatinsulfate, 5-methoxytriptamine chlorohydrate, triptamine chlorohydrate, and 5-oxytriptophane. The greatest protective effect was found with AET, 5-methoxytriptamine, and serotonine, and the use of these preparations resulted in survival of 50% to 70% of the test animals. E.W.

N65-31040 Joint Publications Research Service, Washington, D. C.
THE EFFECT OF RADIATION PROTECTIVE SUBSTANCES ON THE PROTRACTED AFTERGLOW OR IRRADIATED SOLUTIONS OF SERUM ALBUMIN

I. I. Sapezhinskiy and Yu. V. Silayev *In its* Transl. of Biophys. and Physiol. 13 Aug. 1965 p 6–12 refs (See N65-31038 19-04) CFSTI: $1.00

A serum albumin solution in phosphate buffer was irradiated in a thermostatic vessel in a closed flow system. It was pumped first into a cell located near the photocathode of a photomultiplier and then back into the vessel. The irradiation was performed with a mercury lamp, and the movement of the liquid was set so that the kinetic curves of the protracted part of the afterglow could be recorded. Thirteen compounds with known radioprotective properties were introduced into the system both before and after irradiation. The experimental results are presented in a table. From the table it is evident that compounds possessing pronounced protective properties have the strongest effect on the kinetics of protracted afterglow. These compounds have an even stronger effect when introduced before irradiation. At the same time, compounds exhibiting weakly protective action have little effect on the kinetics of afterglow. E.W.

N65-31041 Joint Publications Research Service, Washington, D. C.

PHYSIOLOGICAL CHARACTERISTICS OF EXCITATION DISTRIBUTION IN THE MUSCULAR SYSTEM DURING CONDITIONED REFLEX CHANGES IN RESPIRATORY GAS EXCHANGE

L. A. Isaakyan, R. P. Ol'nyamskaya, and G. A. Trubitsyna *In its* Transl. of Biophys. and Physiol. 13 Aug. 1965 p 19–23 refs (See N65-31038 19-04) CFSTI: $1.00

The purpose of this investigation was to determine the characteristics of excitation in topographically different muscle groups during conditioned reflex changes of gas exchange in connection with effects of temperature changes and muscular activity. A study was made of the deltoid, the pectoral, the external oblique, and the clavicular-costo-sternal muscles. First an electrophysiological analysis was made of the conditioned reflex changes of general gas exchange in connection with raising dumbells. Similar analysis was made for changes during cooling of the hand and forearm. The data showed that during the formation of a motor conditioned reflex and a heat regulating conditioned reflex there is a varied distribution of the stimulus in topographically different muscle groups. It is concentrated to a great degree in the innervating apparatus of the tonic muscles and is weakly expressed in the phase muscles. E.W.

N65-31050*# Teledyne Systems Corp., Hawthorne, Calif.

RESEARCH IN ADVANCED CONCEPTS IN BIOTECHNOLOGY, HUMAN ANALOGS AND BIONICS First Quarterly Report, 8 Jul.–8 Oct. 1963

[1963] 243 p refs

(Contract NASw-780)

(NASA-CR-64177) CFSTI: HC $6.00/MF $1.50 CSCL 06D

This report describes the human analog of the visual sensor. Analysis of the operation of the human eye was conducted utilizing the framework of the Man-Machine Methodology. An outline of the physiology and anatomy of the eye is presented. Also an outline of the photoreceptor processes is given. It was found that the human analog provided a penetrating insight into the fundamental mechanisms and processes carried out in the eye. Information presented can be directly applied to the design of visual machine extenders that operate on the same principles as the human eye. One advantage that such a bionic device would have is that it could operate over a narrow frequency range after detecting impinging radiation. New and efficient devices that function in the visible, infra-red, ultra-violet or, in fact, in any portion of the electromagnetic spectrum could be built that utilize the fundamental ideas presented in this report on the human analog of the eye. Author

N65-31053*# Martin Co., Baltimore, Md. Research Inst. for Advanced Studies.

RESEARCH IN PHOTOSYNTHESIS Quarterly Report No. 8, 6 Mar.–6 Jun. 1965

[1965 17 p refs

(Contract NASw-747)

(NASA-CR-64418) CFSTI: HC $1.00/MF $0.50 CSCL 06A

Investigations on photosynthesis and photosynthetic material are surveyed. Studies are included on chloroplast lipids; lipid synthesis in spinach leaves; photoactivation of photosynthetic reactions in dark stored bean leaves; the action mechanism of manganese in photosystem II; photooxidation of cytochrome c, cytochrome f, and plastocyanin; the reducing power of photoact I; reducing power generated in photosystem II; fluorescence; damaging effects of ultraviolet and strong visible radiation; mass spectrometry; and the identification of the sharp light induced electron spin resonance signal with a photo converter. R.N.A.

N65-31074# Argentina. Comision Nacional de Energia Atomica, Buenos Aires.

PHOTOGRAPHIC FILM DOSIMETRY FOR CUTANEOUS BETA THERAPY [DOSIMETRIA CON PELICULA FOTOGRAFICA PARA BETATERAPIA CUTANEA]

Mario de la Vega Vedoya and Mario E. Garcia 1965 8 p refs In SPANISH

(Rept.-155)

The percentage of radiation penetration for strontium^{90}–yttrium^{90}, used in the treatment of mucous and keloid hemoangioma, was determined for various cutaneous levels. Tissue of varying thickness was placed between the radioactive source and a sensitive photographic plate. The optical densities recorded on the plates were used to determine the dosage received for a particular skin thickness. Tables are included which show the percentage of radiation received for skin thicknesses ranging from 0 to 2000 microns. R.N.A.

N65-31080# Grumman Aircraft Engineering Corp., Bethpage, N. Y. Research Dept.

KINETIC CUEING IN SIMULATED CARRIER APPROACHES

Joseph N. Ruocco, Patrick A. Vitale, and Robert C. Benfari Port Washington, N. Y., Naval Training Device Center, 28 Apr. 1965 97 p refs

(Contract N61339-1432)

(NAVTRADEVCEN-1432-1; AD-617689)

Pairs of matched pilots were trained using a flight simulator in a carrier-landing maneuver under two conditions—kinetic and static. The two conditions were identical, except that in the kinetic mode cockpit motion was provided. Kinetic cueing significantly improved performance in terms of percentage of successful landings, altitude error, time outside the flight path, and variability of pilot inputs. The statically trained group showed a decrement in performance which persisted throughout training and transferred to the criterion flights which involved cockpit motion. Results clearly indicate that kinetic cueing is a valuable and desirable adjunct to flight airborne simulation systems. Evidence indicates that kinetic cueing serves as a general alerter rather than as a source of specific information for the pilot. Author

N65-31081# Hine Labs., Inc., San Francisco, Calif.

FURTHER STUDY OF THE MECHANISM OF ACUTE TOXIC EFFECTS OF 1,1-DIMETHYLHYDRAZINE, METHYLHYDRAZINE, AND 1,2-DIMETHYLHYDRAZINE Technical Report, Sep. 1963–Sep. 1964

Francis W. Weir, Frederick H. Meyers, Robert H. Arbucke, and Jesus H. Nemenzo Wright-Patterson AFB, Ohio, AMRL, May 1965 22 p
(Contract AF 33(657)-11756)
(AMRL-TR-65-48; AD-617692)

Investigations were designed to explore mechanisms of toxic action of SDMH, UDMH, and MMH. The acute toxicity to mice of unbuffered SDMH-dihydrochloride is not different from hydrochloric acid. The tenfold difference between the acute toxicity of SDMH at 24 and 168 hours for mice is not seen in rats or dogs. The degree and time course of liver damage in mice is such that it is probably responsible for the delayed deaths seen in this species. Prophylactic treatment with aminooxyacetic acid provided protection to rats against the lethal effects of UDMH, but not against the effects of MMH. The mechanism and site of action of UDMH (1,1-dimethylhydrazine), MMH (methylhydrazine), and SDMH (1,2-dimethylhydrazine) were investigated. Discrete localized lesions produced in specific areas of the otherwise intact brain stem by suction or electrolytic destruction modify or abolish UDMH-induced convulsions in dogs. The area from which these convulsions arise has been localized to a ventral mid-collicular site. Author

N65-31146*# National Aeronautics and Space Administration. Washington, D. C.
PHARMACOLOGY OF THE CORONARY CIRCULATION
V. N. Kaverina Sep. 1965 209 p refs Transl. into ENGLISH of the book "Farmakologiya Koronarnogo Krovoobrashcheniya" Moscow, Medgiz, 1963
(NASA-TT-F-336) CFSTI: HC $6.00/MF $1.25 CSCL 06O

Pharmacological action on the coronary circulation is reviewed. The investigation is based on published material relating to the effects of pharmacological substances on blood circulation in the heart; information on the physiology of the blood circulation; the results of research on the influence of adrenomimetic, cholinergic, ganglion blocking agents, phenothiazine derivatives, analgesics, nitrites, and nitrates on the cardiac blood vessels; and the data on clinical tests of the new vasodilator chloracizin. The two-phase nature of the action of epinephrine and norepinephrine on the cardiac vessels is reported. Also, acetylcholine and carbachol were found to be capable of dilating the coronary vessels but not of improving the cardiac blood supply owing to hypotonia. The effect of ganglion-blocking agents on blood circulation in the heart depends on the relationship between their influence on the tone of the coronary vessels and blood pressure. Further, the effect of analgesics on the cardiac blood supply is due not to their direct action on the coronary vessels but to their capacity to inhibit the reflexes of these vessels. E.E.B.

N65-31179*# Martin Co., Baltimore, Md.
DESIGN STUDY FOR LUNAR EXPLORATION HAND TOOLS
First Quarterly Report
Donald S. Crouch Jan. 1965 36 p refs
(Contract NAS9-3647)
(NASA-CR-65092; ER-13766) CFSTI: HC $2.00/MF $0.50 CSCL 05E

The purpose of this report is to present the results of the first three months work performed for the Design Study of Lunar Exploration Hand Tools. A review of current authoritative interpretations of lunar surface geology and environment was conducted and the need for a portable, battery-powered specimen sampling tool was established. Preliminary lunar gravity simulator tests were performed to define the optimum size for the power tool. Basic design criteria were established, a battery power pack was selected, motor and mechanism approaches were determined, and an integrated configuration envelope was defined. Author

N65-31185*# Beckman Instruments, Inc., Fullerton, Calif. Scientific and Process Instruments Div.
ELECTROENCEPHALOGRAPH SIGNAL CONDITIONERS
Final Report
23 Apr. 1965 68 p ref
(Contract NAS9-3456)
(NASA-CR-65099) CFSTI: HC $3.00/MF $0.75 CSCL 06B

Electroencephalograph signal conditioner systems intended to perform during spacecraft launch, orbit, reentry, and impact are described. In addition to the physical and electrical specifications for the equipment, the performance requirements are detailed for numerous environmental conditions. Analytical discussions of common mode rejection and recovery time are given. Signal conditioners met all test specifications during high temperature, salt spray, pressure, oxygen atmosphere, acceleration, sand and dust, acoustic noise, shock, and endurance tests. The difficulties encountered in electrical interference, low temperature, humidity, immersion, and vibration tests are discussed along with the adjustments made to satisfy the project requirements. J.M.D.

N65-31199# RAND Corp., Santa Monica, Calif.
INTRINSIC CONTROL OF BODY FLUID AND ELECTROLYTE DISTRIBUTION AND URINE FORMATION
J. C. De Haven and N. Z. Shapiro Jul. 1965 142 p refs
(Contract AF 49(638)-700; Proj. RAND)
(RM-4609-PR; AD-467099)

Mathematical models are used to examine certain physiological hypotheses that appear to explain some of the ways in which the human body controls fluid and electrolyte distribution over time. Special attention is given to the contribution of renal excretion to this control. A simple model intended to predict compositional changes in the several body compartments is shown and the predictive abilities of larger models that encompass much of the present knowledge of the chemical detail of the body's physiological compartments are described. Various methods are presented for introducing time into these models. R.N.A.

N65-31206# Stanford Research Inst., Menlo Park, Calif.
EXPLORATIONS IN THE AUTOMATION OF SENSORIMOTOR SKILL TRAINING
Douglas C. Engelbart and Philip H. Sorensen Port Washington, N. Y., Naval Training Device Center, May 1965 83 p refs
(Contract N61339-1517)
(NAVTRADEVCEN-1517-1; AD-619046)

Some problems of automating sensorimotor skill training were explored with a system served by a CDC 160-A computer. *Ss* were trained to transmit 31 alphanumeric characters on 5-key chord keysets. Training conditions varied response prompting (cueing) and confirmation (feedback). Prompting stimuli were (1) lights (automated visual), (2) air jets (automated tactile), (3) reference sheets (nonautomated). Some *Ss* received feedback; others received none. Discriminability of automated prompts were also compared. Throughout experimentation, the computer controlled all presentations and recorded individual performance. No reliable group differences were found in terminal speed or accuracy among groups trained under different prompting conditions. The group trained with tactile prompts was least variable in response speed but most variable in response accuracy. Feedback signals aided code learning regardless of prompting. Discrimination tests favored visual over tactile prompts; tactile stimuli were difficult for most *Ss* to discriminate. Author

N65-31211# Joint Publications Research Service, Washington, D. C.
THE ROLE OF HEREDITY AND CHROMOSOMAL DISEASES IN ANALYSIS OF THE GENETIC EFFECTS OF RADIATION

Ye. F. Davidenkova and I. I. Shtil'bans 20 Aug. 1965 10 p refs Transl. into ENGLISH from Med. Radiol. (Moscow), v. 9, no. 6, Jun. 1964 p 3–8
(JPRS-31635; TT-65-32130) CFSTI: $1.00

The genetic effects of radiation were studied by calculating the number of chromosomal aberrations in cells of human tissue cultures. Smears of scrapings from oral mucosa, stained with orcein (from children, newborn, and mothers) were used to determine the presence of sex chromatin as a means of diagnosing the Klinefelter's syndrome, the Shereshevsky–Turner syndrome, and the triple-X syndrome, all chromosomal diseases. Down's syndrome, another common chromosomal disease was also investigated for radiobiological connections. This syndrome is based on an anomalous chromosome set of somatic chromosomes (autosomes). The statistical data indicate that chromosomal diseases are useful in studying radiation genetics. The mother's age, type of abberation, and other factors should be taken in account. L.S.

N65-31213# Joint Publications Research Service, Washington, D. C.
OPTIMAL SELF-ADAPTATION OF METABOLIC PROCESSES IN THE CELL
G. Dechev and A. Moskona 9 Aug. 1965 8 p refs Transl. into ENGLISH from Dokl. Akad. Nauk SSR (Moscow), v. 162, no. 2, 1965 p 447–450
(JPRS-31464; TT-65-31960) CFSTI: $1.00

The instantaneous variations of the concentration of metabolites in the system of metabolic processes are determined. Their relations with the Hamiltonian system and pulses are also considered. It is shown that constraints on the control parameters transform the problem of optimization of the system with respect to the given function into a nonclassical variational problem. The solution is given by the theory of optimal systems based on a maximum principle and a closely associated dynamic programming equation. C.T.C.

N65-31233# New Hampshire Univ., Durham.
CHEMICAL SYNTHESES OF ACTINOMYCIN ANALOGS Annual Report, Jun. 1963–Jun. 1964
Robert E. Lyle 15 Mar. 1965 22 p refs
(Grant DA-CML-18-108-61-G28)
(AR-3; AD-616692)

Preliminary pharmacological studies of amino acid derivatives of nicotinic, 4-phenoxathiin carboxylic, and 2-amino-3-oxo-3H-phenoxazine-4,6-dicarboxylic acids are reported. The syntheses of the latter is described. Author

N65-31241# California State Polytechnic Coll., San Luis Obispo.
THE HUMAN BLACK BOX. A LITERATURE SURVEY OF BIOCONTROL DATA
Alexander N. Landyshev 25 Aug. 1965 22 p refs

Reference data on human behavior in engineering terms are presented. Methods are discussed for combining and correlating three phases of the human being and the human operator data; actions, reactions, and responses. Human factors in engineering, electrical engineering, biomedicine, biocontrol, and bioelectronics are also discussed. R.W.H.

N65-31242# Bio-Dynamics, Inc., Cambridge, Mass.
DESIGN AND USE OF INFORMATION SYSTEMS FOR AUTOMATED ON-THE-JOB TRAINING. VOL. III: EXPERIMENTAL USE OF THREE INSTRUCTIONAL CONCEPTS
Thomas B. Sheridan Bedford, Mass., AFSC, Electron. Systems Div., Mar. 1965 85 p refs
(Contract AF 19(628)-455)
(ESD-TDR-64-234, Vol. III; AD-616544)

The report describes three experiments in which novel teaching concepts were demonstrated. These concepts had been proposed in previous reports but their effectiveness remained to be verified experimentally. The results were: (1) A teaching program ordered according to the discovery principle significantly reduced errors and performance time over that observed after training with a conventional training manual. (2) Slides projected directly onto a control console, together with a taped lecture, were found to be an effective method of presenting an automated training program. (3) Graphical logical flow diagrams were found to be efficient instructions for teaching procedures for performing a querying-reasoning task. Author

N65-31249# Bio-Dynamics, Inc., Cambridge, Mass.
DESIGN AND USE OF INFORMATION SYSTEMS FOR AUTOMATED ON-THE-JOB TRAINING, VOLUME V Final Report
Thomas B. Sheridan Bedford, Mass., AFSC, Electron. Systems Div., Apr. 1965 22 p refs
(Contract AF 19(628)-455)
(ESD-TDR-64-234; AD-616545)

This report describes the results and conclusions of a study which was directed at the development of principles for the design of automated instructional subsystems for Information Systems. A series of four Technical Documentary Reports have been issued which describe in detail the activities and results of each aspect of the study. This report brings together and summarizes the results reported in the individual documents, and includes additional items which did not warrant separate documentation. Author

N65-31375*# National Aeronautics and Space Administration, Washington, D. C.
EFFECTS OF IONIZING RADIATION AND OF DYNAMIC FACTORS ON THE FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM—PROBLEMS OF SPACE PHYSIOLOGY
N. N. Livshits, ed. Aug. 1965 189 p refs Transl. into ENGLISH from "Vliyaniye Ioniziruyushchikh Izlucheniy i Dinamicheskikh Faktorov na Funktsii Tsentral'noy Nervnoy Sistemy Voprosy Kosmicheskoy Fiziologii" Moscow, Izd. Nauka, 1964
(NASA-TT-F-354) CFSTI: HC $5.00/MF $1.25 CSCL 06R

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3. EFFECT OF PROLONGED ACCELERATION ON THE GROWTH OF THE ORGANISM AND ON THE FUNCTIONING OF SEVERAL OF ITS SYSTEMS A. A. Gyurdzhian, Z. I. Apanasenko, V. I. Baranov, M. A. Kuznetsova, and L. A. Radkevich p 37–48 (See N65-31378 20-04)
4. EFFECT OF VIBRATION ON THE NERVOUS SYSTEM L. D. Luk'yanova p 49–62 ref (See N65-31379 20-04)
5. EFFECT OF GENERAL VERTICAL VIBRATION ON VESTIBULAR FUNCTION IN GUINEA PIGS Z. I. Apanasenko p 63–71 (See N65-31380 20-04)
6. EFFECT OF ACUTE WHOLE-BODY γ-IRRADIATION ON VESTIBULAR FUNCTION IN GUINEA PIGS Z. I. Apanasenko p 72–78 (See N65-31381 20-04)

N65-31376* National Aeronautics and Space Administration, Washington, D. C.

COMBINED EFFECTS OF IONIZING RADIATION AND OTHER FACTORS

N. N. Livshits *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 1–23 (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

The literature on combined effects of ionizing radiation and nonradiation factors on mammalian organisms is reviewed. The problem of the mechanism of organism response to combined factors is discussed. Published results of experimental investigations of combined effect of vibration and ionizing radiation on some animal organism functions are discussed. These studies are compared with literary data, and the mechanism of higher animal reactions to combined effect of vibration and ionizing radiations is considered. A suggestion is expressed that in responses to vibration and irradiation effects side by side with the mechanisms described in literature, parabiotic processes in the nervous system may be of great importance. Author

N65-31377* National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF RADIAL ACCELERATION ON VENOUS FLOW IN THE CEREBRAL BLOOD VESSELS OF RABBITS

V. Ya. Klimovitskiy *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 24–36 (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

Blood flow in cerebral veins of 9 rabbits was studied by means of a thermistor coupled with a heater. Animals were exposed to accelerations of 5–10 g on the centrifuge in the direction "head-pelvis." Exposure for 30 sec was repeated 5–10 times with 30 min intervals for several days. Venous blood flow increased at the beginning of the centrifugation, and sharply decreased at the end. The phenomenon of successive reaction intensification during repeated exposure was recorded. After the centrifuge was stopped, the increase of venous blood flow during 3–5 min and a prolonged decrease afterward were observed. After 3–4 days some adaptation to the acceleration effect could be observed. It was found that the reaction of venous blood flow was determined by the interaction of 2 factors: passive mechanical blood displacement and physiological compensation. Author

N65-31378* National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF PROLONGED ACCELERATION ON THE GROWTH OF THE ORGANISM AND ON THE FUNCTIONING OF SEVERAL OF ITS SYSTEMS

A. A. Gyurdzhian, Z. I. Apanasenko, V. I. Baranov, M. A. Kuznetsova, and L. A. Radkevich *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 37–48 (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

Rats attaining the age of 2–3 days were exposed to acceleration of 2–3 g 5–6 hours daily during 2–3 months. The weight of experimental rats was smaller than that of the control. Special experiments showed that unfavorable conditions of food intake during rotation were not the single cause of the low weight of experimental animals. Motor activity in experimental rats during special test rotation was higher than in the control. Mortality under the action of lethal acceleration was the same in both groups. No difference between viability of experimental and control rats was observed. In experimental rats the excitability of equilibrium organ was reduced. Bioelectric reaction of extremity muscles to adequate stimulation of vestibular apparatus was lower, the latency of reaction was longer and the duration of aftereffect was shorter. Bioelectric activity of skeletal muscles at rest in experimental rats was lower. The latency of unconditioned defensive reflexes to a weak stimulus in experimental rats was longer than in the control; the latency of the reflex to medium and strong stimuli exhibited a tendency to shortening. Author

N65-31379* National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF VIBRATION ON THE NERVOUS SYSTEM

L. D. Luk'yanova *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 49–62 ref (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

Based on the literature and personal investigations, the author shows the effect of local and total, single and chronic vibration on the state of the peripheral and central nervous systems. The problem of the mechanism of vibration effect on the living body is considered. A generalizing scheme of vibration influence on the nervous system is suggested. This scheme reveals the possibility of formation of the regions of steady excitation in the spinal cord and the higher parts of the central nervous system. Author

N65-31380* National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF GENERAL VERTICAL VIBRATION ON VESTIBULAR FUNCTION IN GUINEA PIGS

Z. I. Apanasenko *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 63–71 (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

The influence of total vertical vibration on the functional state of the equilibrium organ was studied. Electromyograms of the group of antigravitation muscles of guinea pig hind extremities at relative rest and at adequate stimulation of equilibrium organ were recorded. After vibration a statistically significant increase of spontaneous electrical activity of investigated muscles at relative rest was observed. Electromyographic response to adequate stimulation of the equilibrium organ was

activated: latency of this reaction decreased, while after-effect prolonged it. These effects were observed 7–12 days after vibration. General state of the animal and the cells of the peripheral blood were not subjected to statistically significant changes under the action of vibration. Author

N65-31381* National Aeronautics and Space Administration, Washington, D. C.
EFFECT OF ACUTE WHOLE-BODY γ-IRRADIATION ON VESTIBULAR FUNCTION IN GUINEA PIGS
Z. I. Apanasenko *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 72–78 (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

The change in functions of the equilibrium organ of guinea pigs totally irradiated with γ-rays Co^{60} with 500 r, at a dose rate of 261 r/min, was studied. Electromyograms of the group of antigravitational muscles in hind legs of guinea pigs at relative rest and at adequate stimulation of equilibrium organ were recorded. After irradiation a distinct decrease of spontaneous electrical activity of the investigated muscles at relative rest and the change of bioelectric reaction of these muscles to the adequate stimulation of the equilibrium organ were observed. This reaction becomes less regular and often is pathologically increased; its latency increases sharply, while aftereffect is shortened. The clinical state of the animals was in conformity with the normal course of acute radiation sickness with lethal outcome on the 9th–14th day. Author

N65-31382* National Aeronautics and Space Administration, Washington, D. C.
COMBINED EFFECTS OF VIBRATION AND ACUTE IRRADIATION ON VESTIBULAR FUNCTION IN GUINEA PIGS
Z. I. Apanasenko *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 79–87 (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

The complex effect of simultaneously or consecutively applied vibration and acute irradiation with a dose of 500 r on the functions of the equilibrium organ was studied. Electromyograms of the group of antigravitational muscles of guinea pig hind extremities at relative rest and at adequate stimulation of equilibrium organ were recorded. The change in radiation response of the organism under vibration effect was recorded. By the number of blood cells, weight dynamics, general clinical state and animal survival, the author found no authentic differences between complex effect and single irradiation. Author

N65-31383* National Aeronautics and Space Administration, Washington, D. C.
EFFECT OF ACUTE WHOLE-BODY γ-IRRADIATION ON EXCITABILITY OF THE SPINAL REFLEX ARC
M. A. Kuznetsova *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 88–96 (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

Total γ-irradiation with 500 r caused an increase of the latent period of motor defense reflexes in guinea pig extremities. At the same time, normal relation between stimulation intensity and the strength of response was preserved. The excitability threshold of the reaction increased in one group of the animals after irradiation, and decreased in the other group, but these changes were not statistically significant. Correlation between the dynamics of changes in excitability thresholds and of latency was not observed. Author

N65-31384* National Aeronautics and Space Administration, Washington, D. C.
EFFECT OF GENERAL VERTICAL VIBRATION ON SPINAL REFLEX ARC FUNCTION
M. A. Kuznetsova *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 97–104 (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

Total vertical vibration of 70 cps, amplitude 0.4 mm and duration of 15 min was applied twice with a 24-hour interval between exposures. It caused, not sharp, but statistically significant increase of the excitability threshold of motor defense reflex in guinea pig extremities. The latency in one group of the animals increased and in the other group decreased. In all animals, responses to stimulators of weak and high intensity were equalized. This fact indicates development of parabiotic phenomena in the investigated reflex arc. Author

N65-31385* National Aeronautics and Space Administration, Washington, D. C.
COMBINED EFFECTS OF VIBRATION AND IONIZING RADIATION ON THE FUNCTIONAL STATE OF THE SPINEL REFLEX ARC
M. A. Kuznetsova *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 105–110 (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

The complex effect of total vertical vibration and 500 r γ-irradiation on the excitability threshold and the latency of motor defense reflex in guinea pig hind extremities were studied. Total vertical vibration of 70 cps, 0.4 mm amplitude and 15 min duration was applied twice: 30–40 min before and 24 hours after irradiation. In response to complex action of these factors, some properties of separate effects of each factor were combined. In one part of the animals vibration effects predominated, while in the other part irradiation prevailed. According to the reactions of some functions, the results of the complex effect took an intermediate position between vibration and radiation effects. Author

N65-31386* National Aeronautics and Space Administration, Washington, D. C.
EFFECT OF GENERAL REPEATED VIBRATION ON OXYGEN TENSION IN THE BRAIN OF RATS
L. D. Luk'yanova *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 111–125 (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

Single vibration of animals (70 cps) caused the appearance of 3 successively developing phases: (a) increase of oxygen consumption by cerebral tissue, (b) decrease of its consumption, (c) restoration period. Repeated vibrations strengthened the changes in each phase. Adaptation phenomenon was not observed. Changes in the level of oxidative processes induced by vibration are not identical in different parts of the brain. Vibration causes the decrease of lymphocytes during the first hour, followed by leukocytosis. The study shows that the changes in oxygen tension and in the level of its consumption by cerebral tissue reflect a specific state of nerve tissue, that develops in response to vibration effect. Author

N65-31387* National Aeronautics and Space Administration, Washington, D. C.
COMBINED EFFECT OF GENERAL VERTICAL VIBRATION AND IRRADIATION ON THE OXIDATIVE PROCESSES IN THE BRAIN OF RATS

L. D. Luk'yanova *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 126–139 ref (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

Changes of oxidative processes in cerebral tissues of animals (rats) exposed to vibration with subsequent irradiation proceeded differently than those of animals subjected to each effect separately. Summation effect induced by vibration was not observed. Survival of animals in the second case was significantly higher than that in the group of irradiated animals. A parallelism between the functional state of nerve centers of irradiated animals and oxidative processes in the brain was observed. The mechanism of the combined effects of vibration and irradiation on oxygen consumption by cerebral tissue is discussed. Author

N65-31388* National Aeronautics and Space Administration, Washington, D. C.
THE EFFECT OF GENERAL VERTICAL VIBRATION AND X-RAYS ON THE NUCLEI OF BONE MARROW CELLS IN MAMMALS
Yu. S. Demin *In its* Effects of Ionizing Radiation and of Dyn. Factors on the Functions of the Central Nervous System—Probl. of Space Physiol. Aug. 1965 p 140–159 (See N65-31375 20-04) CFSTI: HC $5.00/MF $1.25

The paper presents the results of the investigations of the effect of vibration (60–70 cps), of the irradiation with doses of 50–100 r of X-rays and of the combined effect of vibration and irradiation on the cells of marrow of mice. Vibration of animals causes an increase of disturbed mitosis due to a higher rate of chromosome cohesion. Vibration preceding irradiation does not increase the rate. Some decrease of rate of chromosome aberrations and increase of rate of chromosome cohesion was found when the combined effect of both factors was studied. The rate of disturbed mitosis in the marrow cells of mice analyzed was higher than that in control for as long as ten days. Author

N65-31420# Joint Publications Research Service, Washington, D. C.
CONTROL MECHANISMS OF DNA BIOSYNTHESIS
I. I. Filippovich 17 Aug. 1965 18 p refs Transl. into ENGLISH from Usp. Sovrem. Biol. (Moscow), v. 58, no. 1 (4), Jul.–Aug. 1964 p 22–32
(JPRS-31578; TT-65-32074) CFSTI: $1.00

Five chemical processes which are individually capable of regulating the entire biosynthesis of deoxy-ribonucleic acid (DNA) are discussed. These processes are biosynthesis of monophosphates of the purine and pyrimidine ribosides; reduction of ribotides into corresponding deoxy-ribotides, and deamination of deoxy-cytidine-monophosphate with formation of deoxy-uridine-monophosphate; formation of thymidine-triphosphate; polymerization of the triphosphates of nucleosides with formation of DNA; and disintegration of the DNA-primer into two polynucleotide chains. J.M.D.

N65-31421# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
MICROBIOLOGY Selected Articles
18 May 1965 26 p refs Transl. into ENGLISH from Mikrobiologiya (Moscow), v. 33, no. 3, 1964 p 472–476, 508–515 (FTD-TT-65-66/1+2; AD-617161)

CONTENTS:

1. EFFECT OF BLUE-GREEN ALGAE ON THE DEVELOPMENT OF MICROORGANISMS IN THE SOIL G. M. Perminova p 1–9 refs (See N65-31422 20-04)
2. CULTIVATION OF GREEN PLANKTON ALGAE ON SEWAGE G. G. Vinberg p 10–22 refs (See N65-31423 20-04)

N65-31422 Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
EFFECT OF BLUE-GREEN ALGAE ON THE DEVELOPMENT OF MICROORGANISMS IN THE SOIL
G. N. Perminova *In its* Microbiol. 18 May 1965 p 1–9 refs (See N65-31421 20-04)

Experiments using soddy-podzolic soils from various USSR regions showed that the introduction of blue-green algae into the soil increases the number of aerobic and anaerobic nitrogen-fixing microorganisms. It was also found that blue-green algae in soils characteristic of temperate zones form nitrogen-fixing complexes. J.M.D

N65-31423 Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CULTIVATION OF GREEN PLANKTON ALGAE ON SEWAGE
G. G. Vinberg *In its* Microbiol. 18 May 1965 p 10–22 refs (See N65-31421 20-04)

Laboratory experiments on the growth of algae in sewage are reported which are of interest with respect to the question of whether city sewage water can be self-purified in biological ponds. Various algae varieties were introduced into flasks containing city sewage water, in the presence or absence of air, and culture growth and chemical determinations were made over a period of several weeks. It was found that the dry weight of algae reached a maximum after six to eight days, and remained at that level until the end of the experiments. The amount of ammonium-nitrogen compound appeared to drop rapidly from the outset of the tests. In all cases the active reaction of the medium gradually shifted to the alkali side, reaching Ph values as high as 12.5. The basic factor that limited the extent of algae growth was the amount of carbon available in the sewage water. J.M.D

N65-31484 Naval Research Lab., Washington, D. C.
CONTAMINANTS IN THE SEALAB I ATMOSPHERE
Raymond A. Saunders *In its* Rept. of NRL Progr. May 1965 p 1–7 refs Presented at Conf. on Atmospheric Coat in Confined Spaces, Dayton, Ohio, 31 Mar.–2 Apr. 1965 (See N65-31483 20-34)

The latest experiment in the "Man-in-the-Sea" Program was conducted recently off the coast of Bermuda by the Navy's Special Projects Office. Four scuba divers remained at a depth of 193 feet for 11 days, spending their off-duty time in a suitably-equipped pressure vessel called SEALAB I, which rested on the seabottom. The atmosphere in SEALAB consisted of 4% oxygen, 16% nitrogen and 80% helium at a total pressure of 110 psi. Trace organic contaminants which developed in this exotic atmosphere were sampled with activated charcoal. Contaminants were recovered from the charcoal in the laboratory, separated with a gas chromatograph, trapped from the chromatographic effluent with a fraction collector, and identified by means of their infrared and mass spectra. Almost one hundred trace contaminants were recovered and identified or characterized. Author

N65-31514# Rutgers Univ., New Brunswick, N. J. Dept. of Physiology and Biochemistry.
[PHYSIOLOGICAL AND BIOCHEMICAL STUDIES OF CATS] Formal Progress Report
Harry M. Frankel 14 Jul. 1965 5 p
(Contract AF 41(609)-2635)
(AD-468457)

Measurements of mean arterial (MAP) and right atrial (RAP) pressures in 10 cats during progressive hyperthermia showed effective cardiac output at temperatures greater than 42° C although MAP was decreasing. A negative RAP at temperatures approaching 44° C led to the conclusion, that the decreased

MAP was induced by inadequate venous return. A double balloon catheter for collecting of hepatic vein blood from the inferior vena cava was successfully placed in six cats. Arterial blood ketones and β-hydroxybutyrate were also determined during progressive hyperthermia, but no clear pattern of change in ketone concentration was observed. Total plasma lipids and plasma free fatty acid concentrations decreased consistently with increase in temperatures. G.G.

N65-31520# Joint Publications Research Service, Washington, D. C.
CHEMICAL TRANSMISSION OF NEURAL EXCITATIONS
A. V. Kibyakov 17 Aug. 1965 13 p Transl. into ENGLISH from "Khimicheskaya Peredacha Nervnogo Vozbuzhdeniya" Moscow, Acad. of Sciences USSR, 1964 p 177–185, 207–208
(JPRS-31577; TT-65-32073) CFSTI: $1.00

The conclusions and table of contents are given for a book on the subject of chemical transmission of neutral excitations. Among the conclusions were the following: (1) Removal of the medullary substance of the adrenal glands and certain accessory chromaffin paraganglia in animals affects the action of the sympathetic nervous system. Its basic disruption is the result of a significant decrease in the quantity of sympathin discharged at the adrenergic nerve endings at the time of their excitation. (2) Extirpation of most of the pancreas in animals leads to a noticeable disruption of the activity of cholinergic innervation. The basis of this disruption is the significant decrease in the quantity of acetylcholine discharged at the cholinergic nerve endings during their excitation. (3) The development of tonic contraction of smooth muscle is accompanied by noticeable reconstruction of its contractile apparatus. (4) It is observed that the influence of removing the medullary substance of the adrenal glands on the function of the adrenergic nervous system has a temporary, transitional character.
E.E.B.

N65-31522# Joint Publications Research Service, Washington, D. C.
BIOLOGICAL MEASUREMENTS IN SPACE
K. B. Karandeyev, ed. 24 Aug. 1965 40 p refs Transl. into ENGLISH of the book "Avtomaticheskiy Kontrol' i Metody Elektricheskikh Izmereniy, Tom II: Teoriya Izmeritel'nykh Informatsionnykh Sistem" Novosibirsk, Acad. of Sci. USSR, Siberian Dept., 1964
(JPRS-31679; TT-65-32174) CFSTI: $2.00

CONTENTS:
1. EMPLOYMENT OF A DIGITAL COMPUTER FOR AUTOMATIC MONITORING OF THE CONDITION OF A COSMONAUT AND LIFE SUPPORT SYSTEMS R. M. Bayevskiy, V. V. Bogdanov, A. M. Zhdanov, L. A. Kazar'yan, and V. I. Yazdovskiy p 1–9 refs
2. INFORMATION MEASURING SYSTEMS IN SPACE BIOLOGY R. M. Bayevskiy, A. D. Voskresenskiy, O. G. Gazenko, A. D. Yegorov, N. A. Chekhonadskiy et al p 10–18 refs
3. SENSORS FOR PHYSIOLOGICAL INVESTIGATIONS DURING SPACE FLIGHT I. T. Akulinichev, R. M. Bayevskiy, O. G. Gazenko, K. P. Zazykin, I. S. Shadrintsev p 19–28 refs
4. THE DESIGN OF AUTOMATIC DEVICES FOR ANALYSIS OF BALLISTOCARDIOGRAMS K. P. Buteyko, N. G. Buryy, N. V. Vas'kova, A. K. Romanov, and I. I. Smirnova p 29–37 refs

N65-31531# Joint Publications Research Service, Washington, D. C.
INHIBITION OF EVOKED ACTIVITY OF NEURONS OF THE CEREBRAL CORTEX DURING THE ACTION OF A SOUND STIMULUS
V. G. Skrebitskiy and L. L. Voronin 9 Aug. 1965 8 p refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 160, no. 4, 1965 p 972–975
(JPRS-31467; TT-65-31963) CFSTI: $1.00

Experiments were conducted on anesthetized rabbits to determine the neuronal basis of conditioned reflex activity inhibition induced by the sudden introduction of an outside stimulus. Observed were changes in response to flashes of light by neurons of the visual cortex under the influence of a sound stimulus. Seven rabbits were used and data derived from recordings of the extracellular activity of 100 individual neurons. Results showed that 48% of the recorded neurons did not respond to flashing light, and that 55 did respond. Also a significant number of neurons of the visual cortex (45 of 100) reacted to the introduction of sound stimuli. Presented are numerical data on the changes in neuronal activity during light and sound stimuli; and data on the effects of sound on the discharges evoked by light. The neurons responding best to light were those with low basal activity. Speculation is made concerning the importance of intracellular recording and the morphological identification of neurons of the cortex and subcortical structures.
S.C.W.

N65-31535# Joint Publications Research Service, Washington, D. C.
SOVIET STUDIES IN MOLECULAR BIOLOGY, GENETICS, AND STRESS
18 Aug. 1965 57 p Transl. into ENGLISH from Priroda (Moscow), no. 5, 1965 p 17–20, 24–25, 27–32, 51–55
(JPRS-31599; TT-65-32094) CFSTI: $3.00

CONTENTS:
1. PROBLEMS OF MOLECULAR BIOLOGY. INVESTIGATION OF ANIMATED ON UNANIMATED OBJECTS V. A. Engel'gardt p 1–4
2. AN INTERESTING COLLECTION OF ARTICLES [GENERAL GENETICS] p 5
3. CHROMOSOMES AND THE ORGANISM A. A. Prokof'yeva-Bel'govskaya p 6–18
4. HEREDITARY DISEASES, EFFECT OF ENVIRONMENT AND ...STATISTICS p 19
5. GENETICS AND GERONTOLOGY p 20
6. HOW CAN THE OCCURRENCE OF HERMAPHRODITES BE EXPLAINED? p 21
7. WHAT IS THE SIZE OF THE GENE? p 22
8. HOW PROTEINS ARE FORMED L. L. Kiselev p 23–32
9. GENETICS OF THE Rh FACTOR p 33
10. BIOSYNTHESIS OF NUCLEIC ACIDS G. P. Georgiyev p 34–41
11. IS IT POSSIBLE TO PROTECT POSTERITY FROM RADIATION? p 42
12. MOLECULAR WEIGHT OF RNA AND DNA p 43
13. THE CELL—AN INDICATOR OF RADIATION p 44
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15. STRESS: EXCESSIVE EXERTION OF AN ORGANISM—CAUSES, AND MEANS OF PREVENTION M. M. Reydler p 46–54

N65-31536# Joint Publications Research Service, Washington, D. C.
STUDIES IN GENETICS
M. Ye. Lobashev, ed. 11 Aug. 1965 117 p refs Transl. into ENGLISH from Issled. po Genet. (Leningrad), no. 2, 1964 p 3–20, 46–85, 125–133
(JPRS-31514; TT-65-32010) CFSTI: $4.00

CONTENTS:

N65-31557# Lockheed Missiles and Space Co., Sunnyvale, Calif.

STUDY OF HUMAN PERFORMANCE IN A MARK IV PRESSURE SUIT

A. K. Miller and R. S. Lincoln 15 Nov. 1964 38 p ref
(LMSC-6-62-64-19)

Two subjects wearing Mark IV pressure suits, under both the pressurized and unpressurized condition, were tested on several performance tasks. The purpose of the study was to provide an evaluation of performance tasks under suit conditions. Results of the study indicated that the tasks can be successfully presented on an oscilloscope under computer control to evaluate performance capability of suited crew members. Two interesting effects identified in the experimental data were related to characteristics of the pressure suit. When pressurized: (1) The subjects were hindered in the performance of a tracking task because they were unable to rotate their wrists, and (2) One subject had difficulty operating push buttons, which were separated by 5/8 in. between edges, because of the characteristics of the gloves included with the Mark IV suit. Author

N65-31620# School of Aerospace Medicine, Brooks AFB, Tex.

HEART RATE PATTERNS OBSERVED IN MEDICAL MONITORING Technical Documentary Report, Jan. 1961–Dec. 1964

David G. Simons and Robert L. Johnson May 1965 22 p refs
(SAM-TR-65-26; AD-467734)

The study included heart rate records from several hundred individuals under a wide variety of aerospace flight stress situations including sleep, quiet wakefulness, clinical stress testing, simulated aircraft flight, and F-100 aircraft flight. Automated beat-by-beat heart rate analysis recorded at 1 mm. per second paper speed clearly demonstrated a variety of heart rate patterns. Base heart rate values which reflected homeostatic levels were distinguished from heart rate reflex activity identified as transient disruptions of homeostasis. Reflex patterns were divided into respiratory heart rate and slow wave heart rate reflex activity. Three forms of slow waves were identified: cardioaccelerator, balanced, and cardiodecelerator. The discussion included physiologica mechanisms contributing to the observed heart rate reflex patterns. Author

N65-31622# Westinghouse Electric Corp., Elmira, N. Y. Electronic Tube Div.

SOLID STATE IMAGE INTENSIFIERS, PHASE III. A BROAD CONTINUING PROGRAM FOR THE APPLICATION OF LIGHT AND IMAGE INTENSIFICATION TECHNIQUES TO MILITARY TRAINING Annual Report

D. C. Fowlis, R. D. Harder, R. E. W. Lake, Z. Szepesi, W. A. Thornton et al Port Washington, N. Y., Naval Training Device Center, Mar. 1965 100 p refs
(Contract N61339-1440; Proj. LIT)
(NAVTRADEVCEN-1440-1; AD-619066)

Progress is reported in the development of image intensifier panels with improved characteristics. Panels with the best uniformity, least graininess, and widest half-tone range reproducing capability had maximum standard luminous gains of 20 foot-Lambert per foot-candle and maximum output brightnesses of 30 foot-Lamberts at 200 V and 2000 cps. Response times between 50 and 500 msec were measured. A parameter study of the PC-EL circuit was made with the digital computer; CdSe sintered layers were analyzed and improved; improved image quality of the low resolution image intensifier panel was obtained; and evaporated EL films were prepared with improved reproducibility and longer life. Also, evaporated PC and EI films were built together. E.E.B.

N65-31630# Aerospace Medical Div., Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, Ohio.

ACOUSTICAL EVALUATION OF X-20A DYNA-SOAR FULL-PRESSURE SUIT ASSEMBLIES

Henry C. Sommer and Harald K. Hille May 1965 32 p refs
(AMPL-TR-65-86; AD-618715)

This report presents comparative acoustical data for the "training" model and the "flight-ready" model of the Dyna-Soar X-20A full pressure suit assemblies. For each model the acoustical protection was determined (1) from the subjective measurements of Real-Ear Attenuation at Threshold (REAT) for pure tones and (2) from the objective measurement of transmission loss for wide band noise as recorded outside and inside the helmet at the lip microphone and ear cup positions. Evaluation of the data as measured by the REAT method showed that the training models provide more attenuation than the flight-ready model at the higher frequencies which is the result of a better seal between the ear cup and skull in the training model. The measurement of the transmission loss showed little difference between the two models of the suit assemblies. On the basis of calculated noise levels in the command module of the Dyna-Soar X-20A vehicle, no reduction in speech transmission and reception by the environmental noise is expected for either model. Author

N65-31693# Cincinnati Univ., Ohio. Coll. of Medicine.

METABOLIC CHANGES IN HUMANS FOLLOWING TOTAL BODY IRRADIATION Annual Report, 1 May 1963–28 Feb. 1964

Eugene L. Saenger, Ben I. Friedman, James G. Kereiakes, and Harold Perry [1964] 30 p refs
(Contract DA-49-146-XZ-029)
(DASA-1633; AD-464277)

Information is being investigated to estimate combat effectiveness of troops and to develop methods of diagnosis, prognosis, prophylaxis and treatment of radiation injury. At the present time parameters of active investigation are clinical findings, hematologic effects, profile scores, miscellaneous laboratory tests, deoxycytidine excretion in the urine, xanthurenic acid excretion in the urine, chromosome changes in leucocytes, immunologic studies and the use of autologous bone marrow. Six patients were given from 149r to 231r (100–150 rad) total body irradiation from a Co^{60} source. Only one of the patients had prodromal nausea and vomiting with nausea lasting 48 hours. The lowest hematologic values were found 25 to 35 days after irradiation. Deoxycytidine was found in increased amounts in the urine from patients after total body irradiation. In rats much larger amounts were found in the urine after 500r and 800r whole body irradiation than after lesser doses. Studies indicate there may be an immunologic post irradiation alteration in human gamma globulin antigenicity. Combat effectiveness would be relatively maintained with an exposure up to 200 rad, though a second exposure would result in significant troop ineffectiveness. Author

N65-31712# Joint Publications Research Service, Washington, D. C.
A GROWTH EQUATION SYSTEM AND CERTAIN OTHER SYSTEMS MODELLING BIOLOGICAL OBJECTS
S. I. Anisimov 23 Aug. 1965 4 p refs Transl. into ENGLISH from Biofizika (Moscow), v. 10, no. 2, 1965
(JPRS-31663; TT-65-32158) CFSTI: $1.00

Restrictions on differential equations which are necessary in order to use dynamic modelling to describe biological systems are discussed briefly. J.M.D.

N65-31715# Joint Publications Research Service, Washington, D. C.
HUMAN WORK CAPACITY UNDER CONDITIONS OF WEIGHTLESSNESS
A. V. Yeremin, I. I. Kas'yan, I. A. Kolosov, V. I. Kopanev, and V. I. Lebedev 23 Aug. 1965 10 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Ser. Biol. (Moscow), no. 3, May-Jun. 1965 p 329–334
(JPRS-31665; TT-65-32160) CFSTI: $1.00

Human work capacity remains at a fairly high level during space flights lasting up to five days when cosmonauts remain well secured to work stations within the spacecraft. As the length of space flight and complexity of tasks to be performed increase and when spacemen are in unsupported positions, some decrease in work capacity is anticipated. The authors feel that higher criteria for the selection and training of cosmonauts are indicated to overcome the undesirable effects of prolonged weightlessness. M.W.R.

N65-31717# Joint Publications Research Service, Washington, D. C.
MEDICAL RESEARCH AND EQUIPMENT
9 Aug. 1965 9 p Transl. into ENGLISH from Med. Gazeta (USSR), 6 Apr. 1965
(JPRS-31463; TT-65-31959) CFSTI: $1.00

The problem of human acclimatization to hot climate conditions is discussed. Investigations conducted in Central Asia disclosed that a hot climate, eliciting changes in physiological reactions, affects human pathology. A comparative analysis revealed that the incidence of cerebrovascular affections and myocardial infarct among the inhabitants of Ashkhabad was frequently doubled as compared to the inhabitants of Ufa. It was established that the hot climate induces asthenia, apathy, and loss of appetite which complicates the course of the postsurgical period; shifts in the indices of hemodynamics, and aqueous-saline metabolism were also noted in the postsurgical patients. It was concluded that biotics, particularly salts of copper, molybdenum, zinc, and mercury and iodine, stimulate the phagocyte activity of the leukocytes and metabolism. These facts indicated the possibilities of active interference in the acclimatization processes. R.W.H.

N65-31787# School of Aerospace Medicine, Brooks AFB, Tex.
FLYING STRESS IN RELATION TO FLYING PROFICIENCY
Henry B. Hale, John C. Duffy, Jmes P. Ellis, Jr., and Edgar W. Williams Dec. 1964 15 p refs Submitted for Publication
(SAM-TR-64-88; AD-458843)

Postflight urinary determinations were employed for the purpose of evaluating flight stress in 10 pilots who were practicing bombing-strafing maneuvers. Tests were conducted in daytime and at night. Control data were obtained on nonflying days. Urinary determinations included norepinephrine, epinephrine, 17-hydroxycorticosteroids, creatinine, urea, uric acid, phosphete, potassium, and sodium. By the use of this battery of determinations, it was possible to appraise flight-sensitivity in sympathoadrenal, adrenocortical, and metabolic activities. The results give good leads for further research and suggest that flying proficiency is high when endocrinemetabolic displacement (physiologic cost) is low. These observations also indicate that stress reactions to flight conform to the General Adaptation Syndrome pattern. Author

N65-31798# California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
[BIOCHEMISTRY, RADIOBIOLOGY, PHARMACOLOGY, TOXICOLOGY, AND NUCLEAR MEDICINE] Semiannual Progress Report, Period Ending Jun. 30, 1965
[1965] 129 p refs
(Contract AT(04-1)-GEN-12)
(UCLA-12-541)

A list of publications and reports is presented in the areas of Biochemistry, Radiobiology, Pharmacology and Toxicology, Nuclear Medicine, Biophysics, and Environmental Radiation. R.W.H.

N65-31833# Polytechnic Inst. of Brooklyn, N. Y.
PSEUDO-RANDOM DOT SCAN TELEVISION SYSTEMS
Sid Deutsch [1964] 40 p refs
(Contract AF 19(628)-3815; Grant NSF GP-2384)
(AD-463037)

The principal psychophysical requirements of the human eye are satisfied by a television frame frequency of 1 or 2 cycles/sec. To avoid flicker with such low frame rates, a pseudo-random dot scan is employed in conjunction with long-persistence phosphors. Experiments show that 15% dot flicker is tolerable. Ten systems are discussed, including a two-mission-element picture with 4 mc/sec bandwidth; tape recording at 15 inches/sec; the continuous relaying of satellite pictures; short-wave transmission; phonevision; and very low frame rate applications that use a scan conversion tube. Author

N65-31857# Joint Publications Research Service, Washington, D. C.
CYBERNETICS IN MEDICINE
A. A. Vishnevskiy 25 Aug. 1965 16 p Transl. into ENGLISH from Priroda (Moscow), no. 6, 1965 p 24–34
(JPRS-31712; TT-65-32207) CFSTI: $1.00

Presented is an analysis of the interrelationships and parallel development of cybernetics and medicines. Considered are techniques employed by cybernetic systems, and medical diagnostic techniques. Cited are classical examples which illustrate the effectiveness of diagnostic techniques used in both areas

as in the treatment of congenital heart defects and anomalies of the cardiovascular system. Discussed are medical memory diagnosis, logical processes of machine diagnosis, machine prognosis of disease, and an electronic medical archive. R.W.H.

N65-31864# Air Force Systems Command, Wright-Patterson AFB, Ohio. Biomedical Lab.
DETERMINATION OF HYDRAZINE AND 1-METHYLHYDRAZINE IN BLOOD SERUM Technical Documentary Report, Jun. 1962–Aug. 1963
Barbara A. Reynolds and Anthony A. Thomas Apr. 1964 14 p refs
(AMRL-TDR-64-24; AD-441231)

A simple procedure is described for measuring microgram amounts of hydrazine in the blood serum of rats. The procedure, with a minor modification, can be used for measuring microgram amounts of 1-methylhydrazine. The report presents calibration ranges of 0.5–5.0 μg/ml and 0.5–10.0 μg/ml of hydrazine and 1-methylhydrazine, respectively. Data are presented on the dose–blood-level relationship of hydrazine and 1-methylhydrazine in rats following intraperitoneal injection. Minimum detectable dose levels were 0.6 mg/kg and 3.0 mg/kg of hydrazine and 1-methylhydrazine, respectively. Author

N65-31915# Laboratoires du Centre d'Etude de l'Energie Nucleaire, Mol (Belgium).
CELLULAR AND BIOCHEMICAL RADIOBIOLOGY Final Report, 1964 [RADIOBIOLOGIE CELLULAIRE ET BIOCHIMIQUE RAPPORT FINAL, 1964]
Brussels, EURATOM, 1965 25 p refs In FRENCH; ENGLISH summary
(Contract EURATOM-014-62-1 BIOB)
(EUR-2201.f) Available from Belg. Am. Bank and Trust Co., New York, Account No. 22.186: 40 Belg. Fr.

The authors carried out the following research: (1) Using microelectrophoresis in agar, immuno-electrophoresis and incorporation of amino-acids, on the protein changes in the serum and various tissues of mice irradiated with a lethal and sublethal dose of X-rays. (2) On the permeability of cellular and tissue membranes to macromolecules and the influence thereon of radiations. These studies were carried out on both vegetable and animal organs (genital organs and hyperplasia, normal and cancerous tissues, embryo tissues). (3) On the intracellular distribution of the cytoplasmic hydrolases; the relation between the activity of acid DNAse and growth; the inhibition of DNA-polymerase by rat-liver microsomes; the thymidine phosphokinases; and the isotopic effect of tritium. Author

N65-31931# Library of Congress, Washington, D. C. Aerospace Technology Div.
FUNCTIONS OF THE ORGANISM UNDER CONDITIONS OF AN ALTERED GAS ENVIRONMENT
10 Jun. 1965 30 p refs *Its* A.T.D. Press, Vol. 3, No. 240
(AD-618421)

Twenty seven abstracts are presented of selected articles on respiratory physiology from Soviet literature. Emphasis is placed on problems connected with increased barometric pressure. Several articles deal with the theoretical aspects of decompression sickness. Other articles are concerned with the problem of the toxic effects of oxygen, particularly those functional changes which occur when the effect of oxygen is not accompanied by convulsions. Also, the mechanical effects of pressure during abrupt decompressions, of rarefied atmospheres on the central nervous system, of pressurized respiratory equipment, and of helium utilization in respiratory mixtures are included. E.E.B.

N65-31958# Atomic Energy Commission, Oak Ridge, Tenn. Div. of Technical Information Extension.
SUBJECT INDEX TO EFFECTS OF RADIATION ON THE MAMMALIAN EYE—A LITERATURE SURVEY
Helen L. Ward and William E. Bost Jul. 1964 18 p See also N63-85182
(TID-3912(Index)) CFSTI: $0.50

A subject index of a literature survey dealing with the effects of radiation on the mammalian eye includes headings related to the structure of the eye, diseases of the eye, and various types of radiation. M.W.R.

N65-31969# Yale Univ., New Haven, Conn.
STUDIES IN FORCED COMPLIANCE. I: THE EFFECT OF PRESSURE FOR COMPLIANCE ON ATTITUDE CHANGE PRODUCED BY FACE-TO-FACE ROLE PLAYING AND ANONYMOUS ESSAY WRITING
J. Merrill Carlsmith, Barry E. Collins, and Robert L. Helmreich Jul. 1965 36 p refs
(Contract Nonr-4629(00); Grant NSF GS-492)
(TR-1; AD-617418)

One half of the experimental subjects (male high school students) were enticed to tell the next subject (a female accomplice) that the experimental task was interesting, exciting, fun, and enjoyable (when, in fact, it was quite dull). The other half of the experimental subjects wrote an anonymous essay to the same effect. Experimental subjects were paid an additional $0.50, $1.50, or $5.00 for this counter-attitudinal response. Control subjects merely worked on the experimental task and completed the posttest. The data from the face-to-face condition replicates the original Festinger and Carlsmith experiment; small amounts of money were most effective in convincing subjects that the task was really fun and interesting. Data from the essay condition, however, indicated just the opposite. Large amounts of money produce the most attitude change. Author

N65-31974# Army Natick Labs., Mass. Clothing and Organic Materials Div.
TEXTILES FOR THERMAL RADIATION PROTECTION
Earl T. Waldron Apr. 1965 39 p refs
(TS-132; AD-617707)

The degree of thermal radiation protection provided by a fabric is influenced by the weight of the material, the type of dyestuffs and chemical finishes used, the synergistic effects from blending the fibers, and the chemistry of the fibers. The net thermal protection provided by an ensemble is further influenced by the ignition characteristics of the outer layer and the manner in which the layers are put together. Reflective sub-layers add protection when used with a diathermanous outer layer; sub-layers that incorporate volatile finishes are a hazard when used with impermeable or slightly permeable outer layers. Of the fibers immediately available from industry, the blends of cotton with nylon showed the best performance in solar furnace and carbon arc tests and their efficiency was increased with of the Dyna-Soar X-20A vehicle, no reduction in speech transmission and reception by the environmental noise is expected for either model. Author

N65-32010# Joint Publications Research Service, Washington, D. C.
STANDARDS OF RADIATION SAFETY
Vl. Kalaydzhiev and Iv. Popov 23 Aug. 1965 23 p Transl. into ENGLISH from D'rzhaven Vestn. (Sofia), no. 59, 27 Jun. 1965 p 2–6
(JPRS-31646; TT-65-32141) CFSTI: $1.00

Maximum permissible doses of external and internal irradiation and maximum permissible concentrations of radioactive substances in water and air are discussed, equations for

their calculation are presented, and standards are tabulated. These standards of radiation safety were developed on the basis of the standards adopted in 1964 by the member countries of the Council of Mutual Economic Cooperation and compliance by member countries is mandatory. E.E.B.

N65-32011# Joint Publications Research Service, Washington, D. C.
REPORT OF AN EXPERIMENT ON COLOR PERCEPTION IN BEES
G. A. Mazokhin-Porshnyakov 25 Aug. 1965 11 p refs Transl. into ENGLISH from Priroda (Moscow), no. 6, 1965 p 58–62 (JPRS-31713; TT-65-32208) CFSTI: $1.00

Experiments are described which show that bees possess an adequately developed color vision and that the information derived from this color vision is extensively used in their behavior patterns. It is also observed that insects are capable of making very fine distinctions in radiation intensity. Two radiations can be distinguished to within as little as 0.5 to 1%. Also, insects can with great accuracy visually determine the position of the planes of polarization of polarized light which the human eye cannot do. E.E.B.

N65-32027*# California Univ., Los Angeles. Brain Research Inst.
NEUROPHYSIOLOGICAL CORRELATES OF INFORMATION TRANSACTION AND STORAGE IN BRAIN TISSUE
W. R. Adey [1965] 62 p refs
(Contract NsG-502)
(NASA-CR-64570) CFSTI: HC $3.00/MF $0.75 CSCL 05J

The problem of what constitutes information at the input of cerebral systems, what are its transforms in transactional processes, and what are the bases of storage and recall is considered in the framework of a tri-compartmental cerebral model. Neuronal, neuroglial, and extra cellular activities of the cerebral cellular organization and their interrelationships are discussed. Computed analyses of EEG (electroencephalogram) wave processes indicate the possibility of a stochastic mode of operation in the sensitivity of cortical neurons to recurrent similar patterns of electrical waves. A critical difference between the sensing of physiological processes that relate to transmission and transaction of information, and those relating to information storage was observed. G.G.

N65-32032*# IIT Research Inst., Chicago, Ill.
LIFE IN EXTRATERRESTRIAL ENVIRONMENTS Quarterly Status Report, 15 May–15 Aug. 1965
Charles A. Hagen [1965] 17 p
(Contract NASr-22)
(NASA-CR-64577; IITRI-L6023-2) CFSTI: HC $1.00/MF $0.50 CSCL 06F

Growth response and spore production data on *Bacillus cereus* and *Bacillus subtilis* in a simulated Martian environment for 56 days with different freeze–thaw cycles are presented. As the time of the freeze cycle was extended on the *B. cereus* control group, the growth response was delayed. Compared to the 8-hr freeze cycle, a 16-hr freeze cycle delayed spore germination and vegetative cell growth at least 2 days; sporulation was delayed as much as 4 days. Extension of the freeze cycle to 20 hours delayed spore germination and vegetative cell growth at least 6 days, and sporulation did not occur. The growth response of the *B. subtilis* control group to an increase in the freeze cycle was comparable with that of *B. cereus*. Spore germination and vegetative cell growth were delayed at least 1 day, and sporulation was delayed at least 2 days. Increasing the freeze cycle to 20 hours delayed spore germination and vegetative cell growth at least 3 days, and sporulation did not occur during the 56-day period. Comparison of the growth responses of *B. cereus* and *B. subtilis* showed that *B. subtilis* growth responses were delayed less, and that maximum populations were reached sooner than with *B. cereus*. R.W.H.

N65-32033*# Massachusetts Inst. of Tech., Cambridge. Man-Vehicle Control Lab.
THE VESTIBULAR SYSTEM AND HUMAN DYNAMIC SPACE ORIENTATION
Jacob L. Meiry (Ph.D. Thesis) Jun. 1965 205 p refs
(Grant NsG-577)
(NASA-CR-64545; T-65-1) CFSTI: HC $6.00; MF $1.25 CSCL 06H

The motion sensors of the vestibular system are studied to determine their role in human dynamic space orientation and manual vehicle control. The investigation yielded control models for the sensors, descriptions of the subsystems for eye stabilization, and demonstrations of the effects of motion cues on closed loop manual control. Experiments on the abilities of subjects to perceive a variety of linear motions provided data on the dynamic characteristics of the otoliths, the linear motion sensors. Angular acceleration threshold measurements supplemented knowledge of the semicircular canals, the angular motion sensors. Mathematical models are presented to describe the known control characteristics of the vestibular sensors, relating subjective perception of motion to objective motion of a vehicle. Author

N65-32064# California Univ., Berkeley. Lawrence Radiation Lab.
DEPTH DOSE IN TISSUE IRRADIATED BY PROTONS
Palmer G. Steward (M.S. Thesis) 30 Jul. 1964 83 p refs Sponsored in part by NASA
(Contract W-7405-ENG-48)
(UCRL-10980)

A code has been developed for the depth-dose relation in spheres of tissue due to primary protons and to cascade, evaporation, and hydrogen elastically scattered secondary protons. Hydrogen elastically scattered protons are assumed to be emitted in the forward direction, as also, on the basis of Metropolis's calculations, are cascade protons. Evaporation protons are assumed to deposit their dose locally. It is shown that the dose rate at a depth d in a slab due to a normally incident parallel broad beam of protons is the same as the dose rate at the center of a sphere of radius d when an isotropic flux is incident upon the sphere. The depth-dose results are checked by experiments using 730-MeV protons, and compared with Monte Carlo calculations performed at Oak Ridge for 400-MeV protons. The results show that the depth-dose pattern varies widely with proton energy and sphere size. Author

N65-32090*# North Carolina Univ., Durham. Dept. of Botany.
GROWTH OF A PLANT TISSUE CULTURE IN THE GRAVITY-FREE STATE Semiannual Status Report, 1 Oct. 1963–31 Mar. 1964
Ernest A. Ball [1964] 7 p refs
(Grant NsG-524)
(NASA-CR-59238; P-1002) CFSTI: HC $1.00/MF $0.50 CSCL 06C

In the interest of biosatellite applications, the effects of zero gravity on the processes of regeneration and normal growth were studied in laboratory experiments on tobacco stem segments. Growth responses are documented in photographs which show tobacco stem segments with stem plus leaves, apical callus, stem plus leaves and basal roots, roots alone, and numerous buds without basal roots. One of the most remarkable results achieved to date in this program is the growth of the stem pieces in callus-producing culture medium rotated constantly on a klinostat. J.M.D

N65-32091*# Michigan State Univ., East Lansing Dept. of Physiology.
[RENAL AND VASCULAR CHANGES PRODUCED BY WEIGHTLESSNESS FOR THE PURPOSE OF DEFINING AND VERIFYING AN EXPERIMENT SUITABLE FOR USE IN A BIOSATELLITE] Progress Report
W. D. Collings 15 Sep. 1964 14 p refs
(Grant NsG-516)
(NASA-CR-58985) CFSTI: HC $1.00/MF $0.50 CSCL 06P

Observations have been made with flow system models to determine reliability, error of measurement, and operational characteristics of specific instruments, such as the electromagnetic flowmeter and its probes, the cardiac output computer, and the dye densitometer for cardiac output. While the flowmeter principle is considered well established, additional studies are recommended for probe implantation and blood vessel reaction. With respect to cardiac output, a study will be made to check the performance of the electromagnetic flowmeter with a probe of the ascending aorta. M.W.R.

N65-32115*# Massachusetts Inst. of Tech., Cambridge. Psychological Labs.
[MULTIDISCIPLINARY RESEARCH IN THE SPACE RELATED PHYSICAL, ENGINEERING, SOCIAL AND LIFE SCIENCES] First Semiannual Progress Report, 1 Jun.–1 Dec. 1963
Jan. 1964 42 p refs
(Grant NsG-496)
(NASA-CR-58831) CFSTI: HC $2.00/MF $0.50 CSCL 05J

An overview of research studies is physiological, experimental, developmental, and comparative psychology is presented. Studies of effects of brain injury in adults and children are reported; and researches with experimental animals deal with ablation, stimulation, electrical recordings, and chemical manipulation of the central nervous system. General experimental studies are concerned with perception, sensorimotor coordination, memory, learning, and thought. Infants and children have been observed in various developmental studies including the effects of early experience, orientation, and acquisition of values. Studies in comparative psychology deal with visual training in goldfish, novelty-seeking in hamsters, perception organization in kittens, and formation of learning sets in tree shrews, stumptail macaques, and rhesus monkeys. M.W.R.

N65-32144# European Atomic Energy Community, Brussels (Belgium).
THE EFFECT OF NICOTINAMIDE ON X-IRRADIATED SUSPENSION CULTURES OF RAT BONE MARROW CELLS
J. F. Whitfield, T. Youdale, and H. Brohee 1965 22 p refs (EUR-2415.e) Available from Belg. Am. Bank and Trust Co., New York, Account No. 22.186: 40 Belg. Fr.

During the first 6 hours after irradiation (250 to 1500 r) of suspension cultures of rat bone marrow, the nuclei of the various "blast" cells, promyelocytes, myelocytes, normoblasts and cells of the lymphocyte family, lost their reticular structure and became structurally homogeneous. This change could be retarded by adding nicotinamide (0.075M) to the culture immediately after irradiation. Lactate production was slightly stimulated by irradiation (500 r). Lactate production in both normal and irradiated cultures was reduced by exposure of the cells to nicotinamide. Author

N65-32223# Hughes Aircraft Co., Fullerton, Calif.
CREATIVE COMPUTATION Final Technical Documentary Report, Feb. 1964–Feb. 1965
F. B. Cannonito, V. H. Dyson, A. Kino, and G. Cash Griffiss AFB, N. Y., RADC, Jun. 1965 69 p refs
(Contract AF 30(602)-3339)
(FR-65-11-44; RADC-TR-65-123; AD-618395)

The subject of artificial intelligence is viewed from the point of view of recursive function theory and mathematical logic. An analysis of several central problems in this area yields the following potential solutions and techniques: (1) realization of A-computations; (2) combinatorial information retrieval systems; (3) classification of data processing problems in algebra; (4) computation with invertible programs; (5) applications of ordinal computability; and (6) investigation of the Mendelson-Takeuti hierarchy. Author

N65-32265*# National Aeronautics and Space Administration, Washington, D. C.
ON THE EARTH-MOON ROUTE—A BIOLOGICAL EVALUATION OF RADIATION IN SPACE FLIGHTS [NA TRASSE ZEMLYA-LUNA—BIOLOGICHESKAYA OTSENKA RADIATSIONNOY OPASNOSTI KOSMICHESKIKH POLETOV]
V. V. Antipov, M. D. Nikitin, and P. P. Saksonov Aug. 1965 15 p Transl. into ENGLISH from Priroda (Moscow), no. 4, 1965 p 46–53
(NASA-TT-F-9458) CFSTI: HC $1.00/MF $0.50 CSCL 06R

The physical characteristics of the main types of cosmic radiation were analyzed, and the biological dosages caused by each type of radiation were determined. It was found that a 1 to 2 g/cm^2 shield would insure safety from radiation for the crew of a two-week flight around the Moon during a quiet solar period. The danger of proton radiation from solar flares can be reduced by predictions of these flares, and by increased resistance of the organism to the action of protons through medicinal preparations. G.G.

N65-32277*# Stanford Research Inst., Menlo Park, Calif.
DEVELOPMENT OF A BLOOD-PRESSURE TRANSDUCER FOR THE TEMPORAL ARTERY
G. L. Pressman and P. M. Newgard Washington, NASA, Sep. 1965 69 p refs
(Contract NAS2-1332)
(NASA-CR-293) CFSTI: HC $3.00/MF $0.75 CSCL 06B

This report describes three phases of research on the direct force method of externally measuring arterial blood pressure. First, a miniaturized transducer was designed specifically for application on the superficial temporal artery of man. This device incorporated a differential-transformer sensing element with special mounting to reduce response to acceleration. Second, a transducer of earlier design, intended for the radial artery of man and using strain-gauge techniques was extensively tested on experimental animals and compared with direct intra-arterial measurements. Finally, a number of techniques for the sensing of the transducer position over the artery were investigated both theoretically and experimentally. Author

N65-32289# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
EVALUATION OF WORKING CONDITIONS OF CIVILIAN AIRPORT RADAR INSTALLATIONS
A. Ya. Loshak and Ye. F. Mar'yechkin 14 Jul. 1965 16 p refs Transl. into ENGLISH from Gigiena i Sanit. (Moscow), no. 7, 1964 p 39–44
(FTD-TT-65-345/1+4; AD-618635)

The radiation power flux density of radar antennas was measured to evaluate working conditions of personnel serving at civilian airport radar installations. Tabulated data are given

showing the magnitude of the UHF field (in $\mu w/cm^2$) occurring in search scanning, and in dispatching and landing radar stations, as a function of antenna distance, installation height, and angle of inclination. The data indicate the presence of a reverse interdependence between the intensity of radar emission at the place of measurement; and the height of the installation. The measurements indicate that the higher from the ground that the radiation is recorded, the greater its intensity will be. It was concluded that it is necessary to develop norms for allowable radiation taking into account the periodicity, intensity, and frequency range of the acting UHF energy; and that the high levels of UHF radiation recorded from the antennas require the establishment of zones of sanitary protection, and methods of computating the dosimetric magnitudes of the radiation. L.S.

N65-32303# Ohio State Univ. Research Foundation, Columbus.

INFORMATION PROCESSING IN THE FROG'S RETINA Technical Report, 1 Sep. 1957–29 Feb. 1964

Leo E. Lipetz Wright-Patterson AFB, Ohio, AMRL, Feb. 1965 80 p refs

(Contract AF 33(657)-7578)

(AMRL-TR-65-24; AD-614249)

The information handling properties of the frog's retina were studied by three techniques. (a) An attempt was made to investigate the mutual interaction of excitatory and inhibitory connections to bipolar cells by studying the average electroretinogram response to stimulation with various patterns of light. It was found that present techniques of electroretinography and photometry did not permit the required stability of measurement. (b) Light and electron microscope studies were made of the cell types and connections of the frog's retina. Illustrative micrographs are included in the report. The new findings were made that the Landolt club of the small bipolar cell is a mitochondria-packed process and that it terminates as a cilium in the aqueous space between the visual cells. The large bipolar cells were found most likely to be carriers of "light adaptation" information, the small bipolars of "edge" information. Author

N65-32344# Joint Publications Research Service, Washington, D. C.

REACTIONS OF THE CARDIOVASCULAR AND RESPIRATORY SYSTEMS OF COSMONAUTS UNDER THE CONDITIONS OF ORBITAL FLIGHT ON THE SPACESHIP 'VOSKHOD-1'

P. V. Vasil'yev, A. D. Voskresenskiy, I. I. Kas'yan, D. G. Massimov, I. D. Pestov et al 8 Sep. 1965 15 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Ser. Biol. (Moscow), no. 4, Jul.–Aug. 1965 p 491–499

(JPRS-31913; TT-65-32407) CFSTI: $1.00

Pulse and respiratory rates were determined for the cosmonauts during the flight of Voshkod I, with the two or three respiratory cycles selected from each recorded minute to reflect the dynamics from one flight orbit to the next. Data presented indicate results comparable to those obtained during previous orbital flights, although some individual peculiarities were recorded. During the sixth orbit, one of the cosmonauts who was asleep displayed a pronounced vagotonic reaction and his pulse rate fell to 45 to 48 beats per minute, during sleep on earth this rate was never less than 52. It was found that respiration rates gradually increased during the first six orbits, during the sixteenth orbit the average respiration rate was only somewhat higher than during countdown, although the range of respiration rates was almost half that during countdown and the first orbit. This may reflect changes in general conditions of the cosmonauts in the process of their adaptation to orbital flights and, in particular, to weightlessness. M.W.R.

N65-32350# California Univ., Davis. School of Veterinary Medicine.

THE EFFECTS OF CONTINUED Sr-90 INGESTION DURING THE GROWTH PERIOD OF THE BEAGLE AND ITS RELATION TO Ra-226 TOXICITY Annual Progress Report No. 8

A. C. Andersen Jun. 1965 180 p refs

(Contract AT(04-3)-472)

(UCD-472-112) CFSTI: $5.00

Various studies on the continued effects of Sr-90 ingestion during the growth period of the beagle, and its relation to Ra-226 toxicity, are presented. Included are: clinical blood chemistry in beagles, roentgenographic survey, determination of zinc and iron in biologic materials by X-ray fluorescence spectrometry, vitamin stability and retention in prepared dog food as influenced by storage, uptake and retention patterns in uniformly labeled beagles, skeletal dosimetry and the exposure status of the colony, and ion exchange removal of Sr-90 from biologic wastes. R.W.H.

N65-32356# Joint Publications Research Service, Washington, D. C.

THE PROBLEM OF REACTIVITY IN SPACE MEDICINE

V. V. Parin, P. V. Vasil'yev, and V. Ye. Belay 8 Sep. 1965 17 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Ser. Biol. (Moscow), no. 4, Jul.–Aug. 1965 p 481–490

(JPRS-31909; TT-65-32403) CFSTI: $1.00

Reactivity, or an organism's response to environmental stimuli, and the use of pharmacological substances to increase resistance to such physical, nervous and emotional stresses, were investigated. In animal experiments, the change in reactivity prior to centrifuge testing was achieved by administering such pharmaceuticals as strychnine, epinephrine, norepinephrine, phenamine (benzedrine), phenatine, ephedrine, caffeine, corasole, K-strophanthin, nitroglycerin, dibasol, chloral hydrate, and thiopental sodium. These experiments established that resistance can be increased if the dose, period, and administration method are optimally selected. The best results were obtained from using strychnine, certain sympathomimetic drugs, and narcotics. Findings also indicate that accelerations change the organism's reactivity to narcotics, cardiac glucosides, vasoconstrictors, and vasodilators. It is pointed out that environmental conditions of an organism greatly influence the effect of drugs, and that knowledge of drug action under changed reactivity is essential. M.G.J.

N65-32357# Los Alamos Scientific Lab., N. Mex.

SOME BIOLOGICAL ASPECTS OF RADIOACTIVE MICROSPHERES

23 Aug. 1965 69 p refs

(Contract W-7405-ENG-36)

(LA-3365-MS) CFSTI: $3.00

The biological effects of particulate radiation sources produced by atmospheric reentry and destruction of space nuclear power systems are discussed. Emphasis was placed on fissioned $^{235}UC_2$ microspheres of about 100 to a few hundred μ. All pyrocarbon-coated and about 85 percent of uncoated $^{235}UC_2$ particles maintained their integrity for 42 hours in gastric juices. Uncoated particles placed in situ underwent solubilization in 4 to 6 weeks; coated ones were still partially intact after 8 to 12 weeks. Emergent beta ray dosage as a function of depth of skin was found to be about 20 percent lower than calculated values. Beta-ray dosage above 10000 rads produced small areas of erythema on the skin of backs of monkeys. These lesions persisted for three weeks. G.G.

N65-32373# Joint Publications Research Service, Washington, D. C.

CHANGE OF A DOG'S BLOOD COAGULATION SYSTEM WITH TRANSFUSION OF BK-8 PROTEIN BLOOD SUBSTITUTE

N. A. Gorbunova and V. B. Troitskiy 30 Aug. 1965 6 p refs Transl. into ENGLISH from Patol. Fiziol. i Eksperim, Terapiya (Moscow), v. 9, no. 3, May–Jun. 1965 p 71–73
(JPRS-31763; TT-65-32258) CFSTI: $1.00

It was found that the blood coagulation process was slowed down for 24 to 72 hours after transfusions of protein blood substitute (designated BK-8) and native ox plasma in dogs who had suffered acute blood losses. This was explained by changes in the anticoagulant system of the dog as well as by the entry of a great quantity of free heparin in the blood. Results are given for ten dogs before blood letting and after transfusion; two of the dogs died between two and three hours after transfusion. For the other dogs, it was noted that blood coagulation time increased two to four and a half times after the transfusion. At the same time tolerance to heparin decreased while its quantity increased. Antithrombin activity increased and use of prothrombin sharply decreased. Concentrations of AC-globulin and prothrombin did not change materially. After 72 hours, the coagulation times did not differ from those evident before blood letting and transfusion with the blood protein; with the ox plasma transfusion the recovery of the coagulation system was observed in 24 hours and there was complete recovery in 72 hours. M.W.R.

N65-32377# Joint Publications Research Service, Washington, D. C.

VARIATIONS OF ACCLIMATIZATION AT HIGH ALTITUDE

M. M. Sirotinin 30 Aug. 1965 11 p refs Transl. into ENGLISH from Fiziol. Zh., Akad. Nauk Ukr. RSR (Kiev), v. 11, no. 3, May–Jun. 1965 p 283–288
(JPRS-31761; TT-65-32256)

The effects of such climatic factors as oxygen deficiency, ultraviolet radiation, atmospheric ionization, and decreased environmental temperature are assessed in discussing acclimatization to high altitude climates. Adaptation to hypoxia under various conditions, including pressure chamber tests and mountain climbing expeditions, is also disucssed. A literature survey was made, and findings on blood studies, pulmonary ventilation, oxygen tension in the tissues, and morphological changes are reported; the bibliography is included. M.G.J.

N65-32380# Joint Publications Research Service, Washington, D. C.

THERAPEUTIC APPLICATION OF ELECTRO-SLEEP

Z. S. Kuleshova 2 Sep. 1965 32 p refs Transl. into ENGLISH from "Lechebnoye Primeneniye Elektrosna" Moscow, Min. of Health USSR, 1964 39 p
(JPRS-31837; TT-65-32332) CFSTI: $2.00

Applications of a therapeutic method, called electro-sleep, for direct action on the central nervous system by a weak, low frequency impulse current, are reviewed. The current characteristics, electrodes, and mechanism of action of the method are discussed. The method is considered with respect to hypertonic and ulcerous illnesses, neural and psychiatric practice, treatment of traumatic illness of the brain, schizophrenia, neuro-psychic illnesses of children and adolescents, treating eczema and neurodermatitis, bronchial asthma, brain vessel sclerosis, hypotonic illness, illusory pains, and glaucoma. It is indicated that variations in the method of application can be used as a sleep therapy method, and as a special factor in changing the functional state of the central nervous system by means of gradual strengthening and self-developing inhibition processes. Side effects are absent, and the method seems safe. L.S.

IAA ENTRIES

A65-29938 #
EFFECT OF MICROWAVES ON LIVING ORGANISMS AND BIOLOGICAL STRUCTURES [DEISTVIE MIKROVOLN NA ZHIVYE ORGANIZMY I BIOLOGICHESKIE STRUKTURY].
A. S. Presman.
Uspekhi Fizicheskikh Nauk, vol. 86, June 1965, p. 263-302. 219 refs In Russian.

Review of those microwave biology experiments that are considered to be of particular interest to physicists, described so as to be intelligible to nonbiologists. The absorption of microwaves by the tissues of living organisms is considered under two aspects - energy losses due to ion conductivity and dielectric losses due to polarization relaxation in water molecules. The dosimetry of microwaves for the evaluation of their effects on humans and animals is discussed. The reactions of human organisms to low-intensity microwaves and the reactions of animal organisms to microwaves of all intensities are considered. The changes caused by microwaves in animal tissues and organisms are discussed. The cellular and molecular effects of electromagnetic radiation of all wavelengths are considered. R.A.F.

A65-29941 #
SOME RESULTS OF MEDICAL INVESTIGATIONS DURING THE VOSKHOD SPACESHIP FLIGHT [NEKOTORYE REZUL'TATY MEDITSINSKIKH ISSLEDOVANII, PROVEDENNYKH VO VREMIA POLETA KORABLIA "VOSKHOD"].
P. V. Vasil'ev and Iu. M. Volynkin (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR).
International Symposium on Basic Environmental Problems of Man in Space, 2nd, Paris, France, June 14-18, 1965, Preprint no. 15. 28 p. 8 refs. In Russian.
Symposium sponsored by the International Astronautical Federation, International Academy of Astronautics, UNESCO, International Atomic Energy Agency, International Telecommunication Union, World Health Organization, and World Meteorological Organization.

Results of medical examinations of the cosmonauts Komarov, Feoktistov, and Egorov conducted by means of biotelemetric systems and portable on-board instruments during the Voskhod spaceship flight in Sept. 1964. The central nervous system, the cardiovascular system, the psychotechnical indices of physical fitness, the operation of the life-support systems, and the expediency and ease of performance of the assigned crew member operations are subjects of the study. The data are diagramed and analyzed. The life-support systems are assessed as completely adequate. V.Z.

A65-29942 #
PHYSIOLOGICAL AND HYGIENIC EVALUATION OF LIFE-SUPPORT SYSTEMS OF VOSTOK AND VOSKHOD SPACESHIPS [FIZIOLOGO-GIGIENICHESKAIA OTSENKA SISTEM ZHIZNENNOGO OBESPECHENIIA KOSMICHESKIKH KORABLEI "VOSTOK" I "VOSKHOD"].
G. I. Voronin, A. M. Genin, and A. G. Fomin (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR).
International Symposium on Basic Problems of Man in Space, 2nd, Paris, France, June 14-18, 1965, Preprint no. 16. 20 p. In Russian.
Symposium sponsored by the International Astronautical Federation, International Academy of Astronautics, UNESCO, International Atomic Energy Agency, International Telecommunication Union, World Health Organization, and World Meteorological Organization.

Description of fifteen 1- to 15-day simulation experiments on man conducted in a test chamber in preparation for the Vostok and Voskhod manned space flights. Data were collected on the daily O_2 consumption, CO_2 evolution, heat production, perspiration, and maximum vigil and minimum sleep energy consumption. The life-support systems of the spaceships are briefly described and their operations are given a highly positive assessment. Some physiological data on the space flights of Titov, Nikolaiev, Popovich, Tereshkova, and Bykovskii are included. A block diagram is presented of the Vostok air-conditioning system. Long-period curves for the variation of the cabin air parameters (pressure, temperature, humidity, O_2, and CO_2) are compared with the identical curves for the flight of Voskhod 5. V.Z.

A65-29943 #
RADIATION SAFETY CRITERIA IN PROLONGED SPACE FLIGHTS [KRITERII RADIATSIONNOI BEZOPASNOSTI DLITEL'NYKH KOSMICHESKIKH POLETOV].
Iu. G. Grigor'ev, E. E. Kovalev, A. V. Lebedinskii, Iu. G. Nefedov, V. G. Vysotskii, N. I. Ryzhov, B. A. Markelov, L. N. Smirennyi, V. E. Dudkin, and N. N. Derbeneva (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR).
International Symposium on Basic Environmental Problems of Man in Space, 2nd, Paris, France, June 14-18, 1965, Preprint no. 19. 34 p. 28 refs. In Russian.
Symposium sponsored by the International Astronautical Federation, International Academy of Astronautics, UNESCO, International Atomic Energy Agency, International Telecommunication Union, World Health Organization, and World Meteorological Organization.

Discussion of galactic radiation, the Van Allen radiation belts, the artificial radiation belt produced by high-altitude nuclear explosions, and corpuscular radiation as space-flight hazards. Shielding, dosimetry, medical service (including prophylaxis), and ground radiation safety services are the usual means of protection. Radiation energy absorbed per gram of tissue, the commonly used hazard criterion, is assessed as inadequate, and the introduction of a criterion which reflects the spectral composition of the radiation received is suggested. Three radiation dose levels are proposed: admissible dose, justifiable risk dose, and critical dose. The complexity of the problem is emphasized and the difficulties to be overcome are specified. Collecting of extensive experimental data on radiation effects is urged as a basis for proper hazard criterion selection. V.Z.

A65-29944 #
PROBLEMS OF MAN'S RELIABILITY IN SPACECRAFT CONTROL SYSTEMS [PROBLEMY NADEZHNOSTI CHELOVEKA V SISTEMAKH UPRAVLENIIA KOSMICHESKIM KORABLEM].
P. K. Isakov, V. A. Popov, and M. M. Sil'vestrov (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR).
International Symposium on Basic Problems of Man in Space, 2nd, Paris, France, June 14-18, 1965, Preprint no. 14. 13 p. In Russian.
Symposium sponsored by the International Astronautical Federation, International Academy of Astronautics, UNESCO, International Atomic Energy Agency, International Telecommunication Union, World Health Organization, and World Meteorological Organization.

General considerations concerning the reliability of man (vs automation) as the operator of control systems and scientific instruments on board a spacecraft. Simulation is discussed as an effective approach to this problem, which should include an analysis of manual control-system dynamics, the solution of the control-system synthesis problem, the effects on the operator's behavior of specific flight factors, and operator training. V.Z.

A65-29945 #
SOME PROBLEMS OF ECOPHYSIOLOGY [NEKOTORYE PROBLEMY EKOFIZIOLOGII].
N. M. Sisakian (Akademiia Nauk SSSR, Moscow, USSR).
International Symposium on Basic Problems of Man in Space, 2nd, Paris, France, June 14-18, 1965, Preprint no. 27. 31 p. In Russian.
Symposium sponsored by the International Astronautical Federation, International Academy of Astronautics, UNESCO, International Atomic Energy Agency, International Telecommunication Union, World Health Organization, and World Meteorological Organization.

General outline of ecophysiology as a branch of biological science concerned with the behavior and reactions of live organisms exposed to space conditions. Biological studies on the cell and molecular levels, cryolysis, radiolysis, and photolysis of nucleoproteid molecules, the determination of the maximum endurable vibration limits, and attempts at simulating the martian climate are among the topics given special attention. Works of numerous Soviet scientists in the field are quoted. V.Z.

A65-29946 #
COMBINED EFFECTS OF SPACE-FLIGHT FACTORS ON CERTAIN FUNCTIONS OF THE ORGANISM [KOMBINIROVANNOE VOZDEISTVIE FAKTOROV KOSMICHESKOGO POLETA NA NEKOTORYE FUNKTSII ORGANIZMA].
G. M. Frank, N.N. Livshits, M. A. Arsen'eva, Z. I. Apanasenko, L. A. Beliaeva, A. V. Golovkina, V. Ia. Klimovitskii, M. A. Kuznetsova, L. D. Luk'ianova, and E. S. Meizerov (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR).
International Symposium on Basic Problems of Man in Space, 2nd, Paris, France, June 14-18, 1965, Preprint no. 17. 63 p. 55 refs. In Russian.
Symposium sponsored by the International Astronautical Federation, International Academy of Astronautics, UNESCO, International Atomic Energy Agency, International Telecommunication Union, World Health Organization, and World Meteorological Organization.

Discussion of the effects of acceleration, vibration, ionizing radiation, and their combinations on oxidation metabolism in the central nervous system and the mitosis in cells of hemopoietic tissues. Rabbits, guinea pigs, and white rats were subjected to simulating dynamic tests and irradiation to 500 to 600 rads. The nonparametric statistical method was used for data processing. Changes in the oxidation metabolism and functional conditions of the central nervous system and disorders in the cell division processes of the bone marrow are discussed at length. V.Z.

A65-29947 #
EFFECT ON THE ORGANISM OF PROLONGED EXPOSURE (100 DAYS) TO AN ATMOSPHERE OF PURE OXYGEN AT A TOTAL PRESSURE OF 198 TORR [VLIIANIE NA ORGANIZM DLITEL'NOGO PREBYVANIIA (100 SUTOK) V ATMOSFERE CHISTOGO KISLORODA PRI OBSHCHEM DAVLENII 198 MM RT.ST].
N. A. Agadzhanian, Iu. P. Bizin, G. P. Doronin, A. G. Kuznetsov, and A. R. Mansurov (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR).
International Symposium on Basic Environmental Problems of Man in Space, 2nd, Paris, France, June 14-18, 1965, Preprint no. 13. 17 p. 12 refs. In Russian.
Symposium sponsored by the International Astronautical Federation, International Academy of Astronautics, UNESCO, International Atomic Energy Agency, International Telecommunication Union, World Health Organization, and World Meteorological Organization.

Experimental study of the effect of prolonged exposure to an artificial atmosphere (95% O_2, 0.3 to 0.5% CO_2, remainder water vapor), at low pressure on the behavior and general condition, nervous activity, weight dynamics, metabolism, biochemical characteristics of the blood, and morphological changes in the internal organs of 148 white rats. In tests at 198 torr, lasting 100 days, localized atelectasis and slight cardiac enlargement were the only changes observed. Weight loss of up to 25% in the first 40 to 50 days was not only recovered but in many cases exceeded by the end of the experiment, and no evidence of aeroembolic disorders from low pressure was detected. The results indicate that the conditions tested pose no serious health hazard problems and that a rarefied atmosphere may be of advantage in a manned space cabin. V.Z.

A65-29975
TIME-INTENSITY RELATIONS IN BINAURAL UNMASKING.
H. S. Colburn and N. I. Durlach (Massachusetts Institute of Technology, Research Laboratory of Electronics, Center for Communications Sciences, Cambridge, Mass.).
Acoustical Society of America, Journal, vol. 38, July 1965, p. 93-103. 15 refs.
Research supported by the Joint Services Electronics Program; National Institutes of Health; U.S. Department of Health, Education, and Welfare; NSF; and NASA.

Study of variations in the threshold of a 500-cps tone masked by random noise, as a function of simultaneous shifts in the interaural amplitude ratio and interaural time delay of the tone. The experimental results are found to coincide with the results of computations based on the equalization and cancellation model and are used to define a time-intensity trade for binaural unmasking. (Author) M. F.

A65-29976
JUDGED NOISINESS OF A BAND OF RANDOM NOISE CONTAINING AN AUDIBLE PURE TONE.
K. D. Kryter and K. S. Pearsons (Bolt, Beranek, and Newman, Inc., Cambridge, Mass.).
Acoustical Society of America, Journal, vol. 38, July 1965, p. 106-112. 8 refs.
NASA-supported research.

Discussion of experiments designed to obtain further data on the perceived noisiness of complex sounds consisting of a steady-state pure tone imbedded in a background of random noise. From these data, a method for including a "pure-tone correction factor" in the calculation of perceived noisiness in PNdB is derived. The proposed procedure should have practical application for the evaluation of sounds from modern-day jet aircraft or other broadband sounds that may contain relatively intense, audible pure-tone components. Various problems involved in the measurement and interpretation of band spectra for the location of steady-state pure-tone components in broadband random noise are discussed. (Author) M. F.

A65-29990
EFFECTS OF COMBINED HEAT AND NOISE ON HUMAN PERFORMANCE, PHYSIOLOGY, AND SUBJECTIVE ESTIMATES OF COMFORT AND PERFORMANCE.
Robert D. Dean and Carl L. McGlothlen (Boeing Co., Seattle, Wash.).
IN: INSTITUTE OF ENVIRONMENTAL SCIENCES, ANNUAL TECHNICAL MEETING, 11TH, CHICAGO, ILL., APRIL 21-23, 1965, PROCEEDINGS. [A65-29982 19-11]
Mount Prospect, Ill., Institute of Environmental Sciences, 1965, p. 55-64. 29 refs.

Study of the performance of ten pilots subjected for 20-min periods to ten combinations of heat and noise. The subjects performed simultaneously two monitoring tests and one tracking test; data were also obtained on six physiological measures and two subjective measures. The data indicated that temperatures up to 110°F and white noise up to 110 db did not degrade performance or thermal equilibrium. Subjective data indicated that 80°F was the most comfortable temperature at the levels of humidity and air velocity used. The subjects were unable to accurately estimate the effects of heat on their performance, although they were able to judge the effects of noise. B.B.

A65-30013
DEVELOPMENT OF A PILOT UNIVERSAL COUCH FOR ACCELERATION, VIBRATION, AND SHOCK.
L. M. McClernan and William S. Thayer (Aircraft Armaments, Inc., Cockeysville, Md.).
IN: INSTITUTE OF ENVIRONMENTAL SCIENCES, ANNUAL TECHNICAL MEETING, 11TH, CHICAGO, ILL., APRIL 21-23, 1965, PROCEEDINGS. [A65-29982 19-11]
Mount Prospect, Ill., Institute of Environmental Sciences, 1965, p. 225-240. 21 refs.

Analysis of a cushioned contour couch designed to transmit a minimum of discomfort to its occupant due to acceleration, vibration, and/or shock environments that could reduce efficiency or cause permanent injury. The couch was demonstrated as a highly damped system in shock deceleration, completing its response in one and a half cycles. In acceleration, g-forces were evenly distributed over the subject's dorsal surface, and at high g-levels the couch tended to envelop the subject's sides, providing lateral support. Universality was shown by a wide range of subjects who individually evaluated the couch under dynamic load as the most

comfortable one they had ever ridden. The system of straps used to maintain body position was unnecessary during vibration and G_x acceleration tests. B.B.

A65-30014
HUMAN ANGULAR MOTION CAPABILITY IN THE ZERO GRAVITY ENVIRONMENT.
William S. Thayer (Aircraft Armaments, Inc., Cockeysville, Md.).
IN: INSTITUTE OF ENVIRONMENTAL SCIENCES, ANNUAL TECHNICAL MEETING, 11TH, CHICAGO, ILL., APRIL 21-23, 1965, PROCEEDINGS. [A65-29982 19-11]
Mount Prospect, Ill., Institute of Environmental Sciences, 1965, p. 241-250. 7 refs.

Discussion of a tractionless experimental method which provides an accurate simulation of true weightlessness. Although limited to rotation about a single axis, the method is accurate, repeatable, and well suited to laboratory experimentation. Valid data can be obtained in this manner from relatively simple experimental models, and overall verification of results can be accomplished by a limited number of data runs in a true zero-g environment. The wide range of results can be attributed to several experimental variables. Although the subject was instructed to strive for maximum output on each run, the sensitivity of the air-bearing platform to motion frequently caused it to rotate faster than expected, thus limiting the subject's ability to apply maximum torque on the handle. B.B.

A65-30032
MAINTAINING ENVIRONMENTAL CONTROL REQUIREMENTS FOR FABRICATION AND ASSEMBLY OF STERILE SPACE VEHICLES.
Fred W. Thomas, Jr. and Myron H. Bengson (General Electric Co., New York, N.Y.).
IN: INSTITUTE OF ENVIRONMENTAL SCIENCES, ANNUAL TECHNICAL MEETING, 11TH, CHICAGO, ILL., APRIL 21-23, 1965, PROCEEDINGS. [A65-29982 19-11]
Mount Prospect, Ill., Institute of Environmental Sciences, 1965, p. 387-391.

Consideration of data which can be used to formulate the design criteria and operating procedures required to establish and maintain an environment which is "bioclean." Viable particulate control becomes more difficult as the volume to be controlled becomes larger, and the problem is compounded when personnel are working in the area. Work on small components can be conducted in laminar flow hoods or enclosures, but when every step in the construction of a planetary lander must be conducted in a bioclean area, the procedures for maintenance of the controlled environment must be worked out not on the basis of theory but on that of numerous tests. B.B.

A65-30049
ANIMAL BEHAVIOR IN FIELDS OF SIMULATED GRAVITY.
K. O. Lange and A. B. Broderson (Kentucky, University, Wenner-Gren Aeronautical Research Laboratory, Lexington, Ky.).
IN: INSTITUTE OF ENVIRONMENTAL SCIENCES, ANNUAL TECHNICAL MEETING, 11TH, CHICAGO, ILL., APRIL 21-23, 1965, PROCEEDINGS. [A65-29982 19-11]
Mount Prospect, Ill., Institute of Environmental Sciences, 1965, p. 497-509.

Investigation of the premise that if animals are given a choice of artificial gravities, they will seek a preferred level and thereby indicate a likely preference by humans. The region from zero to 1 g can be explored for an appreciable length of time only in space flight. Preliminary to such space experiments, rodents and small primates are being exposed to gravity fields from 1 g up in the laboratory. The equipment consists of parabolic and spiral centrifuges of various sizes in which the animals are allowed to locomote at will between gravity levels. Their location is continuously monitored by photographic, photoelectric, mechanical, or radiation intensity methods. The relative amounts of time spent at the various gravity levels is taken as a measure of the animal's g-preference. Rats show a definite preference for the 1-g region and appear to be suitable subjects for space experiments. Mice show more erratic behavior, affected by individual and strain differences. Present results with primates do not yet warrant conclusions. (Author) B.B.

A65-30059
CHRONIC WEIGHTLESSNESS SIMULATION IN BIOLOGICAL RESEARCH.
Charles C. Wunder (Iowa, State University, Iowa City, Iowa).
IN: INSTITUTE OF ENVIRONMENTAL SCIENCES, ANNUAL TECHNICAL MEETING, 11TH, CHICAGO, ILL., APRIL 21-23, 1965, PROCEEDINGS. [A65-29982 19-11]
Mount Prospect, Ill., Institute of Environmental Sciences, 1965, p. 593-602. 37 refs.

Review of methods of simulating the various types of weightlessness and their possible effects on man. Possible effects of weightlessness, conditions which achieve some of the effects of weightlessness, and effects of weightlessness to be predicted from various types of simulation are charted and tabulated. Buoyancy (water immersion) studies, which appear to be the best of the simple ground-based simulations of low gravity for man, are recommended if corrections for certain characteristics of submersion are possible. B.B.

A65-30076 #
DETERMINATION OF SPECTRAL-SENSITIVITY CURVES OF LIGHT RECEIVERS FROM ADDITION CURVES [OB OPREDELENII KRIVYKH SPEKTRAL'NOI CHUVSTVITEL'NOSTI PRIEMNIKOV SVETA PO KRIVYM SLOZHENIIA].
N. G. Volkov and V. K. Liapidevskii.
Akademiia Nauk SSSR, Doklady, vol. 163, July 1, 1965, p. 231-234. 7 refs. In Russian.

Determination of spectral-sensitivity curves with the aid of a vision model consisting of two photoelements and three light receivers. By means of these receivers three quantities, which can be taken as the color coordinates in a color space, are obtained at the output of the model. The spectral-sensitivity curves of the three receivers are determined, using addition curves obtained for normal trichromates. It is found that in the model described, in the spectrum region where human vision is two-dimensional ($\lambda > 560$ mμ), all three receivers are operating, the spectral-sensitivity curve of one of the receivers being a linear combination of the sensitivity curves of the other two. A.B.K.

A65-30077 #
INCREASING THE RADIOSENSITIVITY OF THE NERVOUS SYSTEM WITH THE AID OF FLUOROACETATE [O POVYSHENII RADIOCHUVSTVITEL'NOSTI NERVNOI SISTEMY POD DEISTVIEM FTORATSETATA].
P. F. Minaev, O. F. Logvinova, A. P. Mironova, and A. I. Chukhrova (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Moscow, USSR).
Akademiia Nauk SSSR, Doklady, vol. 163, July 1, 1965, p. 235-237. 18 refs. In Russian.

Investigation of the effect of monofluoroacetate on the radiosensitivity of the nervous system. The effect of irradiation on the content of citric, pyruvic, and γ-aminobutyric acids in the cerebellum tissue of dogs given mild doses of monofluoroacetate is determined, and the process of oxidizing phosphorylation in the mitochondria removed from the irradiated cerebella of these animals is studied. As a result of this investigation, it is shown that the radiosensitivity of the nervous system increases considerably under the influence of monofluoroacetate. One of the main causes of the increase in the radiosensitivity of the nervous system against a background of monofluoroacetate poisoning is said to be a disturbance of the citric-acid cycle. A.B.K.

A65-30078 #
FUNCTIONAL SPECTRAL SENSITIVITY OF THE HUMAN VISUAL ANALYZER [O FUNKTSIONAL'NOI SPEKTRAL'NOI CHUVSTVITEL'NOSTI ZRITEL'NOGO ANALIZATORA CHELOVEKA].
V. S. Khazanov (Vsesoiuznyi Nauchno-Issledovatel'skii Svetotekhnicheskii Institut, Moscow, USSR).
Akademiia Nauk SSSR, Doklady, vol. 163, July 1, 1965, p. 238-241. 12 refs. In Russian.

Determination of the effectiveness of monochromatic radiations in ensuring a level of acuteness of discrimination and contrast sensitivity. The results of these determinations are presented in graphical form. It is shown that the effectiveness of homogeneous

radiations in ensuring acuteness of discrimination differs substantially from the effectiveness of homogeneous radiations in ensuring luminosity. A study is made of the additivity of the action of individual monochromatic radiations. It is concluded that there is an additivity of the action of monochromatic radiations in ensuring acuteness of discrimination. The data obtained from the various studies carried out are said to corroborate a hypothesis concerning the presence of independent functional spectral-sensitivity systems in the human visual analyzer. A. B. K.

A65-30099
VIGILANCE FOR AUDITORY INTENSITY CHANGES AS A FUNCTION OF PRELIMINARY FEEDBACK AND CONFIDENCE LEVEL.
Michel Loeb (U. S. Army, Medical Research Laboratory, Fort Knox, Ky.) and John R. Binford (Louisville, University, Louisville, Ky.).
Human Factors, vol. 6, Oct. 1964, p. 445-458. 17 refs.
Army-supported research.

Description of the response of 48 subjects to occasional increments in a pulse train with ratings of certainty of signal occurrence for 20 min. Half (F) of the subjects were given feedback; half (NF) were not. In a second session all responded during an 80-min period with a simple response. In another, half responded with certainty ratings; half responded with a simple response. Finally, those who had responded with ratings responded simply and those who had employed a simple response made ratings. It was found that F subjects made fewer false responses and tended to make fewer detections in earlier sessions. In later sessions false responses were reduced for all. The usual progressive false response and detection reductions and latency increases were noted; when subjects employed ratings, reductions in certainty were noted within sessions. It was concluded that the data support the detection theory model for vigilance for this type of task. (Author) D. P. F.

A65-30100
VISUAL EXPERIMENTS RELATED TO NIGHT CARRIER LANDING.
Robert Keston, Donald Doxtader, and Ronald J. Massa (Laboratory for Electronics, Inc., Boston, Mass.).
Human Factors, vol. 6, Oct. 1964, p. 465-473. 12 refs.

Investigation of the causes of the substantially higher incidence of carrier landing accidents at night than during the day. Disastrously low final approaches, a major source of night landing accidents, have been attributed to a visual illusion involving overestimation of altitude. In order to evaluate visual performance in related tasks, subjective judgments of the altitude of a luminous horizontal bar relative to eye level were obtained in total darkness and in the presence of a peripheral artificial horizon. Errors as large as 1° visual angle, corresponding to 8 ft at a range of 500 ft from touchdown, occur frequently, indicating the inadequacy of direct visual contact unaided by artificial display devices. The dramatic reduction in variability resulting from the presence of the artificial horizon demonstrates the importance of a visual frame of reference or structure. (Author) D. P. F.

A65-30101
EFFECT OF INJURY INFORMATION ON DAMAGE ESTIMATES.
Richard T. Been and Myron L. Braunstein (Flight Safety Foundation, Inc., Aviation Safety Engineering and Research Div., Phoenix, Ariz.).
Human Factors, vol. 6, Oct. 1964, p. 475-477. 7 refs.
Contract No. DA-44-177-AMC-116(T).

Discussion of aircraft accident research which has revealed a relationship between injury to the occupants and damage to the aircraft structure. The present study explores the possibility that judgments of damage are affected by knowledge of injury. A group of 36 male subjects estimated aircraft damage from 36 photographs of aircraft accidents. In connection with each photograph the subjects were provided with fictitious injury (as well as other) information. Accident photographs, subjects, and injury levels were appropriately counterbalanced. The major hypothesis was supported. Accident-involved aircraft were given higher damage ratings when the photographs were presented with higher injury levels than when the same photographs were presented with lower injury levels. Suggestions are made for overcoming this bias which exists in the laboratory and which may exist in the field. (Author) D. P. F.

A65-30102
BODY POSITION AND THE STRENGTH AND ENDURANCE OF MANUAL PULL.
Lee S. Caldwell (U.S. Army, Medical Research Laboratory, Fort Knox, Ky.).
Human Factors, vol. 6, Oct. 1964, p. 479-484. 10 refs.

Discussion of the response strengths and the duration of submaximal holding response (endurance) for measurements at 20 body positions. The magnitude of the holding response for each subject was 80% of his maximum response strength at the poorest of the 20 positions. A corrected r of 0.88 ($p < 0.01$) was obtained between the measures of strength and endurance. Thus, it may be assumed that a change in body position, control placement, or body stabilization which increases strength will reduce the effort required to maintain a given force on the control and that the endurance of the holding response will be proportionately increased. Further, available data on strength may be used to estimate the effect of body stabilization, etc., on the endurance of isometric muscle tensions. (Author) D. P. F.

A65-30103
PILOT EYE FIXATIONS WHILE FLYING SELECTED MANEUVERS USING TWO INSTRUMENT PANELS.
Charles A. Gainer and Richard W. Obermayer (Bunker-Ramo Corp., Canoga Park, Calif.).
Human Factors, vol. 6, Oct. 1964, p. 485-501. 16 refs.
Contracts No. AF 33(616)-7752; No. AF 33(657)-8600; No. AF 33(657)-8021.

Investigation of the eye fixations as they occurred while flying instruments in two panel configurations. The first panel was equipped with vertical moving tape instruments; the second was equipped with round dial instruments. The study was conducted in a MB-5 simulator with the flight characteristics of a high-performance jet aircraft. A standardized flight profile was used allowing comparison of both instrument panels across identical representative maneuvers. System performance measurements were taken during scoring periods for which a film record of the pilots' eyes was also taken. Thus, the data collected in this study allow an analysis of system performance, eye movements, and the correlation of performance and eye movements for each combination of maneuvers and instrument panels. (Author) D. P. F.

A65-30136 #
RADAR DESIGN IN RELATION TO HUMAN PERFORMANCE.
H. C. Freiesleben (German Hydrographic Institute, Hamburg, West Germany).
Institute of Navigation, Journal, vol. 18, July 1965, p. 330-335.

Discussion of ship-based radar and aspects of human physiological and psychological factors relating to its construction and performance. Factors of echo detection on the screen are considered, as are those of visual perception. The peculiarities of shipborne radar are reviewed along with image interpretation and tracking, and the problems connected with collision avoidance are covered in some detail. Findings of psychological tests which determine the abilities of radar operators are given, and the preferences for certain types of equipment are noted resulting from questionnaires filled out by radar operators on German merchant vessels. It is concluded that most visual defects and peculiarities revealed by the physiological and psychological investigations will not be overcome by improvement in instrument design. B. B.

A65-30137 #
RIGHTING REFLEX IN THE RABBIT DURING SHORT PERIODS OF SUBGRAVITY [IL RIFLESSO DI RADDRIZZAMENTO NEL CONIGLIO DURANTE BREVI PERIODI DI SUBGRAVITA].
R. Caporale (Ispettorato di Sanità Aeronautica, Centro di Studi e Ricerche di Medicina Aeronautica e Spaziale, Rome, Italy).
Rivista di Medicina Aeronautica e Spaziale, vol. 28, Jan.-Mar. 1965, p. 10-25. 10 refs. In Italian.

Experimental investigation of the righting reflex of rabbits subjected to short periods of subgravity in a subgravity tower. Rabbit behavior during the tests was studied by means of a movie camera. It was determined that, in subgravity, the righting reflex of unblindfolded rabbits persists, while the reflex is lacking in blindfolded rabbits. The findings indicate that weightlessness inhibits the reflex by impeding the utricular and saccular graviceptive function. (Author) M. M.

A65-30138 #
GAS-CHROMATOGRAPHIC METHOD FOR THE DETERMINATION OF POLLUTANTS IN AVIATION LIQUID OXYGEN [METODO GAS-CROMATOGRAFICO PER LA DETERMINAZIONE DEGLI INQUINANTI NELL'OSSIGENO LIQUIDO AVIO].
E. Cianetti, G. Pecci, and G. Scuderi (Ministero Difesa Aeronautica, Laboratori Aeronautica Militare, Laboratorio Chimico-Technologico, Rome, Italy).
Rivista di Medicina Aeronautica e Spaziale, vol. 28, Jan.-Mar. 1965, p. 26-45. In Italian.

Method for the quick qualitative and quantitative determination of the principal pollutants, both organic and inorganic, of aviation liquid oxygen. The determination of organic pollutants is performed by means of ionizing-flame gas chromatography, that of inorganic pollutants, after preconcentration, is done in two stages by means of a thermistor sensor. (Author) M.M.

A65-30139 #
CONTRIBUTION TO THE STUDY OF THE CARDIOVASCULAR FUNCTION IN MILITARY JET PILOTS [CONTRIBUTO ALL'ESPLORAZIONE FUNZIONALE CARDIO-VASCOLARE DI PILOTI DI AVIOGETTI MILITARI].
Antonio Maria de Angelis (Bologna, Università, Istituto di Clinica Medica e Terapia Medica, Scuola di Perfezionamento in Cardiologia, Bologna; Regione Area, I, Direzione di Sanità, Milan, Italy).
Rivista di Medicina Aeronautica e Spaziale, vol. 28, Jan.-Mar. 1965, p. 46-61. 12 refs. In Italian.

Discussion of the results of an investigation of changes in the EKG and blood pressure recorded, both before and after flight, in 22 pilots with an average age of 29 years. It is reported that increased heart rate and blood pressure, within acceptable physiological limits, occurred in 20 subjects; these findings are in agreement with the most reliable results reported in the literature. A technical appendix describes some modern methods of cardiovascular investigation (by means of radio telemetry and of the electrocardiocorder) used in recording cardiocirculatory data in flight. (Author) M.M.

A65-30140 #
COMPARISON OF THE EFFICIENCY OF SOME TYPES OF AIRBORNE BACTERIA SAMPLERS BY MEANS OF INERT MONO- AND POLYDISPERSED AEROSOLS [COMPARAZIONE DELL'EFFICIENZA DI ALCUNI TIPI DI CAMPIONATORI DI BATTERI AEROGENI CON L'IMPIEGO DI AEROSOL INERTI MONO E POLIDISPERSI].
L. Mammarella (Centro Tecnico Chimico-Fisico Biologico dell'Esercito, Laboratorio, Italy).
Rivista di Medicina Aeronautica e Spaziale, vol. 28, Jan.-Mar. 1965, p. 62-76. In Italian.

Method for comparing the efficiency of various samplers in collecting airborne microorganisms using inert mono- and polydispersed aerosols. The comparative examination, besides the efficiency of the millipore membrane filters, showed the excellent performance of the slit sampler for 3-μ particles (average size of droplet nuclei). The perforated-disk sampler showed appreciable efficiency in collecting particles 3 μ in size; for the 3-μ range of particles, its efficiency is about half that of the slit sampler. It is noted that the vault sampler, spherical segment sampler, and cascade vault sampler are more suitable to collect heavy particles. (Author) M.M.

A65-30195 #
THE ERD CONCEPT IN SPACE RADIATION SHIELDING.
J. W. Haffner (North American Aviation, Inc., Space and Information Systems Div., Downey, Calif.).
American Institute of Aeronautics and Astronautics, Annual Meeting, 2nd, San Francisco, Calif., July 26-29, 1965, Paper 65-497. 18 p.
Members, $0.50; nonmembers, $1.00.

Discussion of the ability of the human body to repair radiation damage to itself. The basic effective residual dose (ERD) concept arose from observing the radiation doses which are lethal in mice. It was observed that the total dose required was increased if it was administered in two or more sublethal doses over a period of time as compared with a single acute dose. The effects of using the ERD concept in the estimation of shield thicknesses for space travel is studied. It is determined that up to approximately 3 gm/cm^2 of shielding can be saved on hazardous missions by proper application of the ERD concept. S.H.B.

A65-30202 #
A PERSONALIZED MATHEMATICAL MODEL OF THE HUMAN BODY.
Ernest P. Hanavan, Jr. (USAF, Systems Command, Aerospace Medical Div., Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio).
American Institute of Aeronautics and Astronautics, Annual Meeting, 2nd, San Francisco, Calif., July 26-29, 1965, Paper 65-498. 12 p. 11 refs.
Members, $0.50; nonmembers, $1.00.

Description of a mathematical model of the human body for the prediction of its inertial properties in any fixed body position. These properties include the location of the center of mass, the moments of inertia and the products of inertia about axes through the center of mass, the principal moments of inertia about the principal axes through the center of mass, and the orientation of the principal axes. It is assumed in the formulation of the model that the human body can be represented by a set of rigid bodies of simple geometric shape and uniform density, the regression equations for body segment weights are valid over the spectrum of body weight in the Air Force flying population, and the limbs move about fixed pivot points when the body changes position. S.H.B.

A65-30207 #
DESIGN REQUIREMENTS FOR THE STERILIZATION CONTAINERS OF PLANETARY LANDERS.
J. B. Tenney, Jr. (General Electric Co., Missile and Space Div., King of Prussia, Pa.) and R. G. Crawford (NASA, Marshall Space Flight Center, Structures Div., Huntsville, Ala.).
American Institute of Aeronautics and Astronautics, Annual Meeting, 2nd, San Francisco, Calif., July 26-29, 1965, Paper 65-387. 20 p. 16 refs.
Members, $0.50; nonmembers, $1.00.

Discussion of problems encountered in the designing of sterilization containers for both hard and soft planetary landers. The sterilization policy prescribed by NASA for planetary landing spacecraft has three basic requirements - (1) the lander will be assembled in cleanrooms at specified levels of assembly, (2) the landing assembly will be subjected to an approved sterilization cycle, and (3) the landing assembly will be enclosed in a bacteriological barrier to maintain cleanliness and sterility. Size, shape, and weight considerations for the barrier are discussed. Problems of heating and pressure connected with the barrier are also examined. S.H.B.

A65-30214 #
THE EFFECT OF SPACECRAFT STERILIZATION ON MANNED INTERPLANETARY MISSIONS.
Albin M. Nowitzky (Exodyne Co., Chatsworth, Calif.).
American Institute of Aeronautics and Astronautics, Annual Meeting, 2nd, San Francisco, Calif., July 26-29, 1965, Paper 65-503. 12 p. 21 refs.
Members, $0.50; nonmembers, $1.00.

Consideration of the engineering problems involved in the design of manned interplanetary space vehicles for sterile missions. Consideration is given to applicable unmanned sterilization techniques and possible mutual effects between anticipated exobiota and terrestrial microorganisms indigenous to man. The problems of adapting current mission concepts to those involving absolute mutual isolation of microorganisms during manned interplanetary operations are also investigated. S.H.B.

A65-30218 #
LIFE SUPPORT SYSTEM OPERATION AND MAINTENANCE IN A MANNED SPACE CABIN SIMULATOR.
R. E. Snyder and M. M. Yakut (Douglas Aircraft Co., Inc., Missile and Space Systems Div., Advanced Biotechnology Dept., Santa Monica, Calif.).
American Institute of Aeronautics and Astronautics, Annual Meeting, 2nd, San Francisco, Calif., July 26-29, 1965, Paper 65-502. 16 p.
Members, $0.50; nonmembers, $1.00.

Description of the testing of space laboratory life-support subsystems installed and operated in a manned space chamber without water and oxygen recovery from waste. Life-support subsystems development tests, the toxicology program, and space cabin simulator manned tests are discussed. In addition, the required

program for crew selection and training and the Fortran computer program for the generalized life-support system are examined.
S.H.B.

A65-30349
THE PARTIAL SIMULATION OF WEIGHTLESSNESS IN WATER [ZUR TEILSIMULATION DER GEWICHTSLOSIGKEIT IM WASSER].
H. von Diringshofen.
Zentralblatt für Verkehrs-Medizin, Verkehrs-Psychologie, Luft- und Raumfahrt-Medizin, vol. 10, Dec. 1964, p. 193-197. 8 refs. In German.

Investigation of the effects of prolonged partial and total immersion in water as a means of simulating some of the conditions of weightlessness and their effects upon the human body. The otic mechanisms of equilibrium, however, remain subject to the effect of gravity. Moreover, there are significant differences between true weightlessness and the partial simulation of this condition in water since there are pressure gradients between internal lung pressure and external pressure on the breastbone and chest which are a function of the depth to which the body is immersed and the pressure of the air supplied to the subject when under a diver's helmet. Of particular importance is the difference between both sides of the diaphragm. For purposes of optimum simulation this pressure should be equalized.
D.P.F.

A65-30350
THE WPW SYNDROME AND FLIER CAPABILITY [WPW-SYNDROM UND FLIEGERTAUGLICHKEIT].
H. W. Kirchhoff (Luftwaffe, Flugmedizinisches Institut, Fürstenfeldbruck, West Germany).
Zentralblatt für Verkehrs-Medizin, Verkehrs-Psychologie, Luft- und Raumfahrt-Medizin, vol. 10, Dec. 1964, p. 204-207. In German.

Description of the symptoms and effects of the Wolff-Parkinson-White (WPW) cardiac syndrome as related to the capabilities and behavior of aircraft pilots. This syndrome of the heart, also observed in young children, is not in any way related to age. It is characterized by the following set of symptoms: (1) a shortening of PQ action to 0.12 sec and less, (2) extension of the QRS complex to 0.11 sec and more, (3) swelling at the start of the pumping cycle, and (4) a displacement of ST and T which in most cases is in the opposite direction. Such WPW syndromes can be detected from an examination of the subject's electrocardiogram and can be latent. WPW syndromes can cause acute paroxysmal tachycardia or the occurrence of flutter, the incidence of which ranges from 50 to 70% for clinically diagnosed cases.
D.P.F.

A65-30468
MEN AND MACHINES FOR TRAINING.
A. G. Parry (British Overseas Airways Corp., Technical Training Centre, London, England).
World Aerospace Systems, vol. 1, July 1965, p. 343, 344.

Consideration of the use of simulation in the training of aviation personnel. The use of a digital computer, which has a time-sharing capacity for multiple programs, permits the investigation of not only the variety of simulation but also the total simultaneous variety of simulation available for both flying and ground staff. It is hoped that a simulator complex rather than individual simulators will produce a more efficient training program for the staff of an aircraft. Cost considerations involved in the development of such complexes are also discussed.
S.H.B

A65-30480 #
BIOLOGICAL EFFECT OF HIGH-ENERGY PROTONS [O BIOLOGICHESKOM DEISTVII PROTONOV VYSOKIKH ENERGII].
P. P. Saksonov, V. V. Antipov, V. S. Shashkov, B. L. Razgovorov, G. F. Murin, and V. S. Morozov.
Akademiia Nauk SSSR, Doklady, vol. 162, May 21, 1965, p. 688-690. 14 refs. In Russian.

Experimental study of the relative biological effectiveness (RBE) of 660- and 120-Mev protons on mice and rats. Various tests of vital-activity and heredity and clinical observations showed an RBE of 0.7 in comparison with γ radiation. The protective action against protons and γ-rays of cystamine dichlorohydrate, aminoethyl isothiuronium dihydrobromide, serotonin creatine sulfate, 5-methoxytryptamine hydrochloride, tryptamine hydrochloride, and 5-hydroxytryptophan was tested.
V.Z.

A65-30481 #
EFFECT OF RADIOPROTECTIVE AGENTS ON THE PERSISTENT AFTERGLOW OF IRRADIATED SOLUTIONS OF SERUM ALBUMIN [VLIIANIE RADIOZASHCHITNYKH VESHCHESTV NA DLITEL'NOE POSLESVECHENIE OBLUCHENNYKH RASTVOROV SYVOROTOCHNOGO AL'BUMINA].
I. I. Sapezhinskii and Iu. V. Silaev (Akademiia Nauk SSR, Institut Khimicheskoi Fiziki, Moscow, USSR).
Akademiia Nauk SSSR, Doklady, vol. 162, May 21, 1965, p. 691-693. 11 refs. In Russian.

Investigation of the effect of oxygen, reduced glutathione, β-mercaptoethylamine, thiourea, cysteine, propyl gallate, sodium thiosulfate, 2-propyl-6-methyl-3-hydroxypyridine, aniline, sodium sulfate, ascorbic acid, glucose, and hydroxylamine on the afterglow of UV-irradiated serum albumin solutions, to extend the studies of Konev and Katibnikov of the luminescence in dry serum albumin. The experimental procedure is described and the results are discussed. Theories are advanced that hold peroxide-type compounds and recombination phenomena in albumin molecules to be essential in the afterglow mechanism. Greater suppressive effect on the afterglow is shown by compounds having radioprotective properties.
V.Z.

A65-30482 #
PHYSIOLOGICAL CHARACTERISTICS OF THE DISTRIBUTION OF EXCITATION IN THE MUSCULAR SYSTEM UNDER VARIATIONS IN THE RESPIRATORY METABOLISM CAUSED BY CONDITIONED REFLEXES [FIZIOLOGICHESKAIA KHARAKTERISTIKA RASPREDELENIIA VOZBUZHDENIIA V MYSHECHNOI SISTEME PRI USLOVNOREFLEKTORNYKH IZMENENIIAKH DYKHATEL'NOGO GAZOOBMENA].
L. A. Isaakian, R. P. Ol'nianskaia, and G. A. Trubitsyna (Akademiia Nauk SSR, Institut Fiziologii, Leningrad, USSR).
Akademiia Nauk SSSR, Doklady, vol. 162, May 21, 1965, p. 716-718. In Russian.

Experimental studies of the effects on muscular biocurrent distribution of variations in the respiratory metabolism occasioned by muscular activity and fluctuations of the ambient temperature. Simultaneous measurements of the respiratory metabolism and of biocurrents in the skeletal muscles were conducted. The results are diagramed and briefly discussed. The nonuniformity of the muscular system as a source of thermal energy is noted and theories are advanced to explain this circumstance.
V.Z.

A65-30589
PROCESSING AND TRANSMITTING INFORMATION THROUGH THE CENTRAL NERVOUS SYSTEM.
Joseph L. Hall, II (Massachusetts Institute of Technology, Cambridge, Mass.).
IEEE Student Journal, May 1965, p. 29-34.
Contract No. DA-36-039-AMC-03200(E); NSF Grant No. GP-2495; Grant No. NsG-496; National Institutes of Health Grant No. MH-04737-04.

Description of experiments conducted to explore the relationship between patterns of neural activity in the central nervous system and the binaural localization of sounds. Acoustic clicks were presented to the two ears of anesthetized cats that had been operated on so as to expose the brain. A simplified diagram of auditory pathways is given. By means of microelectrodes, the responses of auditory neurons in the accessory nucleus of the superior olive were observed. These neurons respond when clicks are presented to both ears, and their response depends on the relative intensities and the relative time of arrival of the click at the ears. These two factors, interaural time difference and interaural intensity difference, are utilized by humans in determining the location in space of a source of sound. The stimulus configurations that were used in the electrophysiological experiments on cats were the same as stimulus configurations that have previously been used in psychophysical experiments on humans. A working hypothesis, or model, was formulated that described the relation between cell activity and localization of a sound source. The empirical results were incorporated into the model to obtain predictions that could be compared to corresponding results from psychophysical experiments on humans.
(Author) M.F.

A65-30593
THERMODYNAMIC EQUILIBRIA IN PREBIOLOGICAL ATMOSPHERES.
M. O. Dayhoff, E. R. Lippincott, and R. V. Eck (National Biomedical Research Foundation, Silver Spring; Maryland, University, Dept. of Chemistry, College Park, Md.).
Science, vol. 146, Dec. 11, 1964, p. 1461-1464. 9 refs.
Contract No. NSR-21-003-002; National Institutes of Health Grant No. GM 08710.

Computation of the concentrations of a large number of compounds of biological interest which would be present in the atmosphere at thermodynamic equilibrium performed under many combinations of temperature, pressure, and elemental composition. The computations revealed a possible mechanism for the abiological formation of asphaltic tar and an oxidative threshold at which all but the simplest compounds disappear. (Author) M.M.

A65-30650
EFFECT OF TEMPERATURE AND PRECONDITIONING ON PHOTOPERIODIC RESPONSE OF PHARBITIS NIL.
Atsushi Takimoto and Karl C. Hamner (California, University, Dept. of Botany and Plant Biochemistry, Los Angeles, Calif.).
Plant Physiology, vol. 39, Nov. 1964, p. 1024-1030. 11 refs.
NSF Grant No. G-23983; Grant No. NsG 237-62.

Experiments designed to investigate the effect of temperature on the photoperiodic response of Pharbitis nil, strain Violet, exposed to very long dark periods and to determine whether or not endogenous rhythms are involved in this response. Special consideration is given to preconditioning which may initiate endogenous rhythms. Data presented here suggest that there are at least three kinds of timing mechanisms in the photoperiodic response of Pharbitis nil. The first timing component is similar to an hourglass in that a linear increase in the flowering response results with increasing duration of the dark period. Furthermore, this component is very sensitive to temperature. The second component is an endogenous circadian rhythm which starts at the beginning of the light period. The third component, which is temperature-insensitive, starts at the beginning of the dark period and has a very light-sensitive phase with the maximum 8 hr after the onset of darkness. To start the last component of the timing mechanism, a light period of 4 hr or more may be necessary before the dark period. M.F.

A65-30671
LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964.
Symposium sponsored by COSPAR.
Edited by Marcel Florkin (Liège, Université, Liège, Belgium).
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965. 258 p.
$8.25.

CONTENTS:

A65-30672
MANNED SPACE FLIGHT - SOME SCIENTIFIC RESULTS.
V. V. Parin, Iu. M. Volynkin, and P. V. Vassil'ev (Academy of Sciences, Dept. of Physiology, Moscow, USSR).
(COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence, Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 3-22. 39 refs.
[For abstract see Accession no. A64-26380 22-16]

A65-30674
EXPERIMENTAL MEASUREMENTS OF THE RADIATION HAZARDS ASSOCIATED WITH MANNED SPACE FLIGHTS.
Benton C. Clark and Duane A. Adams (USAF, Systems Command, Research and Technology Div., Weapons Laboratory, Biophysics Branch, Kirtland AFB, N. Mex.).
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 29-47. 19 refs.

Summary of specific ionization intensities for geomagnetically trapped particles and their secondaries as measured inside materials of various thicknesses and atomic compositions. Tissue-equivalent ionization chambers of special design were flown on US satellites to determine dose-rate levels in space. A chamber shielded by 4.7 g/cm^2 measured doses from energetic protons in the inner Van Allen belt and bremsstrahlung radiation produced by relativistic electrons from the artificial radiation belt formed in July 1962. In Nov. 1962, the maximum dose-rate in space for this shield was 30 rad/hr. Behind 0.4-g/cm^2 shielding, the dose-rate peak was 20,000 rad/hr. These doses were determined to be due to artificial electrons in most regions of space, masking the dose arising from energetic protons. (Author) M.M.

A65-30675
PROCEDURES NECESSARY FOR THE PREVENTION OF PLANETARY CONTAMINATION.
Lawrence B. Hall (NASA, Washington, D.C.) and Carl W. Bruch (NASA, Office of Space Science and Applications, Washington, D.C.).
(COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence, Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 48-62. 42 refs.
[For abstract see Accession no. A64-18827 13-16]

A65-30676
RESPONSE OF MICROORGANISMS TO A SIMULATED MARTIAN ENVIRONMENT.
Ervin J. Hawrylewicz, Charles A. Hagen, and Richard Ehrlich (Illinois Institute of Technology, Research Institute, Life Sciences Div., Chicago, Ill.).
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 64-73. 14 refs.
NASA-supported research.

Investigation of the survival of terrestrial microorganisms in a simulated Martian environment. The ultimate objective is to establish whether earth organisms can contaminate Mars. In addition, any demonstration of survival and growth in a simulated Martian environment will provide information relating to the biology of Mars. In the experimental design, exhaustive consideration was given to the duplication of the known and the theoretical environmental parameters of Mars. These included composition of the soil and the atmosphere, barometric pressure, moisture content, solar radiation, and diurnal temperature extremes. Based on these considerations, a simulated Martian summer environment was defined and used in the experiments. One group of microorganisms was selected from culture collections on the basis of their known characteristics. The other group was made of microorganisms isolated from soils. The soil samples were obtained from the Antarctic, from New Mexico and California deserts, and from the Colorado tundra. The studies showed that a number of microorganisms can survive the simulated Martian environment. However, no substantial growth under such conditions could be demonstrated. The ability of microorganisms to form spores as a mechanism for survival is discussed. Also, experiments utilizing augmented environments to establish minimum environmental conditions which will permit growth are described. (Author) M.M.

A65-30678
REVIEW OF CONCEPTS AND INVESTIGATIONS FOR THE USE OF OPTICAL ROTATION AS A MEANS OF DETECTING EXTRATERRESTRIAL LIFE.
Ira Blei and J. W. Liskowitz (Melpar, Inc., Falls Church, Va.).
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 86-94.
Contracts No. NASr 85; No. NASw-557.

Consideration of optical activity as a satisfactory parameter likely to be of use in detecting extraterrestrial life. One of the most universal properties of living material is its optical activity. The origin of this characteristic is not well understood, but because of its universality, the detection of optical activity on other planets would be compelling evidence of the presence of life similar to that which evolved on earth. New techniques for the measurement of optical activity in the ultraviolet region of the spectrum have been developed. This provides a higher degree of specificity in detecting key biological compounds. In addition, processing methods have been designed which permit the maximum amount of optical activity to be extracted from soils. (Author) M.M.

A65-30679
THE DETECTION OF EXTRATERRESTRIAL LIFE BY MEANS OF A QUANTITATIVE FLUORESCENT NUCLEIC ACID-ACRIDINE ORANGE REACTION.
E. A. Botan and H. P. Hovnanian (Avco Corp., Research Center, Wilmington, Mass.).
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 95-99. 6 refs.

Technique for the detection of extraterrestrial life based on the presence of nucleic acid. The technique uses a fluorescent acridine orange-nucleic acid-staining reaction. The use of a fluorescent reaction for the detection of nucleic acid can be justified on the basis of sensitivity (the nucleic acid of a bacterium of approximately 8×10^{-14} g has been demonstrated through fluorescence). (Author) M.M.

A65-30681
GULLIVER AND DIOGENES - EXOBIOLOGICAL ANTITHESES.
Gilbert V. Levin and Allen H. Heim (Hazleton Laboratories, Inc., Falls Church, Va.).
(COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]

Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 105-119. 7 refs.
Contracts No. NASr-10; No. NAS 5-3799; No. N 178-8097.
[For abstract see Accession no. A64-18680 13-16]

A65-30682
ON ARTIFICIAL MARTIAN CONDITIONS REPRODUCED FOR MICROBIOLOGICAL RESEARCH.
A. I. Zhukova and I. L. Kondratiev (Academy of Sciences, Moscow, USSR).
(COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence, Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 120-126.
[For abstract see Accession no. A64-18801 13-16]

A65-30683
ABIOGENIC SYNTHESIS ON MARS.
Richard S. Young, Cyril Ponnamperuma, and Barbara K. McCaw (NASA, Ames Research Center, Moffett Field, Calif.).
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 127-138. 7 refs.

Discussion of atmospheres capable of producing organic compounds under primitive conditions in the light of recent experimental evidence. The atmosphere of Mars is considered and in particular, the observations of Sinton of reflection spectra with features at 3.45, 3.58, and 3.69 μ, which are attributed to C-H bands and to the presence of organic molecules. Colthup interprets these features as being representative of organic aldehydes and suggests, specifically, acetaldehyde. Many works have considered these observations as being indicative of life on Mars. Rea has offered alternative hypotheses. Experimental evidence is presented of yet another possible explanation: that organic compounds are being produced in the Martian atmosphere, and may be responsible for Sinton's observations. The influence of such syntheses on possible Martian organisms is discussed. Various possible Martian atmospheres were irradiated with ultraviolet light as well as with other possible energy sources, and a variety of organic end products were identified. Martian atmospheres plus acetaldehyde as a starting point were also used and end-products analyzed. Possible abiogenic pathways for Mars are discussed. (Author) M.M.

A65-30684
BACTERIAL ECOLOGIES IN LIMONITE.
W. Vishniac (Rochester, University, Dept. of Biology, Rochester, N.Y.).
(COSPAR, Meeting, 7th, and International Space Science Symposium 5th, Florence, Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 139-141.
[For abstract see Accession no. A64-18837 13-16]

A65-30685
ULTRA-HIGH VACUUM AND MICROORGANISMS.
A. A. Imshenetskii and S. V. Lysenko (Academy of Sciences, Moscow, USSR).
(COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence, Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 142-148.
[For abstract see Accession no. A64-18740 13-16]

A65-30686
REQUIREMENTS OF A MINIMUM FREE LIVING REPLICATING SYSTEM.
Harold J. Morowitz (Yale University, Dept. of Molecular Biology and Biophysics, New Haven, Conn.).
(COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence, Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 149-153.
[For abstract see Accession no. A64-18813 13-16]

A65-30687
A TECHNIQUE AND SOME RESULTS OF METEORITE MICROBIOLOGICAL INVESTIGATIONS.
S. S. Abyzov and A. A. Imshenetskii (Academy of Sciences, Moscow, USSR).
(COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence, Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 155-164.
[For abstract see Accession no. A64-18628 13-16]

A65-30688
CARBON COMPOUNDS IN TERRESTRIAL SAMPLES AND THE ORGUEIL METEORITE.
W. G. Meinschein (Esso Research and Engineering Co., Linden, N.J.).
(COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence, Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 165-181. 63 refs.
[For abstract see Accession no. A64-18644 13-16]

A65-30689
SATELLITE BIOLOGICAL EXPERIMENTS - MAJOR RESULTS AND PROBLEMS.
N. M. Sisakian, O. G. Gazenko, and V. V. Antipov (Academy of Sciences, Moscow, USSR).
(COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence, Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 185-205. 49 refs.
[For abstract see Accession no. A64-18630 13-16]

A65-30690
ON THE BIOLOGICAL PROBLEMS TO BE ATTACKED WITH A SERIES OF U. S. SATELLITES IN 1966.
Colin S. Pittendrigh (Princeton University, Princeton, N. J.; National Academy of Sciences, Space Science Board, Washington, D. C.).
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 206-214.

Consideration of the following tasks to be undertaken by means of biological satellites: (1) the cardiovascular and neurophysiology of primates, deriving from the need to put man into the weightless state for prolonged durations; (2) questions concerning the radiation hazard. Many experiments are planned for a single satellite in which it is hoped to discover whether the weightless state significantly affects biological responses to radiation. If, as is expected, there is no synergism between weightlessness and radiation, it will be possible to pursue all other questions about radiation effects in space by experimentation on the ground; and (3) two other classes of questions that satellite experiments may answer having deeper roots in theoretical and cellular physiology. The first of these concerns weightlessness itself. A long list of experiments involving a diversity of material from animal eggs to higher plants will seek to determine whether or not the absence of a gravitational input to the system significantly affects its general performance. Special interest in the US attaches to suggestions from ground-based experiments that normal morphogenesis may fail in plant systems that are exposed to less than about 10^{-5} g. It is also hoped that satellite experiments will help resolve the long-standing debate on the cause of persistent daily rhythmicity in organisms. One school of workers in the US continues to believe that such rhythmicity is caused by organisms sensing an unidentified physical variable with a 24-hr period and hence presumably caused by the earth's rotation. It is proposed to assay the persistence and stability of such rhythms in organisms orbiting the earth with a period of about 90 min. Persistence of the rhythm in such orbital conditions would dispose of the theory of external causation; failure of such rhythms to persist would, however, constitute strong though not crucial support in its favor. (Author) M.M.

A65-30691
RESULTS OF BIOLOGICAL EXPERIMENTS CARRIED OUT UNDER CONDITIONS OF "VOSTOK" FLIGHTS WITH THE PARTICIPATION OF COSMONAUTS A. G. NIKOLAJEV, P. R. POPOVICH, AND V. F. BYKOVSKY.
V. V. Antipov, N. L. Delone, G. P. Parfionov, and V. G. Vysotskii (Academy of Sciences, Moscow, USSR).
(COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence, Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 215-229. 6 refs.
[For abstract see Accession no. A64-18673 13-16]

A65-30692
THE NASA BIOSATELLITE PROGRAM.
Dale W. Jenkins (NASA, Bioscience Programs Div., Washington, D. C.).
(COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence, Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 230-240.
[For abstract see Accession no. A64-18756 13-16]

A65-30693
ON THE BIOLOGICAL ROLE OF GRAVITY - SOME RESULTS AND PROSPECTS OF SPACE RESEARCH ON SATELLITES AND SPACESHIPS.
O. G. Gazenko and A. A. Gurjian (Academy of Sciences, Dept. of Physiology, Moscow, USSR).
(COSPAR, Meeting, 7th, and International Space Science Symposium, 5th, Florence Italy, May 8-20, 1964, Paper.)
IN: LIFE SCIENCES AND SPACE RESEARCH. VOLUME 3; INTERNATIONAL SPACE SCIENCE SYMPOSIUM, 5TH, FLORENCE, ITALY, MAY 12-16, 1964. [A65-30671 19-04]
Symposium sponsored by COSPAR.
Edited by Marcel Florkin.
Amsterdam, North-Holland Publishing Co.; New York, John Wiley and Sons, Inc., 1965, p. 241-257. 58 refs.
[For abstract see Accession no. A64-18743 13-16]

A65-30738
QUANTITATIVE NEUROANATOMIC STUDIES IMPLEMENTED BY ULTRASONIC LESIONS - MAMMILLARY NUCLEI AND ASSOCIATED COMPLEX OF CAT BRAIN.
William J. Fry, Francis J. Fry, Rita Malek, and Joseph W. Pankau (Illinois, University, Biophysical Research Laboratory, Urbana, Ill.).
Acoustical Society of America, Journal, vol. 36, Oct. 1964, p. 1795-1835. 19 refs.
Grant No. NsG 195-62; Institute of Neurological Diseases and Blindness Grant No. B1567.

Results of a quantitative approach to the elucidation of the structure of the limbic system of the brain. Total neuron populations and anatomically significant subpopulations of the medial and lateral mammillary nuclei of the cat brain are determined. The subpopulations are measured by placing ultrasonic lesion arrays in efferent and afferent tracts and in associated nuclei, waiting for degeneration to occur, and then determining the residual populations in each case. The total neuron populations of a number of structures related directly to the mammillary nuclei are also determined. In addition, the size distribution of the nucleoli of the neurons is measured for each of the structures of interest in the population determinations. The methods and techniques that have been developed to obtain the necessary accuracy in the determination of the cellular populations are described. These include lesion placement, histologic preparation of the tissue, nuclear-boundary determination, and neuron mapping. The data presented constitute the type of information from which a complete quantitative description of the neural circuitry of brain structures can be deduced. (Author) M.M.

A65-30843
THE REAL-TIME SORTING OF NEURO-ELECTRIC ACTION POTENTIALS IN MULTIPLE UNIT STUDIES.
William Simon (Massachusetts Institute of Technology, Research Laboratory of Electronics and Center Development Office, Cambridge, Mass.).
Electroencephalography and Clinical Neurophysiology, vol. 18, 1965, p. 192-195.
Grant No. NsG-496; NSF Grant No. GP-2495; Contract No. DA-36-039-AMC-03200(E); National Institutes of Health Grant No. MH-04737-04.

Description of a method by which action potentials recorded simultaneously can be sorted in a machine of moderate size in real time and on line. Within the last few years, measurements from clusters of nerve cells have begun to provide clues to the functional relationships of cells in the central nervous system. Records from a single microelectrode will often show action potentials from a number of cells. The action potentials of individual cells are distinguished from each other by waveform. Visual examination of a record of a few hundred action potentials will usually reveal a small number of clearly defined groups. Visual sorting, however, is a slow tedious job which does not allow the experimenter to see his results while the preparation is still viable. In the past year, some progress has been made in computer analysis of the microelectrode data. A means by which action potentials could be sorted in a machine of moderate size in real time and on line was needed and was found. (Author) M.F.

A65-30943 #
SIMULATOR REQUIREMENTS DEDUCED FROM COMPARISONS OF PILOT'S PERFORMANCE IN GROUND SIMULATORS AND IN AIRCRAFT.
Lawrence A. Clousing (NASA, Ames Research Center, Full-Scale and Systems Research Div., Moffett Field, Calif.).
(International Council of the Aeronautical Sciences, Congress, 4th, Paris, France, Aug. 24-28, 1964, Paper 64-554.)
IN: INTERNATIONAL COUNCIL OF THE AERONAUTICAL SCIENCES, CONGRESS, 4TH, PARIS, FRANCE, AUGUST 24-28, 1964, PROCEEDINGS. [A65-30918 19-02]
Edited by R. R. Dexter.
Washington, Spartan Books, Inc.; London, MacMillan and Co., Ltd., 1965, p. 615-631; Commentaries, D. K. M. Mendela and J. C. Wimpenny (Hawker Siddeley Aviation, De Havilland Div., Hatfield, Herts., England), p. 631, 632; Author's Reply, p. 632, 633.
13 refs.
[For abstract see Accession no. A64-21683 17-22]

A65-31004
INFORMATION STORAGE AND SURVIVAL OF BIOLOGICAL SYSTEMS AT TEMPERATURES NEAR ABSOLUTE ZERO.
Arthur I. Skoultchi and Harold J. Morowitz (Yale University, Dept. of Molecular Biology and Biophysics, New Haven, Conn.).
Yale Journal of Biology and Medicine, vol. 37, Oct. 1964, p. 158-163.
Grant No. NsG-208.

Series of experiments designed to repeat with precision the verification of survival of organisms at very low temperatures, because of the fundamental theoretical importance of survival near absolute zero. The eggs of the phyllopod crustacean Artemia were chosen as experimental organisms because they can go through the freezing and thawing points without mechanical damage and they are sufficiently complex so that the features assayed after low-temperature treatment require extensive biological information. Cold-treatment of samples was done at the temperatures of liquid N at 1 atm and of liquid He at reduced pressure. Results indicate that with respect to the defining characteristics of emergence and hatching, the morphogenetic response of Artemia cysts is unaffected by treatment at temperatures lower than 2.2°K for six days, thus confirming the ability of complex biological systems to survive temperatures near absolute zero. F.R.L.

A65-31005
STUDY OF A PHOTOSYNTHETIC GAS EXCHANGER - A QUANTITATIVE REPETITION OF THE PRIESTLEY EXPERIMENT.
James H. Eley, Jr. and Jack Myers (Texas, University, Austin, Tex.).
Texas Journal of Science, vol. 16, Sept. 1964, p. 296-333. 21 refs.
Contract No. AF 41(609)-1556; Grant No. NsG(T)-85.

Study of the gas exchange of a dwarf mouse and an illuminated suspension of Chlorella ellipsoidea. The experimental arrangement permitted individual measurements of each component or of two components when coupled in a system closed for gas exchange. Exchange of CO_2 and O_2 were observed by calibrated analyzers which was used in constant-flow systems for the individual components or in fractions of the recirculated gas flow in the closed system. Performance of the algal suspension was observed simultaneously in terms of cell production rate. The experiments demonstrate that the major difficulty in obtaining complete balance in gas exchange between a plant and an animal lies in matching the ratios of exchange of CO_2 and O_2. In the longer of two experiments 98% of the desired perfect match was obtained. F.R.L.

A65-31007
THE MODE OF ACTION OF CHLORPROMAZINE (CPZ) - A REVIEW.
Paul S. Guth (Tulane University, School of Medicine, New Orleans, La.).
Tulane University Medical Faculty, Bulletin, vol. 24, Nov. 1964, p. 35-42. 71 refs.
Research supported by Sandoz Pharmaceuticals, Inc. and USPHS; Grant No. NsG-346.

Evidence to show that CPZ, as a prototype phenothiazine tranquilizer, acts to affect membrane function wherever it accumulates in the body in sufficient concentration. The brain is the organ of prime effect because the drug localizes in certain areas of the brain in very high concentrations. The evidence is presented under three headings - ubiquity of membrane effects, sites of drug concentration, and sites of drug action. F.R.L.

A65-31019
MODAL DIFFERENTIATIONS OF ELECTRICAL ACTIVITIES BY VARIATION OF THE PARTIAL PRESSURE OF OXYGEN ON THREE IDENTIFIABLE NEURONS (APLYSIA DEPILANS) [DIFFERENCIATIONS MODALES DES ACTIVITES ELECTRIQUES, PAR VARIATION DE LA PRESSION PARTIELLE DE L'OXYGENE, SUR TROIS NEURONES IDENTIFIABLES (APLYSIA DEPILANS)].
Angélique Arvanitaki-Chalazonitis and Nicolas Chalazonitis (Centre National de la Recherche Scientifique, Institut de Neurophysiologie et Psychophysiologie, Département de Neurophysiologie Cellulaire, Marseilles; Institut Océanographique, Paris, France).
Académie des Sciences (Paris), Comptes Rendus, vol. 261, no. 2, July 12, 1965, p. 548-551. 10 refs. In French.
Research supported by the Centre National de la Recherche Scientifique, France; National Institutes of Health Grant No. NB-03337; Grant No. AF EOAR 63-114.

Comparison of the bioelectric behavior of three identifiable neurons, Type A, "branchial" (Br) type, and "Genital" (Gen) type as a function of quantitatively evaluated variations of the partial pressure of oxygen. The study was limited to comparison of the variation of the membrane potential and the frequency of the self-sustaining activity. The choice of neurons was governed by the distinctive characteristics of their modal activities. F.R.L.

A65-31103
CONTROL/DISPLAY ASSOCIATION STEREOTYPES IN GROUPED PANEL ARRANGEMENTS.
Michael V. Fiore (General Precision, Inc., General Precision Aerospace Group, Aerospace Systems Div., Wayne, N. J.).
(1965 Aerospace Technical Conference and Exhibit, Houston, Tex., June 21-24, 1965, Paper.)
IEEE Transactions on Aerospace, vol. AS-3, June 1965, Supplement, p. 310-321. 11 refs.

Determination as to whether specific control/display association stereotypes exist in the population when controls and their corresponding displays are arranged sequentially on a two-dimensional surface. The null hypothesis was tested under three control/display configuration conditions by means of a paper and pencil test administered to 70 male college students. Results showed that a reliable correspondence between the location of the display stimulus and the control response exists in orthogonal, rectangular, and alternate arrangements of controls and displays. (Author) B.B.

A65-31105
MONITORING AND RECORDING OF PHYSIOLOGICAL DATA OF THE MANNED SPACE FLIGHT PROGRAM.
T. Wayne Holt and Robert J. Lamonte (NASA, Manned Spacecraft Center, Houston, Tex.).
(1965 Aerospace Technical Conference and Exhibit, Houston, Tex., June 21-24, 1965, Paper.)
IEEE Transactions on Aerospace, vol. AS-3, June 1965, Supplement, p. 341-344.

Review of a magnetic-tape collection system for telemetering low-potential physiological signals. The parameters to be measured were stipulated by the medical groups; in the case of Project Mercury, four measurements were made: electrocardiogram, respiration, blood pressure, and temperature. In reviewing the needs of the Gemini program, it was felt that these parameters would be implemented in the following manner: (1) electrocardiogram: two channels (sternal and axillary leads); (2) respiration: an impedance method using the axillary electrocardiograph electrodes as the sensors; (3) blood pressure: a brachial occlusive system actuated by a manual squeeze bulb; and (4) temperature: an oral measurement using a thermistor probe on an intermittent basis. Signal conditioning specifications and recorder specifications are tabulated, together with record mode, frequency response, and noise specifications. B.B.

A65-31239 #
SOME PROBLEMS OF SENSORY-SYSTEM ACTIVITY WITH REFERENCE TO PROBLEMS OF SPACE PHYSIOLOGY [NEKOTORYE VOPROSY DEIATEL'NOSTI SENSORNYKH SISTEM PRIMENITEL'NO K ZADACHAM KOSMICHESKOI FIZIOLOGII].
V. D. Glezer, V. A. Kisliakov, V. A. Kozhevnikov, V. N. Chernigovskii, and L. A. Chistovich (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR).

International Symposium on Basic Environmental Problems of Man in Space, 2nd, Paris, France, June 14-18, 1965, Preprint no. 18. 30 p. In Russian.
Symposium sponsored by the International Astronautical Federation, International Academy of Astronautics, UNESCO, International Atomic Energy Agency, International Telecommunication Union, World Health Organization, and World Meteorological Organization.

Survey of some principal results obtained in studies of the functioning of sensory systems to determine the adaptability of the human organism to the complex environment of a spaceship. General principles of recognition of visual images, patterns, and sounds of human speech are outlined. Some hypothetical solutions of the man-machine-man problem in engineering psychology are examined, and some practical consequences with direct bearing on the problem of space physiology are discussed. V.P.

A65-31319
AUXIN TRANSPORT IN GEOTROPIC CURVATURES OF A BRANCHED PLANT.
Charles J. Lyon (Dartmouth College, Dept. of Biological Sciences, Hanover, N.H.).
Plant Physiology, vol. 40, Jan. 1965, p. 18-24. 14 refs.
Grant No. NsG-231-62.

Technique for tracing the movement of indole-acetic acid-2-C^{14} (IAA) during the development of geotropic curvature in branches and the main axis of immature plants from a clone of Coleus blumei, Benth., as determined by radio-assay of curvature tissues. The auxin was supplied either symmetrically to defoliated and detipped stems as terminal caps of 1% IAA in lanolin or through a film of the paste on one leaf that was left on the upper side of the horizontal branch. In both cases the extractable, unaltered IAA was found to be distributed in a ratio of approximately 40 to 60 in the upper and lower halves of the curvatures. Most of the radiocarbon was extracted in non-volatile degradation products of the IAA, but the same 40 to 60 ratio held for the total radioactivity in the opposing sides of the stems when the C 14 was supplied directly to the stem. The evidence supports the concept of downward transport of unaltered IAA as the basis for more rapid growth of the lower tissues in a geotropic curvature of a branch or main axis. (Author) D. P. F.

A65-31343 #
EFFECT OF OXYGEN BREATHING ON THE FOLLOWING HYPOXIA.
Haruo Ikegami and Iwao Takase (Air Self-Defense Force, Aero-Medical Laboratory, Japan).
Japanese Journal of Aerospace Medicine and Psychology, vol. 2, June 1965, p. 57-63. 7 refs. In Japanese.

Description of experimental results obtained by immobilizing 10 rabbits with curare and applying artificial respiration for determining the degree to which oxygen inhalation prolongs the time of useful consciousness (TUC) under nitrogen inhalation. The duration of prior inhalation of pure oxygen and its correlation to the prolongation of TUC were investigated; TUC is defined as that period which exists prior to the appearance of high-voltage slow-wave encephalograms. It was found that TUC, which normally ranged from 36 to 51 sec, was prolonged by prior oxygen inhalation, but that this effect reached a saturation point at about 1 min of oxygen breathing. TUC was extended to about 71 sec by the oxygen. The period of time in which the pulse rate decreased to two thirds of its initial value was prolonged by prior oxygen breathing in the same manner as TUC.
(Author) D.P.F.

A65-31344 #
HUMAN ENGINEERING RESEARCH OF TRACKING BEHAVIOR. I.
Eitaro Masuyama (Tokyo University of Education, Tokyo, Japan).
Japanese Journal of Aerospace Medicine and Psychology, vol. 2, June 1965, p. 64-77. 22 refs. In Japanese.

Description of experiments designed to test the ability of human subjects to track rectangular waves on a display using either hand or foot tracking. There were six experiments in all, five of which used a manually operated wheel for pursuit-tracking, while the sixth was designed to test foot-tracking ability. A block diagram illustrates the type of tracking test system used in the experiments. One subject was given instructions to track as accurately as possible and another was told to do so as rapidly as possible. Performance by the subject told to use rapidity as his criterion exceeded that of the one using accuracy in all respects except accuracy.
(Author) D.P.F.

A65-31345 #
THE EFFECTS OF G FORCE ON BODY TEMPERATURE.
Ichiro Saito, Hiroshi Fujiwara, and Masaaki Iwane (Air Self-Defense Force, Aero-Medical Laboratory, Human Centrifuge Section, Japan).
Japanese Journal of Aerospace Medicine and Psychology, vol. 2, June 1965, p. 78-83. 10 refs. In Japanese.

Investigation of the influence of g forces on the rectal temperature of rats. The rats were fixed in an appropriate cage and were subjected to plus 5, 10, and 15 g, minus 5 g, and transverse 5, 10, and 15 g. Rectal temperature was measured at intervals of 3 min after the stress and at 3-min intervals thereafter until it recovered to control level. For plus g, rectal temperature decreased 3.2, 3.7, and 5.4°C from control level for 5, 10, and 15 g, respectively. This would indicate that the magnitude of temperature decrease is a function of stress. This relationship, however, does not hold in the case of transverse g, as the temperature decreased by 2.9, 4.1, and 3.1°C for 5, 10, and 15 g, respectively. At minus 5 g temperature decreased 3.1°C. No rats could tolerate minus 10 or 15 g. Temperature recovery started immediately after cessation of the stress. No tremor was observed.
(Author) D.P.F.

A65-31346 #
THE EFFECTS OF EXERCISE ON CORONARY AND PULMONARY CIRCULATIONS.
Kiyoshi Hosono, Hironobu Kuwabara, Hideaki Nakayama, and Takao Watanabe (Keio University, School of Medicine, Dept. of Internal Medicine, Tokyo, Japan).
Japanese Journal of Aerospace Medicine and Psychology, vol. 2, June 1965, p. 84-89. 20 refs. In Japanese.

Investigation of the effects of exercise and hypoxia on 30 human subjects on whom coronary sinus catheterization had been performed. Twenty-five of these patients had coronary sclerosis and 5 were healthy adults; no significant difference in the values of coronary circulation at rest were observed for these two groups. On exercising, a significant increase of the coronary blood flow (CBF) was observed; the difference between the coronary and arterio-venous oxygen content (ΔO_2) and the cardiac output to maintain the myocardial oxygen consumption (MOC) at a desirable level also increased. In induced hypoxia CBF significantly increased but ΔO_2 decreased so as to maintain MOC at constant level. In some subjects with coronary sclerosis MOC decreased with excercise and induced hypoxia; one of them had an anginal attack during exercise, and in this case both CBF and MOC decreased. In the normal subjects cardiac output was increased and the mean circulation time (MCT) was reduced. In the subjects with sclerosis MCT was prolonged.
(Author) D.P.F.

A65-31347 #
ELECTRORETINOGRAMM AT HIGH ALTITUDE IN THE LOW PRESSURE CHAMBER, AND UNDER GRAVITATION STRESS.
Genyo Mitarai and Sadaharu Takagi (Nagoya University, Research Institute of Environmental Medicine, Nagoya, Japan).
Japanese Journal of Aerospace Medicine and Psychology, vol. 2, June 1965, p. 90-95. 9 refs. In Japanese.

Analysis of the effect of high altitude and 10-g stresses on the electroretinograms of unanesthetized rabbits by means of the amplitude of a and b waves evoked by a strong stroboscopic flashlight of about 1000 lux with a duration of about 1 msec. Between 2000 and 3000 m of altitude, the a and b waves first increased abnormally and then at altitudes higher than 4000 m decreased progressively. During return to atmospheric pressure the amplitude of these waves increased rapidly, and at an altitude lower than 5000 m it frequently attained temporary abnormally high magnitudes. The load imposed by 10-g stresses gave results which were almost the same as those obtained in the low-pressure experiments. However, the variations were so rapid and pronounced that the abnormally high amplitude at the beginning of the load could not be clearly followed.
(Author) D.P.F.

A65-31348
THE CHEMICAL ORIGIN OF LIFE.
Cyril Ponnamperuma (NASA, Ames Research Center, Exobiology Div., Moffett Field, Calif.).
Science Journal, vol. 1, May 1965, 39-45.

Review of advances in the simulation of the prebiological environment and the synthesis of biologically significant molecules from the elements of the "primordial" atmosphere. An electron beam from a linear accelerator provided a convenient source of electrons simulating potassium 40 on the primitive earth. When a mixture of methane, ammonia, and water was irradiated with electrons for about 1 hr, resulting in a total dose of $\sim 10^{11}$ ergs, the largest single nonvolatile compound formed was adenine, a constituent of both deoxyribonucleic acid (DNA) and ribonucleic acid (RNA), and also a unit of many important cofactors in living organisms. Electric discharges, Tesla coils, and luminous tube transformers were used to simulate lightning on the primitive earth. In a typical experiment, lasting 48 hr, most of the methane was converted into more complex organic compounds; some of the constituents of the nucleic acid molecule have been identified. The action of heat on the earth's surface was duplicated by passing a mixture of methane and ammonia, in the presence of water vapor, through a heated Vycor tube at about 1000°C. The effluent gases were absorbed in water. Analysis of the water-soluble material revealed the presence of several amino acids. A preliminary experiment simulating chemosynthesis by meteorite impact was performed by firing a ballistic missile into a mixture of methane, ammonia, and water vapor, yielding some amino acids and a few UV-absorbing compounds which may be of biological significance. Aqueous solutions of glycine and leucine exposed to UV in the presence of cyanamide gave rise to the dipeptides glycylglycine, leucylleucine, glycylleucine, and leucylleucine. W. M. R.

A65-31389
CHLOROPLAST REPLICATION - EVIDENCE FOR 5-BROMOURACIL INCORPORATION AND PLASTID MUTATION IN EUGLENA GRACILIS.
Stanley Scher and Joyce C. Collinge (California, University, Space Sciences Laboratory, Berkeley, Calif.).
Nature, vol. 205, Feb. 20, 1965, p. 828-830. 13 refs.
Grant No. NsG 126-61.

Evidence for the incorporation of 5-bromouracil into cells of Euglena gracilis. Conditions for obtaining stable colorless plastid mutants during replication of plastid determinants in the presence of 5-bromouracil and sulfanilamide are described. It is pointed out that by analogy with other nucleoprotein genetic systems, it is postulated that incorporation of base analogs into the genetic material that determines plastids should lead to mutational changes and that such changes would be reflected in altered plastid structure and function. Such appears to be the case. It is concluded that the induction of plastid mutagenesis is dependent on growth in the presence of 5-bromouracil, and sulfanilamide argues in favor of a plastid determinant that must be replicated for the mutagenic event to occur and suggests that the mechanism for base analog mutagenesis of the plastid genome may parallel that proposed for other DNA-containing genetic systems. M. L.

A65-31574 #
THE MANNED FLIGHT AWARENESS PROGRAM OF THE MARSHALL SPACE FLIGHT CENTER.
Preston T. Farish (NASA, Marshall Space Flight Center, Propulsion and Vehicle Engineering Laboratory, Huntsville, Ala.).
IN: SYSTEM SAFETY SYMPOSIUM, SEATTLE, WASH., JUNE 8-10, 1965, PROCEEDINGS. [A65-31568 20-34]
Symposium sponsored by the University of Washington and the Boeing Co.
Seattle, Boeing Co., 1965. 11 p.

Discussion of a program designed to increase the quality and reliability of space vehicles by motivating management, engineering, and production employees in both government and industry to reduce mistakes, defects, and malfunctions of equipment. Commercial advertising techniques, audio-visual aids, and training programs are employed in this program to instill in each employee an awareness that his individual job is important to the total success of manned space missions. S. H. B.

A65-31588 #
THE HUMAN FACTOR - ASSET OR LIABILITY IN SYSTEM SAFETY?
Catherine S. Marker (Boeing Co., Aero-Space Div., Seattle, Wash.).
IN: SYSTEM SAFETY SYMPOSIUM, SEATTLE, WASH., JUNE 8-10, 1965, PROCEEDINGS. [A65-31568 20-34]
Symposium sponsored by the University of Washington and the Boeing Co.
Seattle, Boeing Co., 1965. 11 p.

Discussion of the effects of human errors on system safety and procedures for minimizing these effects. It is indicated that man should be treated as a genuine subsystem within a given system, and a general philosophy for maximizing safe and reliable operation of the system is presented. The steps outlined are: (1) selecting personnel of adequate skill level, (2) training personnel in system knowledge and theory of operation and maintenance, (3) instructing personnel in the specific details for particular tasks, (4) predicting performance curves and estimating residual failure rates, and (5) providing interface tolerances within the system to accommodate the minimal residual error. S. H. B.

A65-31653
PURE CULTURE OF ANABAENA FLOS-AQUAE A-37.
Robert G. Tischer (Mississippi State University, Microbiology Dept., State College, Miss.).
Nature, vol. 205, Jan. 23, 1965, p. 419, 420. 7 refs.
Grant No. NsG-80.

Study of a method for the isolation of bacteria-free cultures of algae. This method has as its aim the separation of algae from the contaminating bacteria by the simple technique of "positive operator bias" coupled with numerous replication. Accordingly, the method consists of (1) creating artificial predominance of the chosen alga by accumulation with a micropipette; (2) culture of the accumulated algal cells in liquid HGZ medium, a tris-buffered modification of the medium employed by Hughes, Gorham, and Zehnder; (3) culture on HGZ agar dilution plates; (4) repetition of (2) and (3) alternately to obtain uni-algal cultures and to show which is the highest dilution in which algal colonies grow well separated and in small numbers; (5) preparation of 20 replicate plates of the plate dilution which affords good colony separation; (6) daily microscopic observation of plates from which approximately 20 subcultures are made into liquid HGZ; (7) after incubation and growth, inoculation of 1 ml of the HGZ liquid cultures into nutrient broth. Observation at 48 hr indicates the presence or absence of bacteria. It was soon found that several replatings reduced the apparent number of types of bacterial contaminants which would grow on HGZ medium from as many as 10 to one or two types. It is noted that while it is admittedly impossible to provide complete proof of the purity of any algal culture from all bacteria, the "positive operator bias" technique appears to increase the chances of success by at least one order of magnitude without engendering serious metabolic disturbance. M. F.

A65-31672 #
LIFE SUPPORT REQUIREMENTS FOR SPACE MISSIONS.
Charles M. Proctor (Boeing Co., Seattle, Wash.).
American Society of Civil Engineers, Sanitary Engineering Division, Journal, vol. 91, Apr., pt. 1, 1965, p. 1-16. 30 refs.

Examination of the major human requirements in life-support systems for manned space missions and a description of methods for meeting these requirements. The complexity of life-support systems for manned space missions increases as a function of mission duration. Not only must air, water, food, and sanitary facilities be provided, but other environmental requirements, such as heat and noise levels, for example, become more stringent as missions grow longer. Longer missions will require the recovery of water, oxygen, major and minor nutrients, and trace elements that are required for human nutrition. The life-support system for long-term missions will have to be a synthetic, closed ecological system. An approach to such a system is presented and examined. (Author) D. P. F.

A65-31724
STIMULUS CODING IN THE AUDITORY NERVE AND COCHLEAR NUCLEUS.
Nelson Yuan-Sheng Kiang (Massachusetts Institute of Technology, Research Laboratory of Electronics, Center for Communication Sciences, Cambridge; Massachusetts Eye and Ear Infirmary, Eaton Peabody Laboratory of Auditory Physiology, Boston, Mass.).
Acta Oto-Laryngologica, vol. 59, 1965, p. 186-200. 21 refs.
Contract No. DA-36-039-AMC-03200(E); NSF Grant No. GP-2495; Grant No. NsG-496; National Institutes of Health Grants No. NB-01344; No. MH-04737-04.

Comparison of certain selected features of electric responses recorded from units in the auditory nerve and the cochlear nucleus. The average time pattern of response of any auditory nerve fiber to simple acoustic stimuli is predictable from its "tuning curve" and rate of spontaneous discharge. In contrast units in the cochlear nucleus may exhibit radically different response patterns to the same stimuli though their tuning curves and rates of spontaneous discharge are virtually identical. Messages carried by the auditory nerve are apparently recoded in the cochlear nucleus in a number of different ways. Consequently, the nucleus should not be considered merely as a relay station. (Author) M. F.

A65-31725
PRELIMINARY STUDIES ON THE EXTRACELLULAR PRODUCTS OF HYDROGENOMONAS EUTROPHA.
L. R. Brown, D. W. Cook, and R. G. Tischer (Mississippi State University, Dept. of Microbiology, State College, Miss.).
IN: DEVELOPMENTS IN INDUSTRIAL MICROBIOLOGY. VOLUME 6.
Washington, Society for Industrial Microbiology, 1964, p. 223-228. 8 refs.
Grant No. NsG-650.

Description of the detection and identification of extracellular products formed during the autotrophic growth of Hydrogenomonas eutropha on Repaske's medium. Using C-14 tracer studies to determine the quantity of extracellular products formed, it was found that about 2% of the total activity appeared in the supernatant liquid during the log phase of growth. As the stationary phase of growth was reached, the activity increased to about 5% of the total. Paper chromatography in conjunction with radioautography was used for separation and identification of the products. Ribose, glutamic acid, alanine, and tyrosine are among the extracellular products which were identified. (Author) M. M.

A65-31823 #
RESEARCH PICTORIAL FLIGHT DISPLAYS FOR FULL IFR ROTARY WING FLIGHT.
D. J. Dougherty (Bell Aerospace Corp., Bell Helicopter Co., Fort Worth, Tex.).
IN: AMERICAN HELICOPTER SOCIETY, ANNUAL NATIONAL FORUM, 21ST, WASHINGTON, D. C., MAY 12-14, 1965, PROCEEDINGS. [A65-31806 20-02]
New York, American Helicopter Society, 1965, p. 189-197. 14 refs.

Brief discussion of the full IFR (Instrument Flight Rule) or full "black-bubble" flight display system worked on under the JANAIR (Joint Army-Navy Aircraft Instrumentation Research) program. The goals of this program are to develop a full IFR flight display system for rotary wing or vertical lift aircraft. Progress has been made through the first phases and hardware now exists which is flying in a UH-1 bailed to this program and known as the RH-2 (Research Helicopter Number Two). Specific goals which have been achieved in a pilot study are: all visibility flight capability, all basic maneuver IFR capability, one-pilot operation, emphasis on pictorial displays, full flexibility of mission programing in flight, and a fully self-contained system. (Author) B. B.

A65-32301 #
SOME PROBLEMS ASSOCIATED WITH PHYSIOLOGICAL MEASUREMENT DURING INTERPLANETARY FLIGHTS [NEKOTORYE PROBLEMY FIZIOLOGICHESKIKH IZMERENII V MEZHPLANETNYKH POLETAKH].
R. M. Baevskii.
Kosmicheskie Issledovaniia, vol. 3, July-Aug. 1965, p. 636-642. 8 refs. In Russian.

Considerations with regard to the problem of physiological measurements during interplanetary flights, on the basis of an analysis of systems used for physiological measurements on-board the Vostok satellite series, such as operational medical observation and systematic medical investigations, including diagnoses of diseases and scientific medical investigation. Particular attention is given to the problem of transmitting physiological information to the earth and to medical investigations by way of effective coding of generalized data. Some aspects of biological control during interplanetary flight are discussed. V. P.

A65-32302 #
APPEARANCE OF DOMINANT LETHALS IN A DROSOPHILA UNDER THE EFFECT OF VIBRATIONS, ACCELERATION, AND GAMMA RADIATION [VOZNIKNOVENIE DOMINANTNYKH LETALEI U DROZOFILY POD VLIIANIEM VIBRATSII, USKORENIIA I γ-OBLUCHENIIA].
G. P. Parfenov.
Kosmicheskie Issledovaniia, vol. 3, July-Aug. 1965, p. 643-651. 11 refs. In Russian.

Laboratory investigation of the effect of vibration, acceleration, gamma radiation, and the combined effects of these factors on the onset of dominant lethals in the rudimentary cells of drosophila males. The investigation was conducted with the object of analyzing the nature of similar effects obtained during space flights. It is found that the combined effects of irradiation and subsequent acceleration to ~4000 g is equal to the sum of the effect caused by each individual factor. Applied in reversed order, the effect of acceleration also tends to increase the mutagenic effect of irradiation. V. P.

A65-32303 #
EFFECT OF VIBRATION ON THE DIVISION OF BONE-MARROW CELLS [VLIIANIE VIBRATSII NA DELENIE KLETOK KOSTNOGO MOZGA].
G. L. Pokrovskaia, L. A. Beliaeva, and A. V. Golovkina.
Kosmicheskie Issledovaniia, vol. 3, July-Aug. 1965, p. 652-658. In Russian.

Experimental investigation of the effect of vibrations at frequencies of 35 and 70 cps on the division on bone-marrow cells of mice. It is found that vibration depresses mitotic activity somewhat and increases the frequency of disorders in the cell nuclei, such as pontes, fragments, pontes with fragments, and chromosome adhesion. Possible mechanisms for the observed disorders are proposed. V. P.

A65-32323 #
AURAL DETECTION OF AN AERIAL VEHICLE OPERATING AT LOW ALTITUDES.
William J. Gayne (Research Analysis Corp., McLean, Va.).
American Institute of Aeronautics and Astronautics, Annual Meeting, 2nd, San Francisco, Calif., July 26-29, 1965, Paper 65-329. 12 p. 9 refs.
Members, $0.50; nonmembers, $1.00.

Development of a generalized equation for estimating the aural detection distance associated with given vehicle noise levels. The distance at which an aerial vehicle can be aurally detected is primarily influenced by the frequencies and sound pressure levels of the noise generated by the vehicle, the propagation characteristics of sound as influenced by the terrain and vegetation over which the sound travels, the altitude at which the vehicle is operating, the ambient noise level at the point of detection, and the response characteristics of the listener. Detection distance can be minimized by operating a vehicle at low altitude and over terrain well covered with vegetation. The designer should concentrate on minimizing noise with a frequency below 150 cps. The warning time (or time interval) between initial detection of an approaching vehicle and the arrival of the vehicle over the listener is based on the velocity of the vehicle's approach and the distance at which it is initially detected. Equations which relate noise level, detection distance, vehicle velocity, and warning time are developed. Analytical and graphical solutions are given, and an illustrative example is solved. (Author) B. B.

LC ENTRIES

A65-81748
THE FLUCTUATION OF URINE ELECTROLYTE EXCRETION AND ITS RELATION TO MORTALITY OF MULTIPLE IRRADIATED MICE.
M. Pospíšil, J. Sikulová, and F. Sevčík (Czechoslovak Acad. of Sci., Inst. of Biophys., Brno).
Zeitschrift für die gesamte Experimentelle Medizn, vol. 139, 1965, p. 112–121. 11 refs.

The changes in the Na/K ratio were followed on 24-hr. samples of urine repeatedly taken at 7-day intervals during multiple X-irradiation of mice with single exposures of 200 r (up to a total exposure of 1200 r). The fluctuation of the Na/K ratio in the course of the experiments on the individual animals was analysed by using certain principles of time series statistics. Three characteristics were chosen, i.e. regularity of fluctuation, mean amplitude and level of fluctuation of the Na/K ratio. It was shown that low and high amplitudes of fluctuation, accompanied by fluctuation about low and high levels and the least regular type of flucuation, constitute, from the viewpoint of radiosensitivity of the experimental animals, an unfavourable prognostic sign. The authors stress the importance of these findings for solving problems relating to differing individual sensitivity to radiation.

A65-81750
INFLUENCE OF REPEATED EXPERIENCE ON LATENCY AND EXTENT OF AUTOKINETIC MOVEMENT.
Bobby J. Farrow, John F. Santos, James R. Haines (Menninger Found., Topeka, Kan.), and Charles M Solley (Wayne State U., Detroit, Mich.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1113–1120. 14 refs.
Grant Natl. Inst. of Mental Health MH 03924.

This study was designed to assess the influence of massed and spaced practice on the latency and extent of perceived autokinetic (AK) movement. The subjects in the space group were tested on 5 separate occasions following a constant level of dark adaptation, while the subjects in the massed group were tested in one session with an increasing level of dark adaptation. The log-latency scores (time from onset of AK light to onset of AK movement) decreased across trials for both groups, while the log-distance scores (verbal estimates of extent of AK movement) increased for the massed group across trials but not for the spaced group. These results suggest methodological precautions which should be observed in subsequent studies where autokinesis is used to measure isolation and sensory deprivation effects and in those studies involving repeated AK trials.

A65-81751
AN ISOLATION EFFECT IN PATTERN PERCEPTION SIMILAR TO THAT IN SERIAL LEARNING.
E. Rae Harcum (William and Mary Coll., Williamsburg, Va.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1121–1130. 32 refs.
Grant PHS HD 00207-04.

There is a hypothesis that the mechanisms involved in serial learning which produce the characteristic bowed curve of errors also operate in the perception of tachistoscopic patterns to determine the distribution of errors among element-positions. If the mechanisms are in fact the same, isolation of an element in a tachistoscopic pattern will alter the distribution of errors among elements in the same manner that isolation changes the bowed curve of serial learning. Since an isolation effect has not previously been found when the observer does not know of the isolation before the exposure, a postulate of the present experiment is that prior knowledge of the isolation is critical for the isolation effect. Therefore, in this study, in which the observer knew of the isolation before exposure of the pattern, it was predicted that there would be a relative decrease in errors for the isolated element. This was the result.

A65-81752
IMPORTANCE OF TIME AND ITS SUBJECTIVE SPEED.
Joel S. Grossman and Charles E. Hallenbeck (Highland View Hosp., Cleveland, Ohio).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1161–1166.
Grant NIH HD-00669.

Persons who tend to judge time to be important also tend to experience time as passing swiftly. Earlier research has demonstrated that elderly persons, to whom time is presumed to be quite important, prefer faster images to describe time's passage than do young adult subjects. Thirty-nine young adults were instructed to value accuracy in performing a problem-solving task, while 40 other young adults, matched for age, education and IQ were instructed to value speed in performing the same task. The two groups did not differ in subjective speed of time, as measured by the "Time Metaphor Scale". If the validity of the present methods is accepted, it is necessary to conclude from these results that the importance of time is not directly associated with its subjective speed. Direct estimations of four brief time intervals were also obtained from the 40 subjects instructed to value speed over accuracy. Within this group, persons who tended to over-estimate objective time also tended to prefer slower, more static images to describe the passage of time. This latter finding is discussed in terms of the deceleration of an internal chemical clock, as originally proposed by Hoagland.

A65-81753
FURTHER DATA ON A STRESS SYNDROME RELATED TO ACHIEVEMENT MOTIVATION: RELATIONSHIPS WITH AGE AND BASAL SERUM CHOLESTEROL LEVEL.
J. Warren Thiesen, Kenneth D. Brown, Ronald H. Forgus, Silas M. Evans, Genie M. Williams, and Jerome Taylor (Veterans Admin. Hosp., Downey, Ill.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1277–1292. 13 refs.
Veterans Admin. supported research.

A cross-validation of a standard method of measuring striving-induced stress is described. The sensitivity of the previously reported stress measures, based on heart-rate elevation, is verified. The procedure is demonstrably applicable to more varied populations than those used in the original standardization. While a tendency toward higher over-all heart rates with increased age was observed, the principal specific finding was a positive association of basal serum cholesterol level with post-stress heart rate, independent of age. Individuals with higher serum cholesterol levels showed less complete recovery following stress and higher initial heart rates, but they did not necessarily show a stronger immediate response to the stressors. Psychosomatic implications are discussed.

A65-81754
THE INFLUENCE OF D-AMPHETAMINE, BENACTYZINE, AND CHLORPROMAZINE ON PERFORMANCE IN AN AUDITORY VIGILANCE TASK.
M. Loeb, G. R. Hawkes, W. O. Evans, and E. A. Alluisi (U.S. Army Med. Res. Lab., Fort Knox, Ky.)
Psychonomic Science, vol. 3, Jul. 1, 1965, p. 29–30. 12 refs.
Army Med. R and D supported research.

Detections, false responses, and latencies were measured in a one-hour auditory vigilance task following ingestion of either a stimulating drug, one of two tranquilizers, or a placebo. Changes in performance under the placebo were explicable in terms of shifts toward conservatism in the subject's criteria for responding; under the tranquilizers, similar shifts in criteria occurred as well as decrements in effective sensitivity. Under the stimulant, performance quality remained essentially constant during the one-hour vigil.

A65-81755
A METHOD FOR COMPUTER RECOGNITION OF INTRACELLULARLY RECORDED NEURONAL EVENTS.
F. F. Hiltz (Johns Hopkins U., Appl. Phys. Lab., Silver Spring, Md.)
IEEE Transactions on Bio-Medical Engineering, vol. BME-12, Apr. 1965, p. 63–72.
Contracts Nord-7386 and NOw 62-0604-c.

The format described will enable investigators of neuronal activities to reduce and analyze their data with a considerable reduction in time. If the procedures outlined are followed during the initial recording process, satisfactory results are possible. The accuracy of the program in the subthreshold region is approximately 95 percent for the acceptance criteria outlined. The accuracy in the spike channel has been 100 percent for spike detection, if the amplitude clipping associated with the high gain channel was above threshold. The ability to correctly detect the spike peak and width is accurate to within the digitizing resolution. A major reduction in analysis time is achieved by the program in comparison to hand analysis. While there are errors, a large proportion are due to limitations in the present state-of-the-art in recording and digitizing techniques. Furthermore, the same criteria for event recognition is maintained from the beginning of an analysis run to the end.

A65-81756
A FORTRAN PROGRAM FOR INTRACELLULAR EVENT RECOGNITION.
Nancy R. Lakey.
IEEE Transactions on Bio-Medical Engineering, vol. BME-12, Apr. 1965, p. 73–87.

A Fortran program for the recognition of intracellular events has been written for the IBM 7094 digital computer. The program will accept a digitized representation of intracellularly recorded neuronal responses from magnetic tape and will recognize sub- and suprathreshold voltages such as excitatory and inhibitory postsynoptic potentials and spikes. The program will point out salient features such as initiation times, event amplitudes, rise times, and where possible, time constants. Statistics such as time and amplitude histograms may be performed.

A65-81757
INFLUENCE OF MODERATE HYPOXIA IN ONE LUNG ON THE DISTRIBUTION OF THE PULMONARY CIRCULATION AND VENTILATION.
M. Arborelius, Jr. (Allmänna Sjukhuset, Lab. of Clin. Physiol., Malmö, Sweden).
Scandinavian Journal of Clinical and Laboratory Investigation, vol. 17, 1965, p. 257–259. 7 refs.

The influence on the distribution of circulation and ventilation by unilateral breathing of a low oxygen mixture (9.4 percent O_2) during bronchospirometry was measured in seven healthy men. The circulation through the hypoxic lung decreased about 10 percent of the total. On the other hand, there was a significant increase in the ventilation of the same lung (8 percent). These changes ought to cooperate to re-establish normal ventilation-perfusion ratios in hypoventilated parts of a normal lung. The results seem to support the theory of von Euler and Liljestrand (1946) that the oxygen tension in the alveolar gas might act as a physiological stimulus for keeping the alveolar minute volume/respiratory quotient normal within the lungs.

A65-81758
TWO KINDS OF VARIABILITY IN A FLICKER-FUSION DISCRIMINATION TASK.
K. Danzinger and Jennifer R. Hart (Cape Town U., Dept. of Psychol., Rondebosch, South Africa).
Journal of General Psychology, vol. 73, Jul. 1965, p. 37–42. 10 refs.

Flicker and fusion thresholds were determined by the method of limits in a group of 35 student subjects. There was no significant correlation between threshold variability on ascending (fusion) and on descending (flicker) runs. High threshold variability on ascending runs was found to be associated with high intratrial variability, low persistence on a work-building test, and relatively little interference on the Stroop Colour-Word Interference Test. This response pattern was interpreted in terms of a labile type of cognitive control. High threshold variability on descending runs was found to be associated with high flicker thresholds, low scores on the Taylor Manifest Anxiety Scale, and low threshold variabillty on descending runs in a size-estimation task. This respons pattern is interpreted in terms of a scanning-control principle that is characterized by effective deployment of attention over the whole cognitive field and poor emotional expression.

A65-81759
INFLUENCE OF LOCAL FATIGUE ON SPEED AND ACCURACY IN MOTOR LEARNING.
Richard B. Alderman (Calif. U., Berkeley).
Research Quarterly, vol. 36, May 1965, p. 131–140. 8 refs.

Four groups of subjects, each consisting of 30 male college students, were assigned either to the rho motor learning test (speed) or the pursuit rotor motor learning test (accuracy) under either control or experimental conditions. Practice on each task lasted approximately 30 min. and resulted in large amounts of learning. Interpolated severe local physical fatigue was induced by exercising the experimental groups on an arm ergometer half way through the learning of each task. The experimental groups suffered a 40 percent decrement in performance as a result of the interpolated fatigue, but the amount of learning was not influenced.

A65-81760
HUMAN ENGINEERING RESEARCH OF TRACKING BEHAVIOR I.
Eitaro Masuyama (Tokyo U. of Educ., Japan).
Japanese Journal of Aerospace Medicine and Psychology, vol. 2, 1965, p. 64–77. 21 refs. In Japanese.

The results are summarized for four experiments on pursuit tracking of rectangular waves by hand control and for one experiment on compensatory tracking of rectangular waves by foot controls. Among the variables found to affect the tracking performance were: on-off time intervals, instruction, and individual skill.

A65-81761
THE MOTOR THEORY OF SPEECH PERCEPTION: A CRITICAL REVIEW.
Harlan Lane (Mich. U., Center for Res. on Language and Language Behavior, Ann Arbor).
Psychological Review, vol. 72, Jul. 1965, p. 275–309. 60 refs.
Contract U.S. Office of Educ. SAE-9265; and Grant NSF 05586.

The motor theory of speech perception maintains that articulatory movements and their sensory feedback mediate between the acoustic stimulus and the perception of speech. The theory is based on examination of changes in identification probability, identification latency, and discrimination accuracy effected by changes in synthetic speech stimuli. This paper reviews first those experiments cited in support of the theory, then opposing evidence is presented: it is shown that identification and discrimination functions for non-speech stimuli do not differ from those for speech stimuli, when obtained under comparable conditions.

A65-81762
INHIBITOR STUDIES ON THE PHOTOSYNTHETIC CARBON REDUCTION CYCLE IN CHLORELLA PYRENOIDOSA.
Edwin S. Gould and J. A. Bassham (Calif. U., Lab. of Chem. Biodyn. and Lawrence Radiation Lab., Berkeley).
Biochimica et Biophysica Acta, vol. 102, May 25, 1965, p. 9–19. 21 refs.
AEC supported research.

Transient changes in the levels of intermediates of the photosynthetic carbon reduction cycle induced by the addition of various chemical compounds to Chlorella pyrenoidosa photosynthesizing under steady-state conditions were studied. Vitamin K_5, hexylresorcinol, 3-(3,4-dichlorophenyl)-2,1-dimethylurea and m-chlorocarbonyl cyanide phenylhydrazone were found to give rapid inhibition of photosynthesis, accompanied by rapid changes in the levels of intermediate compounds of the photosynthetic carbon reduction cycle. 3-(3,4-dichlorophenyl)-2,1-dimethylurea and m-chlorocarbonyl cyanide phenylhydrazone produced effects similar to those seen during earlier light-dark transient studies. Vitamin K_5 produced effects which, for the most part, could be explained by assuming a diversion of electrons from the photoelectron transport system to cyclic photophosphorylation. Some of the observed results are best interpreted in terms of a separation of the site of the photosynthetic carbon reduction cycle from a site of other metabolic pathways. Hexylresorcinol reporduced some of the effects of each of the other inhibitors studied. The inhibition of the conversion of fructose and sedoheptulose diphosphates to their corresponding momophosphates was noted with both hexylresorcinol and vitamin K_5.

A65-81763
KINETICS OF PHOTOSYNTHETIC FLUORESCENCE INDUCTION IN RELATION TO OXYGEN EVOLUTION [ETUDES SIMULTANEES DES CINETIQUES DE FLUORESCENCE ET D'EMISSION D'OXYGENE PHOTOSYNTHETIQUE].
Pierre Joliot (Inst. de Biol. Physico-Chim., Paris, France).
Biochimica et Biophysica Acta, vol. 102, May 25, 1965, p. 135–148. 11 refs.
In French.

At the beginning of illumination of Chlorella pyrenoidosa a short activation period is observed during which the fluorescence intensity and O_2 emission velocity increase simultaneously; this is followed by a longer phase when the fluorescence intensity continues to increase, whereas the velocity of O_2 emission decreases. The variation of fluorescence intensity and the velocity of O_2 emission are respectively parallel and complementary during the successive tow phase. The linear relations can be explained only if the fluorescence is emitted essentially by the chlorophyll associated with the photochemical system evolving O_2 (System II). Fluorescence kinetics measurements at the beginning of illumination were carried out in the presence of inhibitors specific to O_2 emission. The changes of fluorescence intensity observed during the initial (parallel) phase showed an increase in the presence of inhibitors, whereas the complementary relation during the second phase was maintained. Kinetics comparable to those observed in the presence of inhibitors were obtained at high light intensities and at low temperature(–70°). The different factors disjointed the photochemical reaction from the thermal ones, thus preventing the regeneration of the photochemical complex. All these results are coherent with the scheme proposed in the preceding paper for the interpretation of transient kinetics of O_2 emission.

A65-81764
HIBERNATION OF THE HEDGEHOG (ERINACEUS EUROPAEUS L.): THE PERIODICITY OF HIBERNATION OF UNDISTURBED ANIMALS DURING THE WINTER IN A CONSTANT AMBIENT TEMPERATURE.
Rolf Kristoffersson and Antti Soivio (Helsinki U., Dept of Physiol. Zool., Finland).
Annales Academiae Scientiarum Fennicae, Series A, IV. Biologica, 80, 1964, p. 5–22. 34 refs.

With the aid of continuous recordings of body temperatures with chronically implanted thermocouples, studies have been made of the periodicity of hibernation in hedgehogs kept during the whole winter in darkness and constant ambient temperature. The results obtained indicate that: (1) Throughout the hibernation period (winter) the animals show spontaneous periodic arousals. The longest continuous periods in hypothermia last 10–13 days. In this respect, differences between animals are found. (2) At the beginning of the hibernation period (in autumn) arousals are more frequent and the periods of awakening last longer than in midwinter (February). Towards the spring, arousals again occur more frequently and the periods of awakenings last longer. (3) Changes in atmospheric pressure do not initiate arousal from deep hypothermia in hedgehogs. (4) Under constant environmental conditions, the timing of spontaneous arousals and entries into deep hypothermia does not confirm the possible continuance of the circadian rhythm during the hibernation period.

A65-81765
HIBERNATION IN THE HEDGEHOG (ERINACEUS EUROPAEUS L.): CHANGES OF RESPIRATORY PATTERN, HEART RATE AND BODY TEMPERATURE IN RESPONSE TO GRADUALLY DECREASING OR INCREASING AMBIENT TEMPERATURE.
Rolf Kristoffersson and Antti Soivio (Helsinki U., Dept. of Physiol. Zool., Finland).
Annales Academiae Scientiarum Fennicae, Series A, IV. Biologica, 82, 1964, p. 3–17. 35 refs.

The heart rates and body temperatures of hedgehogs in deep hypothermia (hibernation) were recorded by using chronically implanted electrodes and

thermocouples. Respiration patterns were studied kymographically. Hedgehogs in deep, undisturbed hypothermia showed typical Cheyne-Stokes respiration. Heart rates and body temperatures in a constant ambient temperature of $+4.2 \pm 0.5^{\circ}C$. are given. Changes in respiratory pattern, heart rate, and body temperature related to gradually decreasing or increasing ambient temperature in hibernating animals under continuous observation are described.

A65-81766

CHANGES OF CERTAIN BIOCHEMICAL INDICES OF OXIDATION PROCESSES IN ADAPTATION TO COLD [IZMENENIE NEKOTORYKH BIOKHIMICHESKIKH POKAZATELEI OKISLITEL'NYKH PROTSESSON PRI ADAPTATSII K KHOLODU].

L. A. Guseva (USSR, Acad. of Med. Sci., Inst. of Hyg., Labor, and Prof. Diseases, Moscow).

Gigiena i Sanitariia, vol. 3, Mar. 1965, p. 17–22. 13 refs. In Russian.

The tests were performed on persons both adapted and nonadapted to cold. It was found that the exposure to cold of persons nonadapted to low temperature caused a fall in body temperature in spite of a high intensity of their oxidation processes (a rise in pyrotartatic and lactic acid content of blood, a reduction in the organic acid excretion with urine and a fall of acid production coefficient). Adapted persons were more resistant to the temperature fall. The initial quantity of acids in blood was higher, but in case of cooling their content production remained stable, the excretion of organic acids in the urine as well as the acid formation coefficient remained unaltered. Thus it may be assumed that one of the properties of an organism adapted to cold is the increase in the metabolic rate.

A65-81767

INFLUENCE OF SULPHUR CONTAINING RADIOPROTECTORS ON BIOCHEMICAL CHANGES IN IRRADIATED ORGANISM [VLIIANIE SERUSODERZHASHCHIKH RADIOZASHCHITNYKH PREPARATOV NA BIOKHIMICHESKIE SDVIGI V OBLUCHENNOM ORGANIZME].

T. K. Dzharakian, D. A. Golubentsev, and V. G. Vladimirov (S. M. Kirov Mil. Med. Acad., Leningrad, USSR).

Radiobiologiia, vol. 5, 1965, p. 415–422. 53 refs. In Russian.

Entire body irradiation by x-rays or gamma-rays in 600–750 r doses caused acute disturbance in oxidative phosphorylation and adenosine triphosphate (ATP), deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) content in the radiosensitive tissues of rats. A preliminary intraperitoneal injection of 1% neutralized solution of cysteamine or cystamine (75–100 mg. per kg. of body weight) modified the changes in the biochemical processes but did not prevent them entirely. The concentration of DNA found in small lymphocytes in the spleen indicates that the cystamine radioprotective effect occurs on a cellular level in the intact organism. Prevention of radiation damage to radiation-sensitive cells by cysteamine or cystamine may be the reason for the faster regeneration of hemopoietic tissues. The disturbances in the biochemical processes seemed to become more pronounced with the progress of radiation sickness, which indicated an interrelationship of these processes with the radioprotective mechanism.

A65-81769

FURTHER STUDIES OF THE THYROIDAL RESPONSE TO LOCAL COOLING OF THE "HEAT LOSS CENTER".

B. Andersson, A. H. Brook, and L. Ekman (Veterinärhögskolan, Depts. of Clin. Biochem. and of Physiol., Stockholm, Sweden).

Acta Physiologica Scandinavica, vol. 63, 1965, p. 186–192. 11 refs.

The rise in plasma proteinbound I^{131} (PBI^{131}) which occurs during local cooling of the preoptic/anterior hypothalamic region in the goat was accompanied by a corresponding rise in total serum proteinbound iodine (PBI), confirming that such cooling may cause a conspicuous increase in thyroid hormone secretion. Experiments involving graded central cooling revealed that moderate cooling of the preoptic/anterior hypothalamic region was sufficient to elicit the full thyroidal response, whereas deeper cooling, in certain circumstances, may be completely ineffective. This suggests that the thyroidal response to such cooling reflects a true physiological mechanism operating already at a moderate general hypothermia. Local cooling of the "heat loss center" with the animal in a hot environment revealed that the thyroidal response is obtained even in the absence of peripheral cold inflow.

A65-81770

MASKING AND MASKING SOUNDS. DATA FROM SEVERAL MASKING NOISES COMMONLY USED IN AUDIOMETRY [VERTAUBUNG UND VERTAUBUNGSSCHALLE. DATEN EINIGER IN DER AUDIOMETRIE GEBRAUCHLICHER VERTAUBUNGSGERAUSCHE].

W. Feiser, K. H. Hahlbrock, and H. Michler (U. Hals-Nasen-Ohrenklin., Freiburg i Br., West Germany).

Zeitschrift für Laryngologie Rhinologie Otologie, vol. 44, Feb. 1965, p. 119–134. 28 refs. In German.
Deutsche Forschungsgemeinschaft supported research.

The sound level of various masking noises used in commercially available audiometers was measured. It was noted that nearly all pure tone audiometers had wide-band masking (1964), and this rendered them unsuitable for scientific audiometry. Narrow-band masking is most suitable for pure tone, while wide-band masking is better for speech audiometry. It is recommended that standards be laid down for the construction of audiometers and that the tests, to be satisfactory, should include masking facilities.

A65-81771

HYPOKINESIA SECONDARY TO CHAIR REST FROM 4 TO 10 DAYS.

Lawrence E. Lamb, Paul M. Stevens, and Robert L. Johnson (Aerospace Med. Div., USAF School of Aerospace Med., Brooks AFB, Tex.)

Aerospace Medicine, vol. 36, Aug. 1965, p. 755–763.

The effects of inactivity during chair rest for periods of four days, six days, eight days, and ten days were studied. Despite the presence of body weight and the dependent position of the lower extremities deconditioning occurred. The average decrease in total blood volume after ten days was slightly greater than the average noted after 11 days of bed rest. The average plasma volume loss and the average decrease in red cell mass was similar to that observed after 11 days of bed rest. Orthostatic tolerance and exercise tolerance were progressively diminished with longer periods of chair rest. This study demonstrates that confinement resulting in muscular inactivity causes deconditioning even when normal gravitational factors cause body weight and increased hydrostatic pressure below the diaphragm. For this reason deconditioning during manned space flight may be markedly influenced by confinement with restricted body movement, independent of what influence weightlessness may have on its development.

A65-81772

FIRST DEGREE A-V BLOCK— ANATOMY AND PHYSIOLOGY AS ILLUSTRATED BY A TWENTY-YEAR FOLLOW-UP.

Alan R. Bures (USAF School of Aerospace Med., Aerospace Med. Sci. Div., Internal Med. Branch, Brooks AFB, Tex.)

Aerospace Medicine, vol. 36, Aug. 1965, p. 780–785. 64 refs.

A report is made of a twenty-year follow-up on an example of marked first degree A-V block in a carefully evaluated healthy individual. This member of the flying population has successfully performed his duty during the entire period. Any other associated indications of cardiovascular disorders have been conspicuous by their absence. The P-R interval has been recorded many times at 0.40 sec. (twice "normal"). At no time during the entire period, while multiple serial routine electrocardiograms were taken, did the P-R interval become normal. While one case report does not prove the innocuous nature of such a finding, other reports add support to the concept that isolated A-V block is not in itself indicative of heart disease and may represent a physiological variant.

A65-81773

SPEECH ANALYSIS: SYNTHESIS AND PERCEPTION.

James L. Flanagan (Bell Telephone Labs., Inc., Speech and Auditory Res. Dept., Murray Hill, N. J.)

New York, Academic Press Inc., 1965, viii+317 p. 349 refs.

This handbook of speech analysis contains detailed, diagramed, mathematical information on mechanisms of speech production, transmission, and operation of the ear in speech analysis. Speech may also be analyzed by spectral method (including Formant analysis), voice pitch method, articulatory analysis, automatic recognition of speech, or automatic speaker recognition. Mechanical and mathemetical methods of speech synthesis and perception are presented.

A65-81774

REFLECTIONS ON THE EXAMINATION OF THE CARDIOVASCULAR SYSTEM AT THE INITIAL SELECTION OF AVIATION PERSONNEL [L'EXAMEN DY SYSTEME CARDIO-VASCULAIRE LORS DE LA SELECTION INITIALE DU PERSONNEL NAVIGANT].

Erwin A. Lauschner.

IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 23–27. In French.

Based on a study comparing aviator selection standards of seven countries, the author discusses problems inherent in the three main purposes of the initial cardiovascular examination of aviation personnel: (1) elimination of individuals with cardiovascular abnormalities, primarily by means of the electrocardiogram; (2) evaluation of limits of cardiovascular tolerance under specific stressful conditions, such as the tests of Schneider and Flack, the step test, and hypoxia tolerance; and (3) categorization of inidviduals with respect to the probability of premature cardiovascular troubles, e.g., atherosclerosis. Supplementary examinations which should be given to aviation personnel include the cold tolerance test of Carter and Tillisch, determinations of chemical composition of the blood, and determinations of plasma antistreptolysins for the detection of latent rheumatism of streptococcal infections.

A65-81775

THE ROLE OF THE U. S. AIR FORCE IN INTERNATIONAL MEDICINE.

Oliver K. Niess.

IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 29–32.

The author describes the role of the United States Air Force Medical Service in international medical practice and the contributions of its medical personnel to raising the health standards throughout the world. He emphasizes the importance of cooperation between nations in developing international medicine by sharing the research facilities and the recent advances in the biomedical field.

A65-81776
A STUDY OF VOCATIONAL INTERESTS OF AIRLINE PILOT CANDIDATES.
S. Fichtbauer and H. Kirsch.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 33-36.

A questionnaire dealing with attitudes and motivation toward flying was administered to 100 pilot candidates at the German Airlines Flying School. On the basis of the flight training scores, one half of these candidates fell into the upper bracket and the other into the lower bracket with some failures included. Motivational adjustment was assessed on the basis of instructors' reports. Of the 35 motives for flying as a vocation, either singly or in combination, none showed a significant correlation with the pilot's achievement criterion. The combination of motives (desire for a profession with versatile and high requirements) correlated significantly with the adjustment criteria (phi coefficient 0.26). Of stated interests only the interest in technical and mechanical activities correlated significantly with the pilot achievement criterion (-.30). Denial of remarkable failures also correlated significantly with the pilot achievement criterion (.20). The reasons behind certain discrepancies between the results here and those obtained by others are discussed.

A65-81777
SELECTION AND EVALUATION OF PILOTS FOR HIGH PERFORMANCE AIRCRAFT AND SPACECRAFT BY INFLIGHT EEG STUDY OF STRESS TOLERANCE.
Carl Wilhelm Sem-Jacobsen and Ingebjorg Elisabeth Sem-Jacobsen (Gaustad Hosp. EEG Lab., Vinderen, Oslo, Norway).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 37-45. 11 refs.

Inflight electroencephalograms (EEG) were taken on selected pilots. The EEG tracings and pictures of the pilots taken simultaneously demonstrated that a number of fighter pilots had brief periods of unconsciousness during maneuvers frequently used by fighters (the bomb runs). Several had convulsions. Eighteen pilots who committed "pilot errors" rated B or C in the test. All pilots with an excellent flight record rated A. No indication of black- out or unconsciousness was found in the group selected from test pilots. The study reveals a reason for "pilot errors" which may explain a number of aircraft accidents. It also indicates that some of these pilots were inefficient. If accepted, the test may improve the selection of pilots and reduce accidents due to "pilot errors". Advanced equipment lately developed and tested has made large- scale examination possible. The T- 33 is a cheap and reliable plane for airborne testing. The data may be recorded or telemetered on the ground.

A65-81778
REASONS FOR DISQUALIFICATION OF SPANISH PILOTS [CAUSAS DE DESCALIFICACION DE LOS PILOTOS ESPANOLES].
J. Lucas, F. Merayo, P. Gomez Cabezas, and M. Esteban (Centro de Invest. de Med. Aeron., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 55-57. In Spanish.

Results of physical examinations of military and civilian pilots in Spain over a period of 17 years led to following conclusions and recommendations: (1) Reasons for disqualification of Spanish pilots during their tour of duty do not differ substantially from those observed in other countries, in spite of differences in personality, body measurements, and biological factors. (2) Early diagnoses of incipient diseases and deficiencies are mandatory in pilots older than 50 years, to prevent accidents due to human failure. (3) Psychological screening is essential prior to admission of pilot candidates, with special consideration of "Spanish idiosyncrasies".

A65-81779
TRAINEE PILOT SELECTION.
Sean O'Quigley (Irish Intern. Airlines, Dublin, Ireland) and J. R. M. Nolan (U.Coll., Dept. of Psychol., Dublin, Ireland).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 59-66.

The Aer Lingus (Irish International Airlines) report on the results of their program set up in 1961 for screening prospective trainees for pilot service. The applicants were selected in a three-stage procedure. The first stage consisted of screening, taking into account age limits, minimum educational levels, school reports, and family doctor reports. The selected candidates were put through the second stage, which consisted of group psychological tests. The final selection was based upon aptitude tests, personal interviews, psychological tests, and company medical examinations, which stressed visual acuity and hearing. None of the trainees selected through this program experienced serious difficulty in the training course and examinations. There was no correlation between performance at the group psychological tests and performance in the training school, as evaluated by the instructors. The least emphasis in the selection procedure was on social and cultural criteria. Yet, an inspection of the training school revealed the importance of this factor. It was found that the possession of aptitudes was not sufficient if they were not organized in ways acceptable to the cultural groups.

A65-81780
PRESENT STATUS OF HEARING CHECKUPS ON AVIATION AND GROUND PERSONNEL AT SABENA: RESULTS AND PREDICTIONS [ORGANISATION ACTUELLE DE LA SURVEILLANCE DE L'AUDITION DU PERSONNEL NAVIGANT ET DU PERSONNEL DE TERRE A LA SABENA-RESULTATS-PREVISIONS].
A. Hustin (Sabena, Med. Serv., Brussels, Belgium).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 123-125. In French.

No deterioration was observed in the incidence of hearing impairment of Sabena Airlines personnel, first examined in 1958, when reexamined in 1962. The possibility of individual audiometric decreases from heparic or circulatory disorders is discussed in terms of a 40- year old pilot. There is a probability that some men remain too long in areas of high sound pressure levels. The intervals between hearing tests for the various personnel are reviewed, and it is proposed that working areas be more closely monitored for sound pressure levels.

A65-81781
SOME PROBLEMS CONCERNING MEDICAL EXAMINATION OF AVIATION PERSONNEL [A PROPOS DE QUELQUES PROBLEMES D'EXPERTISE MEDICALE DU PERSONNEL NAVIGANT DE L'AERONAUTIQUE].
J. Lavernhe, J. Raboutet, and E. Lafontaine.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 135-137. 9 refs. In French.

In order to provide a basis for medical disqualification, decisions concerning aviation personnel, a statistical analysis of types of sicknesses of personnel in relation to the kind of work performed should be made. Among aviation personnel, there were uncovered such sicknesses as syphilis, gastroduodenal ulcers, arterial hypertension, glycosuria, tuberculosis, Wolff-Parkinson-White syndrome, amebiasis, and proteinuria.

A65-81782
QUIESCENT CORONARY INEFFICIENCY PATTERN IN FLYERS WITH AN AGING HEART.
G. Jaspers (Natl. Aeromed. Center, Soesterberg, Netherlands).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], 1965 , p. 243-250. 14 refs.

During a routine periodic medical examination, a pilot of about fifty years of age, apparently healthy and without any complaints, showed a normal electrocardiogram taken at rest. However, after physical exercise the electrocardiogram revealed some abnormal tracings. Normalization occurred quickly; but the abnormality appeared consistently after exercise, which indicated some organic cardiac difficulty, not immediately diagnosed.

A65-81783
PROGRESS OF DEAFNESS IN AVIATORS AND PROBLEMS DERIVING THEREOF [EVOLUCION DE LAS SORDERAS DE LOS AVIADORES Y PROBLEMAS QUE PLANTEAN].
P. Gomez Cabezas, E. F. Merayo Magdalena, and J. Lucas Gallego (Centro de Invest. de Med. Aeron., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 261-266. In Spanish.

Evaluation of audiograms of 958 pilots, flight mechanics, and radio operators (discussed in a previous paper) revealed that 44 individuals suffered hearing loss in the speech frequency range (4.37% of the military, 2.18% of the commercial pilots, 13.46% of the radio operators, and 7.85% of the mechanics). While the airlines have heretofore not placed much importance on airplance noise effects as an occupational hazard, it is recommended that the problem be faced with greater alertness to forestall impairment of personnel morale and health. A particular effort should be made to reduce noises to below the 90 db. level, above which hearing damage occurs. All cases involving otological surgery (attic- mastoid trepanation, finestration, and mobilization of the stapes) should have their licenses revoked.

A65-81784
NORMAL AND ABNORMAL EEG IN AVIATION MEDICINE [E.E.G. NORMAL ET ANORMAL EN MEDECINE AERONAUTIQUE].
H. Fischgold, E. Lafontaine, and R. Laplane (Compagn. Natl. Air France, Serv. Méd. Central, Paris, France).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965] , p. 267-269. In French.

A short summary of the use and limitations of the electroencephalogram (EEG) in aviation medicine is presented, especially with respect to the recognition of epileptic wave patterns. The analysis of EEG tracings is complicated by the undetermined significance of certain wave patterns, the limited number of wave patterns possible, and the effects of heredity, metabolism, emotional state, attention or distraction, etc. on the wave patterns. Interpretations of the EEG patterns of individuals should not be considered alone but should be correlated with other data.

A65-81785
SOME VISUAL PROBLEMS OF AERONAUTICAL INTEREST [ALGUNAS CUESTIONES VISUALES DE INTERES AERONAUTICO].
M. Esteban de Antonio, F. Merayo, and P. Gómez-Cabezas (Centro de Invest. de Med. Aeron., Seccion de Med. Aeron., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 293–297. In Spanish.

The following complaints were made by Spanish airline pilots during a periodical medical examination, with reference to visual problems: (1) aircraft cabins painted in dark colors and black instrument panel induces ocular fatigue; (2) poor cabin structure of some aircraft permits the passage of cold air into cabin interior and irritates the eyes; (3) pressurized aircraft tend to cause conjunctival redness due to dryness of cabin interior; (4) some aircraft cabins have no high-intensity lights; (5) although red lights are used in the cabin to retain nightvision adaptation, proper colors have not been given to flight plans, maps, etc., which the pilot must consult; (6) reflection of light from sources away from the pilot is a nuisance; (7) fluorescent and ultraviolet instrument panel lights are a source of visual fatigue; (8) some panels are poorly illuminated necessitating the use of a flashlight to read instruments; (9) some lights on the instrument panel appear brighter than others, are in a vertical position or difficult to read; (12) some aircraft provide no protection against the sun; (13) visibility during rain is poor, there are no windshield wiper to provide satisfactory results in any aircraft; (14) windows soiled by insects are impossible to clean and visibility during flight is poor. These are a few of the problems noted. Included are suggestions for improvement of these hazardous conditions

A65-81786
THE USE OF SMALL CONTACT LENSES IN AVIATION PERSONNEL [EL EMPLEO DE MICROLENTILLAS DE CONTACTO POREL PERSONAL VOLANTE].
Mario Esteban de Antonio and Feliciano Merayo Magdalena.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, Oct. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 305–312. In Spanish.

Decompression chamber tests with various contact lenses on an artificial cornea revealed that when a physiological solution is introduced between the cornea and lens, bubbles appear at 4500–5000m, becoming more numerous at 6500m, and reaching a maximum at 9000m. During decent the bubbles progressively decrease in volume. Methyl cellulose solution substituted for physiological solution effectively delayed the appearance of bubble formation up until 7500–8000m. Explosive decompression for one minute did not modify the results of the test and the appearance of bubbles was equal to slower decompression. The advantages of wearing contact lenses by flying personnel include: (1) elimination of eyeglasses, which interfere with the oxygen mask, pressure and oxygen equipment, helmets, etc.; (2) better visual acuity; (3) possible optical correction of anisometropias; (4) provision of unlimited visual field; (5) psychological factors; and (6) no visual blurring by water vapor, perspiration, etc. Disadvantages for flying personnel are: possibility of bubble formation; production of corneal erosions; limited tolerance of lenses; possibility of removing lens during flight; danger of fatigue due to improper lens. A list is given of persons permitted to wear contact lenses during flight duty. It is recommended that the wearing of contact lenses by pilots and auxiliary personnel be totally contraindicated.

A65-81787
OPHTHALMOLOGICAL PROBLEMS POSED BY COMMERCIAL FLIGHTS AT MACH 2 [LES PROBLEMES OPTHALMOLOGIQUES POSES PAR LE VOL COMMERCIAL A MACH 2].
A. Mercier and E. LaFontaine.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 329–335. In French.

A discussion is presented of some of the opthalmological problems arising with the advent of commercial flights at a speed of Mach 2. review is given of experiences from flights in present-day jet airlines. The effect of speed, high altitude, acceleration and vibration on vision is discussed. It appears that, because of their relative slowness, human sensory and psychomoter reactions will be inadequate for some of the visual requirements at such high speeds. But it seems possible that aviation medical specialists and engineers will overcome the problems.

A65-81788
UTILIZATION OF ELECTROENCEPHALOGRAPHY IN AVIATION MEDICINE [UTILISATION DE L'ELECTROENCEPHALOGRAPHIE EN MEDECINE AERONAUTIQUE].
C. Blanc, E. LaFontaine, and R. Lapiane (Compagnie Air France, Paris).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 341–347. In French.

The author discusses the problems of utilizing the electroencephalogram (EEG) in aerospace medicine for purposes such as pilot selection and health maintenance of personnel. Specifically the author reports on 7,000 cases collected from 1954 in the Service Medical d'Air France. From these recordings a rate of disturbances in the EEG was 35 per 100 recordings. An unconventional classification of EEG tracings is presented and discussed with reference to the normal classification scheme. This new classification takes into account various abnormalities that occur temporarily in a given set of pathological or psychological conditions, but reoccur over the years. The problem of interpreting and using these disturbances, especially the epileptic-bype tracing, is discussed.

A65-81789
THERMIC TOLERANCE OF AN ALERT PILOT [CONTRAINTES THERMIQUES D'UN PILOTE EN ALERTE].
J. Colin, P. Varene, and Ch. Jacquemin.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 349–352. In French.

Attempts to determine means of protecting interceptor pilots on alert for take-off in their planes from solar radiation are presented. Cutaneous and rectal temperatures, body weight loss, and heart rate were recorded as measures of thermal stability. Ventilated- stratocruiser clothing and a protective cover for the cockpit were adopted. Thermal comfort for the pilot for a large range of temperatures was achieved using the above equipment, facilitating his take- off within seconds following the launching of the alert.

A65-81790
THREE YEARS OF EXPERIENCE WITH LABORATORY INVESTIGATIONS OF FROZEN FOOD PUT ON BOARD OF AIRPLANES [TROIS ANNEES D'EXPERIENCE DANS LES CONTROLES DE LABORATOIRE DES REPAS SURGELES MIS A BORD DES AVIONS].
André Delescluse and Christian Prinz (Sabena, Lab. Med., Brussels, Belgium).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 365–270. In French.

A description is given of the use of and the laboratory control of frozen meals on board SABENA Airline aircraft. The step by step preparation, serving, storage and final elimination of the leftovers is described. The hygienic advantages of frozen food are discussed. The laboratory tests used for control are named and results of these tests are recorded from 1959–1961. It was found that using laboratory- examined frozen food reduced the risk of food poisoning, assured better tasting food, enhanced the control of the proper cold range, and intensified hygiene standards for the personnel.

A65-81791
PSYCHOLOGIC FACTORS IN SPACE TRAVEL.
Henry A Imus (U.S. Naval School of Aviation Med., Pensacola, Fla.)
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 383–386.

As a result of scientific data and first- hand observations from balloon and simulated space cabin flights, it is possible to predict the qualities of human performance necessary for successful manned orbital flights. The control of motivation, morale, boredom, and fatigue, the reduction of feelings of isolation, and the minimization of anxiety are all important factors, and should be given the utmost consideration. But, the selection of men who already have demonstrated consistent and reliable performance in a variety of hazardous missions over a period of years, still provides the best guarantee of a successful mission into outer space.

A65-81792
RISKS IN SPACE FOR THE HUMAN ORGANISM [PELIGROS ESPACIALES PARA EL ORGANISMO HUMANO].
José Luis Barceló.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS. [Madrid, 1965], p. 407–414. In Spanish.

A general discussion is presented on the psychophysiological hazards of space flight including the following: (1) gravitational forces producing cerebral malfunction, and personality problems; (2) subgravity effects on the inner ear, the equilibrium mechanism, muscle and heart activity, and skin; and (3) hazards of high- frequency radiations from the sun, cosmic rays and meteorites. Included is an appendix presenting data on subgravity and artificial gravity, the photosynthetic process as a regenerative cycle, medical problems in space operations, radiation doses for nuclear propulsion and their physiological effects, requirements for space cabins, and sequence of operations of a manned satellite.

A65-81793
OXYGEN REGENERATION SYSTEMS IN SPACE CABINS [LES SYSTEMES REGENERATIFS D'OXYGENE DANS LES CABINES SPATIALES].
P-L. Biget (Serv. de Santé de l'Air, Paris, France).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 443–471. 124 refs. In French.

A review is presented by the author of the various systems of oxygen regeneration for use in space cabin environments. The review covers (1) the open ecological system and (2) the completely closed ecological system. The problem of recovering carbon dioxide and water for further use is discussed. Various chemical systems and physical methods are reviewed. Water recovery by refrigeration and compression and by other means are analyzed. Another large section of the review covers the regeneration of carbon dioxide

and water to the normal cycle. Chemical methods using sodium reduction etc. are reviewed, as well as many physical means (photolysis, thermal decomposition, etc.). Photosynthetic gas exchange is discussed and techniques developed by individual investigators are compared.

A65-81794
RESISTANCE TO HYPOXIA AND HYPOTHERMIA [RESISTENCIA A LA HIPOXIA EN HIPOTERMIA].
P. Muñoz, F. Cantero, J. Fraile, and Lucas Gallego (Inst. Español de Fisiol. y Bioquim.; Consejo Superior de Investigaciones Cient.; and Fac. de Farm., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 497-500. In Spanish.

Anesthetized dogs were cooled to a body temperature of 25°C. while breathing a mixture of 10% oxygen in 90% nitrogen. At normal temperatures, hypoxia produced a decrease in arterial oxyhemoglobin which varied between 72% and 80% in absolute values and venous oxyhemoglobin values varying between 42% and 60%. During hypothermia, hypoxia caused an increase in arterial oxyhemoglobin (80-84%) and values of venous blood varied between 32% and 52%. During rewarming the phenomenon was reversed, showing only a relatively greater content of venous oxyhemoglobin. Experiments were also made with dogs subjected to hypothermia with the cava clamped and the aorta, necessitating the pulmonary blood to circulate via the heart and lungs. It appears that hypothermia protects the hypoxic animal against the effects of hypoxia.

A65-81795
STUDY OF ELECTROLYTES IN HYPOTHERMIA AND HYPOXIA [ESTUDIO DE LOS ELECTROLITOS EN HIPOTERMIA E HIPOXIA].
J. Lucas Gallego, A. Navarro Ruiz, F. Cantero Gómez, and C. Villares (Fac. de Farm.; and C. S. I. C., Inst. Español de Fisiol. and Bioquim., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS. [Madrid, 1965], p. 513-515. In Spanish.

Tabulations are presented of the results obtained from dogs subjected to hypothermia to 20°-24°C., with rewarming to 30°-34°C. Serum phosphorus decreased during the cooling phase and increased during rewarming. If serum potassium did not increase, the animal was unable to recuperate and died. Sodium decreased significantly in the serum, total blood, and erythrocytes. Changes in these electrolytes during hypothermia were influenced by the pH, carbon dioxide, glycemia, renal, hormonal, and adrenal function, etc. Decrease of the metabolites may be due to the great renal elimination during hypothermia, and to their accumulation in the tissues and viscera.

A65-81796
SEDIMENTATION SPEED OF LEUKOCYTES IN INDIVIDUALS SUBJECTED TO ACUTE ANOXIA.
G. Mazzella and A. M. De Angelis (Center of Studies and Res. of Aviation and Space Med., Rome, Italy).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 517-520.

Erythrocyte and leukocyte sedimentation rates in blood of 20 Italian Air Force pilot candidates before and after exposure to anoxia in a decompression chamber were investigated. Subjects were exposed in the chamber for 30 min. at a barometric pressure of 379mm. Hg. Neither type of blood cell showed modification of sedimentation rate during the anoxic exposure.

A65-81797
VARIATIONS IN THE ELECTROLYTES Na, K IN GASTRIC SECRETION AT VARIOUS DEGREES OF HYPOXIA [VARIACIONES DE LOS ELECTROLITOS Na, K EN LA SECRECION GASTRICA EN LOS DESTINTOS GRADOS DE HIPOXIA].
J. Lucas Gallego, A. Navarro Ruiz, F. Cantero Gómez, and C. Villares (Fac. de Farm., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 521-524. In Spanish.

Lowering of body temperature under conditions of hypoxia is a defense mechanism of the organism, which in turn has secondary effects on other physiological functions such as electrolyte balance. It was the purpose of this study to record quantitatively the relationship between hypothermia and electrolyte content in gastric secretion as compared to blood serum. Dogs were cooled to temperatures between 30° and 38°C., following administration of histamine dichlorhydrate to stimulate gastric secretion. Tabulation of results revealed that there was no significant reduction of K and Na in the serum, in contrast to the more pronounced reduction in the gastric juice. An interpretation of the findings is given.

A65-81798
RESISTANCE TO HYPOXIA IN THE STATE OF STARVATION.
J. Dvorak, M. Fipal, J. Stverák, and Dolezal, V.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965, p. 533-534.

Hypoxia tolerance during rebreathing was determined in eight young men during five days starvation with water ad libitum. In five men rebreathing experiments were undertaken on each day of starvation and in three men only at the beginning and at the end of the starvation period. The minimal hemoglobin oxygen saturation percent value reached at the moment of loss of consciousness and hypoxic convulsion was taken as the index of hypoxia resistance. Blood sugar levels decreased to 60 mg.% during the first day and were maintained between 40-81 mg.% during the whole period of starvation. The normal body temperature rhythm changed markedly from the third day of starvation. Relatively normal levels of hypoxia resistance observed throughout the whole starvation period were attributed to lowered body metabolism during starvation.

A65-81799
STUDY OF THE BLOOD IONOGRAM DURING HYPOTHERMIA AND HYPOXIA [ESTUDIO DEL IONOGRAMA SANGUINEO EN HIPOTERMIA E HIPOXIA].
F. Cantero, A. Navarro, J. Lucas Gallego, and C. Villares (Fac. de Farm., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 535-537. In Spanish.

Blood ionogram studies were made in dogs rendered hypothermic to 24°, 25°, and 28°C. and during hypoxia. The chlorine and phosphorus anions and the sodium, potassium, and calcium cations were studied. On the basis of tabulations made, it is concluded that hypothermia and hypoxia produce a state of acidosis which causes a decrease of the chlorine, sodium, potassium, and calcium anions and cations, and an increase in phosphorus. During rewarming, however, there appears an increase in calcium, chlorine, sodium and potassium, and a decrease in phosphorus.

A65-81800
PHOSPHORUS AND PHOSPHATASES IN HYPOXIA AND HYPOTHERMIA [EL FOSFORO Y LAS FOSFATASAS EN HIPOXIA E HIPOTERMIA].
A. Navarro Ruiz, C. Villares, F. Cantero Gómez, and J. Lucas Gallego (Fac. de Farm., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 563-565. In Spanish.

Dogs with a normal body temperature of 38°C. were cooled to 32°C. and 26°C with additional histamine injection, and to 36°C. under hypoxic conditions. On the basis of tabulated results hyperphosphatemia appeared during the hypothermic process. This elevation was parallel to that of glycemia in the catabolic sympathetic phase and in acute hepatic insufficiency induced by the experiment. Neither histamine administration nor the state of hypoxia produced a decrease in the high phosphorus level attained during hypothermia. Alkaline phosphatase decreased as the phosphorous level increased in hypothermia. Histamine administration and hypoxia also produced a decrease in the alkaline phosphatase level.

A65-81801
PERSONALITY EVALUATION BY MEANS OF THE MIRROR IMAGE TEST BEFORE AND AFTER ISOLATION TESTS [EVALUATION CARACTEROLOGIQUE AU MOYEN DU TEST DE L'IMAGE SPECULAIRE AVANT ET APRES L'EPREUVE D'ISOLEMENT].
M. Strollo (Centre d'Etudes et Rech. de Méd. Aeron. et Spatiale, Rome, Italy).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 576-579. In French.

The mirror-image test is used as a diagnostic tool to discover any modifications in affective emotional or motor responses of subjects during confinement. Definite changes in these responses were observed. The mirror test, which had previously demonstrated its usefulness for testing aptitude, is found herein to be beneficial also in studying disturbances occurring during isolation.

A65-81802
RESEARCH ON SUBJECTIVE TIME ESTIMATES DURING ISOLATION EXPERIMENTS OF LIMITED DURATION AT A MAXIMUM OF SIX HOURS [RECHERCHES SUR L'APPRECIATION SUBJECTIVE DU TEMPS DURANT DES EXPERIENCES D'ISOLEMENT DE DUREE LIMITEE A UN MAXIMUM DE SIX HEURES].
M. Strollo (Arme de l'Air, Direc. de Santé, Rome, Italy).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 581-585. In French.

An investigation of 70 young subjects' adaptibility to isolation complicated by sensory deprivation, as related to their ability to estimate their time of confinement, is presented. Subjective evaluations of time spent in the isolation chamber were found to be considerably lower than the actual time periods recorded during the experiment. The intention to investigate the underlying causes of these results was discarded.

A65-81803
NEW FINDINGS CONCERNING THE ACID-BASE EQUILIBRIUM IN HYPOTHERMIA [NUEVAS APORTACIONES SOBRE EL EQUILIBRIO ACIDO-BASE EN HIPOTERMIA].

Cautero Gomez, Fraile Blankco, V. Velamazam, Morejon, and E. Ubeda (Inst. ESPANOL DE FISIOL' y Bioquim., Sec. de Fisol. Comparada, Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 615–616. In Spanish.

The simultaneous study of pH in total blood and determinations of carbon dioxide tension revealed that the acid- base equilibrium became more acid during hypothermia. The decrease in pH coincided with high levels of carbon dioxide tension establishing a state of respiratory acidosis. The alkaline reserves (HCO_3) although high at the beginning of the experiment began to drop when the body temperature reached 22°C. Also found was a state of metabolic acidosis during hypothermia, which increased during rewarming. Metabolic acidosis probably was due to hypoxia occurring during the course of hypothermia. Tabulations are presented of experiments on hypothermic dogs using spontaneous respiration controlled with 100% oxygen. When ventilating the animal with atmospheric air during the experiment, carbon dioxide tension levels were not high. The concentration of HCO_3 in total blood decreased throughout the experiment. Th pH did not decrease. Hypothermia appears to be better tolerated when respiration is controlled rather than during spontaneous respiration.

A65-81804
VENTILATION AND O_2 TRANSPORT IN HYPOTHERMIA [VENTILACION Y TRANSPORTE DEL O_2 EN HIPOTERMIA].
J. Fraile Blanco, F. Cantero Gomez, J. Lucas Gallego, E. Moreson Sobron, and E. Ubeda (Inst. Espanol de Fisiol. Y Bioquim., Sec. de Fisiol Comparada, Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. ANDCOMMUNS., [Madrid, 1965], p. 617–623. In Spanish.

Respiratory frequency decreased in hypothermic dogs, from 30 respirations/minute at 37°C., to 16 respirations/minute at 26°C., to 6 respirations/minute at 20°C. At 18C. respiratory rhythm decreased, along with electrical activity in the heart and central respiratory activity. During rewarming respiratory frequency increased rapidly. The circulating air was also decreased during hypothermia as was the respiratory minute volume and oxygen consumption. Arterial oxygen was completely saturated during hypothermia when the animal breathed spontaneously. During rewarming elevated values of arterial saturation were noted. The breathing of a hypoxic mixture (10% oxygen in 90% nitrogen) indicated that this ventilation was sufficient to maintain arterial oxygen saturation at 95% at 22°C.

A65-81805
VESTIBULAR CALORIC TEST ON THE HUMAN CENTRIFUGE.
Martin Bergstedt.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 625–629.

The results of caloric tests in the human centrifuge are presented graphically for four subjects at intensities of 1 g, 1.25 g, 1.5 g, and 1.8 g. A linear relationship was shown between the maximum intensity of nystagmus and the g value. Extrapolation of the data gives 0.1 g. as the liminal g value for nystagmus in the caloric test.

A65-81806
TRANSPORT OF CO_2 IN HYPOTHERMIA [TRANSPORTS DEL CO_2 HIPOTERMIA].
J. Fraile Blanco, F. Cantero Gomez, E. Morejon Sobron, E. Ubeda, and J. Lucas Gallego (Inst. Espanol de Fisiol, y Bioquim., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 501–505. In Spanish.

Anesthetized dogs were rendered hypothermic by immersion into an ice water bath, and an analysis was made of the carbon dioxide (CO_2) variations. Temperatures varied between 19°C to 38°C. At the beginning of the experiment, the percentage of alveolar CO_2 was 5.5%. During hypothermia alveolar CO_2 decreased. At 20°C., CO_2 was 3.5%. During rewarming the percentage of CO_2 showed little change. At 37°C., alveolar CO_2 decreased to 2.5%. The quantity of CO_2/minute decreased during the course of hypothermia, but increased rapidly during rewarming. The CO_2 partial pressure in arterial blood also decreased during hypothermia. In included are two tables showing the percentage of alveolar CO_2 at 19° to 38°C., and the quantity of CO_2 in cc/minute in expired air at 22° to 38°C.

A65-81807
INTERNATIONAL AERONAUTICAL AND COSMONAUTICAL MEDICAL CONGRESS (XITH CONGRESS IN EUROPE), MADRID, OCTOBER, 1962. REPORTS AND COMMUNICATIONS.
Jose Gallego, Ed. (Soc. Espanola de Med. Aeron., Madrid, Spain).
Edited by Jose Gallego (Soc. Espanola de Med. Aeron., Madrid, Spain).
[Madrid, 1965]. 631 p. Many refs. In ENGLISH, spanish, and FRENCH.

The majority of the 77/papers contained in this volume deal with aviation medicine, psychology, and physiology. Five papers only are devoted to space medicine in the stricter sense. Priority is given to problems of general medicine and physiology (35) with emphasis on hypoxia and thermo-regulation. Fourteen papers are concerned with per sonnel selection and training and 4 papers to rescue and safety. Personnel selection and training problems are discussed in 14 papers, and 4 presentations are of a historical nature. Thirty-four papers are in Spanish, 19 in English (or have English abstracts), and 24 in French. The papers have been abstracted separately.

A65-81808
EVALUATION OF VESTIBULAR TESTS IN PILOT SELECTION [VALORACION DE LAS PRUEBAS VESTIBULARES EN EL RECONOCIMIENTO DE PILOTOS].
F. Merayo, J. Lucas Gallego, and P. Gomez Cabezas (Centro de Invest. de Med. Aeron., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. Congr., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 17–20. In Spanish.

It was the purpose of this study to assess the value of the Barany tests as a criterion for the selection of flight personnel. Three groups, each consisting of 10 health subjects were exposed to rotations on the Barany chair (10 rotations for 20 sec.). Group I consisted of pilots who had demonstrated pronounced susceptibility to disorientation; Group II was composed of individuals free of susceptibility to disorientation; and Group III was the control group. The results lead to the conclusion that the Barany test does not furnish sufficient evidence to consider it a reliable method to determine susceptibility to vertigo.

A65-81809
DETERMINATION OF DEAFNESS IN PILOTS [VALORACION DE LA SORDERA EN EL PILOTO].
P. Gomerz Cabezas, J. Lucas Gallego, and F. Merayo Magdalena (Centro de Invest. de Med. Aeron., Madrid, Spain).
IN INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 47–54. In Spanish.

Audiometric examinations were carried out on 958 aviators, divided into groups of military pilots, civilian pilots, mechanics and radio operators. The following findings and conclusions were reached: (1) In the aviation environment, the frequency region of 4000 c.p.s. is particularly damaging, also, to a lesser degree the 8000, 3000, 2000, and 1000 c.p.s. regions (2) Injurious effects were noted most in the radio operators (55.77%) and mechanics (35.52%). In contrast, hearing damage was recorded in much smaller numbers of military (25%) and civilian pilots (18%). (3) There was little correlation between hearing loss and flying time. (4) Unilateral hearing loss, with perference in the left ear, was observed in 25% of the cases; there is no explanation for the left-ear phenomenon, which also applied to radio operators. Because of the risk associated with the progressive nature of hearing loss in aviators, early treatment and, preferably, separation from noisy environments is recommended.

A65-81810
EVALUATION AND REVISION OF MEDICAL DATA IN THE EXAMINATION OF PILOTS [VALORACION Y REVISION DEL CUADRO MEDICO EN EL RECONOCIMIENTO DE PILOTOS].
Vicente López-Coterilla Vazquez (Centro de Invest. de Med. Aeron., Seccion de Med. Aeron., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 67–72. In Spanish.

Between the years of 1960 and 1962 a medical study was made on 4000 flying personnel. Out of 1376 young pilot candidates, the most frequent medical causes for elimination were as follows: visual acuity disorders, dischromatopsia, strabismus, personality and emotional problems, hypertension, vascular instability, rhinitis, sinusitis, otorrhea, hematuria, cylinduria, albuminuria, pulmonary infiltration, poliomyelitis sequelae, anemia, etc. A study made during the same period of flying personnel during periodic medical examinations revealed the frequent occurrence of the following medical problems which were considered incompatible with flying: (1) hearing loss in pilots, mechanics, and radio operators with many hours of flying; (2) arterial hypertension in pilots; (3) microhematurias caused by flight stress; (4) ocular phorias in pilots; and (5) gastric mucosa changes, stomach ulcers, and anxiety caused by flight fatigue.

A65-81811
EEG AND PSYCHOLOGICAL TESTING OF A COMBAT PILOT UNIT [ESTUDIO EEG Y PSICOLOGICO DE UNA UNIDAD DE PILOTOS DE COMBATE].
D. Federico Moldenhauer Gea and D. Pedro Herrero Aldama.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 73–85. In Spanish.

During pilot selection it is of paramount importance to study the individual's personality, state of anxiety, and reaction to the stresses of combat and flight in addition to any neuro- electrical abnormalities which may affect his performance, judgement, conduct, etc. The use of various psychological tests (personality, character, intelligence, mental ability, etc.) and electroencephalography under various conditions on a group of combat pilots indicate that a combination of the two methods provides a series of valuable data for use in the psycho-neurological selection of pilots.

A65-81812
APPLICATION OF ELECTROENCEPHALOGRAPHY IN AVIATION MEDICINE. I. ASPECTS OF THE EEG IN RELATION TO PSYCHOLOGICAL AND PSYCHOPHYSIOLOGICAL FACTORS [UTILISATION DE L'ELECTROENCEPHALOGRAPHIE EN MEDECINE AERONAUTIQUE. I. ASPECTS DE L'EEG EN RELATION AVEC LES FACTEURS PSYCHOLOGIQUES ET PSYCHOPHYSIOLOGIQUES].
C. Blanc, E. Lafontaine, and R. Laplane.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 87–90. In French.

In the selection of aviation personnel, electroencephalographic (EEG) results should be correlated with the individual's personality and general physiological or pathological factors which might influence the nervous or psychic function. EEG tracings are separated into evolutional tracings, which are modifiable by certain psychological or pathological conditions, and stationary tracings, which remain unchanged. The evolutional tracings are further subdivided into major transitory reversible changes, transitory changes of varied importance, and non-evolutional changes.

A65-81813
APPLICATION OF ELECTROENCEPHALOGRAPHY IN AVIATION MEDICINE. I. THEORETICAL AND PRACTICAL PROBLEMS [UTILISATION DE L'ELECTROENCEPHALOGRAPHIE EN MEDICINE AERONAUTIQUE].
C. Blanc, E. Lafontaine, and R. Laplane.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 91–94. In French.

In the selection of aviation personnel, electroencephalographic (EEG) results should be correlated with physiological and psychological findings. Five points which should be considered in the interpretation of EEG tracings are: (1) the possibility of latent epilepsy; (2) the relation of isolated EEG changes to the individual's personality; (3) the repetitions of EEG tracings every six months or yearly; (4) the importance of negative tracings; and (5) the preponderance of "normal" EEG tracings.

A65-81814
AGE LIMIT OF THE SPANISH PILOT [EDAD LIMITE DEL PILOTO ESPANOL].
F. Merayo, M. Esteban, and J. Lucas (Centro de Invest. de Med. Aeron., Seccion de Med. Aeron., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 95–98. In Spanish.

Regardless of the physiological changes accompanying aging, no specific general retirement standards for pilots are provided which are based solely on the age factor. Taking into consideration the pilot, his aircraft, and aging as a general physiological problem, it is recommended that, starting at 50 years of age, the number of flying hours be decreased. In Spain the age limit for pilots coincides with military age. The two ages vary depending on the military grade since it is different from the retirement age. The percentage of pilots disqualified for flight appears to increase from 3% in the 35–40 age group to 33% in the 50 age group. Since 66% of these pilots are still considered capable of flight duty, elimination is not a rigid practice when based on the age factor. The introduction of new techniques to permit the early diagnosis of organic diseases associated with age will be of great value in eliminating older pilots from flight duty.

A65-81815
AIR EVACUATION, ACCIDENTS AND FLIGHT SAFETY [AEROEVACUACION, ACCIDENTES Y SEGURIDAD DEL VUELO].
Angel de Garaizábal (Hosp. Central de Aviacion, Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., Madrid, 1965], p. 99–122. In Spanish.

The primary causes of T-33 and F-86 jet aircraft accidents, in terms of percentages calculated on the basis of 100,000 hours of flying, are as follows: (1) pilot error, 54%; (2) material failure, 16%; (3) error of other personnel, 12%; and (4) other factors, 18%. Of the accidents, approximately 45% occurred during landing; 20% were due to distraction of the pilot during flight or during preflight inspection; 15% to lack of pilot's knowledge of emergency procedures; 7% to violation of normal flight discipline; 5% to maintenance or material failure; and 8% to ignorance regarding flight equipment or normal flight procedures. A discussion is presented on the procedures involved during the official medical investigation of aircraft accidents, including evaluation of the physiopathological, and physical factors facing the pilot along with mechanical factors possibly contributing to the accident, assistance to survivors and identification of the dead, analysis of poisons as possible causative factors, autopsy studies, study of the lesions incurred by victims, and organization of rescue squads and equipment. Out of 2453 accidents, 762 persons died and 636 sustained injuries. Of the 599 injuries studied, 188 were fractures, 27 burns, 160 body lesions, 103 contusions, and 5 amputations. Extensive data are included on the types of multiple fractures, and lesions of the face, spinal cord, thoracic abdomen, arms, legs, and burns.

A65-81816
THE EFFECTS OF AVIATION SERVICE ON THE SPINAL COLUMN [INFLUENCES EXERCEES SUR LA COLONNE VERTEBRALE PAR LE SERVICE DANS L'AVIATION].
Volek Josef.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 127–129. In French.

In order to avoid possible later difficulties, it is suggested that a complete radiological examination of the vertebral column become a part of the battery of pilot selection tests. A considerable number of anomalies of the column were found in radiological studies of older pilots, e.g., spina bifida, displacement of vertebrae, scoliosis, and degenerative osteochondritis.

A65-81817
AEROMEDICAL EVACUATION OF THE SICK OR GRAVELY WOUNDED [LES EVACUATIONS AERO-MEDICALES DE MALADES OU DE BLESSES GRAVES].
M. Poisvert.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 131–133. In French.

It is possible to transport seriously ill or injured individuals in a shorter time with less stress by airplane or helicopter than in an ambulance. A specific example of the transportation of a patient with tetanus is furnished.

A65-81818
LUMBAGO AMONG AVIATION PERSONNEL: CONCERNING SIXTY-EIGHT CASES OF LUMBAGO OBSERVED IN AVIATION PERSONNEL, MILITARY TRAINING HOSPITAL DOMINIQUE-LARREY IN VERSAILLES [LES LOMBALGIES DU PERSONNEL NAVIGANT: A PROPOS DE SOIXANTE-HUIT CAS DE LOMBALGIES OBSERVEES CHEZ LE PERSONNEL NAVIGANT HOPITAL MILITAIRE D'INSTRUCTION DOMINIQUE LARREY-VERSAILLES].
R. P. Delahaye, R. Pannier, and L. Tapusse (Hôp. Mil. d'Instruction Dominique Larrey, Versailles, France).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 139–144. 10 refs. In French.

Air Force flying personnel are affected by backaches due to various causes. Among the most frequent are posttraumatic pains following an accident (crash, bail-out, or ejection). Backache may be due to disk troubles occurring after a considerable lapse of time. Hence the necessity for clinical and X-ray examination of all spinal injuries. Muscular insufficiency in the spinal region is frequent among flying personnel. The second general category of back pains is observed in flying personnel of more than forty years of age. The clinical signs in such cases are not very different from those of arthrosis in other non-flying patients. There are predispositions due to overweight, sedentariness, and faulty metabolism because of incorrect eating habits. A third category of back pains merits special study; posture pains which affect helicopter pilots especially, and which are of varying intensity according to the type of helicopter and the nature of missions accomplished. Attention is called to the value of kinetotherapy and to the need of instructing flying personnel in corrective calisthenics. This kind of physical therapy alone may result in great improvement and cause the majority of such cases of back pains to disappear. This will serve to avoid unnecessary treatment, such as the use of cortex drugs.

A65-81819
CONCERNING SPINAL PAINS IN HELICOPTER PILOTS: ANALYSIS ETIOLOGY, AND PROPHYLACTIC TREATMENT [A PROPOS DES DOULEURS VERTEBRALES DU PILOTE D'HELICOPTERS: ETIOLOGIE, TRAITEMENT ET PROPHYLAXIE].
René Sliosberg.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 145–151. In French.

Of 128 helicopter pilots studied, 87.5% complained of spinal pains, especially after 300 hours of flight duty. The pains may have arisen from body position, need for use and coordination of both arms and legs and vibrations. Preventive measures include careful selection of pilots, regulation of piloting hours per month, elimination or diminution of causes of fatigue such as rotor noise, alternation of difficult and easy missions, amelioration of the seat and body position, and better protection against vibration. The development of strong back muscles by means of a regular program of exercises is emphasized.

A65-81820
CARDIO-RESPIRATORY HYGIENE IN FLIGHT [HIGIENE CARDIO-RESPIRATORIA DEL VUELO].
J. L. Alverez-Sala Moris (Hosp. Central del Aire, Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 163–228. In Spanish.
15 refs.

A review is presented of the literature dealing with cardio-respiratory hygiene during flight which includes the following discussions: (1) cardio-respiratory disorders and pathological processes originating during flight (airsickness, syndromes of rapid ascent, descent, and acceleration); (2) pulmonary diseases (tuberculosis, active bronchial asthma, emphysema, active serofibrinous pleurisy, diffuse fibrosis, active abscess) and constitutional cardiovascular diseases (cardiac insufficiency, pulmonary heart disease, acute uncompensated arterial hypertension) affected by flight; (3) arterial hypertension in the pilot; (4) the problem of syncope in the pilot and the type of constitutional blood vessel changes in relation to selection of flight personnel; (5) electrocardiographic alterations of flight personnel and their use as a means of selection; (6) respiratory function tests in the selection of flight personnel; and (7) physiology and hygiene of positive pressure breathing.

A65-81821
ANOMALIES OF VENTRICULAR REPOLARIZATION: PROBLEMS OF MEDICAL TESTING OF AVIATION PERSONNEL [LES ATYPIES DE LA REPOLARISATION VENTRICULAIRE PROBLEMES D'EXPERTISE MEDICALE DU PERSONNEL NAVIGANT].
H. Mathivat, E. Lafontaine, J. Lavimhe, and D. Clement.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 229–232. In French.

Fifty-nine instances of ventricular anomaly were uncovered in Air France personnel (37 men and 22 women) during selection procedures or routine health examinations by means of five standard tests. Of these individuals, 21 were under 30 years old; 32 were 30 to 50 years old; and 61 were over 50 years of age. The incidence of anomaly could be correlated neither with the age nor with the sex of the individuals.

A65-81822
DYSPNEA IN THE NEUROSES OF AVIATORS [LA DISNEA EN LAS NEUROSIS DE LOS AVIADORES].
Ricardo Pons Bartrán.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 233–237. In Spanish.

Two case histories are reported of neuroses in pilots originating from anxiety, manifested by a state of dyspnea. The factors responsible for the emotional state of the pilots included accidents, domestic and economic problems, etc. A discussion is presented of the mechanisms of somatization, formation of phobias, and conversion, which are part of the neurotic process. Study of these mechanisms is of great prognostic and therapeutic value. Dyspnea of neurotic origin presents problems in differential diagnosis.

A65-81823
CONCERNING THE STUDY OF RESPIRATORY RESISTANCE IN AVIATION BIOLOGY [A PROPOS DE L'ETUDE DES RESISTANCES VENTILATOIRES EN BIOLOGIE AERONAUTIQUE].
Ch. Jacquemin, P. Varene, and J. Colin.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 239–241. In French.
11 refs.

A survey of studies of respiratory resistance in aviation medicine is presented. The biological, usually non-serious, effects of respiratory impedance include subjective effects and objective effects on the pneumotachogram, respiratory gas exchange, residual functional capacity, and expiratory muscles. Several experiments for the quantitative measure of ventilatory resistance and elasticity have been performed. For the measurement of respiratory impedance, methods based on known, valid, physical laws should be used.

A65-81824
EFFECT OF FEAR ON THE FITNESS OF THE MILITARY AVIATOR [INFLUENCIAS DEL MIEDO EN LA CAPACIDAD DEL AVIADOR DE GUERRA].
H. Arribas Mata.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 251–259. In Spanish.

A discussion is presented of the general mechanism and characteristics of fear with reference to the military pilot during times of war. The qualities of attention, intelligence, memory, imagination, and sensory perception are reviewed as related to the selection and training of pilots in order to screen persons predisposed to fear and to control fear.

A65-81825
LOSS OF CONSCIOUSNESS AND MALAISE IN FLIGHT [PERTES DE CONNAISSANCE ET MALAISES EN VOL].
L. Tabusse and R. Pannier (Hôp. Mil. d'Instruction Dominique Larrey, Versailles, France).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 271–291. In French.

The incidence, clinical aspects, and causes of discomfort, weakness or loss of consciousness during flight have been the object of numerous studies. The problems are investigated here by analyzing the records of the Aviation Medicine Clinical Ward of the Dominique Larrey Military Training Hospital, Versailles. The clinical aspects of all cases are similar: deterioration of mental faculties, anxiety, asthenia, sensory troubles, and paresthesia. In some instances the pilot had completely lost his power of control of the aircraft and a fatal accident was avoided only through the intervention of another member of the aircrew. Two large classes of etiological factors are identified: aeronautical and human factors. The combined medical and aeronautical action which must be taken after flight incidents should be assessed in its own clinical, biological, and human context. Prophylaxis is based on (1) the protection of aircrew against harmful factors, and (2) the detection of slight psychological, somatic, and functional abnormalities which can be the advance warning of a possible deficiency in flight.

A65-81826
ACQUIRED MYOPIA IN THE AVIATOR [LA MIOPIA ADQUIRIDA DEL AVIADOR].
Esteban de Antonio, F. Merayo, and F. Moldenhauer (Centro de Ivest. de Med. Aeron., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 299–304. In Spanish.

Ophthalmological examinations of 95 pilots (average age of 41.4 years, average flying time 14,190 hours) gave no statistical evidence of myopia that could be attributed to flight duty. The assumption of "acquired myopia" is therefore discounted in pilots. There is a remote possibility of cataract formation due to prolonged exposure to infrared and ionizing radiation, resulting in an increase in the refraction index of the lens. This, however, could only be substantiated by an extended study of incidences of cataract in pilots.

A65-81827
AERODONTALGIA: PERSONAL PATHOGENIC INTERPRETATION [AERODONTALGIA: PERSONAL INTERPRETACION PATOGENICA].
Luis Calatrava.
IN INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 313–317. 12 refs.
In Spanish.

Based on a review of the literature dealing with aerodontalgia, a hypothesis is presented which considers aerodontalgia a clinical phenomenon with two intervening etiopathogenic factors. (1) Predisposing factors are: great and deep metallic obturations on the teeth with pulp lesions in the form of various types of latent, chronic, or subchronic pulpitis, with lacunar spaces, zonal sclerosis, and pulp mass calculi. (2) Other factors are: reduction of barometric pressure during flight or in the decompression chamber. Factors activating aerodontalgia include: temperature changes, accelerations, expansion of gas in a cavity, tooth vascular changes, and nitrogen bubbles liberated at low altitudes in diseased teeth. A brief discussion is presented on the predisposing factors, classification, diagnosis, and differential diagnosis of aerodontalgia.

A65-81828
HISTORY OF SPANISH CONTRIBUTIONS TO AVIATION AND SPACE MEDICINE [HISTORIA DE LA APORTACION ESPANOLA A LA MEDICINA AERONAUTICA Y COSMONAUTICA].
Miguel Nieto Boqué.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 319–324. In Spanish.

The history of Spanish aerospace medicine begins in 1590 with José de Acosta who described altitude sickness in Peru. In 1735, Antonio de Ulloa provided a more detailed description of the same disorder. However, it was Vicente Lunardi in 1784, who made the first balloon flights in Spain and recorded physiological data. In 1800, Dr. Domingo Bover applied aerostatic balloons to the practice of medicine, and in 1930 Dr. Luis Figueras Ballester performed important studies in the decompression chamber and collaborated with Adolfo Anoy to study labyrinthine reactions during pressure changes. In 1940, the Centro de Investigacion Medico Aeronautico was established in Spain actively beginning studies on physio-pathology of flight and flying personnel. From this time on, many aerospace medicine associations have originated throughout Spain.

A65-81829
IMPORTANCE OF THE SYNDROME INVOLVING EXTENSIVE SLACKNESS OF THE CONNECTIVE TISSUE IN AVIATION MEDICINE [IMPORTANCIA DEL SINDROME DE LA HIPERLAXITUD DEL TEJIDO CONECTIVO EN MEDICINA AERONAUTICA].
A. Tomás-Escué (Barcelona U., Fac. de Med. Spain).
IN: INTERN. AERON. AND COSMON MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 325–328. In Spanish.

The Ehlers-Danlos syndrome (hyperelasticity of the skin, articular changes, subcutaneous hemorrhage and tumors) is discussed in terms of its pathological anatomy, clinical manifestations, diagnosis, and treatment (nonexistent). With regard to the pilot, lesions of the syndrome may appear during flight as a result of speed variations, accelerations, decelerations, rough landing, parachute opening, etc. It is therefore stressed that the anatomical and physiological integrity of the osteoarticular system be considered as an important criterion in the selection and training of flying personnel. It is recommended that: (a)

lesions not compatible with flight duty include cervical torticollis and cervicobrachial neuralgia of discal origin; (b) articular block caused by articular luxation or meniscopathy; and (c) lesions which slightly incapacitate flying personnel, including joint and muscular pain deforming arthrosis, and static disorders of the vertebral column and legs.

A65-81830
EXPRESSIVE VALUE OF ACOUSTICAL SIGNALS [VALEUR EXPRESSIVE DES SIGNAUX ACOUSTIQUES].
E. Lafontaine and A. Lucas.
IN: INTERN. AERON. AND COSMON MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 337–339. In French.

A review is presented of advantages and disadvantages of various audiometric procedures studied by several investigators. Presentation time of auditory signals is suggested to be of primary importance in using audiometry in selecting flying personnel.

A65-81831
MECHANISMS OF THE MORPHOLOGICAL AND FUNCTIONAL CHANGES IN THE DIGESTIVE SYSTEM [MECANISMOS DE LAS ALTERACIONES MORFOLOGICAS Y FUNCTIONALES].
F. J. Garcia-Conde.
IN: INTERN. AERON. AND COSMON. MED. Congr., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 353–363. 45 refs. In Spanish.

A review is presented of the literature dealing with the anatomo-physiological changes of the gastrointestinal system in relation to high altitude and flight stresses. The following discussions are presented: salivary glands and hypoxia; gastrointestinal activity and hypoxia; structure and functional activity of the stomach in hypoxia (structural changes, pigmentary metabolism, biliary excretion, hydrocarbon, protein and lipid metabolism, excretion of dyes, alkaline phosphatase and vitamins); the gastrointestinal system and low atmospheric pressure; digestive-cardiac reflexes; and psychogenic factors (mental, tension, anxiety, moral, physical fatigue) responsible for gastrointestinal problems in flying personnel.

A65-81832
CLINICAL AND PHYSIOPATHOLOGICAL PROBLEMS IN ASTRONAUTICAL AND SPACE MEDICINE [PROBLEMAS CLINICOS Y FISIOPATOLOGICOS QUE SE PLANTEAN EN LA MEDICINA COSMONAUTICA Y ESPACIAL].
A. Fernández-Cruz (Fac. de Med., Barcelona, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 371–382. In Spanish.

A review is presented of the literature dealing with the physiopathological aspects of space flight. Discussed are the following factors which will affect the human organism in space: subgravity; deprivation of sensory, proprioceptive, and exteroceptive stimuli; absence of noise and light; isolation; cosmic radiation, especially that with high energy charges; unknown speeds; acceleration and deceleration stress; time changes; and adaptation to space as a stress factor on the adaptive mechanisms in the nervous, central nervous, vegetative, hormonal, and enzymatic systems.

A65-81833
DYNAMIC CRASH TESTS OF FIXED-WING AND ROTARY-WING AIRCRAFT AS RELATED TO SEAT DESIGN.
Victor E. Rothe and James W. Turnbow (Div. of Flight Safety Found., Inc., Aviation Crash Injury Res., Phoenix, Ariz.)
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 387–405. 10 refs.

The seat design load factors contained in current specifications and standards for both fixed- and rotary-wing aircraft, civilian and military, are not compatible with either human tolerance levels as presently established nor with the apparent strength of basic aircraft structures. It is felt that a reduction in both the number and severity of injuries with a resultant increased survival rate in aircraft accidents can be achieved by increasing the seat design load factors in civilian and military standards and specifications. It is suggested that consideration be given to increasing these load factors to the levels recommended in the "Military Troop Seat Design Criteria" report. (Rothe, V. E.; Turnbow, J. W. Roegner, H. F.: "Military Troop Seat Design Criteria", Tcrec Technical Report 62-79, AvCIR 62-9, Aviation Crash Injury Research, Phoenix, Arizona, Sept., 1962).

A65-81834
AEROSPACE BARRIERS, PAST, PRESENT, AND FUTURE (AEROSPACE MEDICAL ASPECTS).
Paul A. Campbell.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 415–420. 7 refs.

The author outlines the development of man's mastery of powered vehicle flight, which will enable him to proceed with the exploitation of space. He points out the possible physical barriers, such as radiation belts, cosmic and solar radiation and meteorite hazards. He also points out the factors, which may constitute man's limitations in space missions, such as weightlessness, and gravitational stress. Ambient atmospheric components needed for human physiological processes and nutritional requirements are outlined.

A65-81835
THE FACE OF AEROSPACE MEDICINE IN 1962.
T. C. Bedwell (Aerospace Med. Div., U.S.A.F. Systems Command).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 421–428.

The author stresses the importance of ground medical support during space missions. For the sake of space economy the crew must be limited to men with engineering training, but medical attention is all important to keep the group in top health condition. The answer can be found in monitoring the medical situation from the ground through use of biotelemetry. The author demonstrates some bioelectronic devices which can serve this purpose.

A65-81836
THE MOST RECENT RESEARCH TASKS CARRIED OUT IN ITALY IN THE FIELD OF AVIATION AND SPACE MEDICINE [LES RECHERCHES LES PLUS RECENTES ACCOMPLIES EN ITALIE DANS LE DOMAINE DE LA MEDICINE AERONAUTIQUE ET SPATIALE].
T. Lomonaco (Armée de l'Air, Dir. de Sante, Rome, Italy).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 429–442. 124 refs. In French.

A survey is made of research carried out in Italy in the aerospace medical field, with special regard to studies conducted at the Aerospace Medical Center of Rome. Descriptions are presented of the principal facilities employed in this center, including high performance low-pressure chambers, animal centrifuge, human centrifuge, deceleration tower, subgravity rail, and confinement room. Seven major fields of investigation using these facilities are summarized.

A65-81837
ACTIVITY OF CERTAIN SERUM ENZYMES IN THE RAT ASSOCIATED WITH ANATOMIC-PATHOLOGICAL LESIONS PROVOKED BY TRANSVERSAL DECELERATIONS OF EXTENSIVE FORCE AND SHORT DURATION [COMPORTEMENT DE CERTAINES ENZYMES SERIQUES CHEZ LE RAT EN RAPPORT AVEC LES LESIONS ANATOMOPATHOLOGIQUES PROVOQEES PAR DES DECELERATIONS TRANSVERSALES DE FORCE REMARQUABLE ET DE TRES COURTE DUREE].
G. Lalli and G. Paolucci (Centre d'Etudes et Rech. de Méd. Aéron. et Spatiale, Rome, Italy).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 473–495. 38 refs. In French.

Rats were exposed to decelerations of about 100, 200, 300 or 400 g for short durations of 2–4 msec. The transverse forces were in a back-to-chest direction. Enzyme changes were observed 12, 24, 48 and 96 hours after exposure. Histological observations were made on lesions in various organs. Lesions and hemorrhages were found in various intensities and amounts in the head, lung, liver, kidney, blood vessels, adrenals and spleen. Injuries in other organs were less constant. The rats exposed from 100 to 200 g showed small but significant changes in transaminase, aldolase, and sorbitol-dehydrogenase activity. The enzymatic variations, especially those of the transaminases and sorbitol-dehydrogenase, are related to the seriousness and extent of injury. They could be of value in prognosis. Lactic dehydrogenase, malic dehydrogenase and the phosphatases showed little significant change after 24 hours of exposure.

A65-81838
DETERMINATION OF TRANSAMINASES IN EXPERIMENTAL HYPOXIA [VALORACION DE LAS TRANSAMINASAS EN LA HIPOXIA EXPERIMENTAL].
I. Garcia Gonzalez, J. Lvcas Gallebo, F. Cantero, A. Navarro, and C. Villares (Fac. de Farm., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 507–511. In Spanish.

A determination was made of serum glutamic pyruvic transaminase (SGPT) and serum glutamic oxaloacetic transaminase (SGOT) activity in dogs rendered hypoxic by breathing 10%, 7%, and 5% oxygen in nitrogen (corresponding to 5,000 m., 7,500 m., and 8–9,000 m.) anywhere from one to six hours. The transaminase activity increased depending on the degree of hypoxia and the number of hours of exposure, revealing hepatic changes. SGOT increased more than SGPT, indicating the presence of cardiac anoxia in addition to alteration of the hepatic parenchyma.

A65-81839
ALCALINE RESERVE AND pH IN THE BLOOD OF A DOG BREATHING GASES IN CERTAIN PROPORTIONS AND AT VARIABLE TEMPERATURES [RESERVA ALCALINA Y pH EN LA SANGRE DEL PERRO RESPIRANDO GASES EN DISTINTAS PROPORCIONES Y A TEMPERATURAS VARIABLES].
J. Frile Blanco, J. Lucas Gallego, V. Velamazán, E. Morejón, and C. Villares (Inst. Espanol de Fisiol. Y Bioquim., Sec. de Fisiol, Comparada, Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 525–527. In Spanish.

In a dog breathing a mixture of 10% oxygen and 90% nitrogen the following effects were observed: (1) Arterial saturation was more elevated at normal temperature than in hypothermia. (2) Lowering of pH was about equal under both conditions. (3) Under hypothermia, pCO_2 was high but decreased markedly

at normal temperature. (4) Alcaline reserve was high under hypothermia but decreased at normal temperature. (5) Under hypothermia the electrolyte balance was displaced toward the level of respiratory acidosis, while at normal temperature it was on the level of uncompensated metabolic acidosis. (6) The protective effect of hypothermia in a state of hypoxia could not be confirmed.

A65-81840
CHANGES IN GLUTATHIONEMIA DURING HYPOXIA, HYPERTHERMIA AND HYPOTHERMIA VARIACIONES DE LA GLUTATIONEMIA EN HIPOXIA, HIPEROXIA E HIPOTERMIA .
F. Cantero, A. Navarro, and J. Lucas (C.S.I.C., Inst. Espanol de Fisiol. y Bioquim.; and Fac. de Farm., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 529-531. In Spanish.
Dogs anesthetized with thiobarbital were exposed to hypoxia, hyperoxia, and hypothermia as follows: Group I (10 animals) breathed a mixture of 5l. nitrogen and 500 cc oxygen per minute for 2 hr. Group II (10 animals) breathed 100% oxygen for 2 hr. Group III (20 animals) were divided into two groups of 10, each breathing hypoxic mixtures or pure oxygen, respectively, after being cooled to 25°C. for 30 min. The following conclusions were drawn on the basis of the results obtained: (1) Anoxia of 10% is compatible with the animal's survival, though interfering with normal sensory functions and reflexes. (2) The hypoxic dogs exposed to hypothermic conditions demonstrated greater resistance to an exposure of 10% oxygen mixtures. (3) Blood glutathion values decreased under hypoxia and increased under hyperoxia conditions, while no variations were noted under hypothermia conditions.

A65-81841
BEHAVIOUR OF PEROXIDASES, OF ALKALINE PHOSPHATASES, OF POLYSACCHARIDES AND OF THE NUMBER OF MITOCHONDRIA IN THE LEUKOCYTES IN RABBITS SUBJECTED TO CHRONIC SIC DISCONTINUOUS ANOXIA.
G. Mazzella (Center of Studies and Res. of Aviation Med., Rome, Italy).
IN: INTERN. AERON. and COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 539-541. 8 refs.
Modifications occurring in the cellular leukocyte biochemistry of rabbits exposed to anoxia in a decompression chamber were investigated as follows: (1) for 6 days at 3,500 m.; for 5 days at 4,500 m.; and for 7 days at 5,500 m. Peroxidases, alkaline phosphatases, and mitochondria increased significantly, especially at the highest levels. Changes in polysaccharides were not significant.

A65-81842
EVALUATION OF HEPATIC FLOCCULATION TESTS IN EXPERIMENTAL HYPOXIA [VALORACION DE LAS PRUEBAS HEPATICAS DE FLOCULACION EN LA HIPOXIA EXPERIMENTAL].
I. García González, F. Merayo, F. Cantero, A. Navarro, and C. Villares (Fac. de Farm., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONG., MADRID, OCT. 1962 REPTS. AND COMMUNS., [Madrid, 1965], p. 543-548. In Spanish.
Anesthetized dogs were rendered hypoxic by breathing mixtures of 10%, 7%, or 5% oxygen in nitrogen for 6, 5, and 4 hours, respectively. A serum analysis was made using the following techniques: cephalin-cholesterol reaction or Hanger reaction; thymol or Mac Lagan reaction; zinc sulphate turbidity test or Kunkel reaction; and Cadmio or Wuhmann and Wunderly reaction. The hepatic function tests of Hanger, Mac Lagan, Kunkel, and Cadmio showed an increase which depended on the degree of hypoxia and the time the animal was subjected to experimentation. Hypoxia apparently produces hepatic changes in both the parenchyma and mesenchyma.

A65-81843
LACTIC ACID METABOLISM IN EXPERIMENTAL HYPOXIA, HYPEROXIA AND HYPOTHERMIA [EVOLUCION DEL ACIDO LACTICO EN LA HIPOXIA, HIPEROXIA E HIPOTERMIA EXPERIMENTAL].
V. Velamazan, A. Navarro, C. Villares, and J. Lucas (Inst Espanol de Fisiol. y Bioquim., Sec. de Fisiol. Comparada, Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 549-553. In Spanish.
Dogs breathing a mixture of 10% oxygen and 90% nitrogen showed the following effects: (1) Blood lactic acid values rose to an average of 50 mg. These values returned to normal after breathing of regular oxygen mixtures. (2) In animals anesthetized with injections of 5% pentotal and ether-oxygen mixtures, or made hypothermic (down to 25°), lactacedemia was reduced when the same oxygen-nitrogen mixtures were breathed. (3) In hypothermic animals lactacedemia increased markedly (up to 110 mg.) after onset of shivering.

A65-81844
HEMODYNAMICS OF THE GREAT AND SMALL CIRCULATION OF THE DOG IN A STATE OF DISCONTINUOUS CHRONIC HYPOXIA [LE COMPORTEMENT HEMODYNAMIQUE DE LA GRANDE ET DE LA PETITE CIRCULATION DU CHIEN EN ETAT D'HYPOXIE CHRONIQUE DISCONTINUE].
A. Dagianti and E. Busnengo (Armée de l'Air, Direc. de Santé, Rome, Italy).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 555-562. In French.

Five dogs were kept in a decompression chamber for 45 days. For 8 hours each day the animals were exposed to an altitude of 5000 m. The hemodynamic responses of the dogs were observed. In all of the dogs the cardiac output and the arterial pressure showed significant increases. The pulmonary vascular resistance showed a definite decrease, which was proportional to the cardiac output. The general vascular resistance also showed a diminuition but was less proportionate to the cardiac output.

A65-81845
EXPERIMENTAL ESSAY OF SOME FORMULAS BASED ON A NEW CONCEPT OF THE HUMORAL REGULATION OF BREATHING, WHICH ARE USEFUL FOR THE ESTIMATION OF PULMONARY VENTILATION AND OF CARDIAC OUTPUT DURING MUSCULAR WORK, AS WELL AS INDEX OF THE CARDIO-RESPIRATORY FUNCTION.
C. Vacca and L. Vacca Naples U. Inst. of Human Physiol., Italian Air Force and Psychophysiol. Inst., Naples, Italy).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 567-573.
New formulas proposed by E. W. Armstrong et. al. (1961) to determine the theoretical pulmonary ventilation (V) of human subjects performing exercise are evaluated. Another formula permits the determination of cardiac output (Q) at the same time. The formulas are based on a new concept of humural regulation, e.g., that chemoreceptors on the pulmonary artery are sensitive only to variations of carbon dioxide tension of H+ in the venous blood, while the chemoreceptors of the carotid and aorta are sensitive only to variations in oxygen tension in the arterial blood. The theoretical V values obtained with the formulas were compared with those measured in 195 subjects performing heavy muscular exercise on a bicycle ergometer. The differences between the theoretical and experimental V values were not significant. The statistical difference of±0.1 liters during muscular work can be used to estimate at each minute the fitness of the cardio-respiratory function, and especially the fitness of the respiratory system. The formula to calculate Q values at rest and during exercise gave values within physiological limits.

A65-81846
GLUTATHIONEMIA VALUE IN LEGAL AVIATION MEDICINE [VALOR DE LA GLUTATIONEMIA EN MEDICINA LEGAL DEL VUELO].
F. Cantero, J. Lucas, and A. Navarro (C.S.I.C., Inst. Español de Fisiol. y Bioquim.; and Fac. de Farm., Madrid, Spain).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 587-589. In Spanish.
Post-mortem blood examinations on 30 dogs killed after exposure to various degrees of anoxia confirmed the value of glutathionemia determinations. They may aid in establishing whether or not death is to be attributed to hypoxia or to other causes or, specifically, whether or not anoxia preceded death due to trauma incurred in the crash. The method also appears to be of benefit in investigations of cases involving fatal aeroembolism and other pathological symptoms following explosive decompression.

A65-81847
CARDIAC REFLEX AND SUBOXYGENATION [REFLEXE CARDIOMODERATEUR ET SOUSOXYGENATION].
M.-V. Strumza and J.-M. Strumza- Poutonnet.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 591-593. In French.
Cardiac reflex behavior of dogs in response to severe hypoxia (oxygen equaling 20 mm. Hg in inspired air) is investigated. Variations in cardiac frequency during hypoxia are recorded and discussed as they relate to electrical stimulation of the nerve of Hering (sinus) and the left pneumogastric nerve. It is found that the carotid sinus reflex is interrupted by profound hypoxia, but pneumogastric nerve fibers transmit their cardioinhibitor influx until the moment of anoxic cardiac arrest.

A65-81848
CEREBRAL ELECTRIC REACTIONS DURING SHORT ZERO-GRAVITY PERIODS [REACTIONS ELECTRIQUES CEREBRALES A DE COURTES PERIODES DE NON GRAVITE].
R. Grandpierre, R. Angiboust, R. Brice, B. Cailler, G. Chatelier, and J. Rozier (Centre d'Enseignement et de Rech. de Med. Aeronaut., Paris, France).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 595-600. In French.
A description is given of an experiment recording cerebral cortex reactions to weightlessness in rats during rocket flight. Also registered by telemetry were heart rate, respiratory rate, potentials of the mesencephalic reticulum and potentials of neck muscles. The apparatus used is described and details of the flights of the Veronique rockets are given. It was verified that intense cortical activity took place during the flight, shown by an augmentation of the amplitude and an increase in frequency of the electroencephalograms. Under weightlessness (subgravity stage of flight) some recordings showed activity similar to epilepsy. During the acceleration overload or dissipation of accelerative forces, cortical excitability was observed. Contrary to the opinions of others, it is thought that these cortical modifications are due to qualitative and quantitative alterations of the influx of proprioceptive sensations under subgravity.

A65-81849
ASPECTS ABOUT THE THERAPY OF CARDIAC INSUFFICIENCY IN THE STATE OF SUBGRAVITY OR WEIGHTLESSNESS.
C. Moutzithropoulos.
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 601-605. 19 refs.

The effects of weightlessness are discussed primarily with respect to normal cardiodynamics and changes in cardiac insufficiency. A treatment of cardiac insufficiency in the future may be conducted within special subgravity chambers analogous to the iron lung, which would relieve the heart. Some problems that may arise under these conditions include (1) zero-g asthenia, (2) effects of abrupt changes in acceleration, (3) hypodynamic state due to lack of efferent mechano-receptor impulses (Weber-Fechner law), (4) volume changes between endovascular and extravascular fluids as well as the cardiovascular and cerebral fluid systems, and (5) profound changes in endovascular reflexes. Human capacity for adaptation may, however, surpass these difficulties.

A65-81850
ELECTROENCEPHALOGRAPHIC RESPONSES AFTER VESTIBULAR STIMULATION [REPONSES ELECTRONENCEPHALOGRAPHIQUES APRES STIMULATION VESTIBULAIRE].
C. Koch (Armee de l'Air, Dir. de Sante, Rome, Italy).
IN: INTERN. AERON. AND COSMON. MED. CONGR., MADRID, OCT. 1962, REPTS. AND COMMUNS., [Madrid, 1965], p. 607-613. 11 refs
In French.

Forty-seven male subjects were exposed to vestibular excitation by rotatory means. They were placed in a rotation chair with the head inclined 30° forward. Seven areas of the head were recorded from, and a nystagmogram was taken. It is concluded that the cortical vestibular waves are located in the temporal, parietal and frontal lobes and are elicited by rotation. The vestibular-cortical connections are only one component of vestibular reflexes; the principal vestibular function is subcortical in nature. The vestibular stimulation caused a depression of normal cortical activity, owing to an inhibitory action on the one hand manifested by an exaggeration of nystagmus and on the other expressed by an evident reduction of cortical potentials. In regard to the epileptic-type tracings after vestibular stimulation, it appears that rotatory stimulation instead of augmenting the convulsion threshold causes a lessening of the inhibiting action originating in the nystagmogenic and oculomotor areas.

A65-81851
THE QUEST: A REPORT ON EXTRATERRESTRIAL LIFE.
Thomas Allen
Philadelphia, Chilton Co., 1965, xii+323 p. 175 refs. $4.95

A history is presented of man's speculations and attempts to discover if life exists on other planets. The relationship of possible extraterrestrial life to the evolution of life on earth is discussed. The process of chemical evolution, biological data obtainable from meteorites, life-detection devices (Multivator, Gulliver, Wolf Trap, etc.), Mars, Moon, and Venus environmental conditions and possibilities of life, manned-space flight, man-machine systems, and possible alien forms of extraterrestrial life are also discussed. Two appendices, a bibliography, and a combined author and subject index are included.

A65-81852
THE EFFECT OF PROTEIN INTAKE ON THE ENERGY OUTPUT IN SUBSEQUENT PHYSICAL WORK [DER EINFLUSS VON EINEISSAUFNAHME AUF DEN ENERGIEAUFWAND BEI ANSCHLIESSENDER MUSKELARBEIT].
J. Gontzea, P. Schutzescu, S. Dumitrache, D. Cocora, and S. Suma (Inst. für Med. und Pharm., Bucharest, Rumania).
Internationale Zeitschkift für Angewanted Physiologie, vol. 21, 1965, p. 1-12. 12 refs. In German.

A minimum of 100 g. of protein per day was established previously as a requirement in the diet of a man doing physical work (3500-4000 calories per 24 hours). This study attempted to establish protein distribution over three meals. Eight young men were put on diets with the same calorie content and carbohydrate, fat, and protein ratio. The protein content at breakfast was changed every two days. Daily physical work consisted of six periods, 20 min. each, of work on a bicycle ergometer (630 Kg./min.). No definite relation could be established between protein content at breakfast and pulse rate, respiratory rate, and ventilation. However, the energy expenditure necessary to perform the same work increased significantly after a breakfast with 60 g. protein as compared to 15 g. protein. Also, the course of efficiency of activity differed with the different proportions of protein. It is concluded that breakfast rich in protein increases the energy output in performance of physical work and lowers the efficiency of muscle activity. The protein content of a meal should not exceed 14% of the total calorie content.

A65-81853
COORDINATION OF PULSE AND RESPIRATORY RATES DURING PHYSICAL WORK [DIE KOORDINATION VON PULS- UND ATEMRHYTHMUS BEI ARBEIT].
G. Hildebrandt and F.-J. Daumann (Marburg/Lahn U., Physiol. Inst., West Germany).
Internationale Zeitschrift für angewandte Physiologie, vol. 21, 1965, p. 27-48. 46 refs. In German.

The relation between heart rate and respiratory rate (Q P/A) was measured in 16 healthy subjects during rest and muscular work on a bicycle-ergometer (30-150watts). Also estimated were the phase relationships between pulse, respiratory, and pedal rhythm, and the subjective degree of exhaustion. In recumbency the individual Q P/A values show wide differences; but with increasing work load they become more concentrated around the normal value of 4.0 up to the point of exhaustion. In a sitting position the Q P/A is significantly increased without any reduction in the dispersion. In both the lying and the sitting position there is a significant phase coupling between pulse and respiratory cycles, indicating "relative coordination." During muscular work the intensity of phase coupling decreases rapidly. The variability of the pulse periods decreases with increasing work load. The starting points of inspiration fall at three distinct points of the cardiac cycle, with the first one after the R-peak becoming predominant at higher intensities of phase coupling. The tendency to phase coupling between respiratory and pedal cycles does not increase until extreme degrees of work load, excluding it as basis for the loss of coupling between pulse and respiration which starts already at lower degrees of work load.

A65-81854
LIFE SUPPORT'S NEW TWISTS.
Ronald G. Neswald
Space/Aeronautics, vol. 44, Aug. 1965, p. 70-78.

A selection of a life support system which would incorporate subsystems of supply and disposal of metabolic waste, is all-important in the present day program of space travel. Problems of supplying the daily life necessities to the space crew have been worked out satisfactorily, but the disposal of air contaminants and biodegradation of human wastes for the purpose of re-use of its components is still a major problem. Several approaches are being pursued, and the choice of a most satisfactory system becomes quite difficult. Generation of water by the hydrogen-oxygen cells excludes the necessity of urine reconversion or electrolysis of water. The removal of CO_2 from the cabin air can be accomplished by chemical reaction employing lithium hydroxide or through absorption by chemical compounds. Various other methods have been proposed and may be considered as usable. Toxicity of oxygen to tissues because of its great solubility can be eliminated by two-gas atmospheres where helium could be used instead of nitrogen as a dilutant.

A65-81855
RESPONSE LATENCY AS A FUNCTION OF THE TEMPORAL PATTERN OF STIMULATION.
Donald Hardesty and William Bevan (Kan. State U., Manhattan).
Psychological Record, vol. 15, Jul. 1965, p. 385-392. 9 refs.
Contract Nonr-3634(01).

A set of three experiments, involving a total of 360 subjects explored the relation between response latency in a simple vigilance task and the temporal pattern of stimuli presented for detection. The experimental paradigm was the one devised by Mowrer for his studies of the central locus of set. The data indicated response latency to vary as function of the difference between the duration of the immediately preceding interstimulus interval and the average interstimulus interval used in the experimental order of presentation. This latter value is viewed as an internal referent similar to the adaptation level found to function in sensory judgments. Following Adaptation Level Theory the mean was determined to be the best estimate of this average.

A65-81856
SOME TIME PERSPECTIVE-TIME PERCEPTION RELATIONSHIPS.
Irving Zelkind and Bernard Spilka (Denver U., Colo.)
Psychological Record, vol. 15, Jul. 1965, p. 417-421. 13 refs.

This study represents an effort to relate two aspects of the psychological study of time previously treated as independent. One hundred and fifty-four subjects judged the temporal length of a series of short 1000 c.p.s. signals. Time perception scores, the number of overestimations minus the number of accurate judgments and underestimations, were obtained over 26 trials. These measures were then correlated with the scores obtained on five scales of time perspective. The extension, density, directionality, coherence, and valence of future time were thus assessed. Three of the five perspective scales correlated positively with overestimation of the time intervals, supporting the hypothesis that time perception overestimation would relate to future time perspectives.

A65-81857
EXPERIMENTS TO THE PROBLEM OF INTEROCULAR TRANSFER.
Anton Hajos and Manfred Ritter (U. Innsbruck, Inst. für Experimentelle Psychol., Austria).
Acta Psychologica, vol. 24, Jun. 1965, p. 81-90. 13 refs.
Contract U. S. Govt. 91-591-EUC-2917.

Six men and three women participated in an experiment on negative after-effect upon wearing monocular prism spectacles with full occlusion of one eye, or binocular prism spectacles with both prisms placed with the base toward the temporal side. Daily measurements were made of 1) apparent spatial displacement of objects by eye-hand coordination test, 2) apparent curvature of vertical straight line by the rotating-prism method, and 3) visibility of spectral dispersion bands. Apparent displacement showed a negative after-effect. Furthermore there was an almost perfect transfer from the prism eye to the occluded eye. Settings to compensate for apparent curvature also indicated compensation for an after-effect, but to a lesser extent than the spatial displacement. Spectral dispersion bands exhibited compensation for a negative after-effect but no transfer effect to the occluded eye.

A65-81858
BLOODFLOW IN THE INTERNAL CAROTID ARTERY DURING CHANGES IN BODY POSITION [PRZEPLYW KRWI W TETNICY SZYJNEJ WEWNETRZNEJ W CZASIE ZMIAN POZYCJI CIALA].
Boleslav Buła, Adam Gosk, Andrzej Paradowski, and Witold Juzwa (AM, Zakład Fizjologii, Wrocław Poland).
Acta Physiologica Polonica, vol. 16, Mar.–Apr. 1965, p. 165–172. 13 refs. In Polish.

Cerebral blood circulation was studied in dogs during changes in body position (90°) on the rotating table. In the vertical position with the head hanging down, blood pressure rose 30–50 mm. Hg after several seconds. In the vertical position with the head at the top, blood pressure dropped 40–80 mm. Hg, and after about one minute returned to the starting level. Changes in body position were reflected by the bloodflow in the internal carotid artery only for a short period of time immediately after change in position. In the head-downward position, bloodflow was increased; and in the vertical position with the head at the top it diminished. After that, the blood flow behaved opposite to the arterial blood pressure. In the vertical position with the head downward, blood flow was diminished until the position of the dog's body was returned to horizontal. In the vertical position with the head at the top, despite low blood pressure, bloodflow was increased, reaching values higher than the starting value after several seconds. Subsequently, when blood pressure began to rise, the bloodflow diminished.

A65-81859
THE EFFECT OF VIBRATION ON THE HISTOCHEMICAL PATTERN OF ADRENAL GLANDS AND CEREBRAL TISSUES [WPTYW WIBRACJI NA OBRAZ HISTOCHEMICZNY NADNERCZY I TKANKI MOZGONEJ].
Leokadia Lubańska-Tomaszewska, Włodzimierz Missuro, and Alicja Sawicka (Pan, Zakład Fizjologii Pracy; and Ciop, Zakład Fizjologii i Hig. Pracy, Warsaw, Poland).
Acta Physiologica Polonica, vol. 16, Mar–Apr. 1965, p. 207–217. 23 refs. In Polish.

The effect of vibration on the histochemical pattern of the adrenal glands and cerebral tissues was studied with reference to content of the neurohormones (noradrenaline and adrenaline) and ascorbic acid in these organs. The experiments were carried out on rats, which were subjected to vibration of frequency 50 c.p.s. and amplitude 0.1 mm. four hours daily, for 6 days. Vibration produced a rise in the content of noradrenaline accompanied by a drop in the adrenaline content of the cerebral and adrenal tissues. Vibration increased the ascorbic acid content of cerebral tissues, but lowered them in the adrenal glands. Histologic study of the cerebral tissues revealed that mechanical vibration over several days leads to distinct chromatolysis. In the adrenal glands of the rats subjected to vibration, foci of cellular exhaustion, shown by absence of lipid bodies, were observed in the zona fasciculata and zona reticularis.

A65-81860
PRE-SENESCENT ELECTROENCEPHALOGRAPHIC CHANGES IN NORMAL SUBJECTS.
Ewald W. Busse and Walter D. Obrist (Duke U. Med. Center, Dept. of Psychiat, Durham, N.C.).
(Gerontol. Soc., 17th Ann. Meeting. Minneapolis, Minn., Oct. 1964).
Journal of Gerontology, vol. 20, Jul. 1965, p. 315-320. 32 refs.
Grants PHS HD-00668 and HD-00366.

As a normal adult advances through life the aging process is clearly reflected in the electroencephalogram. Anterior temporal foci, found in 36% of elderly subjects, first appear in middle age, where approximately 20% manifest this type of dysrhythmia. The anterior temporal disturbance is predominantly left-sided and does not show predilection for either sex. Diffuse fast activity is frequently found in the normal aging female. Fast brain rhythms reach a peak during the late middle years in women and decline somewhat during senescence. A female above 40 years is at least four times as likely to reveal fast activity as a male of comparable age.

A65-81861
THE EFFECTS OF AGE AND EXTRAVERSION ON PURSUIT ROTOR REMINISCENCE.
Gloria M. Gutman. (Alberta U., Calgary, Canada).
Journal of Gerontology, vol. 20, Jul. 1965, p. 346–350. 12 refs.

An experiment was performed to determine the effects of chronological age and extraversion on reminiscence with the use of a pursuit rotor task. Three chronological age groups were used: a young adult group (17–25 years), a middle-aged group (36–46 years) and an old group (60–91 years). From each age group, three subgroups were selected on the basis of scores obtained on the extraversion scale of the Maudsley Personality Inventory (Eysenck, 1959), a high extravert group, a middle extravert group, and a low extravert group. Subjects from all three age groups were trained under conditions of massed practice. Young and middleaged subjects were also trained under conditions of distributed practice. Amount of reminiscence was found to decrease with increasing age. No significant differences in amount of reminiscence were found between extraversion subgroups.

A65-81862
A SIMULTANEOUS STUDY OF THYROID, GONADAL, AND ADRENAL FUNCTION IN AGING MEN.
Thomas H. McGavack and Hans Hoch (Veterans Admin. Center, Martinsburg, W. Va.)
Journal of Gerontology, vol. 20, Jul. 1965, p. 383–393. 51 refs.

The author reports on the results of a study specifically aimed at analyzing correlations between the various parameters of functions which determine the integrated activity of all endocrine glands, carried out simultaneously on groups of individuals, in order to establish a linear regression at ages 51 to 87. The subjects were ambulatory and semi-ambulatory men in apparent satisfactory health. Multiple regression analysis showed that certain variables, such as specific gravity and urinary volume, dehydroepiandrosterone, androsterone-etiocholanolone ratio, total blood serum iodide, 6 hr. thyroid iodide uptake, and 48 hr. I^{131} excretion were found to be chronological age predictors. But no single variable could be used for assessing the physiological status of any given individual.

A65-81863
DISCRIMINATION OF AUDITORY INFORMATION AS RELATED TO AGING.
Inger A. Olsen (Metropol. Health Serv. of Vancouver, Canada).
Journal of Gerontology, vol. 20, Jul. 1965, p. 394–397. 16 refs.

Two groups of subjects, 50 young adults and 50 old individuals, with self-reported adequate hearing and matched with respect to verbal abstract reasoning and minimal verbal memory, were tested for voice recognition and message output in a voice interference situation. With the use of taped materials, the subjects were "trained" to become familiar with the characteristics of one voice, then required to report messages relayed by that voice when masked by an interfering voice. Two series of messages were used, one with normal sound and one with a low band pass filter. Within each series were three messages, with progressively less "interference ratio". The premise was that the old subjects have measurable difficulties in communication which involved masked auditory stimuli, even when they could rely to some extent on the verbal constancies built into the language. The results indicated that the old subjects were significantly lower than the young both in voice recognition and in message output scores. Further, the results seemed to be related to the complexity of the task rather than to specific factors.

A65-81864
THE EFFECT OF AGE UPON SPEED OF CONCEPT ATTAINMENT.
William Wiersma (Toledo U., Ohio) and Herbert J. Klausmeier (Wis. U., Madison).
Journal of Gerontology, vol. 20, Jul. 1965, p. 398–400. 6 refs.

An experiment was performed to ascertain the effects of age upon speed of concept attainment. The subjects for the experiment were 48 females; 16 in each of the three age groups 20-24, 25-34, and 35 and older. Each subject attained four concepts in sequence. The subjects received standardized instructions and performed the task in the learning laboratory. Two measures were taken on each subject: the mean time to attain the four concepts and the number of "errors" made before the correct concept was attained. An error was the offering of an incorrect concept. Each of the two measures was analyzed by an analysis of variance. Age was the independent variable. The analysis of variance on the mean times indicated a significant ($P < 0.01$) difference among the three groups. The means of the groups increased with increasing age. A subsequent test indicated that the mean of the 35- and older group was significantly higher than the means of the other two groups, with no significant difference between the two younger groups. The means for the groups from youngest to oldest were 4.42, 4.71, and 7.12 minutes. The analysis of variance on the numbers of errors indicated no significant differences among groups. However, the number of errors for the groups from youngest to oldest were 3.5, 4.5, and 5.75.

A65-81865
COMPARATIVE SPIRO-ERGOMETRIC INVESTIGATIONS ON ATHLETES [VERGLEICHENDE SPIROERGOMETRISCHE UNTERSUCHUNGEN BEI SPORTLERN].
P. Wirz (Zürich U. Med. Universitätspoliklin., Switzerland).
Schweizerische Zeitschrift für Sportmedizin, vol. 13, 1965, p. 45–70. 31 refs. In German.

Sixty-seven athletes, divided into three groups on the basis of their physical work capacity on the bicycle ergometer, were subjected to a combined spiroergometric test with a "metabograph" (Fleisch, A. 1956). The various parameters measured showed under stress systematic differences depending on the state of training. The variations in the respiratory quotient, in the specific ventilation for oxygen, and in the oxygen debt were examined in relation to the pulse rate, whereby it could be shown that the pulse rate of 170 is still achieved in a relatively steady state. There is a very good correlation between physical work capacity and maximum "Sauerstoffpuls"

$$\frac{\text{oxygen intake}}{\text{pulse rate}}$$

while there is only a loose relation between these two values and the maximum oxygen intake.

A65-81866
THE EFFECT OF DIGITOXIN ON THE CIRCULATORY RESPONSE OF RATS TO MICROWAVE IRRADIATION.
T. L. Pinakatt, A. W. Richardson, and T. Cooper (St. Louis U. School of Med., Depts. of Surg. and Physiol., Mo.)
Archives internationales de Pharmacodynamie et de Thérapie, vol. 156, Jul. 1965, p. 151–160. 5 refs.
Contract NR-102-362; and Grants PHS HE-06312 and HE-K3-05616.

Anesthetized rats stressed by total body microwave irradiation show significant increase in cardiac output, heart rate, stroke volume and mean arterial blood pressure at a body temperature of 40.5°C. Pretreatment of rats with various doses of digitoxin before irradiation did not prevent the rises in heart rate or blood pressure. Stroke volume increases were less than those shown by untreated animals. The cardiac glycoside alone produced significant increases in cardiac output and stroke volume in doses of 0.04 to 0.1 mg/kg without inducing signs of toxicity.

A65-81867
EFFECT OF ENVIRONMENTAL ILLUMINATION ON ESTROUS CYCLES OF RODENTS.
Elizabeth W. Chu (NIH, Natl. Cancer Inst., Pathol. Anat. Branch, Bethesda, Md.)
Acta Cytologica, vol. 9, May–Jun. 1965, p. 221–227. 17 refs.

When Sprague-Dawley rats, strain C3H/HeN, or in-bred Swiss mice were kept in continuous light for two to four weeks, daily vaginal smears revealed an increase in the incidence of estrous smears. Darkness had the opposite effect. This effect of light on vaginal cytology was not seen in in-bred DBA/2 mice or random bred Swiss mice, or in Syrian hamsters. There was a good correlation between the cytology of the vaginal smear and the histology of the vaginal epithelium among these species. A response to continuous light was shown by the vaginal epithelium in the guinea pig; but this response could not be recognized from a study of the vaginal cytology in this species.

A65-81868
CLINICAL HYPERBARIC OXYGENATION WITH SEVERE OXYGEN TOXICITY: REPORT OF A CASE.
Robert L. Fuson, Herbert A. Saltzman, Wirt W. Smith, Robert E. Whalen, Suydam Osterhout, and Roy T. Parker (Duke U. Med. Center, Depts. of Surg., Med., Obstet., and Gynecol., Durham, N. C.)
New England Journal of Medicine, vol. 273, Aug. 19, 1965, p. 415–419. 13 refs.
Grant PHS HE 07896; and N. C. Heart Assoc. supported research.

The case of a patient with a terminal anaerobic infection who was subjected to hyperbaric oxygenation therapy is reported. Although the initial response was favorable, a series of complications related to the hyperbaric exposure and the primary illness developed, ultimately leading to death, due to development of profound pulmonary oxygen toxicity. This case clearly demonstrates acute central-nervous-system oxygen toxicity in which the symptoms begin some time after termination of the hyperoxic exposure. The central-nervous-system signs of oxygen toxicity are nonspecific and can be misinterpreted easily, particularly in the presence of complex underlying disease. Obvious similarities exist between the neurologic manifestations of acute central-nervous-system oxygen toxicity and decompression illness; however, therapy is different for each condition. The forme responds specifically to a reduction of the inspired gas oxygen tension, and the latter to rapid recompression (with a resultant great increase in alveolar oxygen tension). In addition, the real susceptibility of seriously ill patients to oxygen toxicity is not known.

A65-81869
ACCIDENT SURVIVAL.
Aeroplane and Commercial Aviation News, vol. 110, Jul. 29, 1965, p. 15–22.

Recorded incidents show that modern passenger aircraft can fly with structural damage, such as loss of engine or part of a wing, and still land safely without any serious injury to passengers and the crew. In order to show some methods and structural craft details used to deal with any form of in-flight emergency, an extensive study was made of various incidents, which may bring a modern four-engine jet transport down to a forced ditching or landing. Among the factors that may determine the occurrence of an accident are the following: (1) fire in the fuel system due to overheating or leaks, (2) thunderstorms, which may damage the fuselage or instruments, or (3) and other unforeseen circumstances, that may cause malfunction of any part of the craft. In the article some hypothetical situations, based on actual accidents, are described. Methods of prevention of the occurrence of these situations, combating them, and management of the orderly balance and evacuation of passengers are considered. The importance of ground crew support in the case of crash landings is pointed out. Survival kits containing food and first-aid material are mentioned.

A65-81870
EXPERIMENTAL USE OF STERILE HYDROLYSATES OF VARIOUS ORGANS FOR PROTECTION AGAINST ACUTE RADIATION SICKNESS [OPIT ZA BIOPROFILAKTIKA NA OSTRATA LUCHEVA BOLEST S AVTOKLAVIRANI ORGANOLIZATI].
Ts. N. Tsochev.
Eksperimentalna Meditsina i Morfologiia, vol. 3, Jan.–Feb.–Mar. 1964, p. 56–60. 14 refs. In Bulgarian.

Experimental data on the bioprophylaxis of acute radiation disease by sterilized organlysates of liver, spleen, pancreas, thyroid gland, testes, ovaries, placenta, adenohypophysis, suprarenals, heart and muscles are reported. Preventive effect in male albino rats against repeated radiation with sublethal X-ray doses (LD_{30} 90%) was established only with pancreas lysate (in 45%), adenohypophyseal lysate (in 40%), placental lysate (in 35%), thyroid gland lysate (in 15%) and supramedullar lysate (in 15%) against 10%– thirty day survival in the controls. No practical interest in the application of biopreparations as antiradiation preventive means, due to their nonstandardized production and undertermined dose, was stressed.

A65-81871
PHYSIOLOGICAL AND PSYCHOLOGICAL EFFECTS OF NOISE ON MAN.
Alexander Cohen (PHS, Occupational Health Res. and Training Facility, Physiol. Sect., Cincinnati, Ohio).
(Boston Soc. of Civil Engr., Sanit. Sect., Meeting, Dec. 2, 1964).
Journal of the Boston Society of Civil Engineers, vol. 52, Jan. 1965, p. 70–95. 49 refs.

Adverse effects of noise on man include temporary and permanent hearing loss, speech disruption, loss in performance capacity, and annoyance. Factors believed critical in evaluating a potential noise hazard to hearing are the over-all level, the spectrum of the noise, total exposure duration, time and frequency distribution of short term exposure periods, and the susceptibility of an individual's ears to noise-induced hearing loss. Specifications for valid damage risk criteria for noise exposure must take account of these factors. Measures for predicting speech interference of noise are available and have been used as a guide for establishing limiting noise conditions in rooms where effective speech communication is needed. Annoyance reactions to noise are based upon both acoustic and non-acoustic considerations. Models and measures for predicting noise-nuisance are availabl but require validation.

A65-81872
THE MOTION OF ALGAE IN TURBULENT FLOW.
C. K. Powell, (Ingersoll-Rand Co., Bedminster, N. J.), J. B. Chaddock, and J. R. Dixon (Purdue U., School of Mech. Eng., Lafayette, Ind.)
Biotechnology and Bioengineering, vol. 7, Jun. 1965, p. 295–308. 13 refs.

Large cultures of microscopic, unicellular algae have been proposed as a means of maintaining a life-supporting atmosphere in a closed, manned system. To achieve vigorous growth of the algal culture it is necessary to subject individual algae alternately to short periods of high intensity light and darkness. One of the means suggested for obtaining a favorable light-dark sequence for photosynthesis is to cause turbulence in a closed channel on which light is incident. Since light is rapidly attenuated in a dense suspension, there will be illuminated regions adjacent to the channel walls and a dark central core. The random motions of turbulence normal to the direction of flow would move the algae alternately from the illiminated regions to the dark region and back again. This paper indicates a method for analyzing the motion of algae into the out of the illuminated

region of a channel formed by flat, parallel, transparent plates, with light incident on the plates. Matching of a probability model with a diffusion model makes it possible to estimate the light-dark sequence which could be achieved by turbulence. The results indicate that favorable sequences by this mechanism are unlikely.

A65-81873
OXYGEN TENSION IN HUMAN MUSCLE DURING OXYGEN RESPIRATION AT HIGH ALTITUDES AND IN PRESSURE CHAMBER [NAPRUHAKYSNIU V MIAZI LIUDYNY PRY DYKHANNI KYSNEM V UMOVAKH VYSOKOHIRIA TA "PIDIOMU" V BAROKAMERI]
V. Ia. Berezovskyi and I. F. Sokolianskyi (Ukrainian SSR, Acad. of Sci., O. O. Bogomolets Inst. of Physiol., Kiev).
Fiziologichnyi Zhurnal, vol. 9, May–Jun. 1965, p. 313–318. 12 refs. In Ukrainian.

Changes in oxygen tension in the human muscle during oxygen breathing were studied under ordinary conditions and in pressure chambers simulating high altitudes. At sea level the diffusion current intensity was 1.536 ± 0.150 μamp. During breathing oxygen for 10 min. it increased to 2.526 ± 0.252 μamp. At an altitude of 400 m. the diffusion current intensity fell to 0.729 ± 0.168 μamp. Oxygen respiration under these conditions led to an increase to 1.665 ± 0.237 μamp. The increment of the diffusion current intensity during oxygen respiration at sea level was 1.017 ± 0.168 μamp; under conditions of elevation in a barochamber, it was 0.858 ± 0.234 μamp. At an altitude of 2200 m. the increment of the diffusion current intensity with oxygen respiration was 1.308 ± 0.042 μamp; at an altitude of 4200 m. it was 2.700 ± 0.174 μamp. The difference in oxygen tension increment in the human skeletal muscle during oxygen respiration under acute hypoxia in a barochamber and under high altitude conditions may be the result of alterations in physiological mechanisms arising during gradual acclimatization to high-mountain conditions.

A65-81874
ABSOLUTE AND RELATIVE RED COUNT AND HEMOGLOBIN CONTENT IN ACUTE HYPOXIA [PRO PORIVNIALNYI ANALIZ VIDNOSNYKH I ABSOLIUTNYKH POKAZNYKIV PRY GOSTRII HIPOKSII].
Iu. V. Semenov (Ukrainian SSR, Acad. of Sci., O. O. Bogomolets Inst. of Physiol., Lab. of Age Physiol., Kiev).
Fiziologichnyi Zhurnal, vol. 9, May–Jun. 1965, p. 319–323. 7 refs. In Ukrainian.

In dogs, acute hypoxia caused by breathing air mixtures containing a decreased concentration of oxygen caused an elevation of the blood red count. This increase appeared to be a result of a decrease of the volume of the circulation plasma rather than the increase in the surface of circulating erythrocytes. The variance in the erythrocyte number was not proportional to hemoglobin concentration. These findings led to the conclusion that during hypoxia the erythrocytes thrown into the blood circulation from various depots are smaller than the normally circulating cells.

A65-81875
ELECTROENCEPHALOGRAPHIC STUDY OF THE ROLE OF CEREBRAL CORTEX IN OXYGEN SEIZURES [ELEKTROENTSEFALOGRAFICHESKIE DANNYE O ROLI KORY GOLOVNOGO MOZGA V PROISKHOZHDENII KISLORODNYKH SUDOROG].
I. B. Voronov (USSR, Acad. of Sci., I. M. Sechenov Inst. of Evolutionary Physiol. and Biochem., Lab. of Pharmacol. Biol. Active Substances, Leningrad).
Fiziologicheskii Zhurnal SSSR, vol. 51, Jul. 1965, p. 777–783. 16 refs. In Russian.

In intact cats, the inhalation of oxygen under 4–8 atm. pressure produced desynchronization of the electroencephalon. The tracings showed surges of high amplitude during convulsions caused by the oxygen intoxication. Frontal lobectomy prevented the convulsions and normalized the electroencephalogram. However, the frontal lobes were still sensitive to the action of corasole and other central nervous system stimulants. The experimental results indicated that the pathological effects of oxygen intoxication begins at the reticular formation of the midbrain.

A65-81876
GAS EXCHANGE STUDIES UNDER RARIFIED ATMOSPHERIC CONDITIONS (OSOBENNOSTI ISSLEDOVANIIA GAZOOBMENA V USLOVIIAKH RAZREZHENNOI ATMOSFERY).
N. A. Agadzhanian and I. P. Kalinichenko.
Fiziologicheskii Zhurnal SSSR, vol. 51, Jul. 1965, p. 793–798. 10 refs. In Russian.

The investigations showed that 700 m. altitude the CO_2 partial pressure in the alveoli was 30–38 mm. Hg. at normal breathing. The data cited in the literature indicate that at sea level the values are 37–40 mm. Hg. and at 7,500 meters drop to 24 mm. Hg. During breathing pure oxygen at 9,000–11,000 m. altitude, the CO_2 partial pressure was found to be 35–36 mm. Hg. at rest, and 40 mm. Hg during physical exercise. This information is of great value not only in conducting experiments in pressure chambers but also in the construction of devices for regulating atmospheric conditions in closed aircraft systems.

A65-81877
THE EFFECTS OF DIFFERENT DEGREES OF HYPOXIA ON SENSITIVITY TO EPILEPTOGENIC AGENTS AND ON FUNCTIONS OF MOTOR UNITS OF BRAIN [VLIIANIE GIPOKSII RAZLICHNOI STEPENI NA CHUVSTVITEL'NOST' K EPILEPTOGENNYM AGENTAM I NEKOTORYE FUNKTSIONAL'NYE SVOISTVA DVIGATEL'NYKH OBRAZOVANII MOZGA].
Dolina, S. A. (USSR, Acad. of Sci., I. P. Pavlov Inst. of Physiol., Lab. of Circulatory Physiol., Leningrad).
Fiziologicheskii Zhurnal SSSR, vol. 51, Jul. 1965, p. 779–805. 22 refs. In Russian.

Subjecting rats to a decreased atmospheric pressure in pressure chambers equivalent to 1,500-8,000 m. altitudes prevented the occurrence of muscle spasms induced by subcutaneous injections of corasole, when given at normal (near sea-level) pressure, and decreased the intensity and duration of convulsions. A sudden increase or decrease in pressure produced severe cases of convulsions. Moderate hypoxia (at 1,500 m. altitude) decreased the threshold of local muscle contractions, induced by the electric stimulation, and increased the threshold of generalized spasms. Pronounced hypoxia (at 8,000 m. altitude) produced a reverse effect: an increase in the threshold of local muscle contractions, and a decrease in the threshold of generalized convulsions.

A65-81878
THE EFFECTS OF PROPRIOCEPTIVE STIMULATION ON HUMAN MUSCLE ACTIVITY (BASED ON ELECTROMYOGRAPHIC STUDIES) [O VLIIANII PROPRIOTSEPTIVNOI STIMULIATSII NA MYSHECHNUIU DEIATEL'NOST' CHELOVEKA (PO DANNYM ELEKTROMIOGRAFICHESKIKH ISSLEDOVANII)].
N. N. Khavkina and V. B. Liberman (A. A. Ukhtomski Physiol. Inst., Leningrad, USSR).
Fiziologicheskii Zhurnal SSSR, vol. 51, Jul. 1965, p. 863–866. In Russian.

A study of determining the dominant factor of man's motor activity was conducted on young adults by performance of weight lifting with one or both hands and bending of the elbows. Verbal commands were given to enhance the will power to over come the fatigue. Simultaneously, electromyograms, mechanograms and pulse rates were registered. A comparison of tactile and command stimulations showed that overcoming of fatigue by proprioceptive stimulation was more effective than by exercise of will power. Will power stimulation proved to be less effective and less efficient because it caused an increase in potential action. The efficiency of the proprioceptive stimulus can be explained by its direct transmission to the brain centers that determine the final amount of performed work. Conscious mental supervision of body movements, in order to reduce fatigue, reduces the degree of automatic effort, interferes with the brain cortex stimulation, and thereby reduces the efficiency of the system.

A65-81879
ONTOGENESIS OF PYROGENIC ACTION RELATED TO DEVELOPMENT OF HEAT REGULATION WITH AGE [K ONTOGENEZU PIROGENNOI REAKTIVNOSTI V SVIAZI S VOZRASTNYM FORMIROVANIEM FUNKTSII TEPLOREGULIATSII].
E. A. Shevel'ko (USSR, Acad. of Med. Sci., Inst. of Exptl. Med., Dept. of Comp. Physiol. and Dept. of Gen. Pathol., Leningrad).
Fiziologicheskii Zhurnal SSSR, vol. 51, Jun. 1965, p. 877–883. 10 refs. In Russian.

In order to determine the mechanisms of thermoregulation and the response to pyrogenic agents, groups of rabbits and guinea pigs of different ages were given bacterial pyrogen by means of a gastric tube. They were also subjected to hypothermia. The results showed that a characteristic pyrogenic reaction in the postnatal state is developed along with the development of thermoregulation, particularly the vasomotor response. The chemical factor forms the basis of pyrogenic response but is not the only factor. A sharp rise in temperature as a response of the growing organism, with simultaneous disturbance of the metabolism, is a result of the underdeveloped thermoregulation mechanism, which is still limited to its chemical factor.

A65-81880
EFFECT OF BIPOLAR OR MONOPOLAR LEADS ON THE MUSCLE ELECTROGRAM [KHARAKTERISTIKA BIPOLIARNOGO I MONOPOLIARNOGO OTVEDENII SUMMARNYKH ELEKTROGRAMM MYSHTS].
I. N. Sal'chenko (I. P. Pavlov First Med. Inst., Central Sci. Res. Lab., Leningrad, USSR; and Inst. of Phys. Culture, Dept. of Physiol. and Biochem., Lvov, Ukrainia).
Fiziologicheskii Zhurnal SSSR, vol. 51, Jun. 1965, p. 884–889. 13 refs. In Russian.

Experiments with frog and human skeletal and cardiac muscles showed that in some cases a one-lead electromyogram gives more information than a two-lead one, because it registers only about one half of the frequency and greater amplitude. The one lead electromyogram can register more precisely the moment of stimulation response. In studies of very small organs, the use of one-lead instrument is more convenient and more practical. The interference of cardiac activity may be one of the disadvantages of the single-lead method.

A65-81881
SIMULTANEOUS EVALUATION OF QUANTITATIVE WAVE PATTERNS AND MEAN AMPLITUDE OF BRAIN POTENTIALS BY COMBINED DATA [SPOSOB SOCHETANIIA VOLNOMERA I INTEGRATORA DLIA ODNOVREMENNOI OTSENKI DINAMIKI KOLICHESTVA VOLN I AMPLITUDY BIOTOKOV MOZGA].
A. M. Mitskis (Med. Inst., Lab. of Electroenc Ephalog., Kaunas, Lithuania).
Fiziologicheskii Zhurnal SSSR, vol. 51, Jul. 1965, p. 893–895. In Russian.

Simultaneous evaluation of quantitative wave patterns and mean amplitude of the brain potentials could be performed by combining a wavemeter and an integrator into one system. The integrator is used for determining the variations of the mean brain potential amplitude, the number of units of the integrator per unit of time being proportional to the mean amplitude of the same interval. The wavemeter registers the extremes of the process, requiring calibration of the instrument. The coordinated curve represents the variance of mean amplitude. This method is convenient for continuous registration of brain potentials for a long period of time and gives a better picture of changes than the integrator alone.

A65-81882
CONVERGENCE AS A CUE TO PERCEIVED SIZE AND DISTANCE.
Ivar Lie (Oslo U., Inst. of Psychol., Norway).
Scandinavian Journal of Psychology, vol. 6, 1965, p. 109–116. 14 refs.
Nansen Fund supported research.

A wire mesh was used as stimulus object in the old 'wall-paper experiment'. Fixating a small object on the near side of the wire mesh, the mesh appears of course double. By adjusting the fixation object back and forth a position can be reached at which fusion of the double image is obtained. At this moment the wire mesh appears to shift location. A nearly perfect one-to-one correspondence obtained between the perceived distance of the 'fused' wire mesh and the actual convergence distance. It is concluded that the convergence mechanism may provide perfectly specific information to the visual system concerning the spatial location of objects.

A65-81883
INTERINDIVIDUAL DIFFERENCES IN CATECHOLAMINE EXCRETION DURING STRESS.
Marianne Frankenhaeuser and Paula Patkai (Stockholm U., Psychol. Labs., Sweden).
Scandinavian Journal of Psychology, vol. 6, 1965, p. 117–123. 21 refs.
Swedish Med. Res. Council and Stockholm U. supported research.

Measurements of adrenalin and noradrenaline excretion during inactivity and stress and ratings of 22 personality variables were obtained for 110 subjects. Six factors were extracted by a factor analysis. Two of the factors were associated with personality variables, three primarily with catecholamines, and one with both types of variables. The 'mixed' factor was tentatively interpreted as indicating that individuals with depressive tendencies respond to stressors with a relatively smaller rise in adrenaline excretion. This finding is in line with current theories concerning the role of catecholamines in affective psychoses.

A65-81884
SMOKING AND NIGHT DRIVING.
Gunnar Johansson and Gunnar Jansson (Uppsala U., Psychol. Lab., Sweden).
Scandinavian Journal of Psychology, vol. 6, 1965, p. 124–128. 8 refs.
Swedish Tobacco Co. and Swedish State Traffic Safety Board supported research.

Two experiments were performed with an apparatus simulating night driving conditions in order to study the effect of smoking on detection time and redetection time after glare. In the experimental sessions, the subjects smoked two standard cigarettes during 15 minutes. There were no significant differences in results between these sessions and the control sessions without smoking. The conclusion is that the effect of tobacco smoking on the ability to detect objects on the road is from a practical point of view negligible.

A65-81885
RADAR TARGET AS A FUNCTION OF SEARCH AREA AND VIEWING DISTANCE.
A. D. Wright, E. W. Frederickson, and J. L. Claflin (Human Resources Res. Office, Fort Bliss, Tex.)
Journal of Applied Psychology, vol. 49, Aug. 1965, p. 230–232. 5 refs.

The detection task employed a 9 1/4 in. plan position indicator (PPI) and simulated targets. Thirty Army trainees served as subjects. Each subject performed the 9 combinations of viewing distance, (a) 6 in., (b) 12 in., (c) 18 in., and, search area, (a) whole scope, (b) 1/4 scope, and (c) 11/16-diameter circle within the whole scope. A Treatments x Treatments x Subjects analysis of variance indicated significant main and interaction effects: as viewing distance increases, detection performance is degraded; as search area increases, detection performance is degraded; optimum viewing distance when searching the whole scope is approximately 12 in., while optimum viewing distance for a small area (11/16 in. diameter) within a large area is 6 ins. or less.

A65-81886
RISK-TAKING SET AND TARGET DETECTION PERFORMANCE.
Gary W. Evans (Human Resources Res. Office, Fort Bliss, Tex.)
Journal of Applied Psychology, vol. 49, Aug. 1965, p. 243–244.

An experiment tested the hypothesis that an observer's risk-taking set is related to his target-detection performance on a radar display. Subjects were given an equal number of trials under neutral, risky, and cautious sets, where differential sets were produced by instructions. As hypothesized, when instructed to adopt a risky set, subjects made earlier detections of targets and had a higher false-positive identification rate than the same subjects when instructed to adopt a cautious set. These findings support the contention that radar detection performance can be regarded as a decision task.

A65-81887
SOME EFFECTS OF VIBRATION UPON VISUAL PERFORMANCE.
J. P. Dennis (Coll. of Technol., Portsmouth, England).
Journal of Applied Psychology, vol. 49, Aug. 1965, p. 245–252. 6 refs.

Experiments have been carried out in which the effects upon visual performance of whole-body vibrations have been compared with the effects of vibrating the visual object itself. At 6 c.p.s. using similar angular displacements, vibration of the visual object was found to result in higher impairment of vision than vibration of the human subject. At 14, 19, and 27 c.p.s. the converse was found to be the case—results which support previous theories pertaining to resonance of eyeball or facial tissue and accounting for the sensitivity of visual performance to-whole-body vibration at these higher frequencies.

A65-81888
RADIOPROTECTIVE EFFECT OF SEROTONIN IN RATS [ZUR STRAHLENSCHUTZWIRKSAMKEIT VON SEROTONIN BEI RATTEN].
H.-A. Ladner, G. Wollschlager, and J. Schneider (Freiburg i Br. U., Klin. Strahleninst., West Germany).
Naturwissenschaften, vol. 52, Jul. 1965, p. 393. 7 refs. In German.

Previous experiments had revealed that the highly protective effect of serotonin on whole-body irradiated mice could not be duplicated on rats. To confirm the findings, the experiment was repeated on a different strain of rats (female Wistar rats weighing 160 g.). Each animal received intraperitoneal injections of 3 mg. serotonin (5-hydroxytryptamin-creatinin-sulfate). Shortly after the injection, apathy and accelerated respiration were observed. When 5 mg. serotonin were injected, 18 out of 48 animals died, confirming the toxic effect of serotonin on the rat. Since serotonin is a metobolic product of tryptophane, a group of animals was given additional doses of tryptophan, 14 days after whole-body irradiations of 810, 955, 1050, 1250, 1450, and 1955r., to see whether the protective effect of serotonin could thus be prolonged. Tabulation of survival rates led to the conclusion that the protective effect of serotonin in rats is less consistent than in the mouse. At irradiations of 1250 and 1450 r. the protective effect of serotonin was enhanced by tryptophan administration.

A65-81889
ON THE PROPHYLACTIC EFFECT OF HISTAMINE IN WHOLE-BODY IRRADIATED RATS [ZUR PROPHYLAKTISCHEN WIRKUNG VON HISTAMIN BEI GANZBESTRAHLTEN RATTEN].
H.-A. Ladner and R. von Dusterlho (Freiburg I. Br. U., Klin. Strahleninst., West Germany).
Naturwissenschaften, vol. 52, Jul. 1965, p. 393–394. 6 refs. In German.

Male Wistar rats, 120 days old, were exposed to whole-body irradiations of 690, 810, 955, 1050, and 1250 r., after being given intraperitoneal injections of 30 mg. histamine-dihydrochloride or histamine-diphosphate, 10. min. before exposure. The results show that the prophylactic effect of histamine-dihydrochloride manifested itself in an increased survival rate. The latter was, however, less pronounced in the rats than in mice. This lessened effect was even more conspicuous when histamine-diphosphate was used. The same results were obtained in female rats. The findings are believed to be indicative of a reduced susceptibility of the animals toward histamine. In another series of experiments it was shown that administration of histamine-dihydrochloride and histamine-diphosphate in equal amounts, 24 hr. after whole-body irradiations of 955 r. had a pronounced therapeutic effect. It is concluded that histamine plays an important role in the mammal organism following irradiation, particularly when there is a combination of radiation and traumatic effects.

A65-81890
ANALOGIES IN THE PROGRESS OF LUNAR RHYTHMS IN VARIOUS BIOLOGICAL PROCESSES [UBEREINSTIMMUNGEN IM VERLAUF LUNARER RHYTHMEM BEI VERSCHIEDENARTIGEN BIOLOGISCHEN VORGANGEN].
Hans-Jürgen Lang (Göttingen U., I. Zool. Inst., West Germany).
Naturwissenschaften, vol. 52, Jul. 1965, p. 401. 6 refs. In German.

Analogies were observed in the following biological processes as related to lunar phases: 1. color sensitivity (for yellow) in the guppy (Lebistes reticulatus); 2. sense of orientation (angle of locomotion) in a planarian (Dugesia dorotocephala); 3. color sensitivity in man; oxygen consumption of the snail (Nassarius obsoleta); and 4. migration of the Palolo worm (Eunice viridis). It is concluded that lunar periodicity of diverse biological processes in species that are wide apart in the evolutionary ladder are governed by equal, though as yet unknown, geophysical factors.

A65-81891
ON THE MODE OF ACTION OF BLUE LIGHT ON THE PRODUCTS OF PHOTOSYNTHESIS IN CHLORELLA VULGARIS
A. H. W. Hausschild, C. D. Nelson, and G. Krotkov (Queen's U., Dept. of Biol., Kingston, Ontario, Canada).
Naturwissenschaften, vol. 52, Jul. 1965, p. 435. Nat. Res. Council of Canada supported research.

In order to determine whether blue light is essential during photosynthesis, cell suspensions of Chlorella vulgaris were kept in darkness for eight hours and subsequently pre-illuminated with red or blue light for ten minutes before the measurement of rate of photosynthesis under red-light illumination. Cells pre-illuminated with blue light fixed 25% more C^{14} (from labeled bicarbonate) than did cells pre-illuminated with red light. The C^{14} content of aspartic, glutamic, fumaric, and malic acids was also increased in cells pre-illuminated with blue light, but the C^{14} content of glycine was lower. It is suggested that blue light activates some light-dependent enzyme which retains its activity for a length of time after illumination.

A65-81892
INTRAPULMONARY EXCHANGE OF THE STABLE ISOTOPE $^{18}O_2$ INJECTED INTRAVENOUSLY IN MAN.
N. A. Lassen, H. W. Fritts, Jr., P. R. B. Caldwell, C. Giuntini, W. Dansgaard, and A. Cournand (Columbia U. Coll. of Physicians and Surgeons, Dept. of Med., and Bellevue Hosp., Columbia Med. Div., Cardiopulmonary Lab., New York City, N. Y.).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 809-815. 18 refs. Grants Natl. Heart Inst. HE-02001-08 and HE-05741.

The stable oxygen isotope ($^{18}O_2$) was used to study the exchange of oxygen molecules between pulmonary capillary blood and alveolar gas in 16 patients with either normal lungs or limited lung disease. The technique entailed combining gaseous $^{18}O_2$ with blood, then mixing the blood anaerobically with saline containing T-1824 dye and Krypton (^{85}Kr) in solution. After the combination of tracers had been injected into a vein, arterial blood was collected during the first passage of the indicators through the central circulation. Recoveries of the tracer gases were expressed as percentages of the amounts that would have been found had no loss from the stream occurred. The recoveries of 1902 were related to the oxygen concentration in the inspired gas, and averaged 55, 40, and 11% at inspired concentrations of 14, 21, and 65% respectively. The recovery of ^{85}Kr was about 2%, and was independent of the inspired oxygen concentration. These results were compared to those predicted in a theoretical model, and found to agree satisfactorily.

A65-81893
ALVEOLAR DEAD SPACE, ALVEOLAR SHUNT, AND TRANSPULMONARY PRESSURE.
J. M. Workman, R. W. B. Penman, B. Bromberger-Barnea, S. Permutt, and R. L. Riley. (Johns Hopkins U., Dept. of Environ. Med., Baltimore, Md.).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 816-824. 11 refs. Grants PHS HTS 5453 and HE 01929.

The effect of transpulmonary pressure (PTP) of gas exchange in the dog lung was studied in 10 open-chested dogs. Rates of pulmonary perfusion and ventilation were held constant (right heart bypass and pump respirator) while PTP was varied. Alveolar dead space ventilation and alveolar shunt perfusion were calculated from CO_2 and O_2 gradients. The results are finally expressed in terms of a three-compartment lung model. A misinterpretation is possible if alveolar dead space or alveolar shunt compartments are expressed as fractions, respectively, of all ventilated or all perfused alveoli, therefore each has been expressed as a fraction of the whole lung. The alveolar shunt compartment decreased as PTP was increased, over the lower range of PTP studied. No significant change was detected in the alveolar dead space compartment, as PTP was varied.

A65-81894
EFFECTS OF CHANGES IN TOPOGRAPHICAL DISTRIBUTION OF LUNG BLOOD FLOW ON GAS EXCHANGE.
John B. West and Norman L. Jones. (Postgraduate Med. School, Dept. of Med., London, Great Britain).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 825-835. 17 refs. Med. Res. Council supported research.

The left lung of a dog was suspended in a Lucite box, ventilated with negative pressure, and perfused with venous blood from another dog at 37°C. by varying the pulmonary artery pressure, it was possible to perfuse all the lung or leave increasing proportions of the upper and middle lobes unperfused. The mean P_{CO_2} difference between end-tidal gas and pulmonary venous blood was 1.7 mm. Hg (SE mean 0.6) when all the lung was perfused, but steadily increased up to 17 mm. Hg as more and more of the lung was unperfused. Alveolar dead space/alveolar tidal volume increased linearly with the proportion of lung unperfused. By contrast, the venous admixture component remained small as increasing amounts of lung were unperfused. The results were compared with calculations made on a theoretical model of the lung and it was concluded that the uneven distribution of blood flow caused by hydrostatic pressure differences down the lung may seriously interfere with CO_2 exchange with the pulmonary artery pressure is low, but that this type of uneven distribution affects O_2 exchange much less.

A65-81895
ANALYSIS OF VENTILATORY RESPONSE TO CO_2 DURING HYPOXIA IN DOGS.
Y. Honda, T. Natsui, and N. Hasumara (Kanazawa U. School of Med., Dept. of Physiol., Japan).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 839-843. 19 refs.

The response of the respiratory apparatus to CO_2 during acute oxygen want was investigated in anesthetized dogs. The ratio of elevated ventilation to unit increase of alveolar carbon dioxide tension ($PAco_2$) in hypoxia to that in normoxia (SR) was taken as a measure of interaction between hypoxia and hypercapnia. Furthermore, the separate effect on ventilation by $PAco_2$ ($\Delta AVR/\Delta Pco_2$) and $[H^+]$ ($\Delta AVR/\Delta H$) during hypoxic hypercapnia was evaluated. (a) SR increased in the presence of mild anoxia then decreased in severe anoxia. (b) $\Delta AVR/\Delta Pco_2$ showed a higher value than the normoxia level in mild hypoxia, then progressively decreased with a further development of anoxia. (c) $\Delta AVR/\Delta H$ started increasing at about 70 mm. Hg of alveolar oxygen tension (PAo_2, then increased as the PAo_2 decreased, and reached about four times the normal at 30-40 mm. Hg of PAo_2. The marked difference between isolated carbon dioxide tension (Pco_2) and $[H^+]$ effect on ventilation in severe hypoxia suggested different areas and actions in the respiratory system of both chemical agents.

A65-81896
EFFECT OF CO_2 AND WHOLE-BODY VIBRATION ON VENTILATION.
W. A. Young, D. B. Shaw, J. Navach, H. Shizgal, and N. Kowalsky (McGill U., Roy. Victoria Hosp., Joint Cardiorespirat. Serv., Montreal, Canada).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 844-848. 10 refs. Grant Defence Res. Board, Canada 9310-84.

The ventilatory response of six subjects to increasing levels of alveolar CO_2 was measured at rest and during the hyperventilation induced by passive vibratory movements of the whole body. During vibration, addition of CO_2 to the inspired air produced no increase in ventilation until the alveolar partial pressure reached a critical level, which coincided closely with the intersection of the vibration with the resting CO_2 response curve. Above this level the vibration curve was almost superimposed on the resting one. There was no evidence of an additive effect of the two stimuli, and no increase in sensitivity to CO_2 during vibration. In these respects the situation differs from that in which CO_2 is combined with hypoxia or hyperthermia. The findings indicate that when respiration is stimulated by vibration and CO_2 simultaneously, the resultant ventilation at any point is solely that produced by the stronger of the two stimuli.

A65-81897
EFFECT OF VERTICAL VIBRATION ON RESPIRATORY AIRFLOW AND TRANSPULMONARY PRESSURE.
Fred W. Zechman Jr., Davis Peck, and Edward Luce (Ky. Coll. of Med., Dept. of Physiol. and Biophys., Lexington).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 849-854. 15 refs.
Contract AF 33 (657)-9331.

The response of the human thoracoabdominal system to whole-body, vertical, sinusoidal vibration has been studied. Peak acceleration of the shake table was held constant, and frequency between 2 and 10 cycles/sec. Subjects were seated with trunk axes parallel with the direction of accleration. The amplitude of forced airflow oscillation increased with frequency to an average 1,368 cm^3/sec at 6 cycles and then decreased. The maximum average volume of air forced in or out of the lung with vibration was 46 cm^3 at 5 cycles/sec. Transpulmonary pressure fluctuation exhibited a peak average amplitude of 5.44 cm H_2O at 5 cycles/sec. The response to square-wave table motion was also investigated. The transient flow oscillation produced by the step function had an average frequency of 5.6 cycles/sec. Measurements of the logarithmic decrement of transient flow oscillation indicate the total thoracoabdominal system is underdamped. The calculated damping for the lung subsystem indicates very high damping. Measurements of abdominal deformation produced by the step function suggest the transient flow oscillations result from close coupling of the lung to other components of the lung to other components of the thoracoabdominal system.

A65-81898
EFFECT OF OXYGEN BREATHING AT ATMOSPHERIC PRESSURE ON PULMONARY SURFACTANT.
Samuel T. Giammona, Donald Kerner, and Stuart Bondurant (Ind. U. Med. Center, Depts. of Pediat. and Med., Indianapolis; and Miami, U. School of Med., Dept. of Pediat., Fla.)
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 855-858. 16 refs.
Grants PHS HE 08240, HE 04080, and HE 06308; Am. Heart Assoc. supported research.

To evaluate the effects of oxygen breathing at atmospheric pressure on pulmonary surfactant, cats, rabbits, and rats were continuously kept in 98% oxygen until death occurred. Pulmonary surfactant was extracted by mincing of the lung and by foam fractionation of the lung. Surface tension of the extracts was measured on a Wilhelmy balance. Lung extracts prepared by both methods from the cats and rabbits kept in oxygen had greater surface tension than lung extracts from control animals. Surface tension of extracts prepared by foam fractionation of lungs of rats kept in oxygen did not differ from that of extracts of lungs of control rats, whereas surface tension of extracts prepared by mincing lungs of rats kept in oxygen had minimum surface tension greater than that of lung extracts of control rats. This species difference in the effect of oxygen breathing on pulmonary surfactant may reflect a difference in the pathogenesis of oxygen intoxication.

A65-81899
STROKE VOLUME IN CONSCIOUS DOGS; EFFECT OF RESPIRATION, POSTURE, AND VASCULAR OCCLUSION.
Julien I. E. Hoffman, Abraham Guz, Andre A. Charlier, and D. E. L. Wilcken (Calif. U. School of Med., Cardiovascular Res. Inst., San Francisco).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 865-877. 45 refs.
Grants PHS HY-5251 and H-6385.

Right and left ventricular stroke volumes were measured beat by beat in tranquil, conscious, healthy dogs by electromagnetic flowmeter transducers implanted around the roots of the aorta and main pulmonary artery. The onset and time courses of stroke volume changes of each ventricle differed in response to respiration, passive change of posture, application and release of positive pressure, and occlusion of the inferior cava; the two ventricles were always out of phase when changes of heart rate dominated the picture. The immediate response to these events was probably determined by alterations in systemic venous return which changed end-diastolic fiber length and so altered stroke volume by the Frank-Starling mechanism. Changes of vagal tone might have played a small part by altering atrial contractility but sympathetic activity did not seem to be involved. The initial backflow in the pulmonary artery was taken as an index of the level of pulmonary vascular impedance and increased only when the transpulmonary pressure increased.

A65-81900
PULMONARY DIFFUSING CAPACITY IN MAN DURING IMMERSION IN WATER.
A. R. Guyatt, Faith Newman, F. F. Cinkotai, J. I. Palmer, and M. L. Thomson (London School of Hyg. and Trop. Med., Dept. of Occupational Health and Appl.)
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 878-882. 23 refs.

During immersion in water to the neck, seven seated resting normal subjects showed, without exception in 14 trials, an increase in diffusion capacity of the lung (D_{LCO}) which averaged 16.2 $\pm$0.79 SD % of the control values. At an intermediate depth of immersion at which the calculated hydrostatic pressure (guage) was approximately halved, the rise in D_{LCO} was also halved. The hemodynamic readjustment to external pressure was completed within a few minutes, since no further change in D_{LCO} occurred during continuous immerions to the neck for as long as 90 min. Immersion produced a rise in "permeability" of the lung' (Kco) which was on the average 5.8% greater than that in D_{LCO}. In three subjects the pulmonary capillary blood volume (Vc) rose on the average 47% at the deeper level of immersion, suggesting that, as in the pressure suit, the rise in D_{LCO} was due to pulmonary vascular engorgement.

A65-81901
INCREASE OF ARTERIAL OXYGEN TENSION AT ALTITUDE BY CARBONIC ANHYDRASE INHIBITION
Stephen M. Cain and James E. Dunn II (USAF School of Aerospace Med., Physiol. Dept., Brooks AFB, Tex.)
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 882-884. 12 refs.

Unanesthetized dogs were injected intravenously with 10 mg./kg. per 12 hr. of the carbonic anhydrase inhibitor, acetazolamide, 24 hr. before exposure to a simulated altitude of 21,000 ft. (PB = 335 mm. Hg). Arterial blood samples were drawn frequently from a Teflon T cannula surgically placed in a carotid artery 1 or 2 days before the experiment. Arterial Po_2, Pco_2, pH, lactic, and pyruvic acid concentrations were measured. In comparison with untreated dogs, arterial Po_2 at altitude was 9mm. Hg higher, on the average, in treated animals. No physiologically significant accumulatio of excess lactate was found. The conclusion was made that carbonic anhydrase inhibition did offer measurable protection, with respect to arterial Po_2, against altitude hypoxia and that this protection was achieved at much smaller doses of drug than had been used by other investigations.

A65-81902
IN VIVO AND IN VITRO CO_2 BLOOD BUFFER CURVES.
E. B. Brown, Jr. and Richard L. Clancy (Kan. U. Med. Center, Dept. of Physiol., Kansas City).
Federation of Am. Soc. for Expti. Biol., Meeting, Atlantic City, N. J., Apr. 1963).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 885-889. 16 refs.
Grant Natl. Inst. of Arthritis and Metab. Diseases AM 05649-04. Kansas Heart Assoc. supported research.

In vivo CO_2 blood buffer curves determined on blood drawn from dogs breathing 100% O_2, and 25-30% CO_2 in O_2 have a distinctly lower slope than in vitro curves obtained by equilibrating blood from the same animal with 5, 15, and 30% CO_2 in O_2. The lower slope of the in vitro curve is due to the greater volume of distribution of bicarbonate in vivo. With hyperventilation of 10-15 min. duration the in vivo curve is regularly depressed so that its slope is essentially the same as the in vitro curve. This depression is probably due to an increase in blood lactic acid. The increase in total bicarbonate in the extracellular fluid, resulting from an increase in CO_2 tension, is more than can be accounted for by the increase in blood. This suggests that some source of buffer other than blood, is available to the interstitial fluid.

A65-81903
CONCEPT AND MEASUREMENT OF VENTILATORY SENSITIVITY TO CARBON DIOXIDE.
P. Dejours, R. Puccinelli, J. Armand, and M. Dicharry (Fac. de Méd. et Centre Marie-Lannelongue, Labs. de Physiol., Paris, France).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 890-897. 31 refs.

Four resting subjects breathed 0, 1, 2.5, and 4% CO_2 diluted in air for 25 min. Ventilation, Po_2 and Pco_2 of alveolar and expired gases were measured. One can represent on a Po_2-Pco_2 diagram, as Rahn and Fenn have done, some features of the reaction to CO_2 and plot lines of "ventilatory isosensitivity to CO_2". The relation between experimental points and these lines shows why "ventilatory CO_2 sensitivity," $\dot{V}A/\Delta PACO_2$, for normal conditions cannot be quantified by the classical procedure of giving one or several percent CO_2 to breathe. CO_2 sensitivity nonetheless exists normally, since in subjects breathing mixtures containing a few mm. Hg CO_2, $PACO_2$ is practically unchanged, while PA_{O_2} rises by several mm Hg. The difficulties of accurately measuring $\Delta\dot{V}A/\Delta PA_{CO_2}$ suggest caution in accepting some mathematical developments often applied to raw data, and in taking this ratio as a true index of ventilatory CO_2 sensitivity, particularly when measurements made with high inspired CO_2 concentration are used to interpret the regulation of normal respiration.

A65-81904
RESPIRATORY OXYGEN DEPT AND EXCESS LACTATE IN MAN.
H. Duke Thomas, Carlos Gaos, and Wayne Vaughan (Ala. Med. Coll., Dept. of Med., Birmingham, and Birmingham Veterans Admin. Hosp., Ala.)
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 898-904. 12 refs. Grants PHS H-5332 and H-6353.

The relationship between the respiratory oxygen debt and excess lactate, change in lactate, and change in lactate/pyruvate ratio was examined in 48 experiments in 13 patients and in 13 normal volunteers. The subjects exercised for either 4-or 10-min. periods. The recovery period varied from 17 to 45 min. Methods of analysis of lactate and pyruvate were colorimetric in 18 experiments, enzymatic in 20 experiments, and both in 10 experiments. The correlation coefficients between respiratory oxygen debt and excess lactate, delta lactate, and change in lactate/pyruvate ratio were 0.83, 0.87, and 0.85, respectively, in the colorimetric determinations. The enzymatic group showed somewhat poorer coefficients of correlation for these same variables: 0.76, 0.77, and 0.83, respectively. However, none of these relationships were on-to-one, and the correlation coefficients were poor for all of these variables in both series when they were subdivided into two groups based on whether the respiratory oxygen debt was greater or less than 2.2 liters/$m.^2$.

A65-81905
RESPIRATION AND CEREBROSPINAL FLUID pH IN METABOLIC ACIDOSIS AND ALKALOSIS
R. A. Mitchell and M. M. Singer (Calif. U. Med. Center, Cardiovascular Res. Inst., Dept. of Anesthesia, San Francisco).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 905-911. 28 refs. Grants PHS GM 05881, 2G-63; and HE-06285.

An acute base deficit of 5 mm./liter (metabolic acidosis) was induced in one normal man by an initial oral dose of 20 g. NH_4Cl and sustained for 5 days by administering 3 g. every 6 hr. pHa (arterial) decreased from 7.42 to 7.34 in 4 hr. Ve (minute ventilation) increased from 6.2 to 8.4 liters/min., Pa_{CO_2} decreased from 40 to 37 mm. Hg, CSF pH increased from 7.32 to 7.34, and the CO_2 response curve shifted -2.8 mm. Hg Pco_2 without slope change. At 24 hr. cerebrospinal fluid (CSF) pH was 7.32, with CSF Pco_2 and HCO_3-reduced to 42 mm. Hg and 21.0 mEq./liter, respectively (control 49 mm. Hg, 24 mEq./liter Ve increased to 9.8 liters/min., arterial pH increased to 7.37, Pa_{CO_2} to 39 mm. Hg. decreased arterial pH increased to 7.37, Pa_{CO_2} fell to 36 mm. Hg, and the CO_2 response curve was -5.0 mm. Hg, from control. After six days of acidosis, acute increase in pHa to 7.45 in 2 hr. by $NaHCO_3$ ingestion decreased Ve to 6.8 liters/min., increased Pa_{CO_2} to 39 mm. Hg, decreased CSF pH to 7.30, and shifted the CO_2 response curve back to control. Results of this study are consistent with the hypothesis that the peripheral chemoreceptors initiate and sustain alterations in Ve in metabolic abnormalities in the following manner: (1) acute acidosis increased Ve by stimulating the peripheral chemoreceptors; (2) the Pa_{CO_2} falls and CSF pH increases, decreasing medullary (H+) chemoreceptor activity to normal, causing a further increase in ventilation that partially compensates for the metabolic acidosis.

A65-81906
EFFECT OF TEMPERATURE ON DEOXYGENATION RATE OF HUMAN RED CELLS.
W. H. Lawson, Jr., R. A. B. Holland, and R. E. Forster (Pa. U., Graduate School of Med., Dept. of Physiol., Philadelphia).
(Federation of Am. Soc. for Expti. Biol. and Med., Meeting, Atlantic City, N. J., 1962).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 912-918. 20 refs. Grant NIH H-4108.

The rate of deoxygenation of oxygenated human red cell suspensions was measured in vitro as a function of temperature from 7° to 42°C. at constant Pco_2 in a stopped-flow rapid-reaction apparatus. There is a linear relationship between the deoxygenation rate constant, k_c, and the reciprocal of the absolute temperature; the "activation energy" of 16,743 cal/mole agreed reasonably well with that predicted by theory, 14,565. At 42°C. deoxygenation was half complete in 0.04 sec. while at 7°C. the halftime was slowed to 0.8 sec. If the red cell transit time in tissues cooled to 7°C. approximates the normally accepted value at 37°C. of about 1 sec. the rate of red cell deoxygenation would be a limiting factor in the supply of oxygen to the peripheral tissues in the cold.

A65-81907
EFFECTS OF COMPRESSION ON COMPOSITION AND ABSORPTION OF TISSUE GAS POCKETS.
Hugh D. Van Liew, Beverly Bishop, Pio Walder D., and Hermann Rahn (N. Y. State U., School of Med., Dept. of Physiol., Buffalo).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 927-933. 10 refs. Contracts AF 33(615)-1095 and Nonr-969(03); and Grant PHS AM 08070-02.

Data with subcutaneous gas pockets in rats and theoretical considerations lead to the following conclusions: (1) Besides mechanically decreasing bubble size, compression causes an additional volume decrease due to readjustment of water vapor, CO_2 and O_2 volumes in the bubble. (2) The pocket-to-tissue PN_2 difference (in the stabilized condition in which tissue PN_2 equals arterial PN_2) is almost completely dependent on alveolar oxygen, not on compression per se. Compression with air elevates alveolar O_2, but the same nitrogen difference could be gained by inhaling oxygen-enriched gas at lower pressures. (3) Compression causes an increased pocket-to-tissue PN_2 difference which hastens N_2 absorption, but at the same time decreases surface area and thus tends to slow absorption.

A65-81908
INFLUENCE OF AGE AND SEX ON EXERCISE CARDIAC OUTPUT.
Margaret R. Becklake, H. Frank, G. R. Dagenais, G. L. Ostiguy, and Carole A. Guzman (McGill U., Roy. Victoria Hosp., Joint Cardiorespirat. Serv., Montreal, Canada).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 938-957. 35 refs. John A. Hartford Found., U.S.; Jean Louis Levesque Found., Dept. of Nat. Health and Welfare, and Med. Res. Council, Canada supported research.

Exercise cardiac output was measured by an indirect Fick technique in 94 normal subjects (48 men and 46 women) whose ages ranged from 20 to 85 years. With increasing age, exercise cardiac output was found to be greater despite no such trend in oxygen uptake; in consequence, exercise arteriovenous oxygen difference decreased with age. These trends were seen in both sexes, though the age effects were apparent a decade earlier in men. In addition, in men the heart rate was lower and stroke volume higher with increasing age. By contrast, no age effect on exercise pulse rate was noted in women. When the sexes were compared, exercise cardiac output was higher in women of the younger two decades (20 to 39 years), a difference which was not apparent in subsequent decades.

A65-81909
EFFECT OF LOCAL EXERCISE OF FOREARM MUSCLES ON FOREARM CAPACITANCE VESSELS.
B. Sture Bevegård and John T. Shepherd (Mayo Clin. and Mayo Found., Rochester, Minn.)
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 968-974. 12 refs. Grant NIH HR-5883.

Normal subjects were studied to determine whether exercise of the muscles of one forearm causes changes in venous tone in that forearm by some local mechanism. Forearm venous pressure-volume relationships and the pressure in "isolated" vein segments were unchanged after exercise of forearm muscles. Following venous occlusion, the forearm volume increases and reaches a plateau later than forearm venous pressure This delayed volume change increased with increasing venous filling rate regardless of whether this was accomplished by exercise or by other means. Thus, the local mechanism which dilates resistance vessels in active muscles does not seem to change the contractile state of the muscle in the capacity vessels. The viscous properties of the venous wall, however, act to damp the volume oscillations in intervals between muscular contractions when arterial inflow and venous filling rate are high. The ratio between initial rate of rise in forearm venous pressure and volume following venous occlusion could not be used as an index of active changes in tension of the smooth muscle of the capacitance vessels.

A65-81910
CARDIOVASCULAR AND SWEATING RESPONSES TO WATER INGESTION DURING DEHYDRATION.
Leo C. Senay, Jr. and Margaret L. Christensen (St. Louis U. School of Med., Mo.)
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 975-979. 14 refs. Grants PHS HE-07075-01 and H-4939-05.

The experiments reported are concerned with cardiovascular and sudomotor events preceding, accompanying, and following ingestion of water by five dehydrating subjects 8.75 hr. after entrance into a heat chamber (43.3 C. DB, 29 C. WB). Certain skin areas such as the cheek showed increases in evaporative heat loss before subjects came in contact with water. This reflex could be initiated by saline ingestion but the degree of skin and oral temperature changes appeared to depend on tonicity of fluid ingested. The gustatory reflex was not thought to be the initiating agent for sudomotor responses. Increases in cutaneous blood flow appeared to begin almost as promptly as sweating responses but took considerably longer to develop. Ingestion of saline, though initiating a sweating response, did not alter heart rate, blood pressure, or cutaneous blood flow. It is suggested that fluid ingestion, regardless of tonicity, triggers reflex sweating over the body surface. Intensity and duration of this sudomotor response, as well as initiation of cardiovascular changes, apparently depend on tonicity of ingested fluid.

A65-81911
HUMAN ECCRINE SWEAT GLAND ACTIVITY AND PALMAR ELECTRICAL SKIN RESISTANCE.
Thomas Adams and John A. Vaughn (Civ. Aeromed. Res. Inst., Physiol. Labs., Oklahoma City, Okla.)
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 980–983, 20 refs.

Sweat gland activity, monitored as a function of the rate at which water vapor was removed from the skin surface (EWL), was measured simultaneously with electrical skin resistance (ESR) from adjacent 1-cm.^{2} areas on the human palm. Both ESR and EWL, and ΔESR and ΔEWL, were correlated throughout 20–30 min. of testing during which the subject rested or participated in conversation. The ratio ΔESR/ΔEWL was greater the lower the EWL level. As EWL approached diffusion levels (0.06mg/min. cm.^{2}), ESR assumed the highest and most stable value (ca. 170 kilohms). Subject differences in ESR at high EWL rates and the pattern of ESR-EWL relationships through the range of sudomotor activity (0.06-0.18mg./min. x cm.^{2}) are attributed to individual variation in the density and activity of sweat glands on the palmar surface. The character of ESR-EWL correspondence was also seen to vary with the phase of sweating activity for any one subject.

A65-81912
INITIATION OF SWEATING IN MAN AFTER ABRUPT RISE IN ENVIRONMENTAL TEMPERATURE.
Jean Colin and Yvon Houdas (Flight Test Center, Aerospace Med. Lab., Brétigny-sur-Orge, Seine-et-Oise, France).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 984–990. 23 refs.

In 38 experiments a total of eight men were subjected, after a long waiting period in a neutral environment, to an abrupt rise in environmental temperature. Skin, rectal, oral, and tympanic temperatures, and weight loss were continuously recorded. Two types of responses were seen; (*a*) nonadapted subjects presented a delay in the onset of sweating, with a good correlation between this onset and rise in rectal or tympanic temperature, but without correlation with the rise in skin temperature; (*b*) adapted subjects presented an immediate onset of sweating without correlation with rectal temperature, and a second acceleration of sweating corresponding to the rise of rectal temperature. For nonadapted subjects the mechanism of sweating is activated by centrally located receptors; but in adapted subjects, skin receptors are able to activate the sweating mechanism before central receptors feed their impulses to the heat loss center.

A65-81913
DEVELOPMENT OF A CRITERION FOR PHYSICAL FITNESS TESTS FROM FACTOR ANALYSIS RESULTS.
A. H. Ismail, H. B. Falls, and D. F. Macleod (Purdue U., School of Ind. Eng., Bionucleonics Dept., Pulmonary Function Lab., Phys. Educ. Dept., Lafayette, Ind.
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 991–999. 30 refs.
Grant NIH GM 10380-10.

The purpose of the study is twofold: (1) to illustrate a method whereby it is possible to combine the various criteria for physical fitness to form one composite criterion and (2) to develop physical fitness test batteries. As a result, a method for combining the various criteria of physical fitness tests into one composite criterion was described. Furthermore, physical fitness test batteries were developed.

A65-81914
SOME RESPONSES OF HUMANS TO THERMAL RADIATION.
Charles W. Suggs (N. C. U. State Coll. of Agr. and Eng., Dept. of Agr. Eng., Raleigh).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 1000–1005. 16 refs.
Grant NIH OH-144-01.

The effects of thermal radiation on heart rate, ventilation rate, and oxygen consumption rate were investigated at various conditions of dry-bulb temperature, air velocity, and exercise. Ventilation rate and oxygen consumption rate were essentially independent of thermal radiation under all the environmental conditions investigated. However, heart rate increased appreciably with increases in thermal radiation provided the environment was already warm or hot. In the range between 70° and 100°F. dry bulb, a 7° increase in mean radiant temperature was found to elicit the same average increase in heart rate as a 1°F. increase in dry bulb. For a cool environment the response tended to be reversed with the heart rate decreasing as the environment was made more comfortable by the addition of thermal radiation. Exercise shifted the point at which this reversal occurred toward lower temperatures.

A65-81915
SKIN AND SUBCUTANEOUS TEMPERATURE CHANGES DURING EXPOSURE TO INTENSE THERMAL RADIATION.
J. A. J. Stolwijk and J. D. Hardy (John B. Pierce Found. Lab., New Haven, Conn.)
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 1006–1013. 12 refs.
Defense Atomic Support Agency supported research.

Radiometric measurements have been made of the skin temperature changes occurring during irradiation of the body by high-intensity thermal radiation with square-wave pulses. A quartz lamp bank provided a source color temperature of 2,650 K. and a uniform (about 5%) irradiance of 0.16 cal./sec per cm.^{2} over areas of 40x30 cm. A spring-operated focal-plane shutter controlled exposure times from 2-120 sec. with a rise time of 0.01 sec. The radiometer, mounted between the quartz lamps so as to view the skin from normal incidence, had a 96% response time of 0.1 sec. and a precision of about 0.1°C. When corrections were made to allow for the far infrared radiation reflected from the skin, the radiometer gave accurate measurements of skin temperature during the periods of irradiation. Experimental values of skin temperature rise were compared with those calculated by the finite differences method for various skin layers using the best available values for optical and thermal properties of each skin layer. During the initial 10-15 sec. of irradiation, theoretical and experimental values were in agreement, indicating passive response of the skin to thermal radiation. Subcutaneous temperatures, calculated from surface temperature data, indicated a high degree of penetration of the radiation 0.2-0.4 mm. below the skin surface.

A65-81916
SKIN TEMPERATURE AND CUTANEOUS PAIN DURING WARM WATER IMMERSION.
J. D. Hardy, J. A. J. Stolwijk, H. T. Hammel, and D. Murgatroyd (John B. Pierce Found. Lab.; and Yale U. School of Med., Dept. of Physiol., New Haven, Conn.)
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 104-1021. 25 refs.
Contract DA-49-146-XZ-124; and Grant PHS GM-10289.

Measurements of skin temperature were made during the sudden immersion of the skin of human subjects in water baths at 36-41°C. and related to the reports of pain elicited during the first few seconds of immersion. Within 0.5 sec., the skin temperature rose to bath temperature and remained at this level during the 10-15 sec. of immersion; pain was reported at 37-41°C. occurring 1-5 sec. after the start of the immersion and adapting in 2-6 sec. Calculation of the subcutaneous temperature and thermal gradients indicate maximal thermal gradients in superficial skin layers during the first 0.1-0.2 sec of immersion (60°C./mm.) decreasing rapidly during the first 5 sec. to 6°C./mm. Analysis of the transient pain indicated that it could be considered as the more sensitive "phasic" response of the pain ending of which the "static" unadapting response occurs at skin temperatures of 43-46°C. Several alternative explanations including subcutaneous thermal gradients, vasomotor reactions, and thermochemical changes in the nerve membrane were considered as possible explanations. The last most likely possibility requires a second-order kinetic system of three capacities with highly temperature-sensitive reaction velocities to account for both the phasic and static components of the pain.

A65-81917
EFFECTS OF SIMULATED HIGH ALTITUDE ON THE GROWTH RATE OF ALBINO GUINEA PIGS.
L. Delaquerriere-Richardson, Susanna Forbes, and Enrique Valdivia (Wis. U. Med. School, Dept. of Pathol., Madison).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 1022–1025. 11 refs.
Wis. Heart Assoc. supported research.
Grant NIH 2 RO1 HE 06523

Two different groups of pregnant albino guinea pigs were exposed continuously, during the second half of gestation, to simulated high altitudes of 12,000 ft. in the first experiment and of 14,000-16,500 ft. in the second. Pregnancy was significantly shorter in the second experiment than at sea level. Birth weights were lower than in controls in both experiments, more so in the second. Prenatal mortality was markedly increased, reaching 42% in the second experiment. All animals were kept at 12,000 ft. after birth. Postnatal growth was slower than at sea level, except in females born at 12,000 ft., whose weights did not vary significantly from those of controls.

A65-81918
RENAL FUNCTION IN HIGH-ALTITUDE NATIVES AND IN NATIVES WITH CHRONIC MOUNTAIN SICKNESS.
Rodolfo Lozano and Carlos Monge C. (U. Peruana de Ciencs., Med. y Biol., Inst. de Invests. de Altura, Lima).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 1026–1037. 22 refs.
Grant NIH GM 08576.

When compared with sea-level residents, the healthy natives living at an altitude of 4,540 m. showed a 12% reduction in the glomerular filtration rate, a 37% reduction in effective renal plasma flow, a 12% reduction in effective renal blood flow, and an increase of 39% in the filtration fraction. The corresponding values in patients with chronic mountain sickness living at 4,300 m. above sea level are: glomerular filtration rate, 32% reduction; effective renal plasma flow, 57% reduction; effective renal blood flow, 9% increase; and filtration fraction, 56% increase. The mean hematocrit values of the healthy and sick natives investigated were 59 and 79%, respectively. The possible relationships between cardiac output, hematocrit values, and renal hemodynamics are discussed.

A65-81919
EFFECT OF AN ANABOLIC STEROID ON PHYSICAL PERFORMANCE OF YOUNG MEN.
William M. Fowler, Jr., Gerald W. Gardner, and Glen H. Egstrom (Calif. U., Dept. of Phys. Educ. and School of Med., Dept. of Phys. Med. and Rehabil., Los Angeles).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 1038–1040. 9 refs.
Squibb Inst. for Med. Res., New Brunswick, N. J. supported research.

The performance of 47 men was measured during a 16-week study. Eight of the men received placebos; nine received 1-methyl-Δ^1-androstenolone acetate, an anabolic steroid; 15 received placebos and exercise; and 15 received the drug exercise. There were no significant differences in strength, motor performance or physical working capacity between the control and the androstenolone-supplemental groups. Differences in other factors such as vital capacity, limb circumference, and skin-fold thickness were also nonsignificant. Under the conditions imposed in this study there was no evidence that the anabolic steriod increased strength in young men.

A65-81920
INDIRECT DETERMINATION OF MAXIMAL O_2 CONSUMPTION IN MAN.
R. Margaria, P. Aghemo; and E. Rovelli (Milan U., Lab. of Physiol., Italy).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 1070–1073. 10 refs.
Ital. Natl. Res. Council supported research.

A nomogram is described for obtaining the value of maximum oxygen consumption per kilogram of body weight from the heart rate values observed at two submaximal work loads. The exercise consists in stepping up and down a 30- to 40-cm bench at a frequency dictated by a metronome. This procedure can be applied to all classes of subjects; the variability of the data obtained is within ±7% with those directly determined.

A65-81921
A HOT-WIRE MICROANEMOMETER FOR MEASUREMENT OF AIR MOVEMENTS INSIDE CLOTHING.
N. Krishnaswamy, D. V. Mani, and S. Ranganathan (Defence Inst. of Physiol. and Allied Sci., Madras, India).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 1088–1090.

A hot-wire anemometer has been specially designed and fabricated for the measurement of the wind speed component of the microenvironment inside clothing. A copper-constantan thermocouple has been used for estimation of temperature. The constant-current method is used for measurement of air movement. The sensing element is mounted in a Perspex frame which can be strapped to the human body inside clothing. Speeds in the range 2-280 cm./sec. have been measured with the instrument.

A65-81922
AN ELECTROGRAPHIC ELECTRODE DESIGNED FOR IDENTIFICATION OF RECORDING SITES.
Benjamin L. Hart and Ralph L. Kitchell (Minn. U. Dept. of Vet. Anat., St. Paul).
Journal of Applied Physiology, vol. 20, Sep. 1965, p. 1094–1095.
Grant Div. of Gen. Med. Sci. 5 TI-GM-386-04.

An electromyographic needle electrode was designed so that a marking substance could be injected through the electrode into the recording site. This made it possible to identify the recording site, in the muscle, at the termination of the experiment when a postmortem examination was performed. Colored petrolatum or mineral oil was used as a biologically inert marking substance. Some of the recording sites were readily located as long as 130 days after injection.

A65-81923
THE EFFECT OF CERVICAL SYMPATHECTOMY ON POSTERIOR PITUITARY OXYTOXIC ACTIVITY IN RATS UNDER CHRONIC STRESS.
K. Fendler, E. Endroczi, and K. Lissak (U. Med. School, Inst. of Physiol., Pecs, Hungary).
Acta Physiologica Academiae Scientiarum Hungaricae, vol. 27, 1965, p. 275–278. 13 refs.

The changes in posterior pituitary oxytoxic activity following cervical sympathectomy have been studied in rats. A technique for removing the cervical sympathetic trunk is described. Cervical sympathectomy decreased neurohypophysial oxytoxic activity. Exhaustive swimming daily for 18 days resulted in an increased pituitary oxytoxic activity which was prevented by cervical sympathectomy. The importance of vasomotor activity in hypothalamic-neurohypophysial function is emphasized.

A65-81924
THE POSSIBILITY OF INVESTIGATING GAS EXCHANGE OF PLANTS IN CLOSED SYSTEMS WITH THE HELP OF $C_{14}O_2$ [O VOZMOZHNOSTI ISSLEDOVANIIA GAZOOBMENA RASTENII V ZAMKNUTYKH SISTEMAKH PRI POMOSHCHI $C_{14}O_2$].
V. L. Voznesenskii (USSR Acad. of Sci., V. L. Komarov Botanical Inst., Leningrad, USSR).
Fiziologiia Rastenii, vol. 12, 1965, p. 746–749. 15 refs. In Russian.

A method developed by the author for studying gas exchange in air-tight chambers with the aid of labelled carbon dioxide yielded reliable data on the rate of photosynthesis and its dependence on many external factors (light, temperature, etc.) at high (saturating photosynthesis) concentrations of CO_2. At low concentrations of carbon dioxide (the rate of photosynthesis depends on CO_2 concentration) the radioactive data reflected only the approximate rate of photosynthesis. Depending on the experimental conditions (rate of respiration, isotope effect, participation of labelled CO_2 in respiration), the values obtained may be closer to the apparent than true photosynthetic rate. In closed systems with illuminated plants the specific activity of carbon dioxide did not vary linearly with the time and hence, in the general case, the rate of liberation of CO_2 by plants as a result of respiration could not be deduced on the basis of decrease of specific activity (even if isotopic effects were neglected).

A65-81925
PROBLEMS OF NOISE [PROBLEMA SHUMA].
I. Borshchevskii and E. Lapaev.
Aviatsiia i Kosmonavtika, vol. 47, Jul. 1965, p. 75–77. In Russian.

Constant exposure to noise can cause hearing damage and functional disturbances of the vestibular apparatus in some subjects. Cases are on record where excessive noise has affected vision, respiratory rhythm, cardiac rhythm, blood pressure and spleen and kidney size, and caused a decrease in frequency and amplitude of peristalsis. Continuous noise may cause insomnia, headache, listlessness, and loss of appetite. This information is important in considering the effects of noise during space flight. It has been established that rocket noise can exceed 170 db., and continuous noise at lift-off has been registered in the range of 145-150 db. At lift-off, noise in the space craft is due primarily to turbulence of the peripheral layer. During orbital flight, it is caused exclusively by vibration and by the life-support system in action. This noise is of low level. In jet-plane cabins, noise may reach 85-100 db. During commercial and military flights, when pilots are exposed to continuous noise during long periods, specially constructed anti-noise devices, individually adjusted and incorporated into the head gear, have been found very useful in counteracting noise effects.

A65-81926
AUDIOVISUAL INTERACTION AND ITS CORRELATION WITH CORTICAL STIMULATION IN THE LATERAL THALAMUS.
T. Hotta and S. Terashima (Tokyo Med. and Dental U., Dept. of Physiol., Bunkyo-Ku, Tokyo, Japan).
Experimental Neurology, vol. 12, Jun. 1965, p. 146–158. 19 refs.

Single-unit recordings from the anterolateral region of the thalamus were obtained in cats anesthetized by chloralose and given Flaxedil. When sound and light stimuli were applied, audiovisual interaction was observed in a mutual blocking or facilitatory pattern, in which increased probability of occurrence of discharge, decreased latency of the initial spike discharge, or an increased number of spikes per discharge were demonstrated. Thalamic units, in which the audiovisual interaction was found responded to electric shock applied to the visual or auditory cortex and showed the occlusion between visual and cortical induced responses at appropriate stimulus intervals. The facilitatory effect of sound stimulation on the visual response may be due to synaptically induced depolarization from the auditory afferent pathway. The corticofugal influence from the visual cortex on the thalamic reticular neuron is assumed.

A65-81927
THE BIOLOGICAL EXPLORATION OF MARS.
Elliott C. Levinthal (Stanford U., School of Med., Instr. Res. Lab., Calif.)
TRW Space Technology Laboratories Lecture Series, vol. 2, 1965, p. 14–21.

This paper presents some of the life-detection instrumentation developments being carried out for the biological exploration of Mars. There is no single, unique, definitive detection method which could cover all possible manifestations of life as encountered on earth. However, certain methods may reveal information indicating the presence of life. Indicators of signs of life could be any particles which show microscopically observed movements, difference from wind direction, or Brownian movements. Chemical and biological amplifiers could be used for detecting a particular

kind of enzyme or microbe. The author describes in detail such an instrument which contains a system of amplifiers—the Multivator—, and explains an assay of one of the most common hydrolytic enzymes—a phosphatase. This instrument is light-weight, suitable for the earliest space mission, and requires a fraction of a bit per second for telemetry. In later missions there is a possibility of carrying out microscopic observations. An absorption spectrum of characteristic cellular compounds, such as DNA, could be studied. Some of these instruments have been built and are applied to problems of moderate complexity.

A65-81928
THE ORIGIN OF PLANETARY ATMOSPHERES.
A. G. W. Cameron
(Goddard Space Flight Center, Inst. for Space Studies, Beltsville, Md.)
TRW Space Technology Laboratories Lecture Series, vol. 2, 1965, p. 61–70.

The author lists the processes which may be important in the formation and regulation of planetary atmospheres. The input processes may consist of: (1) capture of gaseous matter from primitive solar nebulae or solar winds, (2) result of collisions with comets and meteorites; (3) outgassing from the interior; and (4) chemical reactions with surface matter. The loss of atmosphere may be due to: (1) thermal evaporation; (2) sweeping action of solar wind; (3) chemical reactions with surface materials; and (4) roration instability of the planet. The author considers the effects of these processes on the existing or speculated composition of atmospheres which surround the solar planets and the moon. The author concludes that we have no knowledge how important these various processes are for the majority of planets, nevertheless, this outline provides a framework for discussion of various planetary atmospheres.

A65-81929
DIFFERENTIAL DIAGNOSIS OF OCCUPATIONAL DISORDERS OF HEARING [DIFERENCNI DIAGNOZA PROFESIONALNICH SLUCHOVYCH PORUCH].
Rostislav Tománek
Pracovní Lekařství, vol. 17, Jun. 1965, p. 195–200. 28 refs. In Czech.

The author discusses fundamental features of occupational disorders of hearing caused by noise, their audiometric symptoms and methods of examination. In the differential diagnosis, occupational hearing disorders are readily differentiated from degenerative conditions by the fact that after elimination of the noisy environment the disorder does not become worse. It is difficult to differentiate accurately occupational hearing disorders from presbyacusis. Differentiation of disorders of hearing caused by noise associated with toxic damage, damage by acoustic trauma, and postinfectious conditions, is possible only by comparison with previous findings. A similar procedure is used for the assessment of disorders of conduction with nervous participation in otosclerosis or conditions involving inflammations of the middle ear. In these workers, noise at the working place may act as a factor causing greater susceptibility or promoting basic nervous hearing damage. The diagnostic difficulties are illustrated on several examples from practice, including audiometric records.

A65-81930
BRAIN TEMPERATURE AND AROUSAL.
C. D. Hull, N. A. Buchwald, B. Dubrovsky, and J. Garcia (Long Beach State College, Dept. of Psychol., Calif. U., School of Med., Dept. of Anat., and Brain Res. Inst., Los Angeles; and Veterans Admin. Hosp., Long Beach, Calif.)
Experimental Neurology, vol. 12, Jul. 1965, p. 238–246. 5 refs.
Grants PHS RH 00068 and MH 07097.

Cerebral cortical temperature was monitored in cats during sleep and wakefulness and in response to a conditioned stimulus. The temperature measure is a sensitive indicator of the behavioral state of the animal. Brain temperature increases in the aroused state and decreases in "slow wave" sleep. An increase in brain temperature occurs to a conditioned stimulus.

A65-81931
CENTRIFUGAL OPTIC NERVE RESPONSES EVOKED BY AUDITORY AND SOMATIC STIMULATION.
D. N. Spinelli, Karl H. Pribram, and Morey Weingarten (Stanford U., Calif.)
Experimental Neurology, vol. 12, Jul. 1965, p. 303–319. 37 refs.
Contract DA-49-193-MD-2328.

The evidence for the efferent control of receptor events has recently been repeatedly challenged. The present experiments were undertaken to provide a simple demonstration of the existence of such a mechanism. Clicks were presented to unanesthetized cats and bipolar recordings made of potential changes evoked in the optic nerve and tract with implants of small electrode wires. Click-initiated optic nerve responses of 10–60 μ amplitude were obtained in fourteen cats at a latency of 20 msec. These responses were unaffected by atropinization or by curarization; they showed amplitude decrement upon repeated presentations and were unobtainable when the animal was restless. They were abolished by bilateral section of the optic tracts central to the implant sites. Similar optic nerve responses could be initiated by tactile stimulation. Also, silent flash produced recordable responses in the eighth cranial nerve. Finally, parametric click-flash interaction effects were observed to differentially affect different fibers in the optic nerve and to alter the B wave of the electroretinogram.

65-81932
CLASSIFICATION AND AURAL CODING IN SHORT-TERM MEMORY.
Douglas L. Hintzman (Stanford U., Calif.)
Psychonomic Science, vol. 3, Aug. 15, 1965, p. 161–162.

Analysis of errors in a short-term memory task indicates that subjects adopted two possible coding strategies: digit vs. letter categorization and subvocal or aural rehearsal. White noise had no effect on types or errors made or on over-all performance, but did bring out the usually covert rehearsal process. Evidence from errors and effects of noise point to a reinterpretation of "auditory" coding in terms of kinesthetic feedback produced by subvocal rehearsal.

A65-81933
THE EFFECT OF NONPATTERNED SENSORY DEPRIVATION ON VISUAL RECOGNITION THRESHOLDS.
Charles M. Friel and Leonard Derogatis (Catholic U. of Am., Washington, D. C.)
Psychonomic Science, vol. 3, Aug. 15, 1965, p. 163–164. 7 refs.

A group of 18 college students underwent 50 min. of nonpatterned sensory deprivation after which they were asked to identify four letter nouns given them at various exposure times. It was found that this group could recognize significantly more words at a faster exposure time than could a similar group not exposed to deprivation. It was concluded that the period of deprivation worked to increase the perceptual acuity of the deprived group.

A65-81934
RAPID ADAPTATION IN THE CONSTANCY OF VISUAL DIRECTION WITH ACTIVE AND PASSIVE ROTATION.
Hans Wallach and Jerome H. Kravitz (Swarthmore Coll. Pa.)
Psychonomic Science, vol. 3, Aug. 15, 1965, p. 165–166. NSF supported research.

Very rapid adaptation in the constancy of visual direction was obtained with an arrangement yielding displacements of the visual field during head movements by continuous exposure to the specific conditions that presumably cause the adaptation. Adaptation was obtained also when, in place of active head movements, subject was turned back and forth on a rotating chair.

A65-81935
THE RELATION BETWEEN SCORE ON THE STIMULUS VARIATION SCALE AND AUTOKINETIC MOVEMENT.
Robert C. Reinehr (Tex. U., Austin).
Psychonomic Science, vol. 3, Aug. 15, 1965, p. 169–170. 8 refs.

Score on a self-report inventory designed to measure the amount of stimulation seeking activity characteristically engaged in by adults (SVS) was related to performance in the autokinetic situation. A significant positive relationship between SVS score and the amount of perceived movement was found when a simple linear measure was treated as the dependent variable. When the extent of perceived movement in autokinesis was converted to a quantitative value known as Voth's Modified Index (1947) and treated as the dependent variable, results were in the hypothesized direction but failed to reach significance.

A65-81936
RESPONSE OF ANIMAL ORGANISM TO STRESS DURING COSMIC FLIGHT [K PROBLEME REAKTIVNOSTI V KOSMICHESKOI MEDITSINE].
V. V. Parin, P. V. Vasil'ev, and V. E. Belai.
Izvestiia Akademii Nauk SSSR, Seriia Biologicheskaia, no. 4, Jul.–Aug. 1965, p. 481–490. 36 refs. In Russian.

The paper presents data on reactivity of the organism exposed to accelerations that have been obtained in experiments on various animal species. It has been established that accelerations cause changes in the sensitivity of the organism to certain pharmacological preparations, e.g. narcotic drugs, heart glucosides, vasopressors and vasodilators. It is concluded that altering the reactivity of the organism by drugs can be used to increase its resistance to acceleration.

A65-81937
ADAPTATION OF HUMAN ORGANISM TO PROLONGED ACTION OF CORIOLIS ACCELERATION [OSOBENNOSTI ADAPTATSII CHELOVEKA K DLITEL'NOMU VOZDEISTVIIU USKORENIIA KORIOLISA].
R. A. Vartbaronov and N. A. Volokhova.
Izvestiia Akademii Nauk SSSR. Seriia Biologicheskaia, no. 4, Jul.–Aug. 1965, p. 500–506. 15 refs. In Russian.

Vegetative, somatic and sensory reactions arising under long action of Coriolis acceleration were studied on several subjects. During rotation in a slow rotating chamber at the rate of 1.8 and 3.5 rev. per min. adaptation was evaluated by subjective feelings and objective indices of physiological reactions. The authors used capacity for work, peripheral blood circulation, and oculomotor reactions as a criterion for adaptation. The authors recommend this method for the study of latent motion sickness and for vestibular training.

A65-81938
THE EFFECT OF AERATION ON THE CHANGE IN OPTIC PROPERTIES OF CHLORELLA SUSPENSION [VLIIANIE BARBOTAZHA NA IZMENENIE OPTICHESKIKH SVOISTV SUSPENZII CHLORELLA].
A. B. Brandt (USSR, Acad. of Sci., Inst. of Biol. Phys., Moscow).
Biofizika, vol. 10, no. 3, 1965, p. 514–517. In Russian.

Experiments conducted on suspensions of Chlorella cells showed that aeration caused an increase in the spectral absorption coefficient. In smaller concentrations this increase was even more pronounced. In all cases, a greater increase of the spectral absorption coefficient was noted in the infrared region of the spectrum. This cannot be explained by an increase in absorption by individual cells, but by increased light absorption by the medium due to an increase in two phase reflection—gaseous (water bubbles) and liquid (water portion)—of the nutrient medium. This reflection causes a rise in temperature of the medium and speeds up the evaporation process. During aeration, the penetration by direct light rays was absent. In order to decrease light absorption by the medium, thus preventing the overheating and evaporation of water from the medium, aeration must not be too intense.

A65-81939
THE ACCELERATION OF POLLEN GERMINATION OF TRADESCANTIA PALUDOSA BY SONIC VIBRATION OF HEARING RANGE [USKORENIE PRORASTANIIA PYL'TSY TRADESCANTIA PALUDOSA POD VLIIANIEM ZVUKOVYKH KOLEBANII V SLYSHIMOM DIAPAZONE].
G. M. Maslova, S. P. Maslov, and S. E. Shnol' (USSR, Acad. of Sci., Inst. of Biol. Phys. and M. V. Lomonosov Moscow State U., Dept of Phys., Moscow).
Biofizika, vol. 10, no. 3, 1965, p. 538–539. In Russian.

The effect of sonic vibrations in the hearing range on the rate of pollen germination of a plant, Tradescantia paludosa, was studied by subjecting it to sound waves of 100–300 c.p.s. for 15 min. The results showed that sound waves within this range increased the germination rate of pollen. No quantitative relationship was established, because the material had not been standardized.

A65-81940
EVALUATION OF THE INFLUENCE OF ACOUSTIC STIMULI ON THE CENTRAL NERVOUS SYSTEM BY MEANS OF THE CLOSED INTELLIGENCE TEST IN RATS [OCENA WPLYWU BODZCOW AKUSTYCZNYCH NA OSRODKOWY UKLAD NERWOWY ZA POMOCA TESTU PLYWANIA SZCZUROW W LABIRYNCIE].
Jan Grzesik and Elzbieta Pluta
Acta Physiologica Polonica, vol. 16, May–Jun. 1965, p. 379–387. 6 refs. In Polish.

The effects of intense 110 db. white noise and pure tones (500, 1,000, 2000, 4000, and 6000 c.p.s.) on the central nervous system by means of the closed field intelligence test for rats, described by Rabinovitch and Rosvold, was investigated. The stimuli decreased the learning efficiency by about 25–30%. This effect was observed only during a short time at the beginning of the difficult test pattern. The usefulness of the mentioned test for evaluation and differentiation of the annoyance of acoustic stimuli was established.

A65-81941
EFFECT OF PHYSICAL EFFORT ON URINARY EXCRETION OF ELECTROLYTES [WPLYW WYSILKU FIZYCZNEGO NA WYDALANIE ELEKTROLITON Z MOCZEM].
Lechoslaw Dec and Marian Pytasz.
Acta Physiologica Polonica, vol. 16, May–Jun. 1965, p. 379–387. 6 refs. In Polish.

In healthy men aged 18–22, actively practicing sports, physical exertion did not have a definite effect on renal glomerular filtration, which was diminished in some cases, increased in others, or unchanged in still others. Uresis was distinctly diminished during physical exercise as a result of increased reabsorption of water in the renal tubules. Increases in concentrations of urea, sodium and calcium and decreases in blood chlorides were not significant. Only the concentration of potassium was significantly diminished. In the urine, pH was diminished after exercise, and ammonia and potassium concentration were increased. Sodium and calcium concentrations on the other hand, were diminished. Urinary excretion of the substances studied was diminished significantly, with the exception of phosphates and creatinine. It appears that during physical exercise the human body strives to maintain isoosmia by renal retention of electrolytes and water.

A65-81942
ON SOME FUNCTIONS OF THE ORGAN OF VISION DURING RESPIRATORY HYPERTENSION [O NIEKTORYCH CZYNNOSCIACH NARZADU WZROKU PODCZAS STOSOWANIA NADCISNIENIA ODDECHOWEGO].
Eugeniusz Sokotowski and Jan Szymański.
Acta Physiologica Polonica, vol. 16, May–Jun. 1965, p. 407–414. 16 refs. In Polish.

Vision was studied in healthy subjects under the influence of various factors such as high intrapulmonary pressure leading to distension of the lung tissue and hypoxia during breathing under pressure at high altitudes. The visual field for white and colored light stimuli (blue and red) was studied, and perception of critical frequency of the flashes was assessed. Moderate degrees of hypoxia had practically no effect on disorders of vision. During breathing under pressures of 500–550 mm. H_2O, vision was not affected in a subject wearing a pressure suit. Breathing under pressure without external compensation produces a reduction in the visual field for white, mainly to colored light stimuli. Critical perception of frequency of flashes was diminished on the average by 2–3 c.p.s. The changes in the different visual functions were not strictly parallel. For instance, in the present experiments the visual field was unequally changed for white and colored light stimuli. It was concluded that changes in vision during respiratory hypertension may occur also if the compensating suit was not well fitted, or in case of considerable increase of hypoxia in the body from various causes.

A65-81943
ANALYSIS OF OBJECTIVE FREQUENCY OF CONFLUENCE OF FLASHES IN THE RABBIT RETINA ADAPTED TO DARKNESS PERFORMED BY MEANS OF AN ANALOGUE COMPUTER [ANALIZA OBIEKTYWNEJ CZESTOTLIWOSCI ZLEWANIA BLYSKOW W SIATKOWCE KROLIKA ZAADAPTOWANEGO DO CIEMNOSCI-WYKONANA ZA POMOCA SUMATORA ANALOGOWEGO].
Kazimierz Strzyzewski.
Acta Physiologica Polonica, vol. 16, May–Jun. 1965, p. 445–449. 5 refs. In Polish.

Flicker fusion frequency in the retina of rabbits adapted to darkness was studied. Retinal potentials were elicited by flashes of a xenon lamp, and were summated with the help of an analogue summator. Flicker fusion frequency was achieved with 100–120 flashes/sec.

A65-81944
ANALYSIS OF OBJECTIVE FREQUENCY OF CONFLUENCE OF FLASHES IN THE ENCEPHALOGRAM OF RABBITS ADAPTED TO DARKNESS PERFORMED BY MEANS OF AN ANALOGUE COMPUTER [ANALIZA OBIEKTYWNEJ CZESTOTLIWOSCI ZLEUANIA BLYSKOW W ELEKTROENCEFALOGRAMIE KROLIKA ZAADAPTOWANEGO DO CIEMNOSCI—WYKONANA ZA POMOCA SUMATORA ANALOGOWEGO].
Kazimierz Strzyzewski.
Acta Physiologica Polonica, vol. 16, May–Jun. 1965, p. 451–455. 8 refs. In Polish.

The electroretinogram (ERG) and electroencephalogram (EEG) curves of the optic cortex of rabbits adapted to darkness were recorded in response to stimulation of the retina with white light from a xenon flash lamp. The EEG and ERG responses were summated with the help of an analog summator. Light flashes of frequency 20/sec. or more caused persistence of only the b_1 wave in the EEG, presumably as a result of the action of the daylight system of the retina. Objective flicker fusion frequency in the optical cortex of the rabbit, determined on the basis of presence of the b_1 wave, amounted to about 50/sec.

A65-81945
EFFECTS OF COLD EXPOSURE ON HEART FUNCTION IN IMMUNOSYMPATHECTOMIZED RATS.
F. Berti, R. Lentati, and M. M. Usardi (Milan U., Inst. of Pharmacol., Italy).
Medicina et Pharmacologica Experimentalis, vol. 13, 1965, p. 227–232. 9 refs.
Contract AF 61(052)736.

The role of catecholamines stored in the adrenal medulla for survival of rats during cold exposure was observed using normal and immunosympathectomized rats, submitted to surgical removal of the adrenal medulla. A dramatic alteration of heart rate electrocardiographic pattern and fall of body temperature were observed in immunosympathectomized-medullectomized rats, but not in the other groups.

A65-81946
EFFECTS OF LOW FREQUENCY AND INFRASONIC NOISE ON MAN.
George C. Mohr, John N. Cole, Elizabeth Guild, and Henning E. von Gierke.
Aerospace Medicine, vol. 36, Sep. 1965, p 817-824. 7 refs.
AF Systems Command supported research.
NASA Defense PR T-22031-G.

Future manned space systems, with larger pay loads and more powerful boosters, will generate during launch operations noise environments with maximum energy in the 1-100 c.p.s. frequency range. In order to investigate human tolerance to such environments, five noise-experienced officers were exposed for two-minute periods to high intensity broad-band, narrow-band, and pure-tone low frequency noise. The effects of these exposures on cardiac rhythm, hearing threshold, visual acuity, and fine motor control were observed. Exposures up to 154 db. in the 1-100 c.p.s. range were achieved; the range of human exposure to infrasound was extended from 20 to 40 db. above prior documented experience. Both objective responses of the subjects demonstrated that short-duration exposure to low frequency noise up to 150 db. is well within human tolerance limits. Exposures above 150 db. elicited responses indicating the limiting range of subjective tolerance and reliable performance was being approached.

A65-81947
OBJECTIVE EVALUATION BY DIGITAL COMPUTERS OF THE HYPOXIC STRESS REACTIONS IN MAN AND OF THE METHODS USED.
J. Dvorak, J. Andel, J. Horak, J. Krecek, and B. Filsakova (Inst. of Aviation Med., Prague, Czechoslovakia).
Aerospace Medicine, vol. 36, Sep. 1965, p. 840-842.

It was proved, by means of computational analysis, that it is possible to express the weights of the methods used by calculating certain coefficients; these are changed according to the number and combination of methods. Thus, a certain set of methods with a relatively smaller deviation from the ideal value and the lowest probable error is easily arranged. In this way it is possible to characterize the best combination of parameters to be followed, the sufficient number of methods in future work, and/or which of two or more combinations of methods is to be preferred.

A65-81948
NEUROLOGIC ADAPTATIONS AND AUDIOGENIC RESPONSES IN MICE EXPOSED TO A CHRONIC 2X GRAVITY FIELD.
Julian P. Cooke and Richard W. Bancroft (Aerospace Med. Div., USAF School of Aerospace Med., Brooks AFB, Tex.)
Aerospace Medicine, vol. 36, Sep. 1965, p. 843-850. 55 refs.
AF Systems Command supported research.

A study of the effect of effective gravity ($2g_e$)-exposure of young mice for 10 or 11 days, following testing for response to intense noise at ground-level gravity is presented. Adaptations affecting neurological response in some animals were observed. These adaptations are not considered necessarily detrimental to the organism. The latter conclusion is based upon both a reduction in the incidence and severity of audiogenic seizure following acceleration. It is suggested that the development of a more efficient circulatory system during acceleration may be associated with this seizure reduction. Other adaptations include alterations in the growth pattern, changes in the percentage ratio of organ/body weight, and hematological alterations that are indicative of stress response. These findings do not rule out re-adaptations of the balance or hearing mechanism or physiological alterations that may result.

A65-81949
OBSERVATIONS ON RATS EXPOSED TO A SPACE CABIN ATMOSPHERE FOR TWO WEEKS.
Philip Felig (Aerospace Med. Div., Aerospace Med. Res. Lab., Wright-Patterson AFB, Ohio).
(Aerospace Med. Assoc., Ann. Meeting, New York, N.Y., Apr., 26, 1965).
Aerospace Medicine, vol. 36, Sep. 1965, p 858-863. 28 refs
NASA Defense PR, R-87.

The effects of breathing 98 per cent oxygen at 258 mm. Hg were studied in male albino rats maintained for two weeks in a closed system environmental chamber. Three separate experiments were conducted, in each of which temperature, humidity and CO_2 concentration were carefully regulated. Control animals were maintained in identical cages in room air. All but one of the 140 rats exposed to oxygen survived for a mortality rate of less than one per cent and a total exposure time of 1,960 rat-days. No significant differences as compared to controls were noted in growth rates or in pulmonary, hepatic, renal and thyroid function. A very modest reduction in hematocrit observed in each experiment may be attributable to a mild suppression of erythropoiesis.

A65-81950
CURRENT UNITED STATES AIR FORCE POLICY ON GLAUCOMA.
Jed Lee Howard, W. Bruce Clark, James F. Culver, and Thomas J. Tredici (AF Systems Command, Aerospace Med. Div., USAF School of Aerospace Med., Ophthalmol. Branch, Brooks AFB, Tex.)
(Aerospace Med. Assoc., Meeting, New York City, N. Y., Apr. 27, 1965).
Aerospace Medicine, vol. 36, Sep. 1965, p. 878-880. 11 refs.

The current United States Air Force glaucoma policy has been in effect since January 1963. In the intervening two years, 43 people have been returned to flying duties on waiver for: (a) Preglaucoma—Aircrew personnel with tensions of 22-29 mm. Hg, full visual fields, normal funduscopy, and capability for quarterly follow-up were permitted to continue flying military mission without medication; and (b) Glaucoma—If the tension surmounted 29 mm. Hg, there was early evidence of visual field loss, or the optic disc appeared cupped, grounding was initiated. Therapy with a sympathomimetic amine was instituted. Waiver for return to flying was considered by the Office of the Surgeon General on the recommendation of the consultation centers at Brooks Air Force Base, Tachikawa Air Force Base, or Wiesbaden Air Force Base attesting to the physiologic normalcy of the eyes. Flying with such medication was then permitted.

A65-81951
TIME PERCEPTION AND ANTICIPATORY REFLECTION.
D. G. El'kin (Mechnikov U., Odessa, Ukrainia).
(Voprosy Psikhologii, May-Jun. 1964, p. 123-130.
Soviet Psychology and Psychiatry, vol. 3, Spring 1965, p. 42-48. 30 refs.

Time interval as a conditioned stimulus was explored in three series of experiments. In the first series the subjects reproduced sounds of 3,5,10 seconds after presentation of the standard stimulus. In the second series conditioned reflexes were developed to the time interval reproduced in the first series. The reflex was developed by transmitting a 60 volt current to the fingers of the subject for the time interval used as the conditioned stimulus. The reflex was regarded as established after it was observed 3 to 5 times in succession. In the third series of experiments time intervals were again reproduced as in the first series. 480 trials were carried out with 11 subjects. The error in reproduction of time interval decreased as the conditioned reflex to a given interval was elaborated. In the third series perfect time perception was frequent. Reproduction of the time interval for which a conditioned reflex was not developed showed no change in the third series as compared to the first. The results are discussed in terms of the formation of anticipatory reflection and of the role of knowledge of results.

A65-81952
NOTE ON INDIVIDUAL STORAGE LOADS AND INDIVIDUAL LOAD REDUCTIONS.
Kenneth E. Lloyd (Wash. State U., Pullman).
Psychological Reports, vol. 16, Jun. 1965, p. 995-996.
Grant AFOSR 256-63.

Sequential memory tasks require the experimenter to construct a sequence of items to be remembered and cues to recall these items. In a series of studies, sequences were constructed in terms of the average number of items the subject was remembering at a recall point and of the average number of items the subject was asked to recall at a recall point. These averages were based on values assigned to individual items and recall points. The present study systematically varied the distribution of these individual values that formed the averages. Bimodal distributions affected recall differently from symmetrical distributions.

A65-81954
STUDIES ON SUBJECTIVE DURATION. II. SUBJECTIVE TIME MEASUREMENT DURING TASKS WITH DIFFERENT INFORMATION CONTENT.
John A. Michon (Inst. for Perception RVO-TNO, Soesterberg, The Netherlands).
Acta Psychologica, vol. 24, Jun. 1965, p. 205-212. 11 refs.

The influence is studied of a multiple choice task on the production of time intervals of 2 subjective seconds. The stimulus uncertainty and the response uncertainty of this task were varied independently between 0 and 2.58 bit (1 to 6 alternatives). Successive stimulus presentations were independent. The results show that the amount of stimulus uncertainty does not influence the length of the produced intervals. Only the transition from the 1-alternative task ($U[s] = 0$) to the multiple choice task ($U[s] > 0$) reflected itself in a decrease in average interval length. Response uncertainty and transmission on the other hand had a marked influence: average interval length appears to be a decreasing and decelerating function

of both response uncertainty and transmission. The results at first sight appear to be contradictory to numerous other investigations. The apparent discrepancy in literature is caused however, by the lack of formal task descriptions, such as are possible by means of concepts like uncertainty or constraint.

A65-81955
INFLUENCE OF MUSCULAR WORK ON THE PLASMA LEVELS OF 17-HYDROXYCORTICOSTEROIDS. [ZMIANY POZIOMU 17-HYDROKSYSTERYDOW W OSOCZU KRWI ZACHODZACE POD WTYWEM PRACY MIESNIOWEJ].
Krystyna Nazar (Pan, Zaklad Fizjologii Pracy, Warsaw, Poland).
Acta Physiologica Polonica, vol. 16, Mar.–Apr. 1965, p. 195–206. 27 refs. In Polish.

Experiments were carried out on 16 healthy men aged 18–25 years performing measured physical work on the cycloergometer. Changes in 17-hydroxycorticosteroids (17-OHCS) were studied under the influence of (1) physical work with a load of 1200 kg. min. performed until complete exhaustion, and (2) work with a moderate load of 450 kg. min. performed for 60 min. without any symptoms of fatigue. Plasma levels of 17-OHCS were determined immediately before work and 20 and 90 min. after stopping work, employing the method of Porter-Silber. The total energy expenditure in both types of work was similar. Additionally the heart rate and the plasma level of lactic acid and glucose were determined. Raised levels of 17-OHCS were observed 20 min. after stopping both types of physical work. After the load of 1200 kg. min. the rise amounted to 36.7 ± 14.8%; the differences are statistically significant. Ninety min. after work with the higher load, the 17-OHCS levels were still higher than at rest. The levels after the smaller work load at this time were already beginning to decline. The physiological mechanism and meaning of observed changes are discussed.

A65-81956
STUDIES ON THE INFLUENCE OF MECHANICAL VIBRATIONS OF LOWER FREQUENCY UPON THE BLOOD CHANGES IN WHITE RATS. III. DIAMETER MEASUREMENTS OF ERYTHROCYTES [BADANIA NAD WPTYWEM DRGAN MECHANICZNYCH NISZYCH CZESTOTLIWOSCI NA ZMIANY W KRWI SZCZUROW BIATYCH. III. POMIARY SREDNICY KRWINEK CZERWONYCH].
Ewa Otto-Buczkowska. (AM, Katedra Anat. Prawidlowej Slaskiej, Zabrze, Poland).
Acta Physiologica Polonica, vol. 16, Mar.–Apr. 1965, p. 219–226. 45 refs. In Polish.

The report deals with results of studies on the effect of mechanical vibrations on blood changes in white rats. The studies were performed on 40 white rats of the Wistar strain aged 4–6 months, weighing 160–180g. The animals were submitted to the action of vibrations for a period of two, four, six weeks and 3 months every day for 2 hours in a horizontal plane at a frequency of 5 c.p.s. and 20 mm. amplitude. Twenty rats formed a control group; the remaining 20 animals were submitted to vibrations, and the results were divided into five groups according to duration of vibrations. Measurements of diameter of erythrocytes were made with the micrometric method on stained preparations. The results showed an increase in the average diameter of erythrocytes and a change in the curve of anisocytosis after prolonged action of vibrations. A single exposure caused no changes.

A65-81957
HUMAN CEREBROVASCULAR RESPONSE TIME TO ELEVATION OF ARTERIAL CARBON DIOXIDE TENSION.
William Shapiro, Albert J. Wasserman (Va., Med. Coll., Dept. of Med., Richmond), and John L. Patterson, Jr. (Natl. Heart Inst., Bethesda, Md.) (Interam. Congr. of Cardiol., Seventh, Montreal, Canada, Jun. 1964).
Archives of Neurology, vol. 13, Aug. 1965, p. 130–138. 29 refs. Richmond Area Heart Assoc. supported research.
NASA Grant 156-61; Grant NIH FR00001602.

The pattern of change in blood gas tensions and cerebral blood flow (CBF) derived from cerebral arteriovenous O_2 differences during the first five to eight minutes following alteration in arterial CO_2 tension was observed in normal human subjects. A steady state was reached within this period for CBF and arterial CO_2 tension. In addition to the time required for elevation of arterial CO_2 tension, the cerebral vasculature, in most instances, required a further finite time interval to achieve a steady state. The return to control for these variables following cessation of CO_2 inhalation was more rapid than the achievement of new levels following inhalation of this gas. Jugular venous CO_2 tension changes correlated as well as the arterial tension of this gas with corresponding changes in CBF. It is suggested that the tissue tension of this gas may be a major, if not the principal factor, regulating the state of the cerebral vessels. Determinations of cerebral blood flow at ten second intervals in the control state and during a sham experiment revealed occasional extremes of variation up to 20%, but the mean of 60 measurements in eight control records was 3.4 ± 5.2% from the control point.

A65-81958
THE UTILIZATION OF GLUTAMINE BY ALGAE.
Loretta Belmont and J. D. A. Miller (U. Coll., Dept. of Botany, London, Great Britain).
Journal of Experimental Botany, vol. 16, May 1965, p. 318–324. 18 refs. Nuffield Found. and Dept. of Sci. and Indus. Res. supported res.

Monodus subterraneus, a strictly photolithotrophic alga, utilized glutamine as a nitrogen source by deamidation to glutamic acid. Cells and filtrates from cultures grown in nitrate deamidated glutamine but had no discernible effect on isoglutamine or asparagine. A protein precipitated from filtrates of cultures in nitrate medium had deamidating activity, and bore some resemblances to known glutaminases. The behaviour of four facultative chemo-organotrophs towards glutamine was examined. Of these, two were unable to utilize it either as a carbon or a nitrogen source; Bumilleriopsis brevis utilized it as a nitrogen source, after a lag period, without glutamic acid accumulation; Chlorella vulgaris absorbed it without a lag period and utilized it as carbon and nitrogen source, again with no evidence of deamidation.

A65-81959
FLIGHTSUIT AND SPACESUIT [SKAFANDR LETCHIKA I KOSMONAVTA].
N. Grishanov and S. Umanskii
Aviatsiia i Kosmonavtika, vol. 47, Jul. 1965, p. 54–60. In Russian.

The development of a pressurized flight suit began in the Soviet Union in the early thirties, in order to protect pilots in high altitude balloons against low temperature and hypoxia. Since then the design has been changing until the present design evolved, which was used by the astronaut Leonov for his extra-vehicular activity. The outstanding features of the modern space suit are: (1) flexibility by means of movable joints; (2) thermoregulation, which is essential in space, where the illuminated side of the body may reach high temperatures, while the dark side may become extremely cold; (3) the visor of the helmet, which must protect the subject from the injurious effect of cosmic rays; (4) automatic pressure regulation inside the suit; and (5) a separate life support system carried by the astronaut for extravehicular activity such as lunar exploration.

A65-81960
A FORCED-CHOICE INDICATOR FOR USE WITH WERNER'S DISC-RING PATTERN IN STUDIES OF BACKWARD MASKING.
Edward G. Heckenmueller and William N. Dember (Cincinati U., Ohio).
Psychonomic Science, vol. 3, Aug. 15, 1965, p. 167–168. 5 refs.

A forced choice method is described for use in backward-masking studies with Werner's disc-ring pattern. The efficacy of the method is verified in data from 4 observers. An interesting interactive effect on detection is reported between disc-duration and brightness.

A65-81961
VIBROTACTILE THRESHOLD AND PULSE POLARITY.
Ronald T. Verrillo (Syracuse U., N. Y.).
Psychonomic Science, vol. 3, Aug. 1965, p. 171. 5 refs. NIH supported research.

Vibrotactile thresholds on human glabrous skin were determined for short monopolar pulses and for two directions of skin displacement. Positive and negative going pulses showed no threshold differences. No threshold difference was obtained when movement into the skin was compared to outward movement of the contactor. The threshold appears to be independent of the direction of displacement.

A65-81962
THE STATE OF CARDIOVASCULAR AND RESPIRATORY SYSTEMS OF ASTRONAUTS DURING THE SPACE FLIGHT OF "VOSKHOD-1" [REAKTSII SERDECHNO-SOSUDISTOI I DYKHATEL'NOI SISTEM KOSMONAVTOV V USLOVIIAKH ORBITAL'NOGO POLETA NA KOSMICHESKOM KORABLE "VOSKHOD-1"].
P. V. Vasil'ev, A. D. Voskresenskii, L. L. Kas'ian, D. G. Maksimov, L. D. Pestov, and N. A. Chekhonadskii.
Izvestiia Akademii Nauk SSSR. Seriia Biologicheskaia, no. 4, Jul.–Aug. 1965, p. 491–499. 12 refs. In Russian.

The general trend of changes in pulse and respiration frequency shown by members of the crew of the Voskhod 1 spacecraft was the same as that of their predecessors, though the dynamics of mean values of these indices had some individual peculiarities. The electrocardiogram (ECG) and seismocardiogram indices corresponded on the average to the pulse frequency and disclosed no disorders in the cardiac activity. Alterations in the fluctuations of the R–R interval in the ECG assessed by 100–200 heart cycles for every orbit and fluctuations of the respiratory pause in similar parts of telemetric recordings agreed both in time and direction. The lowest fluctuation of R–R was found in one astronaut during sleep and was attributed to the stable mean pulse rate. An attempt is made to analyze alterations in R–R fluctuations in relation to the dynamics of the general state of the cosmonauts based on generally accepted ideas regarding the effect of weightlessness upon regulation of cardiovascular functions.

A65-81963
TISSUE AND BLOOD SATURATION WITH BIOTIN IN RELATION TO THE CHARACTER OF MUSCULAR WORK [NASYCENIE TKANEK I KRWI BIOTYNA W ZALEZNOSCI OD CHARAKTERU PRACY MIESNIOWEJ].
Mieczysław Białecki and Feliks Nijakowski.
Acta Physiologica Polonica, vol. 16, May-Jun. 1965, p. 401-405. 11 refs.
In Polish.

Concentrations of biotin in the tissues and blood were determined at rest and after strenuous and prolonged physical effort. It was found that prolonged physical exertion (four hours daily for one month) under conditions of a steady supply of biotin ensuring complete saturation of the tissues increased the biotin concentrations in the skeletal muscles, heart muscle, liver and blood. Physical exercise for ten days under the same conditions caused lowering of the concentrations of biotin in the liver, and elevation in the kidneys. Strenuous physical exercise caused raised concentrations of biotin in the heart muscle.

A65-81964
SECONDARY POLYCYTHEMIA IN ADOLESCENTS AT HIGH ALTITUDE.
Albert Treger, David B. Shaw, and Robert F. Grover (Colo. U. Med. Center, Dept. of Med., Cardiovascular-Pulmonary Lab., Denver).
Journal of Laboratory and Clinical Medicine, vol. 66, Aug. 1965, p. 304-314. 26 refs.
Grant PHS HE-06895; and Colo. State Health Dept. supported research.

Significant changes in the production of red blood cells occur after puberty. The pattern of these changes by age and sex has been well described in populations living near sea level. Since chronic hypoxia might well modify this hematologic pattern, the normal adolescents of a population residing at a high altitude were studied. Samples of venous blood were obtained from 355 boys and girls ranging in age from 10 to 18 years and living at an altitude of 10,200 feet in Leadville, Colorado. Whole blood hematocrit, hemoglobin concentration, and red blood cell (R.B.C.) count were determined. Serum from blotted blood was analyzed for iron content, unsaturated iron-binding capacity, and bilirubin concentration. The effects of chronic hypoxia were clearly manifest in girls. Throughout the age range of 10 to 18 years, mean values for hemoglobin, hematocrit, and R. B. C. count were higher than at comparable ages at sea level. However, there was little or no tendency of these parameters to increase with age. Among the boys, the effects of high altitude were also obvious, in that all 3 parameters were higher than at comparable ages at low altitudes. Prior to puberty, boys and girls had similar blood values. However, in boys, puberty apparently provided an added stimulus to red cell production. From 14 to 18 years of age, there was a progressive and significant increase in all 3 parameters when compared with the data from girls. There was no evidence of iron deficiency in either sex. These data indicate that chronic hypoxia produces a significant erythrocytosis throughout adolescence in both boys and girls living in an altitude of 10,200 feet.

A65-81965
METABOLIC RATES IN PRESSURIZED PRESSURE SUITS.
Thomas J. Harrington, David K. Edwards III, and Edward C. Wortz (AiRes. Manuf. Co., Los Angeles, Calif.)
Aerospace Medicine, vol 36, Sep. 1965, p. 825-830.
NASA Contract NAS 9-1639.

Four subjects wearing a full pressure space suit were tested in a high altitude chamber at sea level pressure and at simulated 34,000 feet with a suit pressurized to 3.5 p.s.i.g. The subjects were exercised on a treadmill, and their metabolic rates were measured and compared with the heat removal rates from the suit by ventilating oxygen gas at 15 cubic ft. per min. flow, 40°F. dew-point temperature, and 70° and 80°F. dry-bulb temperature. Avenues of heat loss other than by suit ventilation gas flow were minimized, so a heat balance was achieved between the subjects' metabolic heats, the heats removed by the ventilation system, heats stored by the subjects, and useful work ("efficiency") accomplished by the subjects. It was found that the gas flow was marginal for cooling at light work rates (at 180 kcal./m^2./hr.) and inadequate for heavier work, in which case the subjects apparently stored the excess heat. The metabolic rates observed with the pressurized suits were quite high, and represented approximately twice the rates observed in experimentation with unpressurized suits.

A65-81966
SYSTEM DESIGN COSTS AND CONSIDERATIONS AS A FUNCTION OF MAINTAINING SPACE CREW PHYSICAL FITNESS.
L. Streimer, A. J. Getzkin, and B. Wendrow (North Am. Aviation, Space and Inform. Systems Div., Downey, Calif.; and San Fernando Valley State Coll., Calif.)
Aerospace Medicine, vol. 36, Sep. 1965, p. 830-833. 19 refs.

The engineering costs imposed by exercise programs upon space system design are detailed. The implications of their impact upon future systems are discussed and the possibilities of the utilization of pharmacological techniques alone or in conjunction with exercise programs as maintainers of space crew physical fitness are surveyed.

A65-81967
INTERSTELLAR MATTER (WITH SPECIAL REFERENCE TO DARK CLOUDS).
Jakob Eugster (Zurich U., Switzerland).
Aerospace Medicine, vol. 36, Sep. 1965, p. 834-840. 34 refs.

Current thought on the structure of dark clouds deserves special attention in that it is paving the way for extensive analyses of interstellar dust particles and, more recently, for studies in space chemistry. Interstellar matter is generally defined as any material which is not clustered together to form stars but which exists as free gas or dust in interstellar space. From a biological viewpoint it is important to know what happens to the rather considerable amounts of dust deposited on the earth's surface. Meteoritic dust and cosmic dust are greatly changed under the influence of water and oxygen in the biosphere. Eventually, dust in the soil or porous rock will seep away and be absorbed by plants (Fe). Through plants, atoms of cosmic material finally are transferred to animal and human bodies. Studies on whether radioactive isotopes of iron (Fe and Cl) can have any biological consequences have not yet been undertaken.

A65-81968
INFLUENCE OF BREATHING CARBON DIOXIDE UPON SOME ALTERATIONS INDUCED BY HYPOXIA.
Maurice V. Strumza (Med. Fac., Lab. of Aviation Med., Paris, France).
Aerospace Medicine, vol. 36, Sep. 1965 p. 850-854. 7 refs.
Direc. des Rech. et Moyens d'Essais, France supported research.

Studies were performed on 114 young healthy volunteers in two parallel trials, to ascertain the correction of the alterations induced by mild hypoxia on the psychologic and psychomotor performances, by addition of carbon dioxide to the artificial atmosphere. The new data corroborate our previous observations and allow an estimate of the limits of correction possibilities. The intellectual efficiency tests and the estimate of the metabolic cost of a task show that: (1) The correction of the alterations bound to mild hypoxia, inspiratory pressure (PIO_2) 115 and PIO_2 110 mm. Hg, seems to be better with $PICO_2$ 15 mm. Hg than with $PICO_2$ 7mm. Hg. (2) The alterations resulting from inhalation of gas mixtures with lower pressure (PO_2, 100 mm. Hg. is better corrected with PCO_2 9 mm. Hg. than with PCO_2 15 mm. Hg. At the lower concentration of carbon dioxide, the subjects were disturbed and hyperventilation was seen. These conclusions are valid for experiments of two hour duration.

A65-81969
INFLUENCE OF EYE LID MOVEMENT UPON ELECTRO-OCULOGRAPHIC RECORDING OF VERTICAL EYE MOVEMENTS.
W. Barry and G. Melvill Jones (McGill U., Dept. of Physiol., Defense Res. Board of Canada Aviation Med. Res. Unit, Montreal, Canada).
Aerospace Medicine, vol. 36, Sep. 1965, p. 855-858.
Grants D. R. B. 9910-37 and 9310-92.

The cause of an electro-ocular artifact noted during vertical saccadic eye movements has been investigated. Records of eye movements were simultaneously obtained from D.C. electro-oculography and a movie photographic method in response to intermittent vertical saccadic changes in visual fixation. The artifact was found to run the same time course as the upper eye lid movement and is probably directly attributable to this. An argument is advanced suggesting that changes in the relative position of the eyelid and eyeball are responsible for the artifact and a simplified model of the electrical set-up by which the eye ball, lids, and electrodes might function is presented.

A65-81970
USAF WHOLE BODY GAMMA SPECTROMETRY.
Alvin M. Burner, Richard E. Benson, and Robert G. Thomas (AF Logistics Command, USAF Radiol. Health Lab., Wright-Patterson AFB, Ohio).
Aerospace Medicine, vol. 36, Sep. 1965, p. 864-868.

Gamma spectrometry has become an important adjunct in support of routine and emergent assessment of radioactivity in biological and environmental specimens. It has proved to be particularly useful in direct identification of known and unknown radionuclides present in the body and in the assessment of the level of activities present. In accord with the increasing demand for an Air Force capability to conduct personnel, a whole body gamma spectrometry facility was established in the USAF Radiological Health Laboratory (AFLC) at Wright-Patterson AFB, Ohio. Studies undertaken to identify the sources of the variation are reported. Techniques employed for calibration of the whole body counter are emphasized. Studies involving human subjects and phantoms to demonstrate the influence of factors such as body size and changing distribution of nuclides within the body upon in vivo counting efficiency are described. The importance and application of whole body gamma spectrometry in support of the Air Force aerospace mission are discussed.

A65-81971
MULTI-STAGE CRYOGENIC TRAPPING SYSTEM.
James P. Conkle, James W. Register, and Gordon L. Worth (USAF School of Aerospace Med., Bioastronautics Dept., Environ. Systems Branch, Chem. Support Sect., Brooks AFB, Tex.).
Aerospace Medicine, vol. 36, Sep. 1965, p. 869–874. 5 refs.

A portable, easily operated, multi-stage cryogenic trapping system contained in a box 86 x 66 x 61 cm. was developed. Liquid nitrogen, gaseous nitrogen, ice, dry ice, and 110 volt 60-cycle power required for operation of the system are available to most military installations. This trapping system was designed for use in studies of trace contaminants in simulated space cabin atmospheres, but may be used in any situation where there is a desire to concentrate atmospheric contaminants for identification and quantification. Partial separation of compounds was accomplished by operating the trapping cylinders of the system at three different temperatures. Several compounds are listed according to the temperature at which they are expected to be concentrated in significant quantities. The system is efficient for concentration of micro and macro contaminants in an atmosphere. The concentration of a contaminant in a sample area may be estimated from the total trapping time, the flow through the system during trapping, and the concentration of the contaminant in the trapping cylinders.

A65-81972
SOVIET HIGH ALTITUDE PRESSURE SUIT DEVELOPMENT, 1934–1955.
Charles L. Wilson (Headquarters AF Systems Command, DCS Sci. and Technol., Andrews AFB, Washington, D. C.).
(Aerospace Med. Assoc., Meeting, New York City, N. Y., Apr. 27, 1965).
Aerospace Medicine, vol. 36, Sep. 1965, p. 874–877. 11 refs.

As a part of the continuing study in international high altitude physiological research, protective equipment development, operational support, and aerospace life-support subsystem planning, an open-source review was made of Soviet high-altitude pressure suit development, testing and use. Beginning with a crude prototype suit in 1934, the Soviet pressure suit program quickly expanded into an exceptionally well organized, staffed, and funded effort. Their accomplishments included a thorough review of world literature on high altitude physiology, aircrew requirements for stratospheric flying, and foreign technological developments; design of many suits; combined low-temperature, low-pressure, and flight tests; electrically heated face plates and clothing; reliable closed circuit aircraft and escape environmental control systems. Soviet aviation medicine specialists enjoyed long, continuous assignment to research problems with the notable exception of the years 1943–1946. Translated open-source literature is abundant; several superb reports are doctoral theses. All evidence suggests that Soviet life scientists have been earnest and sincere in striving to provide adequate personal equipment for their aircrews.

A65-81973
PULMONARY MECHANICS AT ALTITUDE IN NORMAL AND OBSTRUCTIVE LUNG DISEASE PATIENTS.
Silvio Finkelstein, Joseph F. Tomashefski, and Frederick H. Shillito (Ohio State U. Coll. of Med., Dept. of Prevent. Med., Aviation Med. Res. Lab., Columbus).
(Aerospace Med. Assoc., Meeting, New York City, N. Y., Apr. 29, 1965).
Aerospace Medicine, vol. 36, Sep. 1965, p. 880–884. 9 refs.
Grant NIH EF-36

To determine the effects of acute exposure to hypobaric 100 per cent oxygen upon mechanics of ventilation in both normal subjects and in patients with obstructive lung disease, two sets of experiments were designed. Normals were exposed to altitude equivalents of ground level, 18,000 feet and 33,700 feet in an altitude chamber. Similarly, patients were exposed to altitude equivalents of ground level and 18,000 feet. With the single exception of one asthmatic patient, vital capacity decreased under hypobaric conditions in both groups. All of the remaining tests which were high flow dependent improved without exception upon exposure to altitude. In addition to the objective improvement which was found to be statistically significant, a subjective sensation of decreased effort of breathing at altitude in comparison with ground level was experienced by all the subjects, both normals and patients.

A65-81974
"H-RESPONSE" IN THE ELECTROENCEPHALOGRAMS OF AIRCREW PERSONNEL.
E. Liske (USAF School of Aerospace Med., Brooks AFB, Ohio).
Aerospace Medicine, vol. 36, Sep. 1965, p.884–887. 13 refs.
AF Systems Command supported research.

Most clinical reports on the subject agree that the electroencephalogram (EEG) in migraine patients reveals dysrhythmic trends to a greater degree than in normal controls; however, the EEG findings have little specificity. Recently frequency analysis of the EEG's of migraine patients had revealed a much stronger photic response at the higher stimulation rates. When this response is graphed a curve emphasizing the high-frequency response is obtained. This curve has been called the H-response. The present study explores the possibility of determining an "H-response" by simple visual assessment of the EEG without the inconvenience and expense of using a frequency analyzer. The 12 "H-responses" that were obtained from 553 patients are correlated with the clinical findings, with special attention to those with migraine. It is concluded that those "H-responses" which are determined by visual methods cannot be correlated with migraine.

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