NASA SP-7011 (61)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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NASA SP-7011 (61)

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 February, 1969

Scientific and Technical Information Division
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. MARCH 1969

INTRODUCTION

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

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

a NASA entries identified by their *STAR* accession numbers (N69-10000) series),
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c. LC entries identified by a number in the A69-80000 series

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

L C Entries

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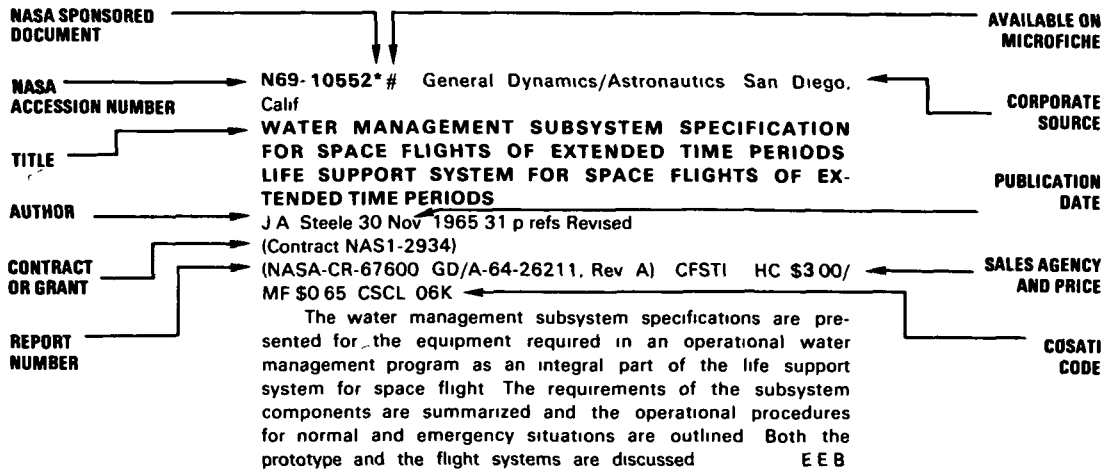
TYPICAL CITATION AND ABSTRACT



AEROSPACE MEDICINE AND BIOLOGY

a continuing bibliography MARCH 1969

STAR ENTRIES

N69-12602 Stanford Univ Calif
THE REORIENTATION OF A HUMAN BEING IN FREE FALL
Preston Gibson Smith Jr (Ph D Thesis) 1967 108 p
Avail Univ Microfilms HC $5 40/Microfilm $3 00 Order No 67-17507

The object of this work is to determine how a freely falling human being can change the orientation (attitude) of his body by moving parts of the body relative to each other To this end four models of the human body are studied in connection with the following two problems (1) How does the orientation of each part of the body change when the relative motions of the parts proceed in certain specified ways? (2) How if at all can the parts be moved relative to each other so as to bring the model from a given *initial state to a given final state? In both problems it is assumed* that the system is initially at rest so far as rotational motion is *concerned* In the case of the first problem results are presented for each of the four models considered, in three instances these results are in the form of plots showing possible reorientations for a typical human being A general method of solution is given for the second problem and this method is applied to a model of the human body Dissert Abstr

N69-12609 Michigan Univ Ann Arbor
CAPILLARY PENETRATION OF LIQUIDS BETWEEN DISSIMILAR SOLIDS
William Joseph O Brien (Ph D Thesis) 1967 97 p
Avail Univ Microfilms HC $5 00/Microfilm $3 00 Order No 67-15666

The purpose of this study was to develop and evaluate a mathematical model for the capillary penetration of a liquid between two dissimilar plates An attendant aim was to apply the proposed model to problems in restorative dentistry involving capillary penetration by mouth fluids In view of the many systems found where a liquid penetrates between different solid materials, such a model should find wide application Experimental values of capillary penetration between combinations of three liquids and several solids were obtained using the hyperbola method Experiments on the penetration of liquid around wax fillings in prepared extracted teeth were carried out A radioactive tracer solution was employed and the relative amounts of penetration were assessed with a liquid scintillation spectrometer The results were interpreted in the light of the derived equation Leakage around dental fillings and denture retention are discussed using thermodynamic concepts Dissert Abstr

N69-12652 Stanford Univ Calif
THE CONTRACTION RATE OF RAT CARDIAC CELLS IN RESPONSE TO PERFUSION AN EXPERIMENTAL STUDY OF CELLS CULTURED *IN VITRO* AND THE FORMULATION OF A MATHEMATICAL MODEL
Michael Antonio Savageau (Ph D Thesis) 1967 172 p
Avail Univ Microfilms HC $8 00/Microfilm $3 00 Order No 67-17495

This paper describes an experimental study of cardiac cells *in vitro* and a mathematical model, based on these observations as well as mechanisms hypothesized at the molecular level Rat hearts were dissociated into isolated cells The cells were seeded in microcapillary tubes which were placed in petri dishes filled with culture medium A mathematical model, based on molecular mechanisms found in microorganisms and believed to function in higher organisms was formulated The model was then used to predict the dynamic responses observed experimentally The agreement between theoretical and experimental results is good Dissert Abstr

N69-12717# School of Aerospace Medicine Brooks AFB Tex
NITROGEN AND HELIUM AS FACTORS AFFECTING DECOMPRESSION STRESS SEVERITY
Henry B Hale and Edgar W Williams Jun 1968 13 p refs
(AD-676133, SAM-TR-68-64) Avail CFSTI CSCL 6/19

Endocrine-metabolic appraisal was made by means of a battery of urinary determinations in three experiments in which human volunteers were exposed to sequential changes in pressure and composition of the gaseous environment In each test there was exposure to a two-gas environment either 46% oxygen - 50% nitrogen or 46% oxygen - 50% helium, with ambient pressure at 7 p s i a The objective was to quantify stress effects of the diluent gases helium and nitrogen Nonspecific stress was detected in each experiment, the sum of the deviations from control levels for ten urinary variables (including norepinephrine epinephrine, 17-hydroxycorticosteroids, various electrolytes, and certain nitrogenous metabolites) serving to differentiate the effects of the different diluent gases When the duration of exposure to the different two-gas environments was only 4 hours and there was brief subsequent exposure to 3 5 p s i a (breathing 100% oxygen), nitrogen appeared to be the stronger stressor with duration increased to 12 hours helium was judged to be the stronger stressor Author (TAB)

N69-12720# School of Aerospace Medicine Brooks AFB Tex
SIMULTANEOUS DETERMINATION OF Fe^{59}, Cr^{51} AND I^{125}, USING A GAMMA SPECTROMETER

John W Harper James F Green, and Donald F Logsdon, Jr May 1968 11 p refs
(AD-676136 SAM-TR-68-40) Avail CFSTI CSCL 6/1

In scintillation spectrometry there are methods for separating 59Fe from 51Cr activity and 51Cr from 125I activity but no standard method has been presented for the simultaneous measurement of 59Fe 51Cr, and 125I In this study a well-type scintillation spectrometer and discriminator were used to determine the activity of these three isotopes in one sample The procedure is based on the use of contributory factors which remain constant and can be used in the calculation of various blood parameters The mixed sample was counted at each of three previously determined settings and corrected for background Then the net 59Fe count equaled the total count at the 59Fe setting the net 51Cr count equaled 10% of the count at the 59Fe setting subtracted from the count at the 51Cr setting and the net 125I count equaled the sum of 7 5% of the net 59Fe count plus 7 0 % of the net 51Cr count subtracted from the count at the 125I setting The method can be used to separate the activity of any group of three or more gamma-emitting isotopes if their energy peaks are well separated
Author (TAB)

N69-12721# Life Sciences Inc , Fort Worth Tex
THE EFFECTIVE TIME CONSTANT IN TRACKING BEHAVIOR Technical Report, Oct 1966–Oct 1967
W G Matheny and D A Norman Orlando, Fla Naval Training Device Center Aug 1968 65 p refs
(Contract N61339-67-C-0034)
(AD-675806 NAVTRADEVCEN-67-C-0034-3) Avail CFSTI CSCL 5/8

The purpose of this study was to derive a construct based upon properties of man and machine which could be postulated to be related to level of precision of control in closed loop tracking by the human operator A construct, termed the Effective Time Constant (te) was developed For second order systems te is derived from the gain (K) frequency (omega) and damping (zeta) of the machine and the threshold (T) of the human operator For first order systems the machine properties are gain (K) and machine time constant (taw) Two experiments designed to test the postulate that te is related to level of control were conducted The Effective Time Constant was found to be related to rate of improvement in performance and to overall level of control However the results indicate that absolute level of control may be more precisely predicted from the product (Kte) of the Effective Time Constant and gain This interactive effect has its greatest effect in early training trials and diminishes with practice The implications of the results for fidelity of simulation adaptive training and the study of basic psychomotor skills are discussed
Author (TAB)

N69-12725# Life Sciences Inc Fort Worth Tex
PILOT PERFORMANCE, TRANSFER OF TRAINING AND DEGREE OF SIMULATION 3 PERFORMANCE OF NON-JET EXPERIENCED PILOTS VERSUS SIMULATION FIDELITY Technical Report, Nov 1966–Nov 1967
N C Ellis A L Lowes W G Matheny and D A Norman Orlando Fla Naval Training Device Center Aug 1968 76 p refs
(Contract N61339-67-C-0034)
(AD-675825 NAVTRADEVCEN-67-C-0034-1) Avail CFSTI CSCL 1/2

This is the fourth report in a study program dealing with pilot performance transfer of training and degree of simulation The purpose of this study was to repeat a previously conducted transfer of training study using non-jet experienced pilots as subjects Its primary objective was to determine the training feasibility of using degraded levels of simulation fidelity in an Operational Flight Trainer (OFT) Simulation fidelity was varied by incorporating coefficient changes into the aerodynamic equations of flight such that rigid coefficients and least squares approximations to flexible coefficients served as the experimental conditions and flexible coefficients served as the control condition
Author (TAB)

N69-12797# Union Carbide Nuclear Co , Oak Ridge Tenn
BIO-PARTICLE CARBON ANALYZER OPERATION AND MAINTENANCE MANUAL
R H Stevens, comp and H A Kermicle comp 30 Aug 1968 53 p refs
(Contract W-7405-ENG-26)
(K-L-6211) Avail CFSTI

Operation and maintenance of an instrument for analyzing individual biological particulates such as cells, pollen, and spores for carbon by sampling them from a drop of liquid media onto a moving wire and analyzing each particle separately in a solid-sample type of hydrogen flame ionization detector are described The smallest detectable carbon weight is approximately 10^{-12} gram
NSA

N69-12859 University of Southern Calif Los Angeles
SYNTHESIS AND IDENTIFICATION OF MATHEMATICAL MODELS FOR THE DISCRETE CONTROL BEHAVIOR OF HUMAN OPERATORS
Michael James Merritt (Ph D Thesis) 1967 199 p
Avail Univ Microfilms HC $9 00/Microfilm $3 00 Order No 67-17689

This dissertation describes the synthesis and identification of mathematical models which characterize the discrete control behavior of human operators This type of behavior occurs in control situations where the human operator must decide between a small number of alternatives while generating continuous control actions at the same time A systematic treatment of discrete control actions is made possible by the introduction of two new elements which can be used to configure complete human operator models Two types of hybrid elements are presented One accepts continuous inputs and produces binary outputs, while the other has continuous inputs and produces continuous outputs under the control of binary signals
Dissert Abstr

N69-12860 Brown Univ , Providence, R I
LARGE SPHERICAL CAPS IN LOW REYNOLDS NUMBER TUBE FLOW A MODEL OF BLOOD FLOW IN CAPILLARIES
Robert Milo Hochmuth (Ph D Thesis) 1967 96 p
Avail Univ Microfilms HC $5 00/Microfilm $3 00 Order No 68-1465

Blood flow in the capillaries of living systems is characterized by the motion of large flexible disc-like red cells suspended in a Newtonian liquid (plasma) which flows through the capillaries at low Reynolds numbers In order to gain an understanding of capillary flow the stability velocity and additional pressure drop (in excess of the Poiseuille drop) associated with the motion of large rigid neutrally buoyant spherical caps were studied for low Reynolds number flow through a 1 cm glass tube It was found that spherical caps were stable in an orientation in which the base plane was perpendicular to the direction of flow For spherical caps in this stable orientation, measurements of the velocity and the additional pressure drop revealed that both were relatively independent of cap thickness and cap spacing, but depended strongly on the cap diameter The experimental results were used to calculate capillary pressure drops and a possible mechanism for non-linear pressure-flow characteristics is suggested
Dissert Abstr

N69-12863 Stanford Univ Calif
THE DISPERSION AND DISSIPATION OF WAVES IN BLOOD VESSELS

James Arthur Maxwell (Ph D Thesis) 1967 113 p
Avail Univ Microfilms HC $5 60/Microfilm $3 00 Order No 67-17464

Dispersion and dissipation phenomena associated with waves propagating in blood vessels are potential measures of the distensibility of the vessels and other cardiovascular parameters We assume the vessels to behave like thin-walled circular cylindrical shells filled with an inviscid compressible fluid The vessel wall is assumed to have isotropic and homogeneous viscoelastic properties The waves are described by small three-dimensional displacements of the middle surface of the shell from an equilibrium configuration defined by a mean transmural pressure and an initial axial strain The fluid motion associated with the waves is considered as irrotational The linearized differential equations of motion are based on the shell equations derived by Flugge Dissert Abstr

N69-12866 Catholic Univ of America Washington, D C
A PHASE CONTRAST CINEMICROGRAPHIC ANALYSIS OF THE EFFECTS OF ELEVATED OXYGEN TENSION ON CELL DYNAMICS IN STRAIN L CELLS
Nicholas Ferencz Jr (Ph D Thesis) 1967 77 p
Avail Univ Microfilms HC $4 20/Microfilm $3 00 Order No 67-17144

Phase contrast cinemicrographic methods and fixed preparations were used to ascertain the effects of prolonged exposure of Strain L cells to Eagle s Minimum Essential Medium which was gassed with a mixture of 95 percent oxygen and 5 percent carbon dioxide Several techniques were developed one of which allows a cell culture to be filmed and exposed to gassed medium simultaneously This was accomplished by gassing medium in a specially constructed glass vessel and intermittently allowing the gassed medium to flow into a growth chamber A basically similar system was developed whereby six sister cultures were perfused simultaneously with gassed medium from the same reservoir A gravity recovery method for collecting synchronously dividing cells on glass coverslips was developed and is described Dissert Abstr

N69-12883# Atomic Energy Commission New York Health and Safety Lab
THE RADIATION FIELD IN AIR DUE TO DISTRIBUTED GAMMA-RAY SOURCES IN THE GROUND
H Beck and G de Planque May 1968 59 p refs
(HASL-195) Avail CFSTI

A much more complete and detailed picture of the external environmental γ-ray radiation field has been obtained through γ-ray transport calculations of exposure rates, differential energy spectra, integral exposure rate spectra, and angular exposure rate distributions due to sources distributed on or in the soil half space The radiation field is examined not only for the natural emitters ^{40}K ^{238}U, and ^{232}Th but also for γ-rays whose energies are typical of weapons test fallout The energy spectra and exposure rate angular distributions are shown to vary with detector height and source distribution with resulting important implications in regard to detector calibration and prediction of ground level exposure rates from aerial survey data Exposure rate results as a function of detector height in air above the soil–air interface are tabulated for various source energies and source distributions Although the calculated results are for specific soil and air densities soil moisture and composition the data can easily be adapted to other soil and air conditions Author (NSA)

N69-12886 Michigan Univ , Ann Arbor
THE DEVELOPMENT OF A PREDICTION MODEL FOR THE METABOLIC ENERGY EXPANDED DURING ARM ACTIVITIES
Don Brian Chaffin (Ph D Thesis) 1967 294 p
Avail Univ Microfilms HC $13 30/Microfilm $3 80 Order No 67-17741

This study is an attempt to quantitatively combine the effects of the following factors to allow the prediction of a given person's metabolic energy expenditure (1) the magnitude of external and inertial forces on the arm(s) (2) the position of the arm(s) and (3) the average speed at which a particular arm movement is performed The empirical development is based on the concept that these factors can be characterized by a single dimension which is the resultant torque(s) at the shoulder(s) elbow(s) or wrist(s) Measured metabolic energy expenditure rates of four subjects performing static arm tasks are reported These disclose that the rate of metabolic energy expenditure by a person for a given level of torque at the shoulder elbow or wrist is also dependent on the following (1) the torque direction (i e clockwise or counterclockwise rotation at the shoulder), (2) the angle at the elbow and shoulder (3) the torque at adjacent articulations and (4) whether one or both arms are active The effects of each of these factors are combined into a whole arm metabolic prediction model for static activities Dissert Abstr

N69-12901# Istituto Superiore di Sanita Rome (Italy) Laboratorio di Fisica
ULTRASTRUCTURE OF THE TEGUMENT AND OF THE DIGESTIVE DUCT'S EPITHELIUM IN *DICROCOELIUM DENDRITICUM* (TREMATODA) [ULTRASTRUTTURA DEL TEGUMENTO E DELL'EPITELIO DEL CANALE DIGERENTE DEL TREMATODE DICROCOELIUM DENDRITICUM]
S Caiazza and G Ferretti (Cagliari Univ , Italy) 12 Jun 1968 20 p refs In ITALIAN ENGLISH summary Supported by Consiglio Nazl delle Ric
(ISS-68/19) Avail CFSTI

The tegument of the Trematode Dicrocoelium dendriticum is a syncytium formed by a superficial satratum connected by cytoplasmic tubules to the nucleated part of the cells which lies below the base membrane and the muscular layers In the distal part of the caecum there is always a syncytial epithelium but the nuclei are above the base membrane The absorbing surface is greatly increased by the presence of microvilli and cytoplasmic ramifications Author

N69-12916# Ballistic Research Labs Aberdeen Proving Ground Md
RADIOLOGICAL HAZARDS OF TRITIUM AND PROMETHIUM-147 ACTIVATED LUMINOUS DEVICES
Richard H Comer and John D Knapton Sep 1968 36 p refs
(AD-676112 BRL-MR-1934) Avail CFSTI CSCL 6/18

The hazards associated with tritium and 147Pm activated luminous devices are considered The primary hazard of tritium is due to the amount of tritium oxide which may be present Eleven capsules were investigated for initial tritium purity and also for the amount of oxide that may be released in the event of an accidental breakage in room air It was found that as much as 30% of the activity may be in the oxide form The primary hazard of 147Pm is that of ingestion and the resulting dose to the LLI An examination of a reasonable hypothetical radiological accident indicated that a dose exceeding 5 times the maximum permissible intake could be received from either a tritium or a 147 Pm luminous capsule Author (TAB)

N69-12919# Army Natick Labs , Mass Food Lab
NUTRIENT-DEFINED FORMULA DIETS FOR AEROSPACE METABOLIC EXPERIMENTATION Final Report, 31 Dec 1964–30 Sep 1967

Henry A Dymsza, Gilbert S Stoewsand and Herbert A Hollender Brooks AFB Tex School of Aerospace Med Apr 1968 32 p refs

(AD-676138 SAM-TR-68-20) Avail CFSTI CSCL 6/11

Nutrient-defined formula diets were developed for possible use in aerospace metabolic experiments or on experimental or operational missions The diets include an aseptically canned liquid, a freeze-dehydrated diet, an instantized dry diet, compressed tablets and bite-size pieces a chewable candy, and a baked cookie product Whenever possible only the most purified ingredients of known nutrient composition were used in the diet formulations Taste-panel evaluations, chemical analyses and human and animal feeding tests showed that many of the diet formulations were of acceptable organoleptic and nutritional quality Further work is needed, however on these and other forms of nutrient-defined formula foods which can meet the exacting nutritional and other specifications established by the Air Force and NASA for aerospace feeding systems *Author (TAB)*

N69-12945# George Washington Univ Alexandria Va Human Resources Research Office

EFFECTS OF CONTROLLED ISOLATION ON PERFORMANCE, PRESENTATIONS AND PAPERS, 1958–1961

Mar 1968 50 p refs

(Contract DA-44-188-ARO-2)

(AD-667630 HUMRRO-Paper-6-68) Avail CFSTI CSCL 5/10

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3 INFLUENCE OF PRIOR VERBALIZATION AND INSTRUCTIONS ON VISUAL SENSATIONS REPORTED UNDER CONDITIONS OF REDUCED SENSORY INPUT E J Kandel T I Myers, and D B Murphy p 12–18 refs (See N69-12948 03-04)

4 STUDIES ON THE EFFECTS OF SENSORY DEPRIVATION UPON VIGILANCE 1 PROGRESS IN THE DEVELOPMENT OF A VISUAL VIGILANCE TASK R A Monty, T I Myers and D B Murphy p 19–28 refs (See N69-12949 03-04)

5 THE EFFECTS OF MISINFORMATION UPON THE COUNTING OF AUDITORY STIMULI R A Monty T I Myers and D B Murphy p 29–30 (See N69-12950 03-04)

6 EFFECTS OF SENSORY DEPRIVATION UPON RECEPTION OF COMPLEX INSTRUCTIONS DEVELOPMENT OF A MEASURE R D McDonald p 31–32 (See N69-12951 03-04)

7 NOTES ON AN AUDITORY VIGILANCE TECHNIQUE S Smith and P M Haas p 33–36 (See N69-12952 03-04)

N69-12946# *George Washington Univ, Alexandria, Va Human* Resources Research Office

THE COUNTING OF AUDITORY STIMULI

Richard A Monty *In its* Effects of Controlled Isolation on Performance Presentations and Papers, 1958–1961 Mar 1968 p 1–6 refs Presented at Western Physiol Assoc, Monterey, Calif 1958 (See N69-12945 03-04)

Avail CFSTI

An investigation is reported of a complex discrimination task in response to an auditory stimulus with many parameters (such as loudness, pitch, frequency speed or repetition, and numerosity) appearing against certain background noise All parameters except numerosity were held constant It was found that error was directly related to numerosity and that a reduction in error was attributable to knowledge of results and was itself positively related to numerosity Author

N69-12947# George Washington Univ, Alexandria Va Human Resources Research Office

INFLUENCE OF INSTRUCTIONS ON VERBAL REPORT OF VISUAL SENSATIONS UNDER CONDITIONS OF REDUCED SENSORY INPUT

Donald B Murphy, Edward J Kandel, and Thomas I Myers *In its* Effects of Controlled Isolation on Performance Presentations and Papers 1958–1961 Mar 1968 p 7–11 refs Presented at Western Physio Assoc Monterey Calif, 1958 (See N69-12945 03-04)

Avail CFSTI

The subjects (42 basic trainees of superior intelligence) were taken into a semi-lightproofed office and given instructions of a positive-suggestive or negative-suggestive nature with respect to the possibilities of actual visual sensations in semi- or complete darkness The positive instruction group reported a significantly greater number of visual sensations than did the negative instruction *group and the sensations reported were significantly more complex* Author

N69-12948# George Washington Univ Alexandria, Va Human *Resources Research Office*

INFLUENCE OF PRIOR VERBALIZATION AND INSTRUCTIONS ON VISUAL SENSATIONS REPORTED UNDER CONDITIONS OF REDUCED SENSORY INPUT

Edward J Kandel, Thomas I Myers and Donald B Murphy *In its* Effects of Controlled Isolation on Performance Presentations *and Papers* 1958–1961 *Mar* 1968 p 12–18 *refs* Presented at the American Physiol Assoc, Washington 1958 (See N69-12945 03-04)

Avail CFSTI

Thirty Army trainees received verbalization experience on selected Rorschach cards another 30 had no Rorschach pre-test Subsequently half of the subjects in each group were instructed that it was normal to experience visual sensations in the absence of light the other half were told that psychiatric patients experienced these visual sensations Each subject then put on opaque goggles and lay on a bed in a darkened room After 10 minutes the subject was asked to describe the visual sensations he was actually seeing The positive instructions resulted in significantly more reports of visual sensations than the negative instructions, prior verbalization had no effect Author

N69-12949# George Washington Univ Alexandria Va Human *Resources Research Office*

STUDIES ON THE EFFECTS OF SENSORY DEPRIVATION UPON VIGILANCE 1 PROGRESS IN THE DEVELOPMENT OF A VISUAL VIGILANCE TASK

Richard A Monty Thomas I Myers, and Donald B Murphy *In its* Effects of Controlled Isolation on Performance Presentations and Papers 1958–1961 Mar 1968 p 19–28 refs (See N69-12945 03-04)

Avail CFSTI

The effects of sensory deprivation and social isolation on the individual were studied A major research problem in this specific area is the development of measures that introduce minimum stimulation to the subject This study is designed to develop a visual task that could be used to measure the effect of deprivation upon behavior Author

N69-12950# George Washington Univ, Alexandria Va Human Resources Research Office

THE EFFECTS OF MISINFORMATION UPON THE COUNTING OF AUDITORY STIMULI

Richard A Monty Thomas I Myers and Donald B Murphy *In its* Effects of Controlled Isolation on Performance Presentations and Papers 1958–1961 Mar 1968 p 29–30 Presented at the Western Physiol Assoc San Diego Calif, 1959 (See N69-12945 03-04)
Avail CFSTI

Subjects were given misinformation on blip items interspersed with correct information in an experiment involving the ability to dount auditory stimuli Author

N69-12951# George Washington Univ Alexandria Va Human Resources Research Office
EFFECTS OF SENSORY DEPRIVATION UPON RECEPTION OF COMPLEX INSTRUCTIONS DEVELOPMENT OF A MEASURE
Robert D McDonald *In its* Effects of Controlled Isolation on Performance Presentations and Papers 1958–1961 Mar 1968 p 31–32 Presented at the Western Physiol Assoc San Diego Calif, 1959 (See N69-12945 03-04)
Avail CFSTI

Experiments were conducted to develop a simple motor task which would indicate the efficiency of reception of complex instructions in complete darkness after sensory or social deprivation Army trainees were administered 10 tape-recorded problems Analysis of variance indicated significant improvement in performance over trials, other experimental treatments had no effect Author

N69-12952# George Washington Univ Alexandria, Va Human Resource Research Office
NOTES ON AN AUDITORY VIGILANCE TECHNIQUE
Seward Smith and Paul M Haas *In its* Effects of Controlled Isolation on Performance Presentations and Papers, 1958–1961 Mar 1968 p 33–36 Presented at the Western Physiol Assoc, Seattle Wash 1961 (See N69-12945 03-04)
Avail CFSTI

An auditory vigilance technique was developed for use in research involving sensory deprivation and social isolation Subjects were placed separately in special rooms constructed to provide an average sound transmission loss of 40 decibels to sounds from the outside They took the test while lying on a bed in a quiet lighted room The subject s task was to operate a Lindsley manipulandum by releasing it as quickly as he could each time he heard a short tone The technique produced a vigilance effect and a significant performance deterioration over time and also minimized the adverse effects of such factors as sensory thresholds motivation signal rate expectancy and drowsiness Author

N69-12959*# Oak Ridge National Lab Tenn Biology Div
NEUROSPORA EXPERIMENT P-1037 Quarterly Progress Report, 16 Dec 1966–15 Mar 1967
May 1968 43 p refs Supported jointly by NASA and AEC
(NASA Order R-104)
(NASA-CR-97867 ORNL-TM-2189) Avail CFSTI CSCL 06S

Activities associated with the flight of Biosatellite A and the post-flight assays to determine the genetic effects of ^{85}Sr γ radiation in the ground control portion of the experiment are described The flight material was not recovered therefore only data on the ground control portion of the experiment is presented Some of the data recording and electronic data processing techniques used for the Neurospora experiment are described and/or illustrated NSA

N69-12973# Mount Auburn Research Associates Inc Cambridge Mass
SYSTEM STUDY, DESIGN, TEST AND EVALUATION OF CONCEPTS FOR MARKING OF LOW VISIBILITY AVIATION OBSTRUCTIONS Final Report
James C Woo Jun 1968 80 p refs
(Contract FA67W-1718)
(SRDS-RD-68-58) Avail CFSTI

A system study was carried out to determine the requirements for effective marking of overhead obstructions of low visibility that are potential aviation hazards The design of effective markers is based on a knowledge of vision through the atmosphere A simple theory on the subject is presented Design concepts based on the theory to meet the requirements determined from the system study are proposed The concepts are evaluated and tested with models in laboratory and in actual field conditions Engineering designs of these concepts are also furnished Author

N69-13049# Wisconsin Univ Madison
THERMOLUMINESCENCE DOSIMETRY Annual Progress Report, 15 Jul 1967–31 Aug 1968
John R Cameron 31 Aug 1968 98 p refs
(Contract AT(11-1)-1105)
(TID-24640) Avail CFSTI

Thermoluminescent radiation dosimetry-related data is reported for properties of manganese-activated lithium tetraborate, ultraviolet repopulation of thermoluminescent traps in lithium fluoride characteristics of dysprosium-activated calcium fluoride use of natural calcium fluoride for ultraviolet dosimetry color centers in strontium-activated monocrystals of potassium chlorides color centers of magnesium-activated monocrystals of lithium fluorides and FORTRAN 4 computer program for calculating thermoluminescent glow peaks and decay rates NSA

N69-13072 Massachusetts Inst of Tech Cambridge Research Lab of Electronics
COGNITIVE INFORMATION PROCESSING
In its Res Lab of Electron 15 Oct 1967 p 153–167 refs (See N69-13060 03-34)
(Contract DA-28-043-AMC-02536(E) Grants NIH 1-PO1-GM-14940-01 NIH 1-POI-GM-15006-01)
Avail CFSTI

Reviews of research in cognitive information processing are presented A character recognition reading machine was developed and provision was made for the effective control of its operation by a blind person Experiments were conducted to compare different modes of specifying the reading speed and the location on the page of the text to be read A computer simulation was made of a character recognition type of reading machine with a spelled speech output Blind subjects were allowed two means of controlling the reading process A graphical interpretation of calculating the output signal of a linear time variant filter with a digital computer is presented Surfaces are reconstructed for contour samples of constant elevation the contours were treated as boundary conditions on which the value of the surface is known and the surface reconstructed by solving Laplace s equation A display system is described which was designed as a research tool for tactile experiments to determine the feasibility of word-at-a-time presentation of Braille to the blind B P

N69-13073# Massachusetts Inst of Tech Cambridge Research Lab of Electonics
COMMUNICATIONS BIOPHYSICS
In its Res Lab of Electron 15 Oct 1967 p 169–189 refs (See N69-13060 03-34)
(Contract DA-28-043-AMC-02536(E) Grant NIH 1-PO1-GM-14940-01)
Avail CFSTI CSCL 06B

A preliminary model of binaural hearing is presented in which the firing patterns on the auditory nerve are regarded as inputs to a central processor and behave randomly The representation of the firing patterns is based on data taken from the

cat s auditory nerve An experiment was performed on time and amplitude interaural just-noticeable differences (JND) both on and off the midline (position of signal image in perceptual space) with a common experimental configuration and set of subjects Another experiment was performed to determine the JND in frequency as a function of duration for a stimulus in which the frequency discrimination was based purely on time information The stimulus was chopped white Gaussian noise and the aspect of the stimulus to be discriminated was the chopping rate The effect of the just-previous trial on a subject s response was studied in the context of a monaural two-alternative-forced-choice intensity-discrimination task The extent to which confidence ratings or second choice paradigms might be used in the task of absolute identification was explored B P

N69-13074* Massachusetts Inst of Tech Cambridge Research Lab of Electronics

NEUROPHYSIOLOGY

In its Res Lab of Electron 15 Oct 1967 p 191–229 refs (See N69-13060 03-34)

(Contracts NSR-22-009-138 AF 33(615)-3885 Grant NIH 5-RO1-NB-04985-04)

Avail CFSTI CSCL 05H

Progress in neurophysiological research is reported The state transition matrix was applied to investigate shift register networks An extensive inductive argument is presented on judging color (including brightness) of colored things The elements of the sensory space of color are reviewed and applied to evaluate Dr Land s experiments with color B P

N69-13132# George Washington Univ Alexandria, Va Human Resources Research Office

TRAINING OF RADAR OPERATORS AND MAINTENANCE PERSONNEL

Jun 1968 45 p refs

(Contract DA-44-188-ARO-2)

(AD-674165 HUMRRO-Papers-20-68) Avail CFSTI CSCL 5/9

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4 DIAGNOSIS AND TREATMENT OF AN ARMY ELECTRONICS TRAINING COURSE J E Whipple R F Mager and L Hitchcock Jr p 29–34 (See N69-13136 03-05)

N69-13133# George Washington Univ Alexandria, Va Human *Resources Research Office*

A PERFORMANCE TEST FOR THE IAAFCS M33 RADAR MECHANIC AND OBSERVATIONS ON TROUBLESHOOTING BEHAVIOR

Robert Vineberg *In its* Training of Radar Operators and Maintenance Personnel Jun 1968 p 1–10 refs Presented at the Symp on Electron Maintenance Aug 1955 (See N69-13132 03-05)

Avail CFSTI

The development of a performance test designed to measure ability of radar mechanics in the energizing and operation of equipment in field adjustments and preventive maintenance and in troubleshooting is described Data from the administration of the test to experienced and inexperienced antiaircraft mechanics are furnished Author

N69-13134# George Washington Univ , Alexandria Va Human Resources Research Office

STUDIES OF FIELD ACTIVITIES OF ARMY ELECTRONICS MAINTENANCE PERSONNEL

George J Wischner Abram M Barch and Joseph C Hammock *In its* Training of Radar Operators and Maintenance Personnel Jun 1968 p 11–20 refs Presented at the Symp on Electron Maintenance, Aug 1955 (See N69-13132 03-05)

Avail CFSTI

In this paper a description of three studies of field activities problems and difficulties of Army electronics maintenance personnel offers information bearing on the methodology employed the kind of data gathered and their utility and implications for training The objective of the research was to work toward job-oriented training geared more directly to field use Author

N69-13135# George Washington Univ Alexandria Va Human Resources Research Office

AN ANALYSIS OF PROBLEM SOLVING FOR USE IN TROUBLESHOOTING RESEARCH

Robert Vineberg *In its* Training of Radar Operators and Maintenance Personnel Jun 1968 p 21–28 refs Presented at the Symp for American Physiol Assoc San Francisco, Calif Sep 1955 (See N69-13132 03-05)

Avail CFSTI

This paper presents an analysis of the approach trouble-shooting mechanics take—ranging from symbolic processes to physical manipulations—in maintaining electronic equipment The symptom-formulation-performance sequence is described Research into the role of different variables affecting troubleshooting responses is suggested Author

N69-13136# George Washington Univ Alexandria, Va Human Resources Research Office

DIAGNOSIS AND TREATMENT OF AN ARMY ELECTRONICS TRAINING COURSE

James E Whipple, Robert F Mager, and Lloyd Hitchcock Jr *In its* Training of Radar Operators and Maintenance Personnel Jun 1968 p 29–34 Presented at the American Physiol Assoc New York, Sep 1957 (See N69-13132 03-05)

Avail CFSTI

A five-stage research program resulting in Army adoption of an improved curriculum for M33 Antiaircraft Fire Control System maintenance mechanics is described The sequence of research activities involved job analysis and definition construction of a criterion test of maintenance proficiency, critical evaluation of the training program using data obtained from the two preceding steps, development of two revisions of the training curriculum, and experimental tryout of the revised curricula Author

N69-13161*# Lockheed Missiles and Space Co Sunnyvale, Calif

VISUAL SENSING OF SPACECRAFT GUIDANCE INFORMATION EARTH ORBIT RENDEZVOUS MANEUVERS

S Seidenstein, W K Kincaid Jr G L Kreezer and D H Utter

Washington NASA Dec 1968 257 p refs

(Contract NAS1-6801)

(NASA-CR-1214) Avail CFSTI CSCL 06B

An analysis of each orbit rendezvous in terms of maneuver geometry served as a basis for establishing the requirements for visually sensed rendezvous guidance information Analysis of the physical environment supported an evaluation of the sensory basis for visually deriving the desired information Visual capabilities were then examined in terms of sensitivity cross range motion perception range and range rate determinations Estimates of sensitivity and variability are presented where available Conclusions are drawn regarding the adequacy of available data and recommendations are given for future areas of study Author

N69-13167# Rochester Univ N Y Dept of Radiation Biology and Biophysics

MEASURING AVERAGE NEUTRON ENERGIES AND DOSE RATES AROUND A 20 MeV VAN DE GRAAFF ACCELERATOR WITH THE MULTI-SPHERE DETECTOR BY THE BLOCK-SHON TECHNIQUE

B R Gifford H Mermagen and H D Maillie 31 Jan 1968 54 p refs Presented at the 13th Ann Health Phys Soc Meeting Denver 16–20 Jun 1968

(Contract W-7401-ENG-49)

(UR-49-894 CONF-680607-8) Avail CFSTI

The neutron dosimetry system used at the Rochester 20-MeV tandem Van de Graaff accelerator is described Various sized Bonner spheres consisting of polyethylene-moderated europium-activated lithium iodide scintillation detectors are used for neutron spectroscopy The Block–Shon technique for measuring average neutron energies and dose-equivalent rates with the multisphere spectrometer system is discussed Operating characteristics are listed in tabular form and graphically NSA

N69-13194*# Stanford Univ Calif Dept of Aeronautics and Astronautics

THE TRANSMISSION CHARACTERISTICS OF LARGE AND SMALL PRESSURE WAVES IN THE ABDOMINAL VENA CAVA

Max Anliker Michael K Wells and Eric Ogden (NASA Ames Research Center) Nov 1968 49 p refs

(Grant NGR 05-020-223)

(NASA-CR-98517 SUDAAR-362) Avail CFSTI CSCL 06C

The mechanical behavior of the abdominal venae cavae of anesthetized dogs has been studied by measuring the speed attenuation and changes in wave form of various kinds of artificially induced pressure signals The propagation of large amplitude pressure waves is shown to be affected by reflection interference and pronounced nonlinear phenomena For pressure signals exceeding a few mmHg the speed increases with amplitude and the wave front steepens during propagation as in the early phases of the formation of a shock wave By inducing distension waves in the form of finite trains of sine waves with amplitudes less than 20 mmH_2O the dispersion and attenuation were determined without requiring Fourier transform computations The vena cava was found to be only mildly dispersive for frequencies between 20 and 100 Hz and the logarithmic decrement appears to be independent of frequency Irrespective of the amplitude and shape of the pressure signals their speeds varied along the vena cava and also with respiration In addition the speeds generally increased under the influence of the chemical and electrical stimuli applied and with rising transmural pressure Author

N69-13197 Purdue Univ Lafayette Ind

A QUANTITATIVE STATEMENT OF THE GENERATOR THEORY OF NERVE CELL FUNCTION

Ronald John MacGregor (Ph D Thesis) 1967 109 p

Avail Univ Microfilms HC $5 40/Microfilm $3 00 Order No 67-16675

The current work examines the behavior to be expected on the basis of a specific set of hypotheses concerning the mechanisms whereby incoming activity is integrated It is assumed that potentials propagate on dendritic membrane according to the equation of electrotonus and that synaptic activation is effected by changes in membrane permeability Conversion of the generator potential into output spike trains is handled by an empirical digital computer simulation of the physiological processes Responses to synaptic activation are found to be inversely related to the size of the neural element This provides a theoretical basis both for the observed higher excitability of smaller nerve cells and for the hypothesis that synaptic potentials in dendritic regions are considerably larger than those in somatic regions Since the amplitude of a synaptic response depends upon the prior potential this hypothesis provides the basis for a high degree of nonlinear interaction in dendritic regions Dissert Abstr

N69-13198 Michigan Univ Ann Arbor

PREDICTION OF ELEMENTAL MOTION PERFORMANCE USING PERSONNEL SELECTION TESTS

Gary Kent Poock (Ph D Thesis) 1967 128 p

Avail Univ Microfilms HC $6 20/Microfilm $3 00 Order No 67-17828

The purpose of this research was to investigate and develop a general methodology for predicting the level of performance an individual should be able to attain when working on a manual task The predetermined time system of the Methods Time Measurement Association (MTM) was used as a measure of performance The scope of the research was restricted to bench type assembly operations where physical strength and exertion were not limiting factors in performance of the job Specifically it was proposed to use sensory motor and psychomotor ability measurements of an individual as independent variables in regression equations to predict the time one would take to perform a basic Reach Grasp, Move or Position motion of the MTM system Testing apparatus were developed to measure (1) the visual sense (2) the kinesthetic sense, (3) the tactile sense (4) forearm motor ability (5) finger dexterity (6) decision making ability, and (7) a person's recoding ability in approaching a problem Dissert Abstr

N69-13202*# Webb Associates, Malibu, Calif

PRELIMINARY EVALUATION TEST OF THE LANGLEY CARDIOVASCULAR CONDITIONING SUIT CONCEPT

B V Blockley and S L Friedlander Washington NASA Dec 1968 70 p refs

(Contract NAS1-6004)

(NASA-CR-1206) Avail CFSTI CSCL 06K

Two experiments were conducted, each two weeks in duration, in which the same subject spent the major portion of each day immersed in water and the remainder of the time in bed The man remained completely horizontal except when submerged In the control experiment a simple waterproof garment was worn over ordinary long underwear during water immersion in the second experiment the man was dressed in a specially constructed pressure suit designed to prevent or retard the deconditioning of weightlessness (cardiovascular conditioning suit or CVCS) The cardiovascular conditioning suit successfully prevented the deterioration in orthostatic tolerance impairment in tolerance for brief mild exercise and reduction in maximum work capacity which had been observed in the control experiment During the initial 5 days, when pressurization time in the suit was less than one hour per day venous compliance increased roughly 2-fold but had fallen again to the initial value by the morning of the 11th day Venous compliance appears to be an excellent predictor of tilt-table response In the experiment in which the CVCS was used there was essentially no difference in venous compliance between pre- and post-exposure and the tilt responses were the same except for a slight elevation of diastolic pressures during the post-exposure tilt Author

N69-13211*# Jet Propulsion Lab Calif Inst of Tech , Pasadena

IMPROVING BIOMEDICAL IMAGE QUALITY WITH COMPUTERS

Robert H Selzer 1 Oct 1968 29 p refs

(Contract NAS7-100)

(NASA-CR-97899 JPL-TR-32-1336) Avail CFSTI CSCL 06B

The analysis of pictorial data in the biomedical fields has increased sufficiently in the past few years to warrant the use of computers to process this data A description of image processing research particularly in the area of image enhancement is contained in this paper Frequency response methods which allow computer

processing techniques to be directly related to the imaging system and to the image subject, are discussed The most important enhancement technique, two-dimensional digital filtering, is described and illustrated with numerical examples Examples of before-and-after computer-processed pictures are shown which illustrate low-pass high-pass high-frequency restoration feature-selective and nonlinear filters Subtraction techniques are also discussed and an example is given of a computerized film-measurement procedure that requires preprocessing of the image by filtering techniques This application involves measurement of the width of trabecular bone shadows from X-ray film Author

N69-13219# Royal Aircraft Establishment Farnborough (England)
A CONTRIBUTION TO THE PHYSIOLOGY OF ROTATIONAL NYSTAGMUS
Taneji Masuda Jul 1968 85 p refs Transl into ENGLISH from *Arch Ges Physiol (Berlin West Ger.) no* 197 1922 p 1–65
(RAF-LIB-TRAN-1308) Avail CFSTI

This paper describes an investigation into the physiology of the labyrinth in which the porpoise was used as an experimental animal The animals were rotated at various speeds and observations were then made of the frequency and duration of the nystagmic eye movements thereby induced Author

N69-13223*# Stanford Univ Calif Dept of Applied Mechanics
PITCH AND YAW MOTIONS OF A HUMAN BEING IN FREE FALL
M P Scher and T R Kane Sep 1968 56 p refs
(Grant NGR-05-020-209)
(NASA-CR-97902 SU-TR-190) Avail CFSTI CSCL 06S

Two limb maneuvers one producing pitch motion, the other yaw motion, are analysed Numerical results are given for *representative examples* Author

N69-13270 California Univ Berkeley
A STUDY OF SIMULATION-AIDED ENGINEERING DESIGN
Ian Irving Mitroff (Ph D Thesis) 1967 292 p
Avail Univ Microfilms HC $13 30/Microfilm $3 75 Order No 68-120

This is a case study of engineering design which analyzes the behavior of a particular design engineer before, during and after the development and subsequent use of a new design aid The study documents the improvement in the engineer's design *performance resulting from his use of the aid, a computer simulation* of the engineer s original design behavior Improvement in performance is a result of the more extensive and systematic examination of alternate designs which the simulation has made possible As a case study of engineering design the study represents an intensive effort to identify and to model as many variables as possible affecting a particular engineer's development of a design project Dissert Abstr

N69-13276*# Arkansas Univ , Fayetteville Medical Center
[THE ROLE OF NUCLEOTIDE METABOLISM IN THE REPAIR OF RADIATION INJURY] Final Progress Report, Sep 1966–Sep 1968
Glenn V Dalrymple Sep 1968 9 p refs
(Grant NGR-04-001-014)
(NASA-CR-97930) Avail CFSTI CSCL 06R

The radiation effects on DNA polymerase nucleases and the survival properties of cells were investigated under conditions of normal growth DNP-treatment and starvation To study DNA synthesis pulse and continuous labeling with P-32 was used in irradiated cells Cells in growth medium showed no difference in P-32 labeling from non-irradiated control cells Starved and DNP-treated cells showed discrete periods of accelerated labeling of DNA and RNA No evidence of DNA degradation was found eight hours postirradiation in cells prelabeled with tritiated thymidine It was found that radiation doses of 100 rads to 1000 rads did not alter polymerase or nuclease activities Survival studies showed that DNP-treated cells had a significantly higher survival than cells in growth medium and starved cells may have had a slightly higher survival than those in growth medium A model is suggested which *explains the repair process in terms of an enzyme that rejoins* single-strand breaks in the DNA molecules N E N

N69-13407# Princeton Univ , N J Dept of Psychology
PERCEPTION OF DYNAMIC STIMULI Final Report, Sep 1, 1963–Aug 31, 1968
Joseph M Notterman Ross D L Filion and Frank J Mandriota Sep 1968 9 p refs
(Contract AF 49(638)-1258)
(AD-676289 AFOSR-68-1926) Avail CFSTI CSCL 5/10

Stemming from considerations of a cybernetic nature the *program was directed towards a theoretical and empirical* examination of the perception of changing stimuli Representative stimuli were selected so as to fall into two classes Kinetic (e g changing loudness and brightness), and topographic (e g , expanding lines and circles moving points) Both classes of stimuli were presented in such manner as to permit either continuous or discontinuous display and in either of two modes Isochronal (equal *time for standard and comparison stimuli) or isometric (equal final* magnitudes attained by standard and comparison stimuli) It is tentatively concluded that topographic displays are superior (i e are perceived more precisely) to kinetic, discontinuous (initial and final values only) are superior to continuous and isochronal are superior to isometric Author (TAB)

N69-13436*# Public Health Service Cincinnati Ohio Food Protection Research
ECOLOGY AND THERMAL INACTIVATION OF MICROBES IN AND ON INTERPLANETARY SPACE VEHICLE COMPONENTS Quarterly Progress Report, Jul 1–Sep 30, 1968
Robert Angelotti and J E Campbell Oct 1968 21 p ref
(NASA Order R-36-015-001)
(NASA-CR-98510 QPR-14) Avail CFSTI CSCL 06M

Results of continuing research on dry heat inactivation of bacterial spores and the influence of spore moisture content on z values are reported Lyophilization techniques for drying spores in thermal inactivation studies were discounted due to leakage around *the vial stopper* Test use of 8 by 50 mm borosilicate glass tubes sealed in commercial tin cans was evaluated and found to be worthy of further study Three spore crops of *B subtilis* var *niger* were produced and compared to the 1965 spore suspension which used stainless steel strips as a vehicle All three had a heat resistance either equal to or greater than the original crop Insonation methods for eluting dry spores from the glass tubes were found to be the most efficient Z values were obtained for spores equilibrated at relative humidities of less than 10% spores embedded in epoxy containing added water and spores suspended in water With the exception of a sharp drop for spores suspended in water little difference in the values was noted regardless of the initial *moisture* A C R

N69-13446# TRW Systems Group Redondo Beach Calif Quantum Physics Lab
TRIPLET MATERIALS RESEARCH AND EYE-PROTECTIVE SYSTEM Final Report, 1 Dec 1966–30 Jun 1968
W R Dawson and M W Windsor Jul 1968 98 p refs
(Contract AF 41(609)-3201)
(AD-676724 TRW-07728-6005-R0-00, FR-8) Avail CFSTI CSCL 6/17

The second prototype model of a 6 x 8-inch photochromic, windshield segment has been developed tested and delivered to the Air Force The device is designed to protect Air Force Pilots against flash blindness resulting from viewing nuclear explosions The reversible photochromic darkening is based upon the absorption of metastable triplet states of aromatic molecules These compounds are incorporated into a transparent plate of epoxy plastic Two plates are attached on the outside of a 6 x 8 x 1 1/2-inch quartz block and the triplet states are excited by uv light from two flash lamps Black-glass filters absorb the visible light from the flash lamps which would otherwise dazzle the pilot With a 3000J excitation flash the windshield segment darkens from an open-state absorbance of 0 08 to absorbances of 0 89, 1 68 2 18 and 2 53, respectively at times of 50 100, 150 and 500 microseconds after the start of the flash The open-state transmission optical quality and rapidity of buildup of absorbance of the present device are greatly improved compared to the performance of the windshield segment developed on the preceding contract The windshield segment reopens to half the closed-state absorbance in 1 6 seconds
Author (TAB)

N69-13458# Milan Univ (Italy)
SYNTHESIS OF 3– AND 4–14 C FRUCTOSE AND GLUCOSE WITH HIGH SPECIFIC ACTIVITY AND ULTRA-HIGH RADIOCHEMICAL PURITY [SINTESI DI GLUCOSIO E FRUTTOSIO 3– E 4–14 C AD ALTA ATTIVITA SPECIFICA ED ALTISSIMA PUREZZA RADIOCHIMICA]
E Sturani Brussels EURATOM Sep 1968 31 p refs In ITALIAN, ENGLISH summary
(Contract EURATOM-083-64-11 RISI)
(EUR-4061 i) Avail CFSTI

The object of this research was to synthesize glucose-3-^{14}C fructose-3-^{14}C, glucose-4-^{14}C and fructose-4-^{14}C The 3PGA-1-^{14}C was synthesized from ribulose 1–5 diphosphate and $NaH^{14}CO_3$ by means of ribulose diphosphate carboxylase refined from spinach leaves Glucose and fructose were then obtained by way of purified enzymes
Author

N69-13465# Army Medical Research Lab Fort Knox Ky
CORRELATION BETWEEN THE GROSS AND MICROSCOPIC APPEARANCE OF CARBON DIOXIDE LASER INDUCED PORCINE SKIN BURNS Interim Report
David K Hysell and Arnold S Brownell 17 Jun 1968 24 p refs
(AD-676578 AMRL-778) Avail CFSTI CSCL 6/18

The skin of white pigs exposed to CO2 laser radiation was biopsied and examined for histologic evidence of damage As the burns increased in severity macroscopically there was a commensurate increase in microscopic evidence of tissue damage Limited data suggests that even though burns present similar surface appearances those produced by high intensity CO2 laser power densities might have more actual tissue damage than those produced by a lower power density Insufficient data was available to determine if the differences were significant
Author (TAB)

N69-13495# Army Medical Research Lab Ft Knox, Ky
LASER PROPERTIES AND EYE HAZARDS Interim Report
George R Peacock and Frederick Van Nus 31 May 1968 28 p refs
(AD-676806, USAMRL-776) Avail CFSTI CSCL 20/5

Eye injury is a recognized hazard of laser radiation This report includes a basic discussion of those laser output parameters that are important in understanding lasers and how they are related to laser eye injury The three most significant properties of laser beams in this respect are wavelength, time characteristics and beam geometry The first two determine the site most susceptible to injury and its sensitivity to laser exposure dose The third, beam geometry, essentially governs the distance at which a given laser is capable of producing a hazardous exposure condition A brief description of experimental injury findings and some threshold exposure doses, as reported in the literature, are summarized Laser safety considerations are discussed
Author (TAB)

N69-13517# California Univ Los Angeles Dept of Psychology
MECHANISMS OF ATTITUDE CHANGE PRODUCED BY FORCED COMPLIANCE Final Report
Barry E Collins Aug 1968 5 p
(Grant AF-AFOSR-1200-67 ARPA Order 897)
(AD-676288 AFOSR-68-1916) Avail CFSTI CSCL 5/10

When an individual is induced to play a role inconsistent with his private opinion he often modifies that private opinion to make it consistent with his public role This suggests that educators or propagandists with control over overt behavior can also gain control over thoughts or private opinions In an earlier experiment the principal investigator demonstrated that financial inducements to undertake the role could either facilitate or inhibit the attitude change A series of experiments have investigated the conditions under which these financial inducements facilitate or inhibit attitude Five of the seven experiments have been written up for publication the entire series has been described in a paper presented at the American Association for the Advancement of Science The experiments indicate that a fear of social retaliation from the audience is not an important factor and that public commitment to the overt behavior is an important factor in producing attitude change
Author (TAB)

N69-13518# Institute for Research State College Pa Div of Psychobiology
THE EFFECTS OF D-AMPHETAMINE UPON ACQUISITION, PERSISTENCE, AND RECALL
Paul M Hurst Robert Radlow and Sallyann K Bagley 9 Sep 1968 23 p refs
(Contract Nonr-4423(00))
(AD-676548 ONR-H-68-1) Avail CFSTI CSCL 5/10

The experiment was designed to measure four component effects of d-amphetamine in a paired-associate learning task The drug was compared with placebo to reveal (1) effects upon acquisition of new material (2) persistence of material so learned (3) effects of drug present during test of delayed recall and (4) interactions between drug present during learning and drug present during test of delayed recall Paired associates of varying degrees of usage frequency association value and intra-list competition were employed Sixty-nine college males were tested in two sessions for learning and delayed recall respectively Presence of the drug during learning resulted in significantly greater delayed recall of the low-competition lists and non-significantly greater delayed recall of high competition lists The same dosage given for the recall session had no significant effect upon delayed recall or relearning
Author (TAB)

N69-13638# Bhabha Atomic Research Center Bombay (India)
INVESTIGATIONS ON BASIC MECHANISMS OF RADIOSENSITISATION BY CHEMICALS
B B Singh V T Srinivasan B Y Bhatt and M A Shenoy 1968 25 p refs
(BARC-352) Avail CFSTI

In order to enable the use of radiosensitizers in the preservation of food materials and sterilization of medical products by ionizing radiations a detailed investigation was carried out on the basic mechanisms involved in the radiosensitisation phenomena Although *Staphylococcus aureus* was selected as the main test organism in view of its role in food-poisoning and food-spoilage *E coli* B/r was also used in certain experiments The sensitising effect of iodoacetic acid was found to be due to the reaction of radiation-induced iodine atoms with the bacterial membrane proteins which might constitute the repair system Vitamin K_5 which occurs in

normal human metabolism and is well known for its anti-microbial and radiosensitising properties was therefore selected for further investigations The results obtained so far have demonstrated that it has high reactivity towards hydroxyl radicals and the transients thus formed cause the sensitisation Author

N69-13643*# Emory Univ Atlanta Ga Dept of Radiology
ENERGY DEPOSITION IN MICROSCOPIC VOLUMES BY HIGH-ENERGY PROTONS
Jerald W Hilbert and Norman A Baily [1968] 24 p refs
(Grant NGR-11-001-026)
(NASA-CR-97911) Avail CFSTI CSCL 06R

Measurements of the frequency distributions of the energy deposited as the result of the passage of high-energy protons through microscopic volumes of biological interest present some unique problems A method is described which permits the determination of such distributions in arbitrarily shaped volumes having dimensions equivalent to fractions of a micron of unit-density tissue The method is illustrated for a 1 77 micron diameter tissue sphere irradiated with 40 MeV protons and implications to other energies and geometries are made in terms of the generalizations possible from these results Distributions for various depths in a tissue-like phantom are also presented Author

N69-13654# Army Behavioral Science Research Lab , Washington D C
MONITORING PERFORMANCE AS A FUNCTION OF MUSCULAR RESPONSE EFFORT
John G Tiedemann and Richard N Feil Jun 1968 38 p refs
(AD-676834 BESRL-TRN-198) Avail CFSTI CSCL 5/10

An exploratory study to determine the effect of requiring muscular effort in responding to signals as a means of improving monitoring performance is described Author (TAB)

N69-13671*# IIT Research Inst Chicago Ill
LIFE IN EXTRATERRESTRIAL ENVIRONMENTS Quarterly Status Report, Aug 15–Nov 15, 1968
[1968] 13 p
(Contract NASr-22)
(NASA-CR-97908 IITRI-L6023-15) Avail CFSTI CSCL 06M

Experiments on the survival of microorganisms airborne in dust clouds showed that the viable cell count of *Bacillus cereus* and *B subtilis* decreased 99% and *Staphylococcus aureus* decreased 99 9% while suspended in simulated Martian dust clouds for 28 days The humidity and temperature of the test environment ranged from 40% to 60% RH and from 20° to 25°C respectively *Serratia marcescens* did not survive one day in the test environment It is pointed out that the time factor and initial cell populations must be considered with decreasing viability determinations In these studies the decreased viability took place within 14 days without any further significant change If bacterial populations of 10^4 to 10^6 cells are considered then the numbers of survivors are important to the contamination of Mars since populations between 10 and 100 cells of some organisms can survive and grow in a simulated Martian environment Author

N69-13679# Navy Medical Neuropsychiatric Research Unit San Diego Calif
A SET OF PROGRAMS FOR COMPUTING MULTIPLE CORRELATIONS AND RELATED STATISTICS TWO ANALYSIS-OF-VARIANCE PROGRAMS FOR DISPROPORTIONATE CELL FREQUENCIES
Cyril H Nute Ardie Lubin and Donald D Beck 1968 47 p refs
(AD-670592 REPT-67-9, REPT-67-11) Avail CFSTI CSCL 5/10

A stepwise linear regression and multiple correlation program with distinct accretion and deletion phases has been developed for use with either complete or incomplete data A companion cross-validation program makes it possible to test the derived regression coefficients by applying them to a different sample obtained from the same parent population The difference between the multiple correlation and the cross-validity indicates the stability of the regression coefficients The set of programs offers great versatility and high capacity In theory it has been known for many years that by using the general linear model multiple regression can give results that are identical to those of analysis-of-variance (ANOVA) In particular multiple regression can give an ANOVA for disproportionate cell frequencies Program GENIV does this for one-way two-way or three-way ANOVA Program deviance performs two-way ANOVAS automatically selecting every possible pair from a given set of predictors Both programs generate all possible interaction variables They binarize (dichotomize) graded or ungraded raw predictor scores assigning each subject to the specified levels of each factor Author (TAB)

N69-13682# Naval Radiological Defense Lab San Francisco Calif
TURBULENCE IN AN UNBOUNDED, UNIFORM-SHEAR FLOW A COMPUTER ANALYSIS
T H Gawain and John W Pritchett 7 May 1968 171 p refs
(ARPA Order-96)
(AD-676883 NRDL-TR-68-86) Avail CFSTI CSCL 19/4

Fluid turbulence is of crucial significance in many problems of scientific and technical importance Current developments in computer technology offer the possibilities of solving the fundamental equations of turbulent flow in a way never before possible In order to accomplish this aim however it is first necessary to formulate the essential theoretical concepts in a suitable manner The report summarizes the progress achieved to date in this connection Various essential basic equations are derived but the emphasis is as much on fundamental concepts as on mathematical details More specifically a method is established for the computer simulation of the detailed stationary turbulence in a uniform shear flow The results obtainable in this way are far more comprehensive than any which could reasonably be obtained by physical experiment The data generated represent fundamental information which may be subsequently analyzed to establish overall phenomenological characteristics of the turbulence The concepts in the report should provide a sound basis for a systematic sustained and productive research plan They have already been successfully applied to a computer program which is now going into operation Results of a typical computer run are included and illustrate qualitative agreement with theoretical predictions Author (TAB)

N69-13684*# Electro-Optical Systems Inc Pasadena Calif
STUDY OF A MULTIPLE RESERVE ELECTROCHEMICAL POWER SOURCE
A Thompkins and M Klein 8 Nov 1968 46 p refs
(Contract NAS7-672)
(NASA-CR-97859 EOS-4008-Final) Avail CFSTI CSCL 10C

A study program was carried out which included limited experimental work to determine the feasibility of metal oxygen primary batteries for multiple reserve use Cadmium iron and magnesium anodes were evaluated coupled with oxygen The concept consists of a series connected monoblock that contains the anode electrolyte oxygen electrode and a gas fed manifold When power is required, oxygen from a lightweight high pressure storage vessel is fed through a pressure reduction regulator to the monoblock In periods of nonuse the oxygen source is closed and the battery remains in the ready condition Author

N69-13690# Union Carbide Corp Parma Ohio
HYDRAZINE-AIR FUEL CELL SIMPLIFICATION STUDIES Quarterly Report, 15 Dec 1967–15 Mar 1968
M B Clark and K V Kordesch Jul 1968 28 p refs
(Contract DAAB07-68-C-0163)
(AD-676872 ECOM-0163-1 QR-1) Avail CFSTI CSCL 10/2

The purpose of the contract is the evaluation of simple concepts for small hydrazine-air fuel cell systems in the power range of 10 to 60 watts The main objectives of the first half of the contract were (a) the elimination of complicated fuel-injection devices and the associated electronic circuitry (b) the ability to activate units rapidly with electrolyte containing high concentrations of hydrazine and (c) ready adaptability to many end uses in batteries with a variety of combinations of size voltage and power level Author (TAB)

N69-13698# George Washington Univ , Alexandria Va Human Resources Research Office
A VIEW OF MAN'S ROLE AND FUNCTION IN A COMPLEX SYSTEM
Francis H Thomas Jun 1968 15 p refs Presented at the Ala Psychological Assn Birmingham Ala May 1968
(Contract DA-44-188-ARO-2)
(AD-676777 PP-25-68) Avail CFSTI CSCL 5/10

In this paper the roles and functions of man in the evolution and development of two complex specific systems within the Army operational environment are discussed It is pointed out that throughout the course of historical development, the basic system functions and objectives have remained unchanged even though the system equipments have varied With equipment changes mans physical functions in system operation have also changed In predicting the effectiveness of man in a future system operational environment an approach independent of equipment differences is required Such an approach in which man is conceived as an information processor is described The approach is applied to the human operator roles in manned aerial reconnaissance and surveillance and in target acquisition Author (TAB)

N69-13709# Southwest Center for Advanced Studies Dallas Tex
THE DOSIMETRY AND RADIOBIOLOGY OF NEGATIVE PIONS 4 WORK ACCOMPLISHED
Chaim Richman M R Raju J Feola and G W Barendsen 25 Jun 1968 25 p
(Contract AT(40-1)-3343)
(ORO-3343-2) Avail CFSTI

Meson ($\pi -$) dose distribution in water at 65 and 91 MeV dose distribution in silicon detectors at 65 MeV and the differential range in Lucite at 67 and 91 MeV are presented graphically Also integral dose distribution curves are given for 65-MeV meson (π^+) beams in a silicon detector NSA

N69-13724# Army Aviation Test Activity, Edwards AFB Calif
SPECIAL STUDY OF AUTOROTATIONAL PROCEDURES Final Report
Kenneth R Ferrell and John J Shapley Jr Apr 1968 27 p refs
(AD-676820) Avail CFSTI CSCL 1/2

A limited investigation was conducted to evaluate the effects of maneuvering flight during autorotation and the flight characteristics during power recovery from autorotation The testing consisted of 6 5 flight hours and was conducted from 11 December 1967 through 24 January 1968 The tests indicated that the existing method of presenting autorotation rate of descent information in the operators manual is not representative of the operational requirement A maximum glide technique which utilizes low rotor speeds can be misleading especially at high gross weights, in that rate of descent may increase glide distance may decrease and rotor energy will be less than optimum The rapid increase in descent angle and rate of descent at speeds below 50 KIAS can be very deceptive Altitude above the ground is probably the most important compensating factor during practice autorotations Power recovery techniques are not particularly demanding at light weights but become extremely important at the limit gross weights Author (TAB)

N69-13759# George Washington Univ Alexandria Va Human Resources Research Office
A BRIEF HISTORY OF AIRCRAFT IDENTIFICATION TRAINING
Arthur C Vicory Aug 1968 15 p refs
(Contract DA-44-188-ARO(D)-2)
(AD-676791 HUMRRO-PP-27-68) Avail CFSTI CSCL 5/9

The paper presents a selective review of previous and contemporary methods of teaching aircraft recognition to personnel manning forward area air defense weapons Methods in use since about 1940 including the WEFT System (image-analysis concept) the Renshaw System (whole-image concept) the modified WEFT-Renshaw System (learning of aircraft features) and a method are examined Research designed to coordinate studies of training with generalization retention and transfer in order to provide a better assessment of training effectiveness is described Author (TAB)

N69-13771# Naval Aerospace Medical Inst Pensacola, Fla
MANIKIN MEASUREMENTS OF THE NOISE ATTENUATION PROVIDED BY FLIGHT HELMETS
John R Forstall Aug 1968 21 p
(AD-676885 NAMI-1049) Avail CFSTI CSCL 6/14

Measurements of the noise attenuation provided by five flight helmets were obtained on a manikin head and compared with attenuation measurements obtained on human subjects according to the USASI Standard for Evaluating Real-Ear Attenuation at Threshold The two sets of measurements were similar The manikin method has certain advantages which should be considered in terms of the particular requirements of an evaluation program (1) a helmet can be optimally fitted with little expenditure of time (2) variability introduced by human factors is kept at a minimum (3) high levels of noise can be used as the test stimulus (4) visual and auditory monitoring of the attenuated noise provides the experimenter with a precise appraisal of the fit as adjustments are made (5) manikin measurements are particularly useful in revealing improvements in attenuation resulting from minor modifications Author (TAB)

N69-13774# Texas Univ Austin Electronics Research Center
COMPUTER-AIDED INSTRUCTIONAL SYSTEM FOR TRANSMISSION LINE SIMULATION
Erwin A Reinhard 10 Jul 1968 135 p refs
(Grant AF-AFOSR-766-67)
(AD-676278 TR-51) Avail CFSTI CSCL 5/9

A computer-aided instructional system has been developed which utilizes dynamic computer-controlled graphic displays and which requires student interaction with a computer simulation in an instructional mode A numerical scheme has been developed for digital simulation of a uniform distortionless transmission line with resistive terminations and arbitrary voltage sources at either or both ends of the line The numerical transient and steady-state solution is exact independent of the number of spatial increments used to simulate the transmission line The numerical solution provides data for an on-line CRT display unit which permits visual observation of the space-time dynamic behavior of the voltage and current waves A computer-controlled audio tape recorder a special keyboard, and special software for dynamic scope displays and for lesson programming have been developed as part of the instructional system This system permits student interactions with a computer

programmed lesson and associated laboratory simulations to create learning experiences which cannot be duplicated in the classroom or laboratory The student interacts with the lesson by responding to multiple choice inquiries, by controlling the simulations by making qualitative measurements of the dynamic variables directly on the scope face, and by constructing responses for subsequent judging by the computer Two programmed lessons on transmission lines each requiring about 45 minutes of student time have been prepared and tested Author (TAB)

N69-13788# Applied Psychological Services Wayne Pa Science Center

DEVELOPMENT OF PERFORMANCE EVALUATIVE MEASURES PERSONNEL PSYCHOPHYSICS TERMINAL THRESHOLD AND SIGNAL DETECTION THEORETIC APPLICATIONS TO PERFORMANCE ASSESSMENTS

Arthur I Siegel M A Fischl and Mark G Pfeiffer Sep 1968 62 p refs

(Contract N00014-67-C-0107)

(AD-676326) Avail CFSTI CSCL 5/10

Two separate but related studies into the development of advanced techniques for performance and training evaluation are described In the first study the application of method of limits procedures to the evaluation of electronic trouble-shooting performance was investigated The results indicated that the technique produced meaningful results and was sensitive to the level of training/experience of the technician and to different types of thinking The second study demonstrated that application of variables derived from theory of signal detection possess merit for discriminating between groups at various levels of training/experience for predicting academic success and as tools for increasing academic and on-the-job performance ability Author (TAB)

N69-13818*# Jet Propulsion Lab Calif Inst of Tech Pasadena

STUDY OF AN INDUCTION-TYPE LIQUID-METAL MHD GENERATOR

Yu A Bakanov et al 30 Jul 1968 12 p refs Transl into ENGLISH from Russian Conf Paper Presented at Symp on the Production of Elec Energy by Means of MHD-Generators Warsaw 24–30 Jul 1968

(Contract NAS7-100)

(NASA-CR-97876 SN-107/160) Avail CFSTI CSCL 10B

Details are given on the construction and testing of a three-phase liquid potassium magnetohydrodynamic generator which was developed to experimentally verify theoretical statements assumed in designing the generator Using the optimized calculation basic dimensions of the generator were selected such as pole division number of poles active length gap in the liquid metal number of turns of the helical duct and transverse internal cross section The electrical circuit contained a three-phase battery of capacitors needed for self-excitation The test circuit make it possible to investigate the generator in the parallel operating mode (connected parallel with the external mains) and in the autonomous self-oscillating mode Equations are derived to determine the loses in the generator and the results of measuring the separate components of these losses are examined Also described are measurements of the magnetic field and test data on self-excitation with power output which were obtained repeatedly for different values of capacitances load and temperature of the liquid potassium M G J

N69-13827# Electric Storage Battery Co Yardley Pa Research Center

HIGH ENERGY SYSTEM (ORGANIC ELECTROLYTE) Final Report, 15 Jun 1967–15 Jun 1968

D P Boden, H R Buhner and V J Spera Oct 1968 126 p refs

(Contract DAAB07-67-C-0385)

(AD-676867 ECOM-0385-F, FR-10) Avail CFSTI CSCL 10/3

The objective of the research were as follows (1) to determine the cause of self-discharge in activated Li/CuF2 cells, and to find a practical solution to the problem leading toward the realization of a non-reserve primary battery (2) To establish conditions for dry storage of Li/CuF2 cells which would provide a basis for the development of a reserve type cell (3) Build and evaluate performance of 37 A H Li/CuF2 cells Author (TAB)

N69-13843# Yonsei Univ Seoul (South Korea) Dept of Physiology

METABOLIC ADAPTATION TO COLD Final Report, Sep 1967–Sep 1968

Suk Ki Hong Oct 1968 39 p refs

(Contract DA-CRD-AFE-S92-544-67-G76)

(AD-676850 J-292-2 AR-2) Avail CFSTI CSCL 6/16

The results of a two-phase study on cold acclimatization in human subjects are reported In the first phase an investigation was undertaken to study the effects of norepinephrine infusion on the resting oxygen consumption the skin heat flux and the blood pressure In addition the quantity of daily catecholamines excretion was also determined In the second phase an attempt was made to determine the maximal aerobic power of ama for a comparison with non-divers and established Korean athletes In addition their maximal aerobic power was also compared between the summer and the winter since the duration of daily diving work considerably differs between the two seasons TAB

N69-13847# Joint Publications Research Service Washington D C

BIBLIOGRAPHY ON AEROSPACE MEDICINE AND BIOASTRONAUTICS FOR 1967

L I Boreva 26 Nov 1968 60 p refs Transl into ENGLISH from the Russian

(JPRS-46947) Avail CFSTI

Bibliographies on the following subjects are presented general problems in space biology and medicine biology general physiology, neurophysiology and physiology of sense organs psychology and psychiatry biological physiological and psychological effects of environment and stresses personnel (selection training professional activity and questions of expertise) medical problems and pharmacology toxicology man–machine system life support systems and methods of investigation for biotelemetry and data processing A list of authors and a system for classification of literature on aerospace medicine and bioastronautics is included F O S

N69-13898# *Massachusetts Inst of Tech Cambridge Dept* of Psychology

THE INFLUENCE OF OCULOMOTOR SYSTEMS ON VISUAL PERCEPTION Final Scientific Report

Whitman Richards Jul 1968 18 p refs

(Contract F44620-67-C-0085)

(AD-676703 AFOSR-68-2098) Avail CFSTI CSCL 6/16

This report describes ongoing work on the influence of the oculomotor systems upon visual perception Three different problems are being considered (1) Saccadic suppression (2) Size-scaling and (3) The corridor illusion Of particular interest is whether or not efferent or outflow mechanisms play a significant role in these perceptual phenomena A perspective illusion of depth has been examined in order to show that planar illusions involve mechanisms different from those underlying size/depth invariances Author (TAB)

N69-13907 Purdue Univ Lafayette Ind
LOW CONVERSION RADIOLYSIS OF METHANE CONTAINING TRACES OF OXYGEN AND OLEFINS
Dale Carter Myers (Ph D Thesis) 1967 160 p
Avail Univ Microfilms HC $7 40/Microfilm $3 00 Order No 68-6336

A study was made of the effects of traces of oxygen (~0 1 vol%) on the low conversion radiolysis of methane and of methane containing traces of olefins (≈0 1 vol%) Oxygen is consumed at a rate which is linear with absorbed dose The minimum dose (ev/molecule) necessary for complete oxygen removal is $D \simeq [O_2] \times 13 \times 10^{-5}$ where $[O_2]$ is in ppm The protection by oxygen of ethylene and acetylene formed during radiolysis allows the determination of $G(C_2H_4) = 0624 \pm 021$ and $G(C_2H_2) \approx 0045-0060$ Oxygen when present in concentrations as low as 10 to 20 ppm completely stops the formation of hydrocarbons via radical reactions Under these conditions ethane is formed by a methylene insertion reaction with methane ($G(C_2H_6) = 0276 \pm 02$) and hydrogen is formed by a series of ion molecule reactions ($G(H_2) = 273 \pm 06$) Dissert Abstr

N69-13909 Pittsburgh Univ Pa
HYDROGEN BOND STUDIES USING SOLUTION CALORIMETRY
Murty S S R Tanikella (Ph D Thesis) 1967 248 p
Avail Univ Microfilms HC $11 25/Microfilm $3 20 Order No 68-7505

Hydrogen bond enthalpies (ΔH_fs) were determined in dilute carbon tetrachloride solutions by solution calorimetry using IR and F^{19} NMR equilibrium constants (K_fs) A novel approach for accurate measurement of hydrogen bond enthalpies is developed by using the base as solvent This pure base method is independent of equilibrium constants The application of the method to many systems and its limitations are discussed in detail Drago s procedure for simultaneous determination of ΔH_f and K_f is applied to three bases using phenol and *para*-fluorophenol as proton donors A method for determinating accurate ΔH_f and K_f values entirely by calorimetry is presented Solvent and temperature effects on ΔH_f are discussed Using ΔH_fs and measured $\Delta\nu$ values the validity and limitations of Badger-Bauer-Drago rule is discussed Dissert Abstr

N69-13926*# Michigan Univ Ann Arbor
SKILL TRAINING FOR THE PRODUCTION OF A MEMORIZED MOVEMENT PATTERN
Margaret Robb and Richard W Pew Washington NASA Dec 1968 37 p refs
(Contract NASR-54(06))
(NASA-CR-1251) Avail CFSTI CSCL 05H

Based on the assumption that man may be regarded as an information processing system experiments were conducted to assess the efficacy of several kinds of feedback information Five groups of subjects were trained under different feedback conditions in the execution of a distinctive movement pattern In a subsequent test condition all groups attempted to reproduce the movement pattern without the aid of any external concurrent feedback The training conditions reflecting different modes of feedback were blanked vision vision-blanked passive-active and slow-standard The main variables were the types of terminal and concurrent feedback administered to the subjects through internal and external modes Performance was compared in terms of integrated absolute error scores and in terms of a more detailed performance criterion that attempted to separate out performance precision with respect to amplitude and timing accuracy The results are graphically depicted and it is hypothesized that the stage during training at which augmented feedback is introduced may be important M G J

N69-13932# Battelle Memorial Inst Richland Wash Pacific Northwest Lab
INTERPRETING COUNTING DATA FOR INTERNALLY DEPOSITED PLUTONIUM
K L Swinth *In its* Ann Rept for 1967 to the USAEC Div of Biol and Med vol 2 pt 1 Jun 1968 p 1–14 refs Reprinted (See N69-13931 04-14)
Avail CFSTI

Developmental sensitive counters presage enhanced measurement of internally deposited plutonium by counting the low-energy photons emitted by the plutonium General factors influencing the interpretation of counting data include (1) The change in photon emission rate with variable isotopic composition (2) The low penetrating power of the radiations and (3) The variable background due to high-energy radiations of other isotopes This paper discusses methods of correcting for such effects Background variations become critical for low-level counting and data show that differences in low-energy (≈17 keV) backgrounds of greater than a factor of two can be expected and are caused primarily by the contribution from other internal radionuclides As described such information can be correlated with count rates in other energy regions Finally the paper discusses the role of pulmonary clearance effects as related to counting Author (NSA)

N69-13936# Battelle Memorial Inst Richland Wash Pacific Northwest Lab
DEVELOPMENT IN THE TIDAL VOLUME AIR MEASUREMENT
R L Wilbur *In its* Ann Rept for 1967 to the USAEC Div of Biol and Med vol 2 pt 1 Jun 1968 p 38–41 refs (See N69-13931 04-14)
Avail CFSTI

Studies of deposition of inhaled radionuclides in canines require an accounting of the amount of air respired An earlier instrument merely counted the breaths and measured the inhalation volume Modifications to the basic instrument enable the digital portion of the device to accept many different transducers and to examine either the inhalation or the exhalation portion of the respiration cycle Two remote operating stations increase the mobility and versatility of the instrument Several internal circuit changes provide greater breath monitoring latitude smoother printer operation and greater operator safety Author (NSA)

N69-13938# Battelle Memorial Inst, Richland Wash Pacific Northwest Lab
DEVELOPMENTAL EVALUATION OF MINIATURE BIOLOGICAL SENSING TRANSDUCERS
R L Wilbur *In its* Ann Rept for 1967 to the USAEC Div of Biol and Med, vol 2 pt 1 Jun 1968 p 44–48 (See N69-13931 04-14)
Avail CFSTI

Physiological and pathological studies being conducted at PNL require many different forms of bioinstrumentation Present commercial transducers often fail during experiments or may not be acceptable for one or more physical and environmental reasons An evaluation record of the performance of transducers used in past current or future experiments should alleviate these difficulties, save money and time and provide accurate physiological data quickly The program also provides selective information regarding transducers and aids in planning application methods appropriate to the acquisition of data in a manner that insures an acceptable attrition rate for the transducers This report describes the information acquired to date on the characteristics preparation calibration and operation of four selected implantable transducers Author (NSA)

N69-13939# Battelle Memorial Inst, Richland Wash Pacific Northwest Lab
SURFACE TENSION INSTRUMENT

R L Wilbur *In its* Ann Rept for 1967 to the USAEC Div of Biol and Med, vol 2, pt 1 Jun 1968 p 49–53 refs (See N69-13931 04-14)
Avail CFSTI

Material of marked surface activity has been obtained from the pulmonary alveoli of mammals Experimental results indicate a hysterisis at the air–liquid interface of lung tissue which varies with the surface tension This report describes an instrument that measures these effects *in vitro* in a manner closely analogous to the *in vivo* situation It also discusses the instrument used, the derivation of the surface tension equation, and the operation of the instrument with emphasis on the acquisition of accurate surface tension measurements Author (NSA)

N69-13948*# Midwest Research Inst, Kansas City Mo
BIOMEDICAL APPLICATIONS OF AEROSPACE-GENERATED TECHNOLOGY Quarterly Report, 1 Sep –30 Nov 1968
David Bendersky and Wilbur E Goll 13 Dec 1968 38 p refs
(Contract NSR-26-002-083, MRI Proj 3217-E(A))
(NASA-CR-98604 QR-2) Avail CFSTI CSCL 06

Activities of the Biomedical Applications Team at Midwest Research Instutute on 30 problems submitted by the participating medical institutions are discussed It is reported that potential solutions were found to 20 of these problems Four transfers of technology were completed which include X-ray photograph enhancement a system for delivery of medication to the respiratory tract temperature telemetry for internal organs and an enzyme amplifier and telemetry system Author

N69-13956 Vanderbilt Univ, Nashville Tenn
THE CRYSTAL STRUCTURE OF CALCIUM 1, 3-DIPHOSPHORYLIMIDAZOLE
Leon Neely Beard Jr (Ph D Thesis) 1967 84 p
Avail Univ Microfilms HC $4 40/Microfilm $3 00 Order No 68-5381

The crystal structure of calcium 1 3-diphosphorylimidazole $Ca_3(C_3N_2H_3(PO_3)_2)_2 \cdot 12H_2O$ has been determined by X-ray diffraction methods The compound is of interest in the study of phosphate transfer in biological processes The crystals are triclinic, space group P1 with a = 6 91 b = 11 29 c = 9 92 Å α = 102 44° β = 92 31° γ = 106 47° Z = 2 Visual estimations of 2020 intensities on levels of 0kl–6kl were made from Weissenberg photographs 323 reflections on levels 7kl–10kl were measured with a diffractometer using the 2θ-scan technique MoKα radiation was used with both techniques The phosphorus and calcium atoms were located from a Patterson synthesis The remaining atoms including all fifteen hydrogen atoms were located from difference syntheses Dissert Abstr

N69-13961 University of Southern Calif Los Angeles
ELECTRIC FIELD INDUCED SPECTRA OF PROPYNAL AND OTHER MOLECULES
Roddy Merl Conrad (Ph D Thesis) 1968 98 p
Avail Univ Microfilms HC $5 00/Microfilm $3 00 Order No 68-7176

Electric field induced spectra have been obtained by applying an A C electric field to molecules in the gas phase and photo-electrically detecting the change in electronic absorption coefficient caused by the field A lock-in amplifier tuned to the first overtone of the field frequency was used The apparatus for recording electric field spectra is described in detail Two approaches to the theory of electric field induced spectra are presented Electric field induced spectra of propynal are used to measure the electric dipole moment component along the near symmetric top axis of the ^1A excited state of propynal to be 99 ± 2 D The use of electric field induced spectra for assignment of the absorption spectrum of propynal is demonstrated over a range of experimental conditions Electric field induced spectra of carbon disulphide sulphur dioxide pyridazine pyridine pyrimidine aniline and thiophosgene are also reported and discussed Dissert Abstr

N69-13969*# Lovelace Foundation for Medical Education and Research, Albuquerque N Mex
RAPID (EXPLOSIVE) DECOMPRESSION EMERGENCIES IN PRESSURE-SUITED SUBJECTS
Emanuel M Roth Washington Nov 1968 129 p
(Contract NASr-115)
(NASA-CR-1223) Avail CFSTI CSCL 06S

A review is presented of the biomechanical factors determining lung damage following explosive decompression of space suits in vacuum test chambers Critical variables such as ratio of free volume of suit to area of orifice pressure ratio and pressure differential are outlined Calculations were made of orifices caused by catastrophic disruption of typical soft and hard space suits at seal sites and predictions were made as to the likelihood of lung damage based on the location of the seal disruption and open/closed glottis conditions It was concluded that all seal areas should be designed for slow propagation of disruptive processes and that preparation of therapeutic devices and facilities for handling explosive decompression emergencies would be advisable It was found that use of gases other than 3 7 psia O_2 in the suits alters the hazard the higher the percentage of helium in the mixture the less is the hazard Also since the maximum possible amplitude of transmural pressure is determined by the pressure difference the higher the initial pressure in the suit the more hazardous the exposure The pathological physiology of explosive decompression was reviewed followed by a summary of the most recent ideas in selection and testing of subjects to reduce the hazard and the treatment of individual syndromes and conditions Author

N69-13970 Maryland Univ College Park
A COMPARISON OF CONDUCTANCE EQUATIONS FOR SYMMETRICAL ELECTROLYTES
David William Ebdon (Ph D Thesis) 1967 90 p
Avail Univ Microfilms HC $4 60/Microfilm $3 00 Order No 68-7016

The interionic attraction theory of conductance was investigated to determine which of the existing extended conductance equations best describes the variation with concentration of the equivalent conductance of unassociated symmetrical electrolytes Computer programs were written to test various equations to determine which was the most internally consistent and to what extent the distance of closest approach parameter affected the association constant It was concluded that the Fouss-Onsager equation was the most internally consistent equation However the physical significance of the distance parameter was called into question It was further concluded that equations attempting to graft short-range interactions onto a continuum theory have highly erroneous results For associated electrolytes it was determined that only the functional form of the conductance equation was important Therefore it was proposed that conductance data for associated electrolytes be fitted using the standard three parameter conductance equation with activity coefficients calculated by a truncated Davies equation in order to avoid introducing an ion size parameter Dissert Abstr

N69-13974# Oak Ridge National Lab Tenn
STANDARD GAMMA-RAY SPECTRA OF THE ELEMENTS FOLLOWING 14-MeV NEUTRON IRRADIATIONS
J E Strain *In* AEC The Use of Small Accelerators for Teaching and Res 10 Apr 1968 p 48–55 refs Supported by AEC (See N69-13971 04-24)
Avail CFSTI

This lecture will deal with the problems of identification of gamma-ray emitting nuclides produced by 14-MeV neutron bombardment and the acquisition of standard gamma-ray spectra

L N Belyayeva 21 Nov 1967 11 p refs Transl into ENGLISH from Gigiena Truda i Prof Zabolevaniya (Moscow) v 9 1965 p 28–32
(AD-677248 FTD-MT-24-308-67) Avail CFSTI CSCL 6/5

Pneumonia which is the most serious and rather frequent complication of poisoning by beryllium compounds develops in interstitial tissue against the background of toxic lesion of alveolae and bronchioles which leads to partial atelectasis and swelling of separate pulmonary areas with considerable increase in the permeability of the pulmonary vessels Development of pneumonia usually involves association of a secondary pneumotropic infection or activation of the primary one which then acquires virulent properties In view of essential changes of reactance of the organism most beryllium pneumonias run the course of a hypoergic type without appreciable rise in body temperature with moderate leucocytosis or normal leucocyte count and without special shifts in the rods and nuclei There is observed arterial hypoxemia hyperventilation and proclivity towards marked tachypnea tachycardia hypotonia and collapse-like conditions Due to the protracted course of the pneumonic process the functional capacity *of the respiratory and hemodynamic systems is slow to recover its* normal vigor Author (TAB)

N69-14144# Columbia Univ New York Radiological Research Lab
RESEARCH PROJECT Annual Report
H H Rossi 1 Jan 1968 303 p refs
(Contract AT(30-1)-2740)
(NYO-2740-5) Avail CFSTI

Separate abstracts were prepared on the three sections of this report They include research in radiological physics biophysics, and radiobiology NSA

N69-14145*# Bolt Beranek and Newman Inc Cambridge Mass
HUMAN VISUAL SAMPLING PROCESSES A SIMULATION VALIDATION STUDY
John W Senders Jaime R Carbonell and Jane L Ward Washington NASA Jan 1969 110 p refs
(Contract NAS1-5059)
(NASA-CR-1258 BBN-1681) Avail CFSTI CSCL 05H

The results obtained in some fundamental investigations strongly support the notion that the behavior of the pilot or controller/monitor is largely determined by and calculable on the basis of physical characteristics of the system Based on the results a validation study more nearly approaching operational situations was undertaken This study used an instrumented flight simulator operational pilots and complete measuring recording and analysis techniques to validate and improve the methods offered by the theory The applied goal of the program was to make possible an a priori evaluation of the work load which any set of information sources to be monitored and controlled will place on the man The following results were obtained a measure of the goodness of prediction of the Nyquist models and the development and a measure of goodness of prediction of a new queueing/cost-effectiveness model Author

N69-14149# National Center for Urban and Industrial Health Washington D C Occupational Health Program
PHYSIOLOGICAL RESPONSES TO A CHANGING THERMAL LOAD
A Henschel C Humphreys T Doyle L Margolies and W Carlson Sep 1968 46 p
(AD-677386 TR-54) Avail Issuing Activity CSCL 6/16

Two series of experiments were conducted In series 1 the work load (metabolic heat production) was constant while the environmental heat load was increased stepwise at 45-minute intervals from comfort conditions to severe heat conditions In series 2, the environmental heat load was constant while the metabolic heat load was progressively increased during the 45-minute intervals from light to moderate work levels Comparative data were obtained from these experiments on the physiological responses to a changing environmental heat load and to a changing metabolic heat load which permitted an evaluation of differences in intra- and inter-individual responses to heat and the resulting physiological strain Author (TAB)

N69-14153# Martin Co Orlando Fla
TARGET ACQUISITION STUDIES FIXED TELEVISION FIELDS OF VIEW Final Report, Feb 1967–Oct 1968
Halim Ozkaptan James G Omart James W Bergert and Robert A McGee Oct 1968 109 p refs
(Contract N00014-67-C-0340)
(AD-677322 OR-9656) Avail CFSTI CSCL 17/8

A study was conducted to investigate an operators target acquisition capability while viewing a television monitor The study was conducted under realistically simulated flight conditions in the Guidance Development Center of the Orlando Division of Martin Marietta Corporation Pilot performance in terms of search detection and recognition was assessed for both briefed and unbriefed missions It was found that Performance as a function of contrast is strongly dependent upon field-of-view and type of briefing Probability of detection is influenced by field-of-view only in the unbriefed mode Extensive target search requirements exist in briefed as well as unbriefed modes Author (TAB)

N69-14177# School of Aerospace Medicine, Brooks AFB Tex
CHANGES IN WATER-SALT METABOLISM DURING A 62-DAY PERIOD OF HYPOKINESIS [IZMENENIE VODNOSOLEVOGO OBMENA V USLOVIYAKH 62-SUTOCHOI GIPOKINEZII]
E N Biryukov et al [1968] 11 p refs Transl into ENGLISH from Russian
(AD-677491 SAM-TT-R-947-0868) Avail CFSTI CSCL 6/16

The picture of biochemical changes presented in the homeostasis of a healthy individual is nothing other than the ultimate manifestation of disorders in the neuro-secretory compensatory processes elicited by prolonged restriction of movement and redistribution of the bodys fluid matrix Author (TAB)

N69-14178# Air Force Systems Command Wright-Patterson AFB Ohio Foreign Technology Div
REANIMATION OF DOGS AFTER CLINICAL DEATH DUE TO THE EFFECT OF RADIAL ACCELERATOR
V D Yankovskyi O P Morozov and M P Adamenko Nov 1967 10 p refs Transl into ENGLISH from Fizol Zh (USSR) v 12 no 5 1966 p 571–575
(AD-677262 FTD-HT-23-1265-67) Avail CFSTI CSCL 6/3

The authors conducted a series of experiments and found that dogs can be reanimated following clinical death resulting from radial accelerations of up to 40 G by a method of artificial *circulation The longest periods of clinical death due to radial* accelerations following which full restoration of functions could be attained varied from 15 min 45 sec to 19 min 30 sec The reanimated dogs live for years bear normal litters and differ in no respect from normal dogs in behavior and work capacity TAB

N69-14212*# Systems Technology Inc Hawthorne Calif
SMALL PERTURBATION DYNAMICS OF THE NEUROMUSCULAR SYSTEM IN TRACKING TASKS
Raymond P Magdaleno Duane T Mc Ruer and George P Moore Washington NASA Dec 1968 133 p refs
(Contract NAS2-2824)
(NASA-CR-1212 TR-154-1) Avail CFSTI CSCL 05H

Existing physiological data and human operator describing function data are synthesized by providing models which are

The discussion will include such factors as flux measurements sample transport counting geometry beta interference and precision The usefulness of the standard spectra will be demonstrated in the prediction of non-destructive analysis sensitivities and matrix interferences Author

N69-14012*# Northeastern Univ Boston Mass Electronics Research Lab

A STUDY OF MICROMINIATURIZED DEVICES FOR BIASTRONAUTICAL MONITORING OR ANALYSIS

B L Cochrun and J S Rochefort 1 Sep 1968 57 p refs

(Grant NGL-22-011-024)

(NASA-CR-98599 REPT-2) Avail CFSTI CSCL 06B

A literature survey on blood oximetry confirmed previous conclusions that it would be advantageous to use solid state devices such as electroluminescent diodes photosensitive diodes and monolithic circuitry An overview is presented on (Ga Al) as growth experiments and on the construction of a prototype modular electrode buffer amplifier (MEBA) A literature search was also conducted on electrodes for long-term physiological monitoring with particular reference to such problems at the skin–electrode interface as electrode polarization motion artifact between electrode and skin and subject discomfort The results indicate that the use of electrode jelly is no longer necessary and that dry electrodes are preferable although their lifetime is limited to about two weeks It is also reported that a hypothetical digital filter was postulated the transfer characteristic was expressed in the Z-transform the values of coefficients were determined and a computer program was employed to assess the frequency esponse sensitivity to parameter variation Admittance matrices are given for active circuit synthesis using uniform and exponential RC distributed lines Bibliographies are included M G J

N69-14025*# Techtran Corp Glen Burnie Md

SOME MECHANISMS RESPONSIBLE FOR THE REDUCTION OF ORTHOSTATIC STABILITY IN EXPERIMENTS WITH SIMULATED WEIGHTLESSNESS

I D Pestov Washington NASA Dec 1968 11 p refs Transl into ENGLISH from 'Nekotoryye Mekhanizmy Snizheniya Ortostaticheskoy Ustoychivosti v Eksperimentakh s Imitatsiyey Nevesomosti Presented at the 19th Congr of the Intern Astron Federation New York Oct 1968

(Contract NASw-1695)

(NASA-TT-F-12064) Avail CFSTI CSCL 06S

In 41 experiments involving 18 hours water immersion (18 test subjects) it was established that compensated and noncompensated forms of orthostatic instability arise with identical changes in water volume and therefore cannot be determined by the level of dehydration of the organism alone Orthostatic collapse appears most frequently in test subjects with unstable vegetative functions and an inclination to vestubular–vegetative reactions It can be prevented by using pharmacological stimulants (strychnine caffeine phenamine) Apparently one mechanism of compensation of the functions in the vertical pose is the nervous-reflector mechanism An experiment involving 70 hours bed confinement showed a reduction in the tensility of the vessels in the lower extremities which partially facilitates compensation of orthostatic shifts Maintenance of normal tensility of these vessels by femoral occlusion collars increases the reserve capacity of the blood depot and orthostatic disorders It is probable that when femoral collars are used this negative effect predominates over the effects for which it is designed Author

N69-14093*# Philco-Ford Corp Palo Alto Calif Western Development Labs

PHYSIOLOGICAL MONITORING TECHNIQUE USING UNATTACHED SENSORS

Mylen Fitzwater dePaul Corkhill Earl Jackson Paul Halvorson and Werner Sepper Mar 1968 97 p refs

(Contract NAS12-121)

(NASA-CR-86048) Avail CFSTI CSCL 06B

This report describes the development of techniques using unattached sensors for measuring Lead I electrocardiograph impedance respiration impedance pulse thoracic sounds and galvanic skin response Two unattached sensor systems for recording these variables have been built and are described in detail Studies were performed to determine the measurements taken with the unattached sensor monitoring system compared with conventional methods Feasibility studies were performed to determine the capability of deriving additional information from characteristics of the obtained measures these include 1) heart rate determination from ECG and pulse channels 2) emotional impedance changes comparable to galvanic skin response 3) myographic (muscle potential) level from ECG signals Results obtained using palm-to-palm dry unattached electrodes are comparable to conventional methods However further circuit design changes are planned based on recent validation studies The developed techniques may be applicable to monitoring astronauts Author

N69-14094*# Kentucky Univ Lexington

AN INVESTIGATION OF THE SUITABILITY OF WHITE RATS FOR SUB-ORBITAL STUDIES OF BEHAVIOR IN A GRAVITY FIELD

A B Broderson and K O Lange Washington NASA Dec 1968 102 p refs

(Grant NsG-456)

(NASA-CR-1255) Avail CFSTI CSCL 06C

Techniques were developed for evaluating the Spraque Dawley rat as a subject for the first of four in-flight gravity preference experiments to be launched into suborbital trajectories by Aerobee 150A rockets Special configuration centrifuges were developed and used to experimentally determine the locomotion behavior of rats in fields of simulated gravity Techniques were developed for investigating the effect of rocket launch stress on this behavior and an environmental simulation system was developed and used to routinely prepare rats for the confinement acceleration spin noise and vibration of an Aerobee launch The suitability of the subject and the effectiveness of the environmental simulation routine were verified by the satisfactory behavior demonstrated in the first flight experiment Author

N69-14127# Brookhaven National Lab Upton N Y Medical Research Center

USE OF Cf 252 AS AN INTERSTITIAL SOURCE OF FAST NEUTRONS

Harold L Atkins [1967] 18 p refs Presented at Meeting of the Transplutonium Program Comm Germantown Md

(BNL-12409 CONF-680420-1) Avail CFSTI

Unlike γ rays and X-rays the biological action of neutrons is virtually independent of oxygen Since anoxia is a major cause of failure in cancer radiotherapy there appears to be some advantage to the use of neutrons The low penetration of neutrons in tissue in comparison to that high-voltage X-rays or ^{60}Co γ rays makes implantation of neutron sources within and around tumors appropriate Californium-252 has been fabricated in the form of needles It has a half-life of 2 6 yrs and 1 μg of ^{252}Cf is equivalent to 1 mg of radium Use of ^{252}Cf for interstitial radiotherapy would combine the advantages of low-intensity irradiation (as with radium) with the advantages of high LET radiation These advantages are being verified presently using cultured human tumor cells NSA

N69-14137# Air Force Systems Command Wright-Patterson AFB, Ohio Foreign Technology Div

PECULIARITIES OF THE CLINICAL COURSE OF PNEUMONIA FOLLOWING POISONING WITH BERYLLIUM COMPOUNDS

compatible with the overall human operator s input/output characteristics as well as with the individual components of the neuromuscular system in tracking situations Of interest are recent anatomical and physiological data for the muscle spindle and input/output studies of the muscle which indicate that quasi-linear models can describe the basic behavior of these elements in tracking tasks Two key developments are reported 1) variation in muscle system parameters as a function of average muscle tension or operating point and 2) the role of the muscle spindle both as an adaptive equalization element and in its effect on setting muscle tone or average tension The pertinent whole human data include the covariation of high and low frequency describing function phase data and the variation of high frequency phase with set tension changes interpreted from force disturbance experiments Author

N69-14213*# Case Western Reserve Univ Cleveland Ohio
A LUNAR GRAVITY SIMULATOR, VOLUME 3
Dennis A Millett Washington NASA Dec 1968 252 p refs
(Contract NAS1-7459)
(NASA-CR-1235) Avail CFSTI CSCL 14B

Magnetic air bearings for use as low friction overhead support fixtures in a vertical lunar gravity simulator were investigated This device consists of a flat magnetic disc with a central air orifice The theoretical analyses of the air bearing are in good agreement with experiment Theoretical magnet force ranged from 15% to 35% above the experimental value Disc ceramic magnets were theoretically optimized based on maximum force-to-weight ratio and design curves are presented Author

N69-14220# Albert Einstein Medical Center Philadelphia Pa Dept of Genetics
ULTRAVIOLET LIGHT EFFECTS ON NUCLEIC ACID FORMATION AND GENETIC EVENTS IN BACTERIA Annual Progress Report
C O Doudney 29 Apr 1968 13 p ref
(Contract AT(30-1)-3893)
(NYO-3893-1) Avail CFSTI

Peroxide effects on survival and mutation induction were studied in bacteria exposed to uv and photoreversed When uv-exposed *Escherichia coli* were incubated in the presence of hydrogen peroxide and yeast extract a marked lethal effect was observed within 4 min Results indicated that the interaction of the peroxides with some non-photoreversible uv damage causes considerable lethality but this interaction has little effect in inducing certain reversions to phototrophy in auxotrophic bacteria Mutation frequency decline and photoreversal of uv-induced mutation in mfd + and mfd − strains of *E coli* were studied It was found that photoreversal response of induced phototrophy corresponded to that of photoreversal of lethality in regard to amount of light exposure suggesting that photoenzymatic elimination of pyrimidine dimers is responsible for both responses Studies on the effect of acriflavine on DNA and RNA formation in uv-damaged bacteria indicated the effects were related to the presence of the pyrimidine dimer NSA

N69-14221*# Aztec School of Languages Inc Acton, Mass
CERTAIN PROBLEMS OF THE ENERGIES OF LITHOTROPIC ORGANISMS
N G Doman and G V Tikhonova Washington NASA Dec 1968 25 p refs Transl into ENGLISH from Nekotoryye Probl Energ Organizmov-Litotrofov Usp Sovrem Biol (USSR) v 60 no 2 1965 p 238–256
(Contract NASw-1692)
(NASA-TT-F-12018) Avail CFSTI CSCL 06A

The authors discuss certain problems in the energy exchanges of lithotropic organisms particularly the Hydrogenomonas Nitrosomonas Nitrobacter, Thiobacillus and Desulfovibrio Particular attention is centered on the role of the 'reverse electron transfer in the synthesis of the CO_2 reducing agent of such organisms The possible ways in which the reducing agents and macroergs (prerequisites for the energy conversions) are developed are also presented Author

N69-14248*# Scripta Technica Inc Washington D C
ANALYSIS OF NUCLEAR FUNCTIONS IN THE ONTOGENETIC DEVELOPMENT OF THE FROG 4 MODIFICATIONS OF THE CHROMOSOME FORMULA [CONTRIBUTION A L'ANALYSE DES FONCTIONS NUCLEAIRES DANS L'ONTOGENESE DE LA GRENOUILLE 4 *MODIFICATIONS DE LA FORMULE CHROMOSOMAILE*]
A Dalcq NASA Dec 1968 18 p refs Transl into ENGLISH from Arch Biol (Belgium) v 43 1932 p 345–366
(Contract NASw-1694)
(NASA-TT-F-11945) Avail CFSTI CSCL 06R

Earlier investigations had provided some evidence that the nuclear complex played some part in segmentation and gastrulation attempts were now made to produce a fertilized ovum with a subhaploid chromosome formula It was a matter of eliminating the paternal chromatin by irradiation or poisoning and on the other hand removing part of the maternal haplome by puncture of the maturation spot These attempts failed whether because the residual chromosomes were always damaged to some extent indirectly or because gastrulation and neurulation require the presence of a complete and intact haplome This negative conclusion was arrived at after cytological examination of the chromosomes of larvae which might provide the answer together with examination of chromosomes from quite a considerable number of controls Author

N69-14271# Busche Associates Northridge Calif
ANIMATED PANEL LOGIC PROGRAMMING TECHNIQUES Final Engineering Report, Jun 1967–May 1968
Orlando Fla Naval Training Device Center Sep 1968 24 p
(Contract N61339-67-C-0201)
(AD-677476 NAVTRADEVCEN-67-C-0201-1) Avail CFSTI CSCL 5/9

The study was concerned with methods materials and techniques for producing panel artwork and equipment for programming and sequence control as applied to animated training panels Two basic methods of producing the display panel itself were investigated Both allow easy and rapid conversion of the artwork from one training problem to another Both room light visable and controlled visability systems of artwork illumination were studied A punched card programming system was advanced which promises much flexibility and ease of program change while retraining a simple easily understood mechanization It permits excellent control of the training sequence by the instructor and its simplicity and obvious operational concept allows the instructor to modify or generate his own sequences Author (TAB)

N69-14278# Illinois Univ Urbana Group Effectiveness Research Lab
COMMUNICATION, COOPERATION, AND NEGOTIATION IN CULTURALLY HETEROGENEOUS GROUPS Quarterly Report
Fred E Fielder and Harry C Triandis Oct 1968 14 p refs
(Contract Nonr-1834(36) ARPA Order 454)
(AD-677670) Avail CFSTI CSCL 5/10

A brief review is presented of current work on culture assimilators TAB

N69-14298# Army Natick Labs Mass Clothing and Organic Materials Lab
FACTORS INFLUENCING THE IMPACT ENERGY ATTENUATION CAPABILITIES OF THE U S ARMY FLYER'S PROTECTIVE HELMET (AFH-1)
Abraham L Lastnik Jul 1968 18 p refs *Its* Ser C&ED-48
(AD-677119 TR-69-21-CM) Avail CFSTI CSCL 6/17

Quality assurance impact testing of the U S Army s standard flight helmet was conducted in particular factors that influence the impact energy attenuation capabilities of the helmet were tested The Armys specification requires that the helmet shall sustain two successive impacts in each of four designated sites without bottoming or transmitting an excess of 300 Gs to an instrumented headform Because of the helmets configuration and construction the sides exhibited the greatest ability to attenuate impact energy followed in descending order by the front and rear areas of the helmet Author (TAB)

N69-14329*# George Washington Univ Washington D C Medical Center
BIBLIOGRAPHY ON INACTIVATION OF VIRUSES AND RICKETTSIAE BY HEAT
Mary Shipp Watson and Lydia M Homann Nov 1968 113 p refs
(Contract NSR-09-010-027)
(NASA-CR-98665) Avail CFSTI CSCL 06M

This volume contains a bibliographic listing of 514 literature references concerning the inactivation of viruses and rickettsiae by heat A permuted index and a complete author index are included Author

N69-14340# School of Aerospace Medicine Brooks AFB Tex
TRENDS IN AIRCREW ATTITUDES AND JOB-SATISFACTION WIVES' REPORT
George K Cantrell Jun 1968 31 p
(AD-677188 SAM-TR-68-67) Avail CFSTI CSCL 5/9

Part of the aircrew management survey is a short questionnaire to be completed by wives on a voluntary basis Data from four groups were compared to reveal potential trends in the problem areas covered in the survey This comparison revealed that for officer wives the largest favorable change involved a reduction in the number of days husbands spent on TDY and resulting improvement in the husbands ability to relax The largest negative changes involved living conditions cost-of-living and the effect of the husbands frequent absences on the marriage For airman wives the largest favorable changes involved living conditions and cost-of-living the average number of days husbands spent on TDY and additional duties The largest negative changes involved attitude toward husbands flying duties effects of husbands absences on children and greater difficulties experienced by husbands in relaxing Descriptions of the modal officer and enlisted aircrewman were derived Author (TAB)

N69-14341# Dunlap and Associates Inc Santa Monica Calif
ADAPTIVE PERFORMANCE MEASUREMENT Final Report
Charles R Kelley and Daniel J Prosin Aug 1968 69 p refs
(Contract Nonr-4986(00))
(AD-677049) Avail CFSTI CSCL 6/16

Adaptive human performance measurement is measurement in which the subjects response is fed back to affect the measurement process modifying stimuli problems or the measurement apparatus Research from related fields was analyzed to search out different adaptive measurement techniques The most important other technique was measuring by modeling in which the parameters of a model which adapts to match subject performance are the measurements Experimental demonstrations of adaptive measurement include (1) fixed and adaptive measurements of visual acuity (2) a computer simulation of adaptive visual acuity runs and (3) adaptive measurements of shape perception and of auditory binaural intensity discrimination Application of the technique is discussed Author (TAB)

N69-14345*# Louisville Univ Ky
EFFECTS OF PRACTICE AND WORK LOAD ON THE PERFORMANCE OF A CODE TRANSFORMATION TASK (COTRAN)
Earl A Alluisi and Ben B Morgan Jr Washington NASA Dec 1968 73 p refs
(Grant NGR-18-002-008)
(NASA-CR-1261) Avail CFSTI CSCL 05H

Results are presented on the effects of practice and operator work load on the acquisition and performance of a code-transformation (COTRAN) task which was developed to obtain performance measurements of that part of intellectual functioning which is typically called non verbal mediation It follows the problem-solving paradigm During the acquisition phase 27 COTRAN problems were solved on each of four (Group-4 with four subjects) eight (Group-8 with twenty subjects) or twelve (Group-12 with four subjects) successive days Performance reached asymptotic levels in four to six sessions in general and the differences in final levels of performance of the three groups (4 8 and 12) were not statistically significant During the transfer phase each of the 28 subjects solved 27 COTRAN problems of each of five successive days while time-sharing the COTRAN task with different combinations of tasks selected from a multiple-task performance battery The results indicated that skilled COTRAN performance is sensitive to at least two or three levels of work-load stress and that different subjects may tend to adopt different strategies in time-sharing the COTRAN task with other tasks Author

N69-14348# School of Aerospace Medicine Brooks AFB Tex
PSYCHOMOTOR EFFECTS OF LOW DOSES OF ACETAZOLAMIDE TO AID ACCOMMODATION OF MEN TO ALTITUDE
Bryce O Hartman and Phelps P Crump Jul 1968 20 p refs
(AD-677187 SAM-TR-68-65) Avail CFSTI CSCL 6/15

Studies were conducted to evaluate the usefulness of acetazolamide in aiding accommodation to altitude Three experimental conditions were included in the studies five men decompressed to a pressure altitude of 14 000 ft for 6 hours six men decompressed to 16 000 ft for 4 hours and three men decompressed to 14 000 ft for 5 days Each subject participated in two runs one with administration of the drug and the other in placebo using the usual double blind procedure Author (TAB)

N69-14375# Tennessee Univ Knoxville Dept of Psychology
OPERATIONAL ANALYSIS OF BEHAVIORAL SITUATIONS Final Report, 1 Mar 1967–30 Sep 1968
William S Verplanck Oct 1968 57 p
(Grant AF-AFOSR-1269-67)
(AD-677607 AFOSR-68-2326) Avail CFSTI CSCL 5/10

The project is concerned with the development and implementation of a procedure for the evaluation reclassification and the retrieval of the experimental evidence in psychology Based on an empirical vocabulary and utilizing an analysis of experimental reports into the specific operations carried out by the experimenter analysis sheets and a notational code were developed and are now being refined in use The analysis sheet provides for succinct statement of each variable that enters into the experiment The notation permits statement in coded form of the specific operations independently of the particular conditions of the experiment The notational summary of the operations will provide the basis for reclassification of empirical findings Using the bibliographic methods of a parallel research at the University of New Mexico the original literature on the topic sensory preconditioning was evaluated and is now being summarized as well as a randomly selected sample of approximately 300 papers Author (TAB)

N69-14387*# National Aeronautics and Space Administration Washington D C
AEROSPACE MEDICINE AND BIOLOGY
Nov 1968 191 p
(NASA-SP-7011(56)) Avail CFSTI CSCL 06

Subject coverage 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 Each entry consists of a standard citation accompanied by its abstract Author

N69-14407#
MAN AND AUTOMATA IN SPACE
G Petrov [1968] 3 p Transl into ENGLISH from Pravda (Moscow) no 358(18405) 23 Dec 1968 5 p
Avail CFSTI

The Soviet development of automated space probes space stations and manned spacecraft with additional full automatic control capability is briefly described Docking maneuvers are discussed and some of the risks of the Apollo 8 moon flight due to the emphasis on human control over automatic control are pointed out K W

N69-14421# Air Force Systems Command Wright-Patterson AFB Ohio Foreign Technology Div
SEMINAR ON NERVOUS SYSTEM FUNCTION MODELING
Ye N Sokolov 4 Dec 1967 6 p Transl into ENGLISH from Zh Vysshei Nervnoi Deyatel nosti (Moscow) v 15 no 1 1965 p 188–189
(AD-677252 FTD-HT-23-1110-67) Avail CFSTI CSCL 6/16

A seminar on problems involved in modeling nervous system functions on the individual neuron level the neuron system level and the level of the behavior of the entire organism was held by Vilnyus State University from 4 to 11 July 1964 Representatives from six Soviet cities presented papers at the seminar Author (TAB)

N69-14444# Air Force Systems Command Wright-Patterson AFB Ohio Foreign Technology Div
SPACE PSYCHOLOGY
V V Parin et al 14 Dec 1967 15 p refs Transl into ENGLISH from Priroda (Erevan) no 12 1966 p 3–12
(AD-677689 FTD-HT-23-1067-67) Avail CFSTI CSCL 5/10

Soviet and Western concepts of the selection and training of cosmonauts effects of isolation psychophysiological stress and biological rhythms in space are reviewed Author (TAB)

N69-14455# Martin Co Denver Colo
A SOLAR-ILLUMINATED ALGAL PHOTOSYNTHETIC EXCHANGER
Richard L Miller Don W Smith Calvin H Ward Denzel L Dyer and Robert D Gafford Brooks AFB Tex School of Aerospace Med Jun 1968 26 p refs
(Contract AF 41(609)-1606)
(AD-677116 SAM-TR-68-66) Avail CFSTI CSCL 6/11

A continuous culture system was designed to study the use of solar energy for algal growth and photosynthetic gas exchange Design parameters were calculated to support algal growth and photosynthesis during peak sunlight at a rate sufficient to provide respiratory support for one man The unique feature of the system was the facility for orienting the panels to face and track the sun Instrumentation was provided for monitoring the important variables affecting algal growth Testing with the system spanned a three-year period and two geographical locations Experimental results provided data on the operating parameters of a large solar-illuminated algal culture system and approximately confirmed the original calculations for algal production rate Author (TAB)

N69-14457# Air Force Systems Command Wright-Patterson AFB Ohio Foreign Technology Div
INSTRUMENT FOR SYNCHRONOUS SWITCH OF SIMULATORS AND CONTROL-MEASURING DEVICES
O T Lebedev et al 15 Dec 1967 7 p refs Transl into ENGLISH from Fiziol Zh SSSR (Moscow) v 51 no 7 1965 p 895–896
(AD-677237 FTD-HT-23-1158-67) Avail CFSTI CSCL 6/2

An electronic circuit has been designed by means of which the stimulant and a number of control and measuring devices are switched on simultaneously in experiments in which the dynamic characteristics of analysers (visual auditory etc) are studied Application of the circuit proposed eliminates the shortcomings connected with the use of electromechanical relays The arrangement in question is suitable for the study of conditioned reflexes TAB

N69-14478*# Dunlap and Associates Inc Darien Conn
PERIPHERAL VISION DISPLAYS, PHASE 2 REPORT
Leroy L Vallerie Washington NASA Dec 1968 49 p refs
(Contract NAS12-88)
(NASA-CR-1239 BSD-68-643) Avail CFSTI CSCL 05H

Two commercially available display systems were investigated in conjunction with other concepts involving the use of flicker to encode airspeed signals and differential brightness to enhance the discriminability of input signals Tracking information was presented in three control dimensions viz pitch roll and airspeed An adaptive loop simulator was employed to evaluate operator performance The results clearly indicated that effective control can be exercised using peripheral displays employing changes in motion as the primary encoding stimulus A higher level of performance was achieved with one system which contained a single display for presenting integrated pitch and roll signals The addition of airspeed was found to degrade performance in pitch and roll under all display conditions Performance could not be enhanced by means of differential brightness Further evidence was provided for the use of motion as a very effective means for encoding displays designed for viewing in the periphery Author

N69-14484# Bolt Beranek and Newman Inc Cambridge Mass
STUDY OF ACOUSTIC PROPERTIES OF SPEECH SOUNDS
Kenneth N Stevens and Mary M Klatt Aug 1968 95 p refs
(Contract F19628-68-C-0125 ARPA Order 627)
(AD-676979 BBN-1669 AFCRL-68-0446 SR-8) Avail CFSTI CSCL 17/2

The spectral and temporal characteristics of American English vowel and consonant sounds in a variety of phonetic contexts are examined and compared with data reported in the literature Spectrograms and sampled spectra (obtained from an analog filter bank connected to a digital computer) were assembled for a number of monosyllabic and bisyllabic utterances generated by three talkers and a variety of measurements were made from these displays The characteristics examined include durations of vowels durations of various phases of consonants in prestressed and poststressed positions and in clusters spectra of vowels and diphthongs and their variation with time spectra of consonants during constricted intervals and time-variation of spectra during the release of consonants The aim of the study is not to present an exhaustive acoustic-phonetic description of American English speech sounds but rather to indicate the kinds of acoustic properties that need to be utilized in schemes for machine recognition of speech Author (TAB)

N69-14491*# Naval Aerospace Medical Inst Pensacola Fla
THE PROBLEM OF ARTIFICIAL GRAVITY IN SPACE FLIGHT *Progress Report, 1 Jul –31 Dec 1968*
Ashton Graybiel 31 Dec 1968 7 p refs
(NASA Order R-93)
(NASA-CR-98662 PR-20) Avail CFSTI CSCL 06S

This report summarizes progress in several studies concerned with the central nervous system ataxia vestibular activities and motion sickness in connection with human adaptation to rotating environments The work also covers adaptation by means of controlled head movements the use of preventive drugs and the etiological factors of motion sickness K W

N69-14494*# Garrett Corp Los Angeles Calif AiResearch Manufacturing Div
DEVELOPMENT OF AN ELECTROLYTIC SILVER-ION GENERATOR FOR WATER STERILIZATION IN APOLLO SPACECRAFT WATER SYSTEMS APOLLO APPLICATIONS PROGRAM *Final Report*
C F Albright R Nachum and M D Lechtman Jun 1967 133 p refs
(Contract NAS9-3541)
(NASA-CR-65738 RFPT-67-2158) Avail CFSTI CSCL 06K

An electrolytic water sterilizer was developed for control of microbial contamination in the Apollo spacecraft Individual units are self-contained and require no external power or control The small size (2 5-in diameter by 4 in long) light weight (0 6 lb) and absence of interface requirements make it possible to incorporate such sterilizers at various desirable locations in the potable water system or the waste water system The sterilizer produces silver ions in concentrations of 50 ppb to more than 200 ppb in the water flow system the desired concentration being adjusted to the average water flow rate After installation no maintenance is required The unit can be neglected with no damage to the cell or the system since it becomes self-limiting if water flow is shut down An external shunt is provided for on–off functions and monitoring of current flow Probable life expectancy is 9000 hr without a change of batteries Laboratory tests under simulated conditions have demonstrated essentially complete kill of *Staphylococcus aureus* and *Escherichia coli* within 8 hr using initial bacterial concentrations greater than 5×10^5 organisms per ml Author

N69-14541*# Harvard Univ Boston Mass Thorndike Memorial Lab
A STUDY OF PHYSIOLOGICAL MECHANISMS AND INTER-RELATIONS BETWEEN SYSTEMIC AND REGIONAL BLOOD VOLUME, BLOOD FLOW AND ELECTROLYTE BALANCE Interim Progress Report
Walter H Abelmann 31 Dec 1968 8 p refs
(Grant NGR-22-007-019)
(NASA-CR-98660) Avail CFSTI CSCL 06P

In experiments on the regulation of sodium excretion the effects of fasting and re-feeding with carbohydrate were investigated in eight young healthy obese volunteers who were hospitalized and maintained on a constant sodium potassium and water intake The studies suggest that the natriuresis of starvation may be attributed to a decrease in distal tubular reabsorption and that the re-feeding of carbohydrate induces antinatriuresis by enhancing proximal tubular reabsorption The relationship of valvular disease to sodium excretion is discussed briefly Animal studies on the effects of atrial tachycardia and atrial fibrillation indicate that mean arterial pressure is a major factor in changes in tubular reabsorption of sodium associated with altered atrial rhythm In evaluating the role of circulatory congestion it was found that orthostatic tolerance in normal subjects was improved by expansion of plasma volume It is also reported that cardiovascular deconditioning was not observed in patients with congestive heart failure who were treated with bed rest Development plans for a miniature pressure transducer are mentioned M G J

N69-14542*# *Aztec School of Languages Inc Acton Mass*
INVESTIGATIONS OF AUTONOMOUS MOVEMENTS OF PRIMARY LEAVES OF CANAVALIA ENSIFORMIS DC [*UNTERSUCHUNGEN UEBER DIE AUTONOMEN* BEWEGUNGEN DER PRIMAERBLAETTER VON CANAVALIA ENSIFORMIS DC]
Anthonia Kleinhoonte Washington NASA Dec 1968 37 p refs Transl into ENGLISH from German
(Contract NASw-1692)
(NASA-TT-F-11975) Avail CFSTI CSCL 06C

Data pertaining to the nyctinastic movements of leguminous leaves are reviewed with particular attention centered on experiments to influence plants by noncyclical stimuli in such a way that they no longer experience circadian cycles Details are given on several experiments concerning the autonomous nature of leaf movements including experiments with the clinostat with plants raised under continuous illumination and with plants raised under 8 8-hour illumination cycling Theoretical studies pertaining to circadian autonomous movements and supplementary oscillations during nyctitropic movements are discussed Among the results reported are the following (1) Further displacements of an already displaced movement occur in the same way as displacements from a normal condition (2) Plants grown under constant illumination soon show a more or less well-shaped approximately circadian movement (3) Plants grown under 8 8-hour illumination cycling initially show movement synchronous with this cycle Often this movement is abandoned and circadian autonomous periodicity is then developed synchronously with the change between day and night M G J

N69-14586*# Aztec School of Languages Inc Acton Mass
TWIN MALFORMATIONS ARISING IN THE COURSE OF CENTRIFUGATION OF FERTILIZED EGG-CELLS OF RANA TEMPORARIA PRIOR TO SEGMENTATION [VOZNIKNOVENIYE BLIZNETSOVYKH URODSTV PRI TSENTRIFUGIROVANII OPLODOTVORENNYKH YAYTSEKLETOK TRAVYANOY LYAGUSHKI DO DROBLENIYA]
V L Kasyanov Washington NASA Dec 1968 6 p refs Transl into ENGLISH from Dokl Akad Nauk SSSR (Moscow) v 180 *no* 4 1968 p 1008–1011
(Contract NASw-1968)
(NASA-TT-F-12075) Avail CFSTI CSCL 06S

Methods are described by which groups of egg-cells of Rana temporaria were subjected to artificial insemination and subsequent centrifugation The resistance of various developmental stages to this centrifugation is discussed in terms of the percentage of developed embryos and the percentage of twin malformations It is also shown that a shaking of test tubes with groups of egg cells has a weaker effect than does centrifugation Author

N69-14587*# Techtran Corp Glen Burnie Md
MOST ANCIENT MANIFESTATIONS OF LIFE ON EARTH [O DREVNEYSHIKH ZHIZNEPROYAVLENIYAKH NA ZEMLE]
A G Vologdin Washington NASA Dec 1968 12 p refs Transl into ENGLISH from Tr Astrofiz Inst Akad Nauk Kaz SSR (Alma-Ata) v 9 1967 p 159–166
(Contract NASw-1695)
(NASA-TT-F-12043) Avail CFSTI CSCL 06A

This essay represents a summary of information concerning the origin of life on earth as obtained by various scientists including V I Vernadskiy Stanley Miller A I Oparin and others The work also includes some commentary on various problems encountered by science in its efforts to solve the mystery of the

origin of life The role of certain microorganisms and algae in the evolution of life the atmosphere and mineralization during the Precambrian and Cambrian and certain sedimentary strata containing these organisms are discussed Author

N69-14591*# University of Southern Calif Los Angeles School of Medicine
OBSERVATION OF ARTERIAL BLOOD PRESSURE OF THE PRIMATE AAP-Bio-A-1 Quarterly Progress Report 10 Jul -9 Oct 1968
John P Meehan 12 Nov 1968 9 p
(Contract NSR-05-018-087)
(NASA-CR-98664) Avail CFSTI CSCL 06B

During this reporting period major effort was concentrated in circuit development acquisition of components experimental evaluation of implant sites and tentative scheduling Three of the major circuits are either in the prototype packaging or in the final breadboard stage Author

N69-14592*# Aztec School of Languages Inc Acton Mass
PRIMARY CARBONACEOUS COMPOUNDS AND THEIR CONVERSION IN NATURE [PERVICHNYYE UGLERODISTYYE SOYEDINENIYA I IKH PREVRASHCHENIYA V PRIRODE]
G P Vodvykin Washington NASA Dec 1968 11 p refs Transl into ENGLISH from Tr Astrofiz Inst Akad Nauk Kaz SSR (Alma-Ata) v 9 1967 p 151-158
(Contract NASw-1692)
(NASA-TT-F-12044) Avail CFSTI CSCL 07C

The development of primary carbonaceous compounds in meteorites and in the Earth s crust is described in this article The author concludes that living matter is a particular form and a higher evolutionary stage of carbonaceous compounds and that this living matter is the inevitable result of an advantageous development of all inorganic matter on the whole He also discusses the similarities in the content and structure of the carbonaceous compounds found in outer space and on the Earth Author

N69-14620# Human Factors Research Inc Santa Barbara Calif
GEOGRAPHIC ORIENTATION IN AIRCRAFT PILOTS A FIELD VALIDATION OF A POST-FLIGHT METHOD OF REPORTING NAVIGATION PERFORMANCE
Gail J Borden and James J McGrath Jul 1968 68 p refs
(Contract Nonr-4218(00))
(AD-677055 JANAIR-680714 HFR-TR-751-14) Avail CFSTI CSCL 5/10

In a previous study a method was developed for obtaining navigational data from operational missions by means of postflight reports by the pilot In this study a series of flight tests were conducted to determine the validity of navigational data obtained by that method Two fixed-wing squadrons and two rotary-wing squadrons flew a total of 39 low-altitude sorties and an objective record of the track of each sortie was obtained During fixed-wing sorties the objective track was determined by chase pilots during rotary-wing sorties it was determined by Decca Flight Logs After each sortie the pilot marked on his aeronautical chart the track he recalled having flown Measurements of navigational errors were made from the objective tracks and compared with those made from the recalled tracks Author (TAB)

N69-14622# School of Aerospace Medicine Brooks AFB Tex Otolaryngology Branch
SOUND ATTENUATION PROVIDED BY PERFORATED EARMUFFS
Harrell C Sutherland Jr and James E Endicott Sep 1968 11 p refs
(AD-677190 SAM-TR-68-86) Avail CFSTI CSCL 20/1

Sound attenuation characteristics were determined for two types of earmuffs with perforated shells The muffs had been perforated to allow air pressure equalization when used in a chamber where rapid barometric pressure changes take place in the presence of highly intense noise It was found that both types of perforated muffs provided a substantial amount of ear protection even though they were not as effective as intact muffs Author (TAB)

N69-14627*# George Washington Univ Washington D C Medical Center
SCIENTIFIC PUBLICATIONS OF THE BIOSCIENCE PROGRAMS DIVISION VOLUME 5 PLANETARY QUARANTINE
Mary Shipp Watson and Frances Hong 19 Nov 1968 47 p refs 2d ed
(Contract NSR-09-010-027)
(NASA-CR-98672) Avail CFSTI CSCL 06A

Publications appearing as serial literature monographs books reports and speeches were used in compiling this bibliography It consists of a list of citations arranged chronologically according to author s names a permuted title index an author index and a senior author and laboratory directory Author

N69-14654# Naval Submarine Medical Center Groton Conn
CARBONIC ANHYDRASE ANALYSES OF THE BLOOD OF SUBJECTS EXPOSED TO A HELIUM-OXYGEN ENVIRONMENT AT SEVEN ATMOSPHERES PRESSURE
Donald V Tappan and Michael J Jaley Apr 1968 7 p refs
(AD-676325 NSCM-MR-68-6) Avail CFSTI CSCL 6/1

The carbon dioxide hydrating ability of erythrocytes measured as carbonic anhydrase activity and the qualitative pattern of the isozymes of this enzyme group were studied in men exposed to a helium-oxygen environment at seven atmospheres pressure No alteration in the enzyme or its activity of apparent physiological significance was detected Author (TAB)

N69-14660 South Carolina Univ Columbia
SPEECH COMPRESSION
Hideo Seo (Ph D Thesis) 1967 133 p
Avail Univ Microfilms HC $6 40/Microfilm $3 00 Order No 68-3942

An improved method of time compression of speech utilizing the digital computer is presented The use of the method to increase the communication capacity of the ear as the vital channel in audio communications is also described The method yields time compressed speech which is natural of normal pitch and highly intelligible even at compression ratios of two It utilizes a systematic approach in which portions of phonemes are sectioned out without destroying cognitive qualities A sample of speech recorded in regular audio tape is fed to the AD converter attached to the IBM system 7040 The digitized data is then analyzed and the optimum control of trimming out sections of the above record is accomplished by a method which trims out highly redundant sections and which minimizes the transients The resultant digital output is subsequently converted to analog data by the DA converter Dissert Abstr

N69-14661# Universidad Nacional de Trujillo (Peru) Departamento de Fisiologia
THE ROLE OF CATECHOLAMINES AND SEROTONIN IN THE PROCESS OF ADAPTATION TO HIGH ALTITUDE Final Report
Arnoldo Medina Luis Utano and Gilberto Olava Sep 1968 11 p refs
(Grant AF-AFOSR-888-67)
(AD-676685 AFOSR-68-2087) Avail CFSTI CSCL 6/19

This work is relationed with the study of the catecholamines and serotonin in the process of adaptation to high altitude The effects of hypoxia (12 85% O2 in N2) on the pulmonary artery pressure of dogs have been studied as well as the variations in the levels of Serotonin and Catecholamines in the blood of the same artery Hypoxia produced pulmonary hypertension in the dogs studied and at the same time an increase in the level of Serotonin in the blood of the pulmonary artery was produced The dogs reserpinized had hypertension pulmonary This result is expounded in relation to a reflex vasoconstriction which is mediated by Serotonin Author (TAB)

N69-14673*# Techtran Corp Glen Burnie Md
SIMULATION OF WEIGHTLESSNESS BY RAPID ROTATION ITS INFLUENCE ON VARIOUS ORGANISMS [SCHWERELOSIGKEITSSIMULATION DURCH RASCHE ROTATION IHR EINFLUSS AUF VERSCHIEDENE ORGANISMEN]
W Briegleb Washington NASA Jan 1969 14 p refs Transl into ENGLISH from German rept BMwF-FB-W-68-30 Presented at the Symp on Extraterrest Biophys, Biol and Space Med Marburg West Ger 9–10 Oct 1967 Submitted for publication
(Contract NASw-1695)
(NASA-TT-F-12040) Avail CFSTI CSCL 06S

The author describes apparatus and procedures for simulating weightlessness by rapid rotation and for recording minute deviations in development due to that factor He believes that this method has more evidential value than experiments thus far conducted on this point on satellites Nevertheless in experiments on cultures of *Chlorella pyrenoidosa* and *Phormidium* and on developing eggs of the beetle *Tribolium castaneum* he finds fully normal development with no significant deviations He announces his intention of refining the method In order to draw inferences bearing upon manned space flight he recommends study of the aquatic mammals dolphin and seal Author

N69-14720# Northrop Corp Hawthorne Calif Life Sciences Labs
EFFECTS OF THE RATE OF DELIVERY OF IONIZING RADIATION ON THE $LD_{50/30}$ OF RODENTS Final Report, 15 Nov 1966–15 Nov 1967
Jerome J Gambino and B H Faulkenberry Brooks AFB Tex School of Aerospace Med May 1968 47 p refs
(Contract F41609-67-C-0004)
(AD-677185 SAM-TR-68-47) Avail CFSTI CSCL 6/18

Mortality and shock-avoidance performance were observed in Wistar albino rats subjected to pulsed ionizing radiation from two different nuclear reactors In one the n/gamma dose ratio obtained ranged from 2 5/1 to 6 6/1 and the pulse width was 48 microsec at half-amplitude In the other the pulse half-width was either 10 to 150 msec and the n/gamma tissue dose ratio used ranged from 1/23 to approximately 5 3/1 Author (TAB)

N69-14728*# National Aeronautics and Space Administration Manned Spacecraft Center Houston Tex
PILOT CURRICULUM AND INSTRUCTOR'S GUIDE EMPHASIZING SAFETY IN COMPRESSED GASES AND CRYOGENIC LIQUIDS
Edwin M Logan and William T Kitts Feb 1968 101 p refs
(NASA-TM-X-58022) Avail CFSTI CSCL 05I

The Curriculum Guide was prepared to assist both instructors and those persons interested in the presentatin of various safety aspects of industrial gases and cryogenic liquids Safety is emphasized as concerns gases and cryogenic liquids at the Manned Spacecraft Center Houston Texas Publications audiovisual aids and equipment devices in this field are included in the course Author

N69-14734*# Techtran Corp Glen Burnie Md
WATER-SALT METABOLISM DURING SPACE FLIGHTS [VODNO-SOLEVOY OBMEN PRI KOSMICHESKIKH POLETAKH]
I S Balakhovskiy Washington NASA Jan 1969 16 p refs Transl into ENGLISH from Russian Presented at the 19th Congr of the Intern Astronautical Federation New York Oct 1968
(Contract NASw-1695)
(NASA-TT-F-12063) Avail CFSTI CSCL 06S

In view of the fact that water–salt metabolism is not entirely understood even under terrestrial conditions of weightlessness in space the problem of human water–salt matabolism during space flights is considered and published data on this subject during space flights are summarized It is assumed that weight loss is the result of losses of extra- or intracellular body fluids, apparently affected by nutrition and consumption of salts Tests were conducted on the crew of the Voskhod spacecraft in an effort to determine the changes which occur in human water metabolism during space flight These tests are described and the results are summarized Author

N69-14768*# Michigan Univ Ann Arbor
PROPRIOCEPTIVE CUES AND THEIR INFLUENCE ON OPERATOR PERFORMANCE IN MANUAL CONTROL
James Herman Herzog Washington NASA Jan 1969 178 p refs
(Contract NASr-54(06))
(NASA-CR-1248) Avail CFSTI CSCL 05H

The neuromuscular control system of the human upper limb was investigated as an auxiliary source of sensory information Analysis of a functional block diagram of the human operator indicated that a control system with interesting characteristics could be devised if the control stick were constructed to be a mechanical analog of the plant being controlled This is called the matched manipulator control technique in which the control force applied to the plant is a scalar multiple of the reaction force experienced by the operator The operator is in a particularly advantageous position to formulate control strategies to emphasize either accurate control performance or minimum use of control effort Experimentation with several human operators indicated that performance with the matched manipulator technique was consistently superior to control of the same plants with position type control sticks This technique seems to offer an interesting and useful means of altering the interface between the human operator and his electro-mechanical surroundings in order to improve the system performance Author

N69-14788# Army Edgewood Arsenal Md
ENDURANCE OF OVERHEATED MEN IN EXHAUSTING WORK
Francis N Craig and Harry L Froelich Jul 1968 25 p refs
(AD-677359 EATR-4193) Avail CFSTI CSCL 6/19

Men worked themselves to exhaustion on a treadmill at 3 5 mph and a grade beginning at 10 percent and increasing by one percent per minute in a room at 46 degrees C The men were first overheated by enclosure in a plastic bag or by immersion in a warm bath Enough water was drunk to prevent dehydration Effects of dehydration on endurance in exhausting work at 46 degrees C reported previously appear to be due mainly to overheating during the period of water restriction Author (TAB)

N69-14825# Saskatchewan Univ Saskatoon
AN ANALOGUE COMPUTER STUDY OF THE HUMAN CARDIOVASCULAR CONTROL SYSTEM
W D Pickering P N Nikiforuk and J E Merriman 1968 22 p refs
Avail CFSTI

A simplified analogue computer model of the human cardiovascular control system is developed in this paper This model

can be adjusted to reproduce the response of a subject to a submaximal work-load The validity of the model is evaluated and suggestions for its further development are included Author

N69-14860*# National Aeronautics and Space Administration Washington D C
NASA CONTRIBUTIONS TO BIOINSTRUMENTATION SYSTEMS—A SURVEY
Gershon Weltman Moshe Klagsbrun Donald Ukkestad and Ben Ettelson 1968 101 p refs Prepared by Spacelabs Inc
(NASA-SP-5054) Avail SOD $1 00 CFSTI CSLC 06B

Advances in bioinstrumentation devices and techniques achieved by the National Aeronautics and Space Administration are described to facilitate use of NASA contributions in medicine and the bioinstrumentation industry Accordingly the survey is directed largely toward two groups those in medicine who plan specify and utilize advanced bioinstrumentation systems and those in engineering who design develop and manufacture them The objectives are to stress the correspondence between spaceflight and nonaerospace applications and to lay the groundwork for subsequent extrapolation of NASA s experiences by the reader Five main areas of NASA bioinstrumentation system development are identified (1) *Planning*—The techniques to establish information requirements and equipment specification for system development are outlined (2) *Sensing and signal conditioning*—Detection of physiological signals under aerospace conditions and design of advanced electronic instrumentation to process and transmit these signals are discussed (3) *Medical monitoring and data processing*—Significant NASA contributions to data processing including acquisition techniques computation of derived parameters and methods of data display are included (4) *Measurements in the field*—Solutions to some difficult problems of making laboratory quality measurements in the field are treated (5) *Manufacture*—NASA contributions to bioinstrumentation fabrication and quality assurance are presented Author

N69-14870# Naval Submarine Medical Center Groton Conn Medical Research Lab
TASTE THRESHOLDS TO BITTER COMPOUNDS DURING A SUBMARINE PATROL
John W Nesson and William R Shiller 25 Jun 1968 11 p refs
(AD-677038 SMRL-538) Avail CFSTI CSCL 5/9

Polaris submarines make two month patrols and are submerged without external ventilation during the entire time The atmosphere is controlled to maintain habitability using CO CO2 and H2 removers as well as O2 generators The ambient CO2 is elevated during the entire patrol to an average level of 1 0% In general the atmospheric trace components of this closed environment are expected to differ from those found under normal environmental conditions Past study has indicated a decrease in the taste threshold for the sour modality aboard submarines This study was undertaken to test the effect of this atmosphere on the bitter modality threshold Taste thresholds for quinine (bitter) were determined during the refit period while in port and used as a baseline Three subsequent taste tests were accomplished during the patrol at about two week intervals A borderline statistically significant decrease in taste threshold (more sensitive) for quinine was noted A consistently higher threshold was noted in smokers than in non-smokers Author (TAB)

N69-14935*# Department of the Army Fort Detrick Md Protection Branch
THE EFFECT OF DIMETHYL SULFOXIDE ON THE SPORICIDAL ACTIVITY OF ETHYLENE OXIDE GAS
David R Spiner 9 Jan 1969 9 p
(NASA Order R-35)
(NASA-CR-98741) Avail CFSTI CSCL 06M

Tests were conducted to obtain a quick evaluation of whether there is an enhancement of the sporicidal activity of ethylene oxide (EtO) gas by incorporating dimethyl sulfoxide (DMSO) Previous screening tests in which a cloth patch contaminated with *B subtilis* var *niger* (BG) spores was suspended for 24 hours in a liter bottle over 0 1 ml of DMSO revealed no measurable sporicidal activity but a similar test with *Staphylococcus aureus* cells killed 100% showing that DMSO is antibacterial Similar 4-hour vapor tests were conducted using five chemicals with and without 0 1 ml DMSO contained in a small glass weighing cup A 0 1 ml amount of the other chemical was placed on the bottom of the bottle to volatilize The activity of four of the chemicals was depressed by the presence of DMSO One chemical s activity was not affected Vapor pressure is probably an important factor here It was noted that little of the DMSO had volatilized and the liquid could be absorbing some of the other vapor The vapor pressure of pure DMSO at 25° C is 0 6 mm Hg which is equivalent to approximately 1 6 mg/liter Author

N69-14936# School of Aerospace Medicine Brooks AFB Tex
PRESENT AND FUTURE CONCEPTS FOR THE EVALUATION OF MAN'S CARDIOVASCULAR SYSTEM DURING SPACE FLIGHT [SOVREMENNOE SOSTOYANIE I PERSPEKTIVY ISSLEDOVANIYA SERDECHNO-SOSUDISTOI SISTEMY CHELOVEKA V KOSMICHESKIKH POLETAKH]
I T Akulinichev et al [1968] 9 p refs Transl into ENGLISH from Russian Presented at 18th Congr of Intern Astronautical Federation Belgrade 25–30 Sep 1967
(AD-677489 SAM-TT-R-944-0768) Avail CFSTI CSCL 6/5

In processing diagnostic and symptomatic data certain difficulties are unavoidable because of limited data during flight and because of diversity of adopted methods and electrode characteristics In this light standardization of the research methods employed of the data processing and sensory instrumentation is of essence Such standardization could promote use of space medicine methodology in clinical practice which in turn would provide an additional check of their effectiveness Author (TAB)

N69-14972# Westinghouse Electric Corp Elmira N Y Electronic Tube Div
SOLID STATE IMAGE INTENSIFIERS, APPLICATION OF LIGHT AND IMAGE INTENSIFICATION TECHNIQUES TO MILITARY TRAINING, PHASE 4 Annual Report, Apr 1966–Apr 1967
Zoltan Szepesi and Michael A Novice Orlando Fla Naval Training Device Center Jun 1968 23 p refs
(Contract N61339-66-C-0064)
(AD-673980 NAVTRADEVCEN-66-C-0064-1) Avail CFSTI CSCL 9/1

The objectives of this contract were (1) to improve reproducibility and uniformity of image intensifier panels (2) to improve speed of response and output brightness (3) to prove feasibility of building image intensifier panels in modularized construction (4) to have a black and white output image and (5) to be able to view the image in moderately illuminated rooms The most effort during the first year of this program was spent on the study of reproducibility some problems of the modularized construction were solved Image intensifiers with white output light have been built problems of ambient light viewing have been analyzed and the necessary techniques experimented No appreciable improvement was achieved in speed of response and output brightness Author (TAB)

N69-14975# Westinghouse Electric Corp Elmira N Y Electronic Tube Div
SOLID STATE IMAGE INTENSIFIERS, APPLICATION OF LIGHT AND IMAGE INTENSIFICATION TECHNIQUES TO MILITARY TRAINING, PHASE 4, PROJECT LIT Final Report
Zoltan Szepesi M A Novice and T G Keeton Orlando Fla Naval Training Device Center Jul 1968 61 p refs
(Contract N61339-66-C-0064)
(AD-673981 NAVTRADEVCEN-66-C-0064-2) Avail CFSTI CSCL

9/1

The objectives of the contract were (1) to improve reproducibility and uniformity of image intensifier panels (2) to improve speed of response and output brightness (3) To prove feasibility of building image intensifier panels in modularized construction (4) To have black and white output image and (5) To be able to view the image in moderately illuminated rooms, most of the objectives of this program have been closely approached The reproducibility and uniformity of small intensifier units have been improved also the spectral response at the lower end of the visible spectrum has been increased A modularized image intensifier panel consisting of nine modules of 2 inches ±2 inches has been built with acceptable uniformity and yield of fabrication, it had white output light and the image could be viewed in an ambient illumination of 20 ft-C In a later development still considerable improvement in picture quality has been obtained and a resolution of 180 lines/inch has been reached It is concluded that the stage has been reached where the fabrication of larger modules and modularized panels could be undertaken Author (TAB)

N69-14976# Cambridge Univ (England) Dept of Zoology
THE CONTROL OF CIRCADIAN ACTIVITY IN COCKROACHES Final Report
J E Harker 9 Mar 1968 29 p refs
(Grant AF-EOAR-65-19)
(AD-677609 AFOSR-68-2174) Avail CFSTI CSCL 6/3

A study was made of the concentration of potassium and sodium in the blood of Periplaneta americana to determine whether daily fluctuations occur which might imply ionic control of the circadian locomotor activity rhythm Analyses were carried out on 166 blood samples taken at different times of day A fall of about 10% occurred in the potassium concentration during the first hour of darkness, there was also a small decline of 2% in the sodium concentration However series of 6 successive blood samples taken over a period of 3 weeks from 10 individual cockroaches revealed no daily change in the level of potassium sodium or haemocyte density No conclusions are drawn on the activity control aspect but the results do suggest that daily changes may occur in cockroach blood ions Author (TAB)

N69-14979*# Case Western Reserve Univ Cleveland Ohio
A LUNAR GRAVITY SIMULATOR, VOLUME 2
Richard J Morgen Washington NASA Dec 1968 142 p refs
(Contract NAS1-7459)
(NASA-CR-1234) Avail CFSTI CSCL 14B

The design of a vertical lunar gravity simulator is presented The simulation technique involves negating the various limb segments separately using constant-force negator springs Overhead support is provided by magnetic air pads which offer negligible resistance to horizontal movement The torso harness that is used provides for six degrees of freedom over a wide range of movements The dynamic behavior of the lunar gravity simulator is considered Indications are that low fatigue-life negator coils mounted back-to-back will be suitable as constant-force long-deflection springs A conical drum adjustable-force negator unit is optimized for minimum weight A technique for determing the mass and center of mass of the various body segments is also presented An analysis to determine the correct attachment points for negating the limbs and torso is presented It is recommended that negator coils of the lowest rated fatigue life be used as constant-force long-deflection spring elements Author

N69-14992# *Stanford Univ Calif Dept of Computer Science*
ARTIFICIAL INTELLIGENCE PROJECT
John McCarthy Edward Feigenbaum and Arthur Samuel 13 Sep 1968 93 p refs
(Contract ARPA SD-183 ARPA Order 457)
(AD-677528 SU-AI-69) Avail CFSTI CSCL 6/4

Recent work of the Stanford Artificial Intelligence Project is summarized in several areas Scientific hypothesis formation Symbolic computation Hand-eye systems Computer recognition of speech Board games and Other projects Author (TAB)

N69-14993# Army Biological Labs Fort Detrick, Md
AN EXPERIMENT ON THE DISINFECTION OF SURFACES WITH CHLORAMINE AEROSOLS
V G Kern et al Sep 1968 8 p Transl into ENGLISH from *Zh Mikrobiol Epidemiol i Immunobiol (Moscow)* v 27 no 4 1956 p 112–115
(AD-676997 TRANS-88) Avail CFSTI CSCL 6/12

Aerosols of chloramine solutions can be utilized for the dispersion of disinfection mediums on surfaces of premises and furniture during intestinal and droplet infection The suggested method of obtaining the aerosols through the use of compressed air insures (a) a large dispersion of the disinfecting solution and its deep penetration (b) an even cover of the surface with small particles of the dispersed solution and a high effectiveness (c) the desirable direction of the stream of aerosol (d) disinfection of the air medium (e) a great economizing of the disinfecting mediums The surfaces are not damaged during the use of aerosol methods The ability to obtain compressed air from portable compressor units which operate on ordinary electrical currents allow using the aerosols for disinfection in any locality Author (TAB)

N69-14996# Defense Research Board Ottawa (Ontario)
DECOMPRESSION CALCULATIONS ANALOGUE AND DIGITAL METHODS
R S Weaver L A Kuehn and R A Stubbs May 1968 44 p refs
(DRET-703) Avail Issuing Activity

In a previous report a theoretical model was proposed to predict the response of an experimentally validated pneumatic decompression computer Equations derived from the theoretical model were found to be non-linear and no analytic solutions were obtainable This paper reports in detail the analogue and digital computer programs developed to obtain solutions for the equations The equations are shown to predict accurately the response of the pneumatic decompression computer to a standard pressure test procedure Curves obtained from the computer programs are presented which relate ascent time to time at constant depth in diving situations ascent height to time after surfacing for flying after diving and nil-decompression diving to supersaturation ratio during ascent The latter program shows that for air the supersaturation ratio 1 8 agrees extremely well with previous experimental results this ratio is used in the current pneumatic decompression computers Author

N69-15009*# National Aeronautics and Space Administration, Washington D C
THE INFLUENCE OF MECHANICAL RESTRAINT AND OF BURDEN ON NYCTITROPIC MOVEMENTS [DER EINFLUSS VON MECHANISCHER HEMMUNG UND VON BELASTUNG AUF DIE SCHLAFBEWGUNGEN]
W Pfeffer Dec 1968 113 p refs Transl into ENGLISH from *Akad Wiss Math -Phys Klasse (Leipzig)* v 32 1911 p 161-295
(NASA-TT-F-11984) Avail CFSTI CSCL 06C

An investigation on nyctitropic movements of leaf organs with variable joints was conducted over prolonged periods of restraint and duly recorded It was also determined if as the result of displacement of illumination times analogous reactions are triggered in freely moving leaves and in leaves whose execution of movements is restrained A detailed exposition is presented on the subjects Some of the results follow The movement efforts on which nyctitropic movements are based are continuously sustained in the joint even when execution of the strived for movements are prevented by a resistance If the execution of this strived for movement is prevented by a resistance the leaf reacts to illumination changes in a manner similar to the freely moving leaf Significant autonomous movement activity was observed after nyctitropic movements died out as a result of the establishment of continuous illumination both in the free leaf as well as in the leaf working against resistance B P

IAA ENTRIES

A69-12859 #
MEDICINE OR PHYSIOLOGY IN SPACE?
F T de Dombal (Leeds University, Dept of Surgery, Leeds, England)
British Interplanetary Society, Journal, vol 21, Dec 1968, p 385-392 17 refs

Critical review of current biomedical research trends in the field of space travel, with particular reference to the field of gastroenterology It is pointed out that current biomedical research in space frequently does not merit the title of space medicine, for it deals not with any disease process, but rather with the physiology of man in space It is noted that, as long as present research trends continue, space travel will be restricted to an elite of highly trained, superfit young adults Examples selected from the field of gastroenterology show how, with the advent of commercial space flight, problems can result from our present failure to explore the effect of space travel upon the diseases which affect man M M

A69-12883
THE FLYER WHO FAILS
Roger F Reinhardt.
Flight Safety, vol. 2, Dec 1968, p 17-19. 19 refs

Excerpts from a psychiatric study of 46 naval aviators who had demonstrated their mastery of techniques of attack carrier aviation but became unable to continue flying high-performance aircraft In only a small number of cases was an anxiety reaction or a phobic reaction to flight uncovered It is considered that the diagnosis of "adult situational reaction" is applicable to most of these flyers who fail, because it emphasizes the difficulty of their task and the absence of serious underlying personality defects F R L

A69-12884
THE EFFECTS ON RESPIRATORY DISTURBANCE OF DIFFERENT TYPES OF OXYGEN FACE MASK
L R C Haward.
Flight Safety, vol 2, Dec 1968, p 20-25 26 refs.

Study of individual differences in respiratory response due to attitudes toward an oxygen face mask, as well as differences in response due to different types of mask Disturbance in respiration in 60 males aged between 20 and 40 years was measured Ten separate measures were treated statistically to provide a single comprehensive measure of the respiratory response to stress, and by the use of a respiratory disturbance score the relationship between experience of, and attitudes toward, gas anesthesia, and the response to different types of face mask were explored F R L

A69-12885
SAFETY ASPECTS OF HUD
N Penney.
Flight Safety, vol. 2, Dec. 1968, p. 32, 33

Discussion of Head-Up Display (HUD) systems, a form of instrument display which does not require the pilot to look down to seek data about the performance of the aircraft. The display is a combination of alpha-numerical and symbolic information, which is formed electronically on the face of a bright cathode ray tube and viewed on a semitransparent reflector via a collimating lens Two very important safety aspects provided by HUD are applicable to the transition from instrument to visual flight, and to the problem of division of crew duties Problems associated with the operation of modern aircraft, particularly the SST, such as runway performance variability, can be overcome by a HUD which provides the pilot with a takeoff director. F R L

A69-12987 *#
WATER ELECTROLYSIS - PROSPECT FOR THE FUTURE
T Wydeven (NASA, Ames Research Center, Moffett Field, Calif) and R W Johnson (NASA, Langley Research Center, Hampton, Va).
(AVIATION AND SPACE PROGRESS AND PROSPECTS, PROCEEDINGS OF THE ANNUAL AVIATION AND SPACE CONFERENCE, BEVERLY HILLS, CALIF , JUNE 16-19, 1968, p 93-102)
ASME, Transactions, Series B - Journal of Engineering for Industry, vol 90, Nov 1968, p 531-540 13 refs
[For abstract see issue 16, page 2908, Accession no A68-33412]

A69-12992 #
WATER RECLAMATION BY MEMBRANE VAPOR DIFFUSION
H J Kolnsberg and M D Dudarevitch (United Aircraft Corp , Hamilton Standard Div , Windsor Locks, Conn)
(AVIATION AND SPACE PROGRESS AND PROSPECTS, PROCEEDINGS OF THE ANNUAL AVIATION AND SPACE CONFERENCE, BEVERLY HILLS, CALIF , JUNE 16-19, 1968, p 38-47)
ASME, Transactions, Series B - Journal of Engineering for Industry, vol 90, Nov 1968, p 569-576 6 refs
[For abstract see issue 16, page 2908, Accession no A68-33406]

A69-12993 *#
ADVANCED DEVELOPMENTS IN HARD SPACE SUIT TECHNOLOGY
H C Vykukal (NASA, Ames Research Center, Moffett Field, Calif)
(AVIATION AND SPACE PROGRESS AND PROSPECTS, PROCEEDINGS OF THE ANNUAL AVIATION AND SPACE CONFERENCE, BEVERLY HILLS, CALIF , JUNE 16-19, 1968, p 86-92)
ASME, Transactions, Series B - Journal of Engineering for Industry, vol 90, Nov 1968, p 577-583
[For abstract see issue 16, page 2908, Accession no A68-33411]

A69-13359
SIZE-DETECTING MECHANISMS IN HUMAN VISION
Allan Pantle and Robert Sekuler (Northwestern University, Dept of Psychology, Evanston, Ill)
Science, vol 162, Dec 6, 1968, p 1146-1148 10 refs
NIH Grant No NB-06354

Description of experiments conducted to determine whether the human visual system can directly encode the area of retinal images produced by objects of different sizes Alternating bars of light and dark were used to isolate mechanisms responsive to bars of a given width. Results suggest that the human visual system contains several different classes of size detectors, each maximally sensitive to visual targets with sizes in a particular range B H

A69-13360
VISUAL CORTEX NEURONS - RESPONSE TO STIMULI DURING RAPID EYE MOVEMENTS
Robert H Wurtz (National Institute of Mental Health, Laboratory of Neurobiology, Bethesda, Md)
Science, vol 162, Dec 6, 1968, p 1148-1150 16 refs.

Description of experiments conducted with awake, unanesthetized monkeys to determine whether any blanking out of vision occurs by the time visual afferent information reaches cerebral cortical neurons during rapid eye movements With the eye stationary, responses of single neurons in the visual cortex were studied, and the size, shape, orientation, and location of the stationary or slowly moving visual stimulus necessary to activate the neuron were determined Then, the effect of this stimulus on the cell was tested during an eye movement With the eye stationary, a motionless or slowly moving stimulus falling on the receptive field of striate cortex neurons produced an excitatory response When a rapid eye movement was made across the same stimulus, many of these neurons continued to give an excitatory response but the discharge of other neurons was unchanged or was suppressed during the eye movement B H

A69-13361 #
HUMAN FACTORS EVALUATION OF THE VERTICAL CONTACT ANALOG DISPLAY
Kenneth D Cross (U S Navy, Naval Missile Center, Point Mugu, Calif)
Naval Research Reviews, vol 21, Nov , Dec 1968, p 14-18

Discussion of a research program to design a vertical contact analog display (VCAD) to unburden pilots by providing an integrated display of needed information Present program objectives give special emphasis to defining the need for supplementary information in a systematic way It is anticipated that considerable research effort will be expended in defining minimum supplementary information that is necessary for each of the different mission segments selected for study G V

A69-13400
THE ROLE OF PRODUCT ASSURANCE IN SPACECRAFT STERILIZATION
Herbert C Schwartz (Avco Corp , Avco Space Systems Div , Lowell, Mass)
(American Astronautical Society and New England Academic Community, Regional Symposium on Planetary Geology and Geophysics, Boston, Mass , May 25-27, 1967)
IN USE OF SPACE SYSTEMS FOR PLANETARY GEOLOGY AND GEOPHYSICS
Edited by R D Enzmann
Tarzana, Calif , American Astronautical Society (AAS Science and Technology Series Volume 17), 1968, p 471-474

Discussion of the role that product assurance plays in maintaining the integrity of existing planetary biological environments in space programs devoted to the determination of extraterrestrial life The Voyager program, whose objective is the exploration of possible extraterrestrial life on Mars, and the NASA planetary quarantine requirements are dealt with in detail It is concluded that product assurance and, especially, sterilization requirements must be built into the equipment and carried through all assembly and test operations Results of a pilot program indicate that methods and procedures exist both to facilitate sterile operations and to evaluate the degree of conformance. B H

A69-13433 *
UPTAKE AND INCORPORATION OF EXOGENOUS LEUCINE IN BACTERIAL CELLS UNDER HIGH OXYGEN TENSION
Ho Lee Young (NASA, Ames Research Center, Moffett Field, Calif)
Nature, vol 219, Sept 7, 1968, p 1068, 1069 8 refs

Investigation of the relationship between the transport and the incorporation of amino acids, and net synthesis of protein at high oxygen tension in cells of Pseudomonas saccharophila The results indicate that the ratio of endogenous to exogenous leucine is greater in cells grown in oxygen than in cells grown in air during incubation, and not the reverse The results also suggest that high oxygen tension has little direct effect on the incorporation of leucine into protein, but that it strongly inhibits the leucine uptake M M

A69-13434 *
APPLICATION OF INFORMATION THEORY TO THE STUDY OF THE STIMULATING EFFECTS OF IONIZING RADIATION, THERMAL ENERGY, AND OTHER ENVIRONMENTAL FACTORS - PRELIMINARY IDEAS FOR A THEORY OF ORGANIZATION
Henri Atlan (NASA, Ames Research Center, Moffett Field, Calif)
Journal of Theoretical Biology, vol 21, 1968, p 45-70 50 refs

The stimulating effects of low doses of ionizing radiation or of factors of the normal environment which are detrimental at higher levels are no less surprising than the "stimulating" effects of thermal energy and of the passage of time These effects exemplify a basic property of living matter - i e , the ability to increase information content up to a certain limit under the influence of contingent external factors In the transmission of information between substructures, the noise resulting from external contingent factors may act as a factor of autonomy which increases the complexity and efficiency of living systems This concept has been applied to extend Yockey's equations to the domain of low doses of environmental factors A change in alphabet appears necessary to insure that living systems with increased autonomy can overcompensate the information destruction caused by low doses of contingent factors (Author)

A69-13438 *
PARAMETRIC ANALYSIS OF SOME REQUIREMENTS FOR LIFE SUPPORT SYSTEMS APPLIED TO EARTH ORBITAL MISSIONS
Robert S Barker, Stuart W Nicol, Mahmoud M Yakut (McDonnell Douglas Corp , McDonnell Douglas Astronautics Co , Huntington Beach, Calif), and Joseph L Anderson (NASA, Office of Advanced Research and Technology, Mission Analysis Div , Moffett Field, Calif)
Society of Automotive Engineers, Aeronautic and Space Engineering and Manufacturing Meeting, Los Angeles, Calif , Oct 7-11, 1968, Paper 680746 17 p 6 refs
Members, $0 75, nonmembers, $1 00

A parametric analysis of the life support systems was completed, from which scaling laws were developed and adapted to computer solutions This new tool permits the evaluation of a great variety of life support system types and combinations The interdependencies and interrelations within the life support system itself can be evaluated, as well as the interactions between the life support system, the spacecraft, and other systems Representative data are presented for several partially closed life support system configurations usable for manned earth-orbital missions The life support systems are principally affected by alternative degree of closure, the functional methods selected for the various subsystems, and mission requirements Variations in the method or equipment used to provide a given recovery process, such as for carbon dioxide reduction, are shown in terms of the weight, volume, electrical power required, and spare parts for the particular subsystem involved, as well as for the other subsystems and the whole system Results are given to show the influence of input variables such as mission duration, crew size, logistic supply intervals, and emergency requirements such as meteoroid puncture or solar flare activity (Author)

A69-13440
SYSTEMS ANALYSIS APPLICATIONS TO THE C-5
D L Bouquet and P C. Greenlee (Lockheed Aircraft Corp , Lockheed-Georgia Co , Marietta, Ga)
Society of Automotive Engineers, Aeronautic and Space Engineering and Manufacturing Meeting, Los Angeles, Calif , Oct 7-11, 1968, Paper 680729 16 p
Members, $0 75, nonmembers, $1 00

Applying systems analysis to the C-5 the basic analytical tools used were computer programs which evaluated C-5 characteristics and determined cost effectiveness Three programs used to evaluate characteristic effectiveness were the loading program, productivity program, and effectiveness analysis program The fourth program, a life cost model presentation, determined airplane cost effectiveness, and is presented in two levels, the conceptual and contract definition phase and the acquisition phase A description of PERT-TECH techniques is also presented outlining how managers on the C-5 program were able to assess the technical health of the program and to pinpoint problem areas where action had to be taken during developmental work Systems analysis applications presented illustrate one of the first cases where detailed alternatives on a major transportation system were measured against total system effectiveness to attain maximum product performance (Author)

A69-13441 *
MICROBIOLOGICAL STUDIES ON A WATER MANAGEMENT SUBSYSTEM FOR MANNED SPACE FLIGHT
Judd R Wilkins and David C Grana (NASA, Langley Research Center, Hampton, Va)
Society of Automotive Engineers, Aeronautic and Space Engineering and Manufacturing Meeting, Los Angeles, Calif , Oct 7-11, 1968, Paper 680718 7 p
Members, $0 75, nonmembers, $1 00

Currently under investigation at the Langley Research Center in Hampton, Va , is a research test chamber to study and test life support subsystems for long-duration space missions This system is designed to support four men for a period of one year in a near-earth circular orbit with resupply at a 90-day interval Critical

life support subsystems include the recovery of water from urine, waste management, and personal hygiene Microbiological studies in support of the development and testing of a wick evaporator, water management subsystem are reported The goal of this program is to produce water meeting the recommended standard of "essential sterility," that is, no more than a sum total of 10 microorganisms per ml Modification of the wick evaporator system to permit the use of heat for sterilization will be described Microbiological and chemical results obtained during research and development on a bench model and from two units inside the Integrated Life Support System (ILSS) test chamber are presented The multidisciplinary approach used in this program and the background philosophy behind water standards for space missions are discussed The laboratory techniques used for the microbiological examination of samples from the water management system are reviewed (Authc

A69-13443
WET OXIDATION FOR SPACE WASTE MANAGEMENT
J J Konikoff and T K Slawecki
Society of Automotive Engineers, Aeronautic and Space Engineering and Manufacturing Meeting, Los Angeles, Calif , Oct 7-11, 1968, Paper 680714 6 p 5 refs
Members, $0 75, nonmembers, $1 00.

Long term multimanned space missions present numerous complex problems in devising a suitable life support system Among these problems is the management of the waste products generated during the mission A promising approach appears to be the wet oxidation process wherein the organic waste materials are decomposed at high pressures (50 atm or higher) and intermediate temperatures (100-300 C) This technique is promising because effluent may be used as a nutrient media, and thermodynamically it is exothermic Problems associated with the adoption of this approach to waste management are amenable to experimental investigation and resolution (Author)

A69-13459 #
OCCUPANT RESTRAINT SYSTEMS OF AUTOMOTIVE, AIRCRAFT, AND MANNED SPACE VEHICLES - AN EVALUATION OF THE STATE-OF-THE-ART AND FUTURE CONCEPTS
R G Snyder (Ford Motor Co , Automotive Safety Research Office, Dearborn, Mich)
Wayne State University, Impact Injury and Crash Protection Bioengineering Symposium, Wayne State University, Detroit, Mich , May 10, 1968, Paper 92 p 194 refs

Summary and evaluation of techniques for vehicle-occupancy protection, both existing and projected All types of protective garments are described, and evaluated for cost, practicability, ease of use, and public acceptance Gradual improvement of the current Type 2 restraint, employing better self-adjusting and lock-webbing play-out devices, is seen as the most likely area of development. The trend toward bucket seats may allow such alternatives as double shoulder harness with integral inertia reels stored in a higher seat back providing head restraint Long-range possibilities include lateral thigh and side protection, combined protection using a lap belt in combination with air bag systems or improved interior cushioning devices, and possibly a totally passive restraint in which the occupant wears nothing, but is protected by devices positioned at the instant of entry or impact B H

A69-13461 *
LOCATION OF UNIQUE SEQUENCES IN TOBACCO MOSAIC VIRUS RIBONUCLEIC ACID
Stanley Mandeles (California, University, Space Sciences Laboratory, Berkeley, Calif)
Journal of Biological Chemistry, vol 243, July 10, 1968, p 3671-3674 19 refs
NIH Grant No GM-12158, Grants No NsG-479, No NGR-05-003-020

Description of an experiment in which tobacco mosaic virus is partially stripped of its protein coat by sodium dodecyl sulfate The nucleic acid exposed was digested with T_1 ribonuclease, and the products were examined for the presence of three oligonucleotides of unique sequence The results indicate the location of two of the unique oligomers to be near the 5'-OH-linked end, and the third to be near the middle of tobacco mosaic virus RNA M G

A69-13462 *
STABILITY AND HABITUATION OF NONSPECIFIC GSRs
Charles Kaiser and Robert Roessler (Houston, University, Baylor University, College of Medicine, Houston, Tex)
Perceptual and Motor Skills, vol 27, 1968, p 495-498 13 refs
Grants No AF AFOSR 727-65, No NGR-44-003-031

Nonspecific galvanic skin responses (GSRs) were recorded during periods of stimulation (sound and light) and resting in a group of medical and dental students Testing occurred on four occasions over a 3-month period There was significant stability of frequency over testings Habituation occurred during both light and sound stimulation periods in the first testing but not in the remaining three testings Alert subjects produced significantly more nonspecific GSRs than drowsy subjects (Author)

A69-13470
STRESS-INDUCED OCULAR-MOTOR FAILURES IN PILOTS AND ASTRONAUTS [STRESSINDUZIERTE AUGENMUSKELSTORUNG BEI PILOTEN UND RAUMFAHRERN]
L M Fenning
(Arbeitstagung uber extraterrestrische Biophysik und Raumfahrtmedizin, 2nd, Universitat Marburg, Marburg, West Germany, Oct 10, 1967)
Ärztliche Praxis, vol 20, Feb 17, 1968, p 584, 585 In German

Analysis of tests conducted in a low-pressure chamber to determine the causes of convergent and divergent strabismus leading to pilot error Divergent strabismus, leading to short landing, and convergent strabismus, leading to overshooting of the runway, are shown to be directly related to changes in the blood pressure, in particular the amplitude of the pressure, brought on by atmospheric and barometric pressure increases at low altitudes These blood-pressure changes are shown to induce changes in the cerebrospinal fluid, causing increased pressure inside the skull, which in turn causes a slight contusion of the sixth cranial nerve, leading to a slight paralysis of the rectus lateralis muscle of the eye The conditions under which one or the other form of strabismus is induced are described in detail B H

A69-13476 *
SPACE RADIATION BIOLOGY, WORKSHOP CONFERENCE, UNIVERSITY OF CALIFORNIA, BERKELEY, CALIF , SEPTEMBER 7-10, 1965, PROCEEDINGS
Conference sponsored by NASA, Grant No NGR-05-003-115
Edited by P E Schambra, G E Stapleton, and N F Barr
Radiation Research Supplement, no 7, 1967 477 p

CONTENTS

(Harvard University, Massachusetts General Hospital, Boston, Mass), p 439-450

THE EFFECT OF HIGH-ENERGY PARTICLE IRRADIATION ON THE VESTIBULAR MECHANISM IN RABBITS L W McDonald (California, University, Berkeley, Calif), p 451-458

SUMMARY OF WORKSHOP C A Tobias and P E Schambra p 459-463

A69-13477

INTERACTIONS ABOVE 10 GEV

Frederick P Cowan (Brookhaven National Laboratory, Health Physics Div , Upton, N.Y)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965.)

Radiation Research Supplement, no 7, 1967, p 1-9 15 refs

AEC-sponsored research

Classification and description of the interactions occurring in the GeV energy region with emphasis on energies greater than 10 GeV Various types of high-energy interactions are briefly examined, emphasizing factors influencing dosimetry at energies above 10 GeV G V

A69-13478

RADIOLOGICAL PHYSICS OF PIONS

Johan Baarli (European Council for Nuclear Research, Geneva, Switzerland)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)

Radiation Research Supplement, no 7, 1967, p 10-19 11 refs

Review of the possible application and problems associated with negative pion beams for therapy, radiobiology, and dosimetry A description is given of some experiments dealing with the dose distribution in water irradiated with a 70-MeV pion beam from the CERN 600-MeV Synchro-Cyclotron The results show that the maximum dose rate is measured at the 14 8-cm penetration depth with a 2 2 ratio between this rate and the entrance dose rate Isodose distribution of this beam in water is also presented The quality factors evaluated from measurements with a high-pressure tissue-equivalent ionization chamber show values from 2 7 to 3.4 in the peak and a value of 1 at the beam entrance Calculated depth doses compared with the measurements seem to indicate that about 20 MeV is locally deposited in water per interacting negative pion Considering both quality factors and buildup factors, particles per square centimeter per second for producing 1 mrem per hour are compared with 400-MeV neutrons, 600-MeV protons, and 70-MeV pions G V

A69-13479

THERMAL SPIKE EFFECTS IN HEAVY-ION TRACKS

Amos Norman (California, University, School of Medicine, Dept of Radiology, Los Angeles, Calif)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)

Radiation Research Supplement, no 7, 1967, p 33-37 23 refs

Brief discussion of the consequences of the rise to high temperature of material in heavy-ion tracks It is shown that the rates of various physical and chemical reactions increase greatly, and that the heated material expands explosively This model can account for some observed LET and temperature effects in radiation biology and radiation chemistry, and it accounts very well for radiation nucleation in liquids G V

A69-13480

THE PHYSICAL CHARACTERISTICS OF SOLAR FLARES

S B Curtis (Boeing Co , Seattle, Wash)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)

Radiation Research Supplement, no 7, 1967, p 38-42 7 refs

Consideration of the order of magnitude of the radiation doses which are to be expected in space, as an aid to determination of critical astronaut body regions and to suggest research areas where future experimentation will be particularly helpful in evaluation of the hazard Only the hazard from solar particle events is discussed at length, with the trapped radiation in the Van Allen belts mentioned only to the extent that it contributes to the total radiation dose accumulated on lunar or interplanetary missions It is shown that the dose deposited to the skin and organs near the surface of the body is significantly greater than that deposited to the organs in the interior of the body, and that, behind thin shielding, the highly ionizing contribution cannot be neglected The hazard from malfunction of critical organs containing neural or retinal cells is emphasized as a possible factor on extended space flights G V

A69-13482

INACTIVATION OF RIBONUCLEASE BY ELASTIC NUCLEAR COLLISIONS

Horst Jung (Karlsruhe, Kernforschungszentrum, Institut fur Strahlenbiologie, Karlsruhe, West Germany)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)

Radiation Research Supplement, no 7, 1967, p 64-73 26 refs

Discussion of experimental results obtained when extremely thin layers of ribonuclease were irradiated with slow protons, and determination of the differential inactivation cross section for various proton energies in the range from 0 8 to 60 keV The data show that, with decreasing proton energy, the inactivation cross section reaches a sharp minimum at 1 2 keV and increases again at still smaller energies By comparing the experimentally determined inactivation cross sections with the cross sections for energy losses in elastic nuclear collisions and in ionizations, elastic collisions are demonstrated to destroy the enzymatic activity of ribonuclease The energy required for an inactivation by nuclear collisions is only one-fourth of the energy necessary for an inactivation by ionization G V

A69-13483 *

INACTIVATION AT VARIOUS TEMPERATURES OF THE ESTERASE ACTIVITY OF DRIED TRYPSIN BY RADIATIONS OF DIFFERENT LET

Tor Brustad (Norsk Hydro's Institute for Cancer Research, Montebello, Norway)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)

Radiation Research Supplement, no 7, 1967, p 74-86 24 refs

Research supported by the Norsk Hydro's Institute for Cancer Research, AEC, and NASA

Investigation of the inactivation by heavy ions of the esterase activity of dried trypsin, studied as a function of the temperature of the sample during irradiation in the range from 10 to 430 K, and in the LET range from 45 to about 13, 000 MeV-cm^2/g Stripped nuclei of argon, carbon, boron, helium, and deuterium were used in the study For all radiations used, the radiosensitivity was found to be essentially constant when the irradiation was carried out at temperatures below 100 K When irradiation was carried out at higher temperatures, the radiosensitivity increased with increasing temperatures, but this increase was less when radiation of high LET was used The effects are observed only if the samples are subjected to heat and radiation simultaneously G V

A69-13484 *

FREE RADICALS INDUCED IN ENZYMES BY ELECTRONS AND HEAVY IONS

Thormod Henriksen (California, University, Lawrence Radiation Laboratory, Berkeley, Calif , Norsk Hydro's Institute for Cancer Research, Montebello, Norway).

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)

Radiation Research Supplement, no 7, 1967, p 87-101 15 refs

AEC-NASA-supported research

Study, by ESR spectroscopy, of the free radicals produced in solid samples of ribonuclease, lysozyme, and trypsin when exposed, in vacuum and at various temperatures, to different types of ionizing radiation The enzymes were irradiated with 6 5-MeV electrons and fast, stripped helium, carbon, and argon ions at temperatures from 77 to 330 K For all three enzymes, it was found that the resonance spectra at room temperature can be

ascribed mainly to sulfur radicals and to a radical in which the unpaired electron is localized on an α-carbon atom in the protein backbone For all three enzymes, another unidentified resonance was found which is spread out over approximately 70 gauss, is centered at a g value approximately that of the free electron and is more unstable than the two other secondary radicals A good correlation was found between the production of secondary radicals and the inactivation of the three enzymes G V

A69-13485 *

ELECTRON SPIN RESONANCE STUDIES ON PROTON-IRRADIATED RIBONUCLEASE AND LYSOZYME

K Stratton (Massachusetts General Hospital, Physics Research Laboratory, Boston, Mass)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 102-115 20 refs
Research supported by the American Cancer Society and NASA

Study, by ESR spectroscopy, of the long-lived radicals produced in crystalline ribonuclease and lysozyme by 120-Mev protons Bragg peak protons, and ^{60}Co gamma irradiation Proton irradiations produced no markedly different resonance spectra from those obtained after ^{60}Co gamma irradiation at the same temperature, but higher LET radiation ($\bar{E} \sim 300$ keV neutrons) at 77 K did give rise to a different spectrum The efficiency of production of long-lived radicals in these enzymes by Bragg peak protons relative to ^{60}Co gammas was 0 85 ± 0 02, with some dose-rate dependence, especially for lysozyme G V

A69-13486

INACTIVATION AND TRAPPED RADICALS IN DRY TRYPSIN EXPOSED TO ULTRAVIOLET LIGHT

H B Steen and T Brustad (Norsk Hydro's Institute for Cancer Research, Montebello, Norway)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 116-127 19 refs

Experimental study of the causal relationship between trapped radicals and the inactivation of solid trypsin exposed to UV light The procedure used was to measure the concentration of radicals and the degree of inactivation as functions of exposure time and wavelength The various wavelengths were obtained by irradiation with a polychromatic light source through optical filters which were opaque below different wavelengths The number of trapped radicals per inactivated molecule varied from approximately 0 2 for wavelengths below 3000 Å to 0 004 at 3340 Å Between 3130 and 3340 Å the ESR spectrum changed significantly There is good agreement between the photon energy corresponding to this wavelength and the dissociation energies of N-H and C-H bonds The results make it unlikely that the inactivation is due entirely to the trapped free radicals For UV light below 3000 Å, however, a significant contribution to the inactivation due to the trapped radicals seems possible B H

A69-13487

EXCITATION, DISSIPATIVE, AND EMISSIVE MECHANISMS IN BIOCHEMICALS

Leroy Augenstein, Edward Yeargers (Michigan State University, Biophysics Dept , East Lansing, Mich), James Carter, and DeVaughn Nelson (Oak Ridge National Laboratory, Health Physics Div , Oak Ridge, Tenn)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 128-138 10 refs
AEC-supported research

Study of the fluorescence and phosphorescence from tryptophan powders stimulated at low temperatures with UV, vacuum UV, fast electrons, and X rays Radiationless conversions between higher-excited singlet and triplet states and the ground state are found to be efficient but temperature-insensitive The data indicate that both optically forbidden and optically allowed transitions produced by fast and slow electrons are probably important in the light emitted as a result of X irradiation B H

A69-13488

ULTRAVIOLET-INDUCED EXCITED STATES IN DEOXYRIBONUCLEIC ACID

Ronald O Rahn, J W Longworth (Oak Ridge National Laboratory, Biology Div , Oak Ridge, Tenn , Bell Telephone Laboratories, Inc Murray Hill, N J), and R G Shulman (Bell Telephone Laboratories, Inc , Murray Hill, N J)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 139-146 6 refs

Investigation of the excited-state properties of DNA and some of its fundamental constituents The methods used were optical emission and electron spin resonance Evidence is presented that the triplet state of DNA and of poly dAT has properties similar to that of ionized thymidine Because thymidine phosphoresces only on losing its N_3 proton (pH = 9 8), these results are consistent with an effective transfer of this proton in the hydrogen-bonded polyadenine upon ultraviolet excitation B H

A69-13489

MOLECULAR EVENTS RESULTING IN RADIATION INJURY, REPAIR AND SENSITIZATION OF DNA

Waclaw Szybalski (Wisconsin, University, McArdle Laboratory, Madison, Wis)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 147-159 58 refs
Research supported by the Alexander and Margaret Stewart Trust Fund, NSF Grant No B-14976, PHS Grant No CA-07175

Discussion of structural and transcription damage to DNA Two general classes of damage are postulated One of these is damage resulting in major distortion of the DNA structure and a change in its topology Most often this damage takes the form of breakage of phosphodiester bonds with resulting single or double chain scission, or covalent linking of the complementary strands, binding to protein or other macromolecular cell components The other type of damage is a change in information, caused most often by more subtle radiochemical modification of individual DNA bases A diagrammatic representation of the postirradiation repair process of DNA on the molecular level is given B H

A69-13490

MUTATION-INDUCTION AND NUCLEAR INACTIVATION IN NEUROSPORA CRASSA USING RADIATIONS WITH DIFFERENT RATES OF ENERGY LOSS

F J de Serres, B B Webber, and J T Lyman (Oak Ridge National Laboratory, Biology Div , Oak Ridge, Tenn , California, University, Donner Laboratory, Berkeley, Calif)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 160-171 17 refs
AEC-sponsored research

Comparison of the effects of accelerated helium and carbon ions on inactivation and mutation induction in Neurospora crassa with the effect of X rays Mutation induction is studied by using the specific-locus technique in a genetically marked two-component heterokaryon, which permits the recovery of mutations resulting from gene inactivation from either intragenic or extragenic alterations This approach shows that in Neurospora heavy ions have about the same RBEs for inactivation as for mutation induction and that these RBEs are greater than 1 0 The fact that RBEs for mutation induction are about the same as the RBEs for inactivation in Neurospora is apparently due to the recovery of a class of mutations not analyzed previously with other microbial test systems P v T

A69-13491 *

INDUCTION OF DIFFERENT CLASSES OF GENETIC EFFECTS IN YEAST USING HEAVY IONS

S Nakai and R Mortimer (California, University, Donner Laboratory, Berkeley, Calif)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 172-181 16 refs
NASA-AEC-supported research

Study of the induction of a number of classes of genetic effects using radiations of different total linear energy transfer It has been found that for all effects studied - lethality, mitotic segregation, allelic recombination, and reverse mutation - densely ionized particles are more efficient than sparsely ionized radiation With respect to the differences ascertained, haploid inactivation and mutation appear to be in one class, while diploid inactivation, dominant lethality, mitotic crossing-over and allelic recombination are in another class This might indicate differences in the molecular mechanism of induction of these effects No pronounced differential effects of heavy ions compared to light ions were apparent for the induction of mitotic recombination in different intergenic or intragenic regions, even though the relative dimensions differ by two orders of magnitude P v T

A69-13492

SURVIVAL, CHROMOSOME ABNORMALITIES, AND RECOVERY IN HEAVY-ION- AND X-IRRADIATED MAMMALIAN CELLS

L D Skarsgard, B A Kihlman, L Parker, C M Pujara, and S Richardson (Yale University, Dept of Molecular Biophysics and Dept of Radiology, New Haven, Conn)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967 p 208-221 24 refs
AEC Contract No AT (30-1)-2653, PHS Grant No CA-06519-03

Evaluation of the results for survival of colony-forming ability, chromosome damage, and recovery between two dose fractions of a wide range of accelerated heavy ions and for X rays The dependence of the dose response on LET_∞ was found to be very similar for colony-forming ability (as judged by the final slope of the survival curve) and chromosome damage, supporting the hypothesis that the radio-sensitive sites are the same for these two effects The survival curves for heavy ions demonstrated a small but significant shoulder, persisting at least to an LET_∞ of 1890 MeV-cm^2/g, indicating the presence of accumulated sublethal damage at these high-ionization densities The recovery data showed that up to an LET_∞ of 443 MeV-cm^2/g some of this damage, at least, is reversible, however, somewhere in the LET_∞ region between 400 and 130(MeV-cm^2/g P v T

A69-13493

THE USE OF A DEUTERON MICROBEAM FOR SIMULATING THE BIOLOGICAL EFFECTS OF HEAVY COSMIC-RAY PARTICLES

Howard J Curtis (Brookhaven National Laboratory, Biology Dept , Upton, N Y)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 250-257 7 refs
AEC-sponsored research

Study of the ionization produced by heavy cosmic-ray particles, which is almost entirely highly concentrated along single tracks The microscopic dose within these tracks is very high, although the overall dose rate in outer space would be very low These particles cannot be produced now in the laboratory, so a microbeam of deuterons has been developed which simulates the ionization patterns of these particles When the microbeam is used on mice, it is found that this type of radiation causes very little damage in the brain or eye and presumably in the other vital organs of the body However, it does cause graying of hair It is concluded that this type of radiation will not constitute a serious hazard for space flight P v T

A69-13494

THE INTERPRETATION OF MICROBEAM EXPERIMENTS FOR MANNED SPACE FLIGHT

Howard J Curtis (Brookhaven National Laboratory, Biology Dept , Upton, N Y)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 258-264 6 refs
AEC-sponsored research

Discussion of recent developments in radiobiology, leading to an assessment of the possible hazards from the heavy cosmic-ray particles for manned space flight Summarizing earlier experiments on the effects of a deuteron microbeam on the brain, the eye, and the hair, the investigation is extended to other parts of the body It is predicted with considerable confidence that the heavy cosmic-ray particles will not constitute an appreciable hazard for space flight of some months' duration P v T

A69-13495

RADIOLOGICAL PROPERTIES OF BEAMS OF HIGH-ENERGY PROTONS

Borje Larsson (Uppsala, University, Gustaf Werner Institute, Uppsala, Sweden)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 304-311 19 refs
Research supported by the Knut and Alice Wallenberg Foundation, the Swedish Cancer Society, and the Swedish Medical Research Council, Contracts No AF 61(052)-183, No AF 61(052)-740

Investigation of the potentialities of a 187-MeV proton beam from the Uppsala synchrocyclotron in biological and medical research Particular attention is paid to the use of this radiation in the treatment of tumors and in functional neurosurgery where the radiation is now being used both clinically and in physiological experimentation as a substitute for classical surgical instruments A general physical and radiobiological characterization of the high-energy proton radiation is given P v T

A69-13496

PROTON-IRRADIATION EFFECTS IN PRIMATES

James Culver, John E Pickering (USAF, School of Aerospace Medicine, Brooks AFB, Tex), and Robert Zellmer

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 325-329

Evaluation of experiments carried out to determine the biological effects of protons on infrahuman primates (Macacca rhesus) in the hope that the data resulting from such experiments would allow the shield design engineer to provide better protection with a minimum amount of weight penalty Five groups of ten animals each were irradiated with 730 MeV protons, the irradiation levels being 300, 400, 500, 600, and 700 rads Clinical observations included food and water consumption, activity, vomiting, diarrhea, purpura, epilation, erythema, edema, and dysentery, as well as time of death or survival time All the animals in the 700-rad group died, and none of the animals in the 300-rad group died In the groups receiving intermediate doses there was a dose-death dependency Pathological examinations included the classical gross and microscopic analyses of tissues In general, the pathological findings in this group were not different from those seen in animals dying from other types of radiation P v T

A69-13497 *

ACUTE SOMATIC EFFECTS IN PRIMATES OF PROTONS TO 400 MEV

I R Lindsay and G V Dalrymple (USAF, School of Aerospace Medicine, Aerospace Medical Div , Brooks AFB, Tex)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 330-335 10 refs
NASA-supported research

Evaluation of the biological effects in primates irradiated with protons of discrete energies selected to represent significant portions of the space proton spectrum Protons that penetrate only the superficial tissues and protons that have sufficient range to penetrate the entire body were studied In general, the highly penetrating protons produce no really new or unusual findings The only significant clinical departure from the experience with 2-MeV X rays is an increased severity of gastrointestinal and hemorrhagic signs The etiology of deaths occurring after 32-Mev proton irradiation is understandable If sufficient energy is delivered into the skin, subcutaneous tissue, and underlying muscle, necrosis is produced Once the necrosis occurs, infection sets in, and the progression is similar to that produced by thermal burns P v T

A69-13498 *

EFFECTS OF ACUTE EXPOSURE TO HIGH-ENERGY PROTONS ON PRIMATES

S Tom Taketa, Bruce L Castle, Wayne H Howard, Charles C Conley, Webb Haymaker (NASA, Ames Research Center, Moffett Field, Calif), and Charles A Sondhaus (California, University, Lawrence Radiation Laboratory, Berkeley, Calif)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 336-359 45 refs

Discussion of data from collaborative studies to determine the biological effectiveness of protons as compared with other types of radiation, specifically ^{60}Co gamma radiation The study, which used 43 rhesus monkeys, demonstrated the phenomena of dose buildup from the action of high-energy protons to be independent of the Bragg peak effect and to be related to the distance traversed by the primary protons Data based on midpoint air dose, midpoint tissue dose, and average body dose were used for the evaluation Protons appeared to be as effective or slightly more effective than gamma rays when the comparisons were based improperly on midpoint air dose, but less effective when based on absorbed tissue dose Appearance, radiation syndrome symptoms, and pathological changes were essentially similar in both groups Silver impregnation in the brains of 15 animals revealed glial activation in most of them and was considered a radiation effect G V

A69-13499

RADIOBIOLOGICAL STUDIES WITH HEAVY PARTICLES AS RELATED TO THERAPY

John H Lawrence (California, University, Lawrence Radiation Laboratory and Donner Laboratory of Medical Physics and Biophysics, Berkeley, Calif)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 360-368 48 refs

Review of current research results and experimental programs of mammalian radiobiological studies of the effects of heavy particles The therapeutically advantageous characteristics of heavy particles are cited as being less scatter, greater penetration, independence of oxygen concentration, lack of tissue recovery, and Bragg peak effect Emphasis is placed on the present-day need for information concerning whole-body heavy particle irradiation of man G V

A69-13500

TIME-INTENSITY DATA IN SOLAR COSMIC-RAY EVENTS - BIOLOGICAL DATA RELEVANT TO THEIR EFFECTS IN MAN

W H Sweet, R N Kjellberg, R A Field, A M Koehler, and W M Preston (Massachusetts General Hospital, Boston, Mass)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 369-383 12 refs

Summary of the characteristics of the emission of heavy particles in major solar cosmic events from the viewpoint of possible biological effects Attention is drawn to the probability of a less lethal effect of continuous irradiation for hours during a flare, and to the special protective effect of the body itself for an adequate amount of the vertebral bone marrow at the energy ranges in question The same may be true of the liver, kidneys, gut, pancreas, and adrenal glands Only the important lateral cerebral mantle of gray matter is in a relatively exposed position and might conceivably profit by a special helmet to shield it P v T

A69-13501

HISTOLOGY OF THE SURGICAL RADIOLESION IN THE HUMAN BRAIN AS PRODUCED BY HIGH-ENERGY PROTONS

William Mair, Bror Rexed, and Patrick Sourander (Uppsala, University, Gustaf Werner Institute and Institute of Anatomy, Uppsala, Sweden)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 384-389 6 refs
Research supported by the Swedish Medical Research Council, Contract No AF 61(052)-183

Study of the possibility of destroying a small selected region of the human brain, such as the spinothalamic tract in the midbrain, by using stereotaxic methods and a crossfire technique, with high-energy protons The irradiated region is sharply demarcated It is ovoid in shape with a crenated border Destruction of myelin sheaths, axons, astrocytes, and oligodendroglia occur in the irradiated region, and there are some tiny perivascular hemorrhages in it Nuclear debris and collections of macrophages are found at the edge of the necrosis Little proliferation of astrocytes is seen around it nine weeks after irradiation The changes are exactly similar to those seen in goats seven and four weeks after irradiation with the same dose and by the same technique Tiny discrete, rounded zones of necrosis are seen in man just rostral to the confluent necrosis, and a similar change was seen in goats These zones are presumably the result of intersecting beams as they pass to the center of irradiation P v T

A69-13502

RADIATION ACCIDENTS AND THEIR MANAGEMENT

Gould A Andrews (Oak Ridge Associated Universities, Inc , Medical Div , Oak Ridge, Tenn)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 390-397 18 refs

Study of radiation accidents which, in most cases, involve a sudden, brief exposure to penetrating radiation The most important information concerning such accidents has to do with the response to doses in the near-lethal and sublethal ranges The early decrease in lymphocytes is an excellent index of dosage The greatest depression in granulocytes and platelets always occurs about the fourth or fifth week after exposure and is associated with the major clinical manifestations of hemorrhage and infection Treatment consists in a group of measures directed toward carrying the patient over the phase of marrow depression For the treatment of more severe injuries, anti-infectious measures, measures to prevent bleeding, and marrow-graft therapy are recommended P v T

A69-13503 *

CLINICAL STUDIES OF RADIATION EFFECTS IN MAN - A PRELIMINARY REPORT OF A RETROSPECTIVE SEARCH FOR DOSE-RELATIONSHIPS IN THE PRODROMAL SYNDROME

C C Lushbaugh, Frank Comas (Oak Ridge Associated Universities, Inc , Medical Div and Mathematics Div , Oak Ridge, Tenn), and Ruth Hofstra (Oak Ridge National Laboratory, Oak Ridge, Tenn)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 398-412 29 refs
AEC-NASA-supported research

Description of studies that are a preliminary attempt to obtain probit equations of radiation dose-symptomatic response relationships for the six commonest symptoms of the prodromal radiation syndrome - anorexia, nausea, vomiting, diarrhea, fatigue, and listlessness An attempt was also made to determine the 60-day postirradiation LD_{50} of a group of 100 patients, 93 of whom suffered at the time from various blood dyscrasias, in order to provide an upper (lethal) frame of reference to the ED_{50} for these sublethal effects The studies were planned so that the 95% confidence intervals in the measurements would be obtained in order to define the statistical uncertainties P v T

A69-13504

PHYSIOLOGICAL EFFECTS OF SPACE CABIN ATMOSPHERES

E M Roth (Lovelace Foundation for Medical Education and Research, Albuquerque, N Mex)

(Workshop Conference on Space Radiation Biology, University of California, Berkeley, Calif , Sept 7-10, 1965)
Radiation Research Supplement, no 7, 1967, p 413-422 11 refs

Discussion of variables of the space-cabin environment which must be considered for the longer and more hazardous mission projected for the future Physiological criteria for the selection of space-cabin atmospheres are reviewed Emphasis is placed on the implications of these factors with regard to engineering constraints and radiobiological considerations The current operational atmospheres with 5 psi of 100% oxygen do not appear to significantly affect the radiation hazard within the cabin Analysis of the complex man-machine interactions and engineering tradeoffs suggest that the selection of the ideal space-cabin atmosphere must be specific for each space mission in question P v T

A69-13551 *

STEROID HORMONES AND THE NEUROPSYCHOLOGY OF DEVELOPMENT

Elliot S Valenstein (Fels Research Institute, Antioch College, Yellow Springs, Ohio)

IN NEUROPSYCHOLOGY OF DEVELOPMENT

Edited by R L Isaacson

New York, John Wiley and Sons, Inc , 1968 39 p 107 refs

NIH Grant No M-4529, Grant No NsG-437

Review of current changing opinion as to the effect of steroid hormones on the nervous system and behavior Experimental data from studies with gonadectomized rats and monkeys treated with testosterone propionate are presented in graphical and tabular form The results of these studies seem to indicate that the neural substrate mediating sexual behavior goes through a relatively undifferentiated stage During this period androgen is effective in differentiating the nervous system in a male direction, and the indications are that this trend is irreversible In the absence of androgen, development proceeds in a female direction Estrogens do not appear to play an active role in imposing a female organization on the developing nervous system There are also indications that early administration of androgen may alter the motivational significance of sensory input G V

A69-13700 *=

EXTRATERRESTRIAL BIOLOGY - PROSPECTS AND PROBLEMS IN THE EARLY 1970'S

Richard D Johnson and Harold P Klein (NASA, Ames Research Center, Moffett Field, Calif)

American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display, 5th, Philadelphia, Pa , Oct 21-24, 1968, Paper 68-1122 7 p 17 refs

Members, $1 00, nonmembers, $1 50

The scientific rationale and experimental strategy for the biological exploration of Mars are discussed in terms of the chemical and biological experiments planned for these missions in the early 1970's The experimental concepts and hardware development are treated in conjunction with the various mission constraints Specifically, the chemical experiments are discussed in terms of the specificity of the analysis as applied to extraterrestrial samples, the experimental complexity with respect to sample processing, and the various types of analysis with respect to the detectors The biological experiments are discussed in terms of growth and reproduction, metabolism, enzyme activity, and microscope scanning. Problems associated with growth media, water availability, and interference from soil are treated in terms of the experiment design The evolution and integration of the various separate experiments into more complex instruments is discussed as a prospect for later missions (Author)

A69-13855 *

THE USE OF MULTIPLE MODELS IN CARDIOVASCULAR SYSTEM STUDIES - TRANSPORT AND PERTURBATION METHODS

Jan E W Beneken (Nederlandse Centrale Organisatie, Medisch-Fysisch Instituut, Utrecht, Netherlands) and Vincent C Rideout (Wisconsin, University, Dept of Electrical Engineering, Madison, Wis)

IEEE Transactions on Bio-Medical Engineering, vol BME-15, Oct. 1968, p 281-289 25 refs

Research supported by the Wisconsin Alumni Research Foundation and the University of Wisconsin, Grant No. NGR-50-002-083

Computer models of the circulation, based on lumped circuit approximations, may be used for simulation studies of its pulsatile pressure, flow, and volume interrelationships A second model, coupled to such a basis circulation model, may be devised to simulate the flow of substances carried by the blood Such a slave, or dependent model, is based on the notion that transport flow is proportional to concentration in the slave circuit multiplied by flow in the main circuit The combined, or multiple model, may be used in studies of dye dilution measurement schemes, or control studies related to the transport of CO_2 or O_2 Another kind of multiple model of the circulation is based on perturbation analysis In this case, subtraction of the unperturbed from the perturbed equations gives the perturbation equations upon which the slave or dependent model is based Coupling between the two models in this case is required only at points of nonlinearity These multiple models may be used to study the propagation of small pressure or flow disturbances with advantages in scaling and detection of the disturbance amplitudes (Author)

A69-13897 *

CRITICAL TEMPERATURE FOR INTRACRANIAL SELF-STIMULATION IN WHITE RATS

Pava Popovic, A B Silver, and V P Popovic (Emory University Dept of Physiology, Atlanta, Ga)

American Journal of Physiology, vol 214, Apr 1968, p 801-803 12 refs

Grant No. NGR-11-001-009

Evaluation of experiments made with white rats in order to ascertain the critical temperature for self-stimulation Bipolar stainless steel electrodes were chronically implanted in the hypothalamic supramammillary area ("pleasure center") of 18 white rats which were trained to press a lever for intracranial self-stimulation Each rat pressed the lever 40 to 60 times per minute whenever it was placed for 1 hr in the box When the body temperature reached 22 to 23°C, the rats eventually stopped pressing the lever This point represents the "critical body temperature" for intracranial self-stimulation. P v T

A69-14067

FROM LAND TO SPACE IN A GENERATION - AN EVOLUTIONARY CHALLENGE

G Melvill Jones (McGill University, Dept of Physiology, Defence Research Board, Aviation Medical Research Unit, Montreal, Canada)

(Aerospace Medical Association, Annual Scientific Meeting, 39th, Bal Harbour, Fla , May 6-9, 1968)

Aerospace Medicine, vol 39, Dec 1968, p 1271-1283 32 refs

Discussion of the biological evolutionary barriers faced by man in going from land to space in a single generation Historical perspectives of man's first venture into the atmosphere in lighter-than-air vehicles are briefly traced, and experiments conducted both in the laboratory and in flight on orientation problems are reviewed, together with biological experiments performed in the space environment M M

A69-14068

BEHAVIOR OF PRIMATES FOLLOWING INJECTION OF MONOMETHYLHYDRAZINE WITH AND WITHOUT PYRIDOXINE

Glayde D Whitney, Paul Y Batson (USAF, Aeromedical Research Laboratory, Holloman AFB, N Mex), and Thomas L Wolfle (California, University, Dept of Psychology, Los Angeles, Calif)

Aerospace Medicine, vol 39, Dec 1968, p 1283-1286 9 refs

Ten macaque monkeys were trained on a complex behavioral program containing both aversively and appetitively rewarded tasks A two-phase experimental design was utilized During phase one, all subjects were repeatedly exposed at one of two dose levels of monomethylhydrazine and pyridoxine HCl The monomethylhydrazine (1 p.) and pyridoxine HCl (1 m) injections were administered simultaneously Phase two was a replication without pyridoxine HCl Data included behavior on a Sidman avoidance schedule, FR 100, and three-stimulus oddity for food, as well as discrete avoidance with both visual and auditory cues Gross clinical signs were noted Dose-response and temporal relationships were investigated Appetitive responding was found to be most sensitive, and the differences between the two phases provide some evidence that pyridoxine HCl is effective as a therapeutic agent in situations involving exposure to low levels of monomethylhydrazine (Author)

A69-14069

EFFECT OF XENON, KRYPTON, NITROGEN AND NITROUS OXIDE ON OXYGEN CONSUMPTION OF RAT LIVER SLICES

Ian S Longmuir, Stella Sun (North Carolina State University, Dept of Biochemistry, Raleigh, N C , Jefferson Medical College, Dept of Anesthesiology, Philadelphia, Pa), and Sheldon F. Gottlieb (Purdue University, Biological Sciences Div , Fort Wayne, Ind)

Aerospace Medicine, vol 39, Dec 1968, p 1287-1289 25 refs

PHS Grant No HE-10328

The effects of some inert gases at pressures slightly less than one atmosphere on the respiration rate of rat liver slices at various partial pressures of oxygen have been studied Contrary to some previous publications they have no detectable effect (Author)

A69-14070 *

EFFECT OF IN VIVO HYPEROXIA ON ERYTHROCYTE FATTY ACID COMPOSITION

Charles E Mengel, Rose Marie Husney (Ohio State University, University Hospitals, Div of Hematology and Oncology, Columbus, Ohio), and Robert L Carolla

Aerospace Medicine, vol 39, Dec 1968, p 1290-1293 11 refs
PHS Grant No CA 08702, Contracts No NAS 9-6910, No AF 33(615)-67-C-1482, No Nonr-495(30)

The hemolytic effect of 100% oxygen under hyperbaric pressures has been recognized for several years In order to elucidate the mechanism of this biologic phenomenon, mice deficient in tocopherol, a lipid antioxidant, were subjected to oxygen under high pressure, and erythrocytes were examined for alterations in fatty acid composition The results showed that, in contrast to total saturated fatty acids, there was significant decrease in the percent composition of total unsaturated fatty acids when compared with controls Furthermore, the specific fatty acids involved also appear to be altered by in vitro incubation of red cell suspensions with hydrogen peroxide vapor (Author)

A69-14071 #

ADAPTATION OF DOGS TO 60 AND 90 MM Hg CO_2 AT A TOTAL PRESSURE OF 260 MM Hg

William E Pepelko (USAF, School of Aerospace Medicine, Aerospace Medical Div , Brooks AFB, Tex)

Aerospace Medicine, vol 39, Dec 1968, p 1294-1298 11 refs

Two groups of six dogs each were exposed continuously for nine days to an environment having a total barometric pressure of 260 mm Hg, a partial pressure of 140 mm Hg O_2, and either 60 or 90 mm Hg CO_2 Arterial samples were collected daily from a previously exteriorized carotid artery Exposure to the 60 mm Hg CO_2 resulted in a drop in arterial pH from 7 42 to 7 32 followed by recovery after 4 to 5 days to between 7 36 and 7 39 Exposure to 90 mm Hg CO_2 resulted in a pH drop to 7 21 with recovery to about 7 30 Arterial standard bicarbonate levels increased from 23 to 28 mM/liter during exposure to 60 mm Hg CO_2 and to near 31 mM/liter during exposure to 90 mm Hg CO_2 (Author)

A69-14072 *

PUBLIC HEALTH ASPECTS OF GALACTIC RADIATION EXPOSURE AT SUPERSONIC TRANSPORT ALTITUDES

Hermann J Schaefer (U S Naval Aviation Medical Center, Aerospace Medical Institute, Pensacola, Fla)

Aerospace Medicine, vol 39, Dec 1968, p 1298-1303 7 refs
NASA-supported research

Although the galactic radiation level at SST altitudes is such that exposure appears entirely unobjectionable, the prospect of large-scale commercial passenger operations calls for accurate assessment of the radiation load to the individual crew member and passenger and to the population as a whole The maximum dose rate of about 1 millirem/hr at 65,000 ft in the polar region for 600 hr per year leads to a yearly dose of 0 6 rem, which exceeds the maximum permissible dose (MPD) for passengers by 20% but constitutes only 12% of the MPD for crew members On the other hand, shifting all jet travel to SST altitudes would still keep the additional radiation burden for the total population at the level of a few per cent of the fallout exposure although the individual passenger would accumulate the yearly fallout dose in about 25 hr at altitude Radiobiologically, special consideration has to be given to heavy nuclei because of their high values of linear energy transfer ("microbeams") However, the small fraction of the heavy flux, which carries the "microbeam" effects, undergoes a substantially higher absorption in the atmosphere than does the total flux The microbeam effectiveness of galactic primaries, therefore, is virtually extinguished at SST altitudes (Author)

A69-14073 #

EFFECTS OF COLOR OF INSTRUMENT LIGHTING ON ABSOLUTE AND ACUITY THRESHOLDS WITH EXPOSURE TO A SIMULATED INSTRUMENT PANEL

H N Reynolds and W F Grether (USAF, Aerospace Medical Div , Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio)

Aerospace Medicine, vol 39, Dec 1968, p 1304-1309 29 refs

Comparison of three colors of aircraft instrument illumination, aviation red, unfiltered white, and blue-filtered white, to determine their effects on postexposure, scotopic absolute and acuity threshold, as well as on legibility for the reading of instruments A simulated T-38 instrument panel, illuminated by light from incandescent instrument lamps, was used for light exposure The results were (1) at a low instrument-panel luminance of 0 01 ft-lambert, absolute thresholds did not differ after exposure to the three colors of lighting, but scotopic acuity thresholds were somewhat lower after exposure to red light than after exposure to either unfiltered or blue-filtered white, (2) at a luminance of 0 05 ft-lambert, both absolute and acuity thresholds were lower after exposure to red light than after exposure to unfiltered and blue-filtered white, and (3) the luminances required for the legibility of transilluminated letters of various sizes were about the same for red, unfiltered white, and blue-filtered white instrument lighting When extraneous sources of illumination can be controlled, it is recommended that those aircraft which might be used in nighttime visual reconnaissance missions be equipped with a dual red/white instrument-lighting system M M

A69-14074

EFFECTS OF BODY THERMAL STATE ON MANUAL PERFORMANCE

John A Vaughan, E Arnold Higgins, and Gordon E Funkhouser (Federal Aviation Administration, Office of Aviation Medicine, Civil Aeromedical Institute, Physiology Laboratory, Oklahoma City, Okla)

Aerospace Medicine, vol. 39, Dec 1968, p 1310-1315 29 refs

Thirty-six young men were exposed for two hours to environmental temperatures of 10, 26 7, or 46°C Measurements of rectal and skin temperatures, heart rate, and respiratory rate were made, and average skin and average body temperatures were calculated Manual performance consisted of standardized peg tests for hand and finger dexterity, and a written motor coordination test Converted scores showed no significant differences in peg placing at any of the thermal states studied Men exposed to the neutral environment scored highest in the finger dexterity tests, but values for motor coordination were greater in the heat than in the other two environments These data suggest that coarse hand movements are independent of body thermal state, but that more discrete tasks involving hand and finger dexterity, and motor coordination, can be most efficiently performed in warmer environments which promote at least thermally neutral values of skin and deep body temperature (Author)

A69-14075 #

EFFECT OF HIGH ENERGY X-IRRADIATION OF THE HEAD ON CEREBRAL BLOOD FLOW AND BLOOD PRESSURE IN THE MACACA MULATTA

Paul H Chapman and Robert J Young (USAF, School of Aerospace Medicine, Radiobiology Div , Weapons Effects Branch, Brooks AFB, Tex)

Aerospace Medicine, vol 39, Dec 1968, p 1316-1321 40 refs
DASA-supported research

Results of exposure of nine Macaca mulatta monkeys to a head-only dose of 2500 rads of 6-Mev X rays at a dose rate of 644 r/min Five animals served as sham-irradiated controls Cerebral blood flow, blood pressure, and systemic arterial and cerebral venous blood gas measurements were made just prior to and during the hour following irradiation Cerebral blood flow was calculated from desaturation curves, using the inert radioactive isotope krypton 85 A small but significant decline in blood pressure was found immediately after irradiation, with no significant change in cerebral blood flow It is concluded that the hypotension and decreased cerebral blood flow observed after whole-body radiation exposure are not due primarily to a direct effect of radiation on the central nervous system (Author)

A69-14076 #
STUDIES OF ACOUSTICAL STIMULATION OF THE VESTIBULAR SYSTEM
D E Parker, H E von Gierke, and M. Reschke (Miami, University, Dept of Psychology, Oxford, Ohio, USAF, Systems Command, Aerospace Medical Div , Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio)
Aerospace Medicine, vol. 39, Dec 1968, p 1321-1325 16 refs
Contract No AF 33(615)-1397
Slow time-varying pressure changes in the external auditory meatus were correlated with a variety of eye movements, including nystagmus, in the guinea pig These responses were eliminated *following eighth nerve section but were retained after destruction* of the cochlea by loud sound The observations are interpreted as supporting the hypothesis that acoustical stimuli may activate the receptors of the vestibular apparatus Various possible mechanisms of acoustical vestibular stimulation are discussed (Author)

A69-14077
INADEQUACIES OF METEOROLOGICAL DATA FOR PREDICTING THERMAL STRESS
W C Kaufman (Medical Research Council, National Institute for Medical Research, Hampstead Laboratories, London, England)
(AEROSPACE MEDICAL ASSOCIATION, 1967 ANNUAL SCIENTIFIC MEETING, WASHINGTON, D C , APRIL 10-13, 1967, PREPRINTS OF SCIENTIFIC PROGRAM, p 151, 152)
Aerospace Medicine, vol 39, Dec 1968, p 1326-1328 6 refs
[For abstract see issue 23, page 3935, Accession no A67-41593]

A69-14078
GLAUCOMA IN COMMERCIAL PILOTS
G F Catlett and G J Kidera (United Air Lines, Inc , Medical Dept , Chicago, Ill)
(International Academy of Aviation and Space Medicine, International Congress on Aviation and Space Medicine, 17th, Oslo, Norway, Aug 5-8, 1968)
Aerospace Medicine, vol 39, Dec 1968, p 1329-1337 25 refs
Evaluation of the problem of glaucoma in commercial airline *pilots over the past decade Out of more than 14, 000 examinations,* 49 cases of confirmed ocular hypertension were detected for a cumulative 10-yr incidence of 2 4% Among these cases, nine were eventually diagnosed as chronic simple glaucoma representing only 0 44% of those studied The results confirm the value and safety of routine tonometry in aviation medicine, but indicate that the prevalence of occult pathology which can be demonstrated thereby has been exaggerated in the commercial-pilot population M M

A69-14079 *
EVALUATION OF SIXTEEN ANTI-MOTION SICKNESS DRUGS UNDER CONTROLLED LABORATORY CONDITIONS
Charles D Wood and Ashton Graybiel (U S Naval Aviation Medical Center, Aerospace Medical Institute, Pensacola, Fla)
Aerospace Medicine, vol 39, Dec 1968, p 1341-1344 27 refs
NASA-supported research
The effectiveness of a drug in reducing susceptibility to acute motion sickness is readily determined in a Slow Rotation Room where the stressful Coriolis accelerations are under quantitative control and the experimenter and subject can collaborate under laboratory conditions Fifty subjects were used, each serving as his own control in evaluating 16 representative antimotion sickness drugs Only the drugs with a sympathomimetic or parasympatholytic action and some of the antihistamines were notably effective The summation effect of dextroamphetamine sulfate and l-scopolamine hydrobromide provided far better protection than any single drug Other classes of drugs had either a slightly favorable or slightly unfavorable action (Author)

A69-14080
CORONARY ATHEROSCLEROSIS IN MILITARY PILOTS I - RELATIONSHIP TO FLYING AND AVIATION ACCIDENTS
Harold Z Scheinman (U S Armed Forces Institute of Pathology, American Registry of Pathology, Washington, D C)
Aerospace Medicine, vol 39, Dec 1968, p 1348-1351 19 refs
Investigation of 206 autopsied military pilots with varying degrees of coronary atherosclerosis The data obtained demonstrate that the amount of flying time and type of aircraft are neither statistically related nor contributory to the severity of coronary atherosclerosis in pilots Furthermore, a 10% random sample of all military aviation accidents recorded at the Armed Forces Institute of Pathology from 1958 through 1968 demonstrates that coronary artery disease has a causal relationship to 0 4% of military aviation accidents M M

A69-14081 *
RAPID FILLING PERIOD OF THE LEFT VENTRICLE - MEASUREMENT BY APEXCARDIOGRAPHY
David H Spodick (Tufts University, School of Medicine, Boston University, School of Medicine, Boston, Lemuel Shattuck Hospital, Cardiology Div , Mass) and Sudarshan Kumar (Tufts University, School of Medicine, Boston, Lemuel Shattuck Hospital, Mass)
Aerospace Medicine, vol 39, Dec 1968, p 1351-1353 18 refs
Grant No NGR-22-012-006
Measurement of the rapid filling period from the rapid-filling wave of the apexcardiogram in 47 normal, active male subjects, aged 22 to 35 yr The values obtained range from 80 to 120 msec, with a mean of 99 8 ± 14 2 msec The results obtained are compared with other reports of comparable measurements in normal individuals in a tabulation It is noted that it is possible that age and sex may influence the rapid-filling phase M M

A69-14192 #
POSSIBILITIES OF PROTECTIVE ADAPTATION AND ADAPTATION LIMITS UNDER CONDITIONS OF MAXIMUM ACCELERATIONS AND WEIGHTLESSNESS [VOZMOZHNOSTI ZASHCHITNYKH PRISPOSOBLENII ORGANIZMA I GRANITSY ADAPTATSII V USLOVIIAKH MAKSIMAL'NYKH PEREGRUZOK I SOSTOIANIIA NEVESOMOSTI]
V V Parin, O G Gazenko, and V I Iazdovskii
IN MEDICO-BIOLOGICAL STUDIES OF WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIIA V NEVESOMOSTI]
Edited by V V Parin and I I Kas'ian
Moscow, Izdatel'stvo Meditsina, 1968, p 29-33 In Russian
Discussion of organic reaction and adaptation *to simulated* weightlessness and acceleration, and comparison with data obtained during orbital flight It was found from the results of studies on rabbits and dogs subjected to various transverse acceleration values, compared with experimental data from the Titov and Gagarin flights, that human response is roughly analogous to the response of these animals The data revealed that initially there is a reduction in the biopotential, and in the number of slow waves, and an increase in respiration and cardiac contractions, this condition was followed by synchronization of the biopotential, and a decrease in the respiratory and cardiac contraction rates It is concluded from the studies that, during space flight, there is a reduction, and possibly a change, in the usual afferentation of the otolithic and skin receptors, and that afferentation from the vestibular apparatus may predominate, leading to irritation and, perhaps, to motion sickness G V

A69-14193 #
SIMULATION OF THE REGULATORY FUNCTION OF THE CARDIOVASCULAR SYSTEM DURING WEIGHTLESSNESS [O MODELIROVANII FUNKTSII REGULIATSII SERDECHNO-SOSUDISTOI SISTEMY V NEVESOMOSTI]
I I. Kas'ian and N A Chekhonadskii
IN MEDICO-BIOLOGICAL STUDIES OF WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIIA V NEVESOMOSTI]
Edited by V V Parin and I I Kas'ian
Moscow, Izdatel'stvo Meditsina, 1968, p 280-286 9 refs In Russian
Description of experimental electrical models of the cardio*vascular system designed* to approximate the regulatory function of the system under normal gravity and under conditions of weightlessness The elementary models presented represent an initial effort, and, while the results are some steps removed from actual data from astronauts in space, they do permit some generalizations to be made about human cardiovascular system function under conditions of weightlessness For example, it is concluded that it will probably be necessary to allot more time for *rest during weightlessness, since,*

in space, restoration to initial pulse repetition rate after effort takes several hours as compared to 3 to 5 min on earth G V

A69-14194 #
BLOOD CIRCULATION UNDER CONDITIONS OF WEIGHTLESSNESS [KROVOOBRASHCHENIE V USLOVIIAKH NEVESOMOSTI]
I I Kas'ian, V I Kopanev, and V. I Iazdovskii
IN MEDICO-BIOLOGICAL STUDIES OF WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIIA V NEVESOMOSTI]
Edited by V V Parin and I I. Kas'ian.
Moscow, Izdatel'stvo Meditsina, 1968, p 245-259 31 refs In Russian

Survey of experimental and literary data regarding mechanisms involved in the effect of weightlessness on the blood circulation system The animals and humans discussed were either in suborbital or orbital space flights Three groups were studied according to their physiological reactions - namely, (1) considerable decrease in pulse frequency and blood pressure, (2) no change, and (3) increased pulse frequency and blood pressure The adaptation mechanism is discussed in detail It is noted that acceleration and weightlessness appear as strong biological stimulants. I P

A69-14195 #
RESULTS OF PHYSIOLOGICAL-BIOCHEMICAL STUDY OF MEMBERS OF THE CREW OF THE SPACECRAFT VOSKHOD [REZUL'TATY FIZIOLOGO-BIOKHIMICHESKOGO OBSLEDOVANIIA CHLENOV EKIPAZHA KOSMICHESKOGO KORABLIA "VOSKHOD"]
I S Balakhovskii, P V Vasil'ev, I I Kas'ian, and I G Popov
IN MEDICO-BIOLOGICAL STUDIES OF WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIIA V NEVESOMOSTI]
Edited by V V Parin and I I Kas'ian
Moscow, Izdatel'stvo Meditsina, 1968, p 225-233 11 refs In Russian

Study intended to clarify certain indicators of the condition of the cardiovascular system and metabolism of the cosmonauts Komarov, Feoktistov, and Egorov during spaceflight, taking into consideration the individual peculiarities of the reaction of each The conditions under which the cosmonauts were tested are described The medical and physiological investigations were divided into two groups radiotelemetric and onboard clinical physiological study No disruptions were observed in the cosmonauts' health following the flight A number of functional changes were noted in both the cardiovascular and respiratory systems, and in various phases of the metabolism indicative of a reaction to stress and general fatigue I P

A69-14196 #
CHANGES IN CARDIAC ACTIVITY AND RESPIRATION OF COSMONAUTS DURING LIGHT PHYSICAL EXERTION IN AN ORBITAL FLIGHT ON THE SPACECRAFT VOSKHOD [IZMENENIIA SERDECHNOI DEIATEL'NOSTI I DYKHANIIA U KOSMONAVTOV PRI LEGKOI FIZICHESKOI NAGRUZKE VO VREMIA ORBITAL'NOGO POLETA NA KOSMICHESKOM KORABLE "VOSKHOD"]
A D Voskresenskii, I I Kas'ian, and D G Maksimov
IN MEDICO-BIOLOGICAL STUDIES OF WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIIA V NEVESOMOSTI]
Edited by V V Parin and I I Kas'ian
Moscow, Izdatel'stvo Meditsina, 1968, p 206-213 In Russian

Description of the results of studies of the electrocardiograms, seismocardiograms, and pneumograms of cosmonauts Komarov, Feoktistov, and Egorov while they worked with a dynamometer during the orbital flight of the spacecraft Voskhod An increase in pulse frequency and respiration was observed Some of the physical reactions of the cosmonauts are described and discussed An analysis of the dynamograms indicated rapid fatigue symptoms It is noted that, although some reactions may be related to discomfort following a spatial disorientation illusion, the direct effect of weightlessness on the function of external respiration cannot be theoretically excluded I P

A69-14197 #
SOME PHYSIOLOGICAL MECHANISMS OF THE EFFECT OF WEIGHTLESSNESS ON HUMAN ORGANISM [O NEKOTORYKH FIZIOLOGICHESKIKH MEKHANIZMAKH VLIIANIIA NEVESOMOSTI NA ORGANIZM CHELOVEKA]
I I Kas'ian and V I Kopanev
IN MEDICO-BIOLOGICAL STUDIES OF WEIGHTLESSNESS [MEDIKO-BIOLOGICHESKIE ISSLEDOVANIIA V NEVESOMOSTI]
Edited by V V Parin and I I Kas'ian
Moscow, Izdatel'stvo Meditsina, 1968, p 77-83 43 refs In Russian

Literature survey showing that during weightlessness some deviations in the sensory, motor, and sympathetic components of the general reaction of the human organism were observed, as well as individual differences in the development of adaptive and compensatory reactions The disorders caused by weightlessness, which can be divided into direct and indirect effects, are discussed It is noted that during space flights the effects of weightlessness are combined with the effects of such factors as nervous and emotional tension, noise, and vibration Adaptation to weightlessness and some of the disruptive aspects of this adaptation are also considered I P

A69-14199 #
PHYSICOCHEMICAL METHOD OF SYNTHESIZING CARBOHYDRATES FROM THE PRODUCTS OF HUMAN BIOLOGICAL ACTIVITY IN LIMITED CLOSED SPACES [FIZIKO-KHIMICHESKII METOD SINTEZA UGLEVODOV IZ PRODUKTOV ZHIZNEDEIATEL'NOSTI CHELOVEKA V OGRANICHENNYKH ZAMKNUTYKH PROSTRANSTVAKH]
Iu E Siniak and V A Uspenskaia
IN PROBLEMS OF CREATING CLOSED ECOLOGICAL SYSTEMS [PROBLEMY SOZDANIIA ZAMKNUTYKH EKOLOGICHESKIKH SISTEM]
Edited by A A Nichiporovich and G M Lisovskii
Moscow, Izdatel'stvo Nauka, 1967, p 197-202 12 refs In Russian

A possible life support system process for converting human urine and feces into carbohydrates is described An experimental setup is used for catalytic oxidation of the homogenized material into CO_2, H_2O, and sulfur and nitrogen oxides, at 300 to 350°C, at atmospheric pressure, and at air/gas flow rates of 5 liter/min The hydration of the CO_2 into methane by an unspecified method and conversion of the methane into formaldehyde are suggested as a further stage Third stage polymerization with Ca $(OH)_2$ and Sr $(OH)_2$ was complete after 3 to 4 hr, but no catalytic effect on polymerization could be achieved with the other hydroxides Ascending paper chromatography showed that pentoses and hexoses prevailed in the polymerized products (ATD/LC)

A69-14201 #
STUDY OF THE EFFECTS OF VARIOUS WORK AND REST SCHEDULES ON SUBJECTS UNDER CONDITIONS OF RELATIVE ISOLATION [IZUCHENIE VLIIANIIA RAZLICHNYKH REZHIMOV TRUDA I OTDYKHA NA ISPYTATELEI, NAKHODIASHCHIKHSIA V USLOVIIAKH OTNOSITEL'NOI IZOLIATSII]
N I Andrzheiuk, A A Veselova, N N Gurovskii, B A Dushkov, L R Iseev, F P Kosmolinskii, M I Kozar', E M Krutova, and G A Manovtsev
IN AVIATION AND SPACE MEDICINE [AVIAKOSMICHESKAIA MEDITSINA]
Edited by V V Parin and I M Khazen
Moscow, Moskovskoe Fiziologicheskoe Obshchestvo (Sektsiia Aviatsionnoi i Kosmicheskoi Meditsiny, Trudy, No 11), 1967, p 105-117 In Russian

Study of the effects of various activity schedules (wakefulness and sleep) on the working capacity and physiological state of three male subjects confined for two 15-day periods in a sealed 23-m^3 chamber at 24 to 27°C in an atmosphere of 21% oxygen, with a roughly 70% humidity and 0 4 to 1 0% CO_2 content Increased ascorbic acid, hydroxycorticosteroid, ketosteroid contents in the urine and increased salivary lysozyme content, indicating the development of a neuroemotional condition, were established in the subjects when periods of sleep and wakefulness were alternated every 6 hr V.Z

A69-14202 #
CHANGE IN THE FUNCTIONAL STATE OF THE HUMAN ORGANISM DURING TESTS IN CHAMBERS [IZMENENIE FUNKTSIONAL'NOGO SOSTOIANIIA ORGANIZMA CHELOVEKA PRI ISPYTANIIAKH V KAMERAKH]
B A Dushkov, V A Znachko, M I Kozar', F P Kosmolinskii, and A N Zolotukhin
IN AVIATION AND SPACE MEDICINE [AVIAKOSMICHESKAIA MEDITSINA]
Edited by V V Parin and I M Khazen
Moscow, Moskovskoe Fiziologicheskoe Obshchestvo (Sektsiia Aviatsionnoi i Kosmicheskoi Meditsiny, Trudy, No 1), 1967, p 118-127 In Russian

Investigation of the effects that periods of isolation ranging from 12 hr to 70 days in a small sealed chamber at 20 to 25°C have on the higher nervous activity, motor and vegetative reactions, muscular strength, and the emotional state of a group of 80 healthy male subjects, 24 to 38 years old The daily routine of the subjects consisted of routine or special activities and 6 to 8 hr sleep A Kosmolinskii "Shundir" apparatus was used to evaluate performance, dynamometry and kinocyclography were employed in muscle strength and fatigue studies, and a urine and saliva analysis was carried out The decrease in emotional stability, in muscle strength, and in mental efficiency, and the changes in hormone metabolism - all of which were established in the subjects - are discussed V Z

A69-14203 #
PROBLEM OF THE DIURNAL RHYTHM OF PHYSIOLOGICAL FUNCTIONS IN MAN UNDER CONDITIONS OF ISOLATION [K VOPROSU O SUTOCHNOM FIZIOLOGICHESKIKH FUNKTSII U CHELOVEKA V USLOVIIAKH IZOLIATSII]
V I Miasnikov
IN AVIATION AND SPACE MEDICINE [AVIAKOSMICHESKAIA MEDITSINA]
Edited by V V Parin and I M Khazen
Moscow, Moskovskoe Fiziologicheskoe Obshchestvo (Sektsiia Aviatsionnoi i Kosmicheskoi Meditsiny, Trudy, No 1), 1967, p 128-133 In Russian

Investigation of the effect of changes in the daily sleep and wakefulness times on the heart rate rhythm, respiration, and body temperature in a group of 18 male subjects, 23 to 35 years old, kept in isolation for periods of 10 to 15 days EKGs were recorded four times daily, and an M-24 microammeter was used to record the frequency of respiratory motions every 15 min The functional changes and the reduced capacity to endure physical stresses, observed in the subjects, are discussed V Z

A69-14204 #
CHANGE IN THE CARDIOVASCULAR ACTIVITY AND EXTERNAL RESPIRATION FUNCTION UNDER THE INFLUENCE OF PROLONGED MOTION RESTRICTIONS (HYPODYNAMIA) [IZMENENIE SERDECHNO-SOSUDISTOI DEIATEL'NOSTI I FUNKTSII VNESHNEGO DYKHANIIA POD VLIIANIEM DLITEL'NOGO OGRANICHENIIA PODVIZHNOSTI (GIPODINAMII)]
P V Buianov
IN AVIATION AND SPACE MEDICINE [AVIAKOSMICHESKAIA MEDITSINA]
Edited by V V Parin and I M Khazen
Moscow, Moskovskoe Fiziologicheskoe Obshchestvo (Sektsiia Aviatsionnoi i Kosmicheskoi Meditsiny, Trudy, No 1), 1967, p 136-141 In Russian

Study of changes in the blood circulation, external respiration, and gas exchange rates in a group of ten subjects under conditions of strict motion restriction, and in a group of 12 subjects under conditions of partial motion restriction, with six members of the latter group subjected in a pressure chamber to pressure equivalents of 5000 to 7000-m altitude with a normal sea level pO_2 The results obtained indicate that the functional changes observed can affect the stress tolerance of man during flight-trajectory and weightlessness-to-gravity shifts V Z

A69-14205 #
INVESTIGATION OF THE MOTOR ACTIVITY OF MAN UNDER CONDITIONS OF HYPODYNAMIA AND INCREASED CO_2 CONTENT [ISSLEDOVANIE DVIGATEL'NOI DEIATEL'NOSTI CHELOVEKA V USLOVIIAKH GIPODINAMII I POVYSHENNOGO SODERZHANIIA SO_2].
L I Karpova
IN AVIATION AND SPACE MEDICINE [AVIAKOSMICHESKAIA MEDITSINA]
Edited by V V Parin and I M Khazen
Moscow, Moskovskoe Fiziologicheskoe Obshchestvo (Sektsiia Aviatsionnoi i Kosmicheskoi Meditsiny, Trudy, No 1), 1967, p 152-156 In Russian

Study of the muscular strength, static endurance, and motion coordination precision in a group of seven subjects performing six various programs of motor activity and respiratory exercises during a 30-day confinement period in a 7-m^3 sealed chamber with increased CO_2 content The positive effect of the prescribed motions and exercises on the physical functions of the subjects is discussed The recovery of a normal blood O_2 level after hypoxemia induced by breath-holding is noted in particular The electromyography of the upper-arm, upper- and lower-leg, masticatory, and trapezius muscles showed that negative hypodynamia effects on the neuromuscular apparatus were prevented by these physical exercises V Z

A69-14206 #
AUDITORY FUNCTION OF MAN DURING EXPOSURE TO LOW BAROMETRIC PRESSURE FOR SEVERAL DAYS [SLUKHOVAIA FUNKTSIIA PRI MNOGOSUTOCHNOM PREBYVANII CHELOVEKA V USLOVIIAKH PONIZHENNOGO BAROMETRICHESKOGO DAVLENIIA]
I Ia Borshchevskii and Iu V Krylov
IN AVIATION AND SPACE MEDICINE [AVIAKOSMICHESKAIA MEDITSINA]
Edited by V V Parin and I M Khazen
Moscow, Moskovskoe Fiziologicheskoe Obshchestvo (Sektsiia Aviatsionnoi i Kosmicheskoi Meditsiny, Trudy, No 1), 1967, p 167-169 In Russian

Brief discussion of the hearing thresholds of two subjects kept for a number of days in a pressure chamber at pressures corresponding to an altitude of 7000 m The hearing thresholds at 125, 250, 500, 1000, 3000, 4000, and 6000 Hz, and the readaptation time for 1000 Hz after a 3-min exposure to 50-dB white noise are determined on an AU-5 audiometer The results indicate that the auditory function is not affected by prolonged exposures to a pressure of 308 torr, provided that the oxygen partial pressure is kept normal V Z

A69-14207 #
CHANGES IN THE ELECTROPOTENTIALS OF THE HEART IN FLYING PERSONNEL AFTER FLIGHT CAUSING INTENSE NEUROEMOTIONAL STRESS [IZMENENIIA ELEKTROPOTENTSIALOV SERDTSA U LETNOGO SOSTAVA POSLE POLETOV, VYZYVAIUSHCHIKH BOL'SHOE NERVNO-EMOTSIONAL'NOE NAPRIAZHENIE]
P V Buianov, S E Komshaliuk, and F P Kosmolinskii
IN AVIATION AND SPACE MEDICINE [AVIAKOSMICHESKAIA MEDITSINA]
Edited by V V Parin and I M Khazen
Moscow, Moskovskoe Fiziologicheskoe Obshchestvo (Sektsiia Aviatsionnoi i Kosmicheskoi Meditsiny, Trudy, No 1), 1967, p 201-203 In Russian

Results of electrocardiographic tests with standard and thoracic sensory electrodes, performed on a group of 280 crew members of modern aircraft before and after flight Psychoemotional stresses caused by flight activity are found to induce certain changes in the functional state of the myocardium It is indicated that EKG combined with other tests may assist aviation physicians in correctly assessing the psychoemotional condition of flying personnel V Z

A69-14208 #
EFFECT OF "ALTITUDE" AND ACCELERATION FACTORS ON THE HUMAN ORGANISM - AN X-RAY STUDY [VLIIANIE NA ORGANIZM CHELOVEKA FAKTOROV "VYSOTY" I USKORENII - RENTGENOLOGICHESKOE ISSLEDOVANIE]
A R Mansurov
IN AVIATION AND SPACE MEDICINE [AVIAKOSMICHESKAIA MEDITSINA]

A69-14209

Edited by V V Parin and I M Khazen
Moscow, Moskovskoe Fiziologicheskoe Obshchestvo (Sektsiia Aviatsionnoi i Kosmicheskoi Meditsiny, Trudy, No 1), 1967, p 286-289 In Russian

X-ray investigation of the effect of repeated simulated exposures to altitude and acceleration during 1 to 7-yr periods on the organisms of a group of 26 healthy professional flyers It is found that extended systematic exposures to high-altitude conditions may in some cases cause persisting changes in the respiratory and circulatory systems, such as the first symptoms of pulmonary fibrosis and emphysema as established in one of the subjects Enlargement of the heart and vascular bundle was also observed in subjects after a 5-yr testing period, although the heart function showed no significant changes V Z

A69-14209 #

EFFECT OF THE SONIC BOOM CAUSED BY SUPERSONIC AIRCRAFT ON THE CORTICOSTEROID LEVEL IN HUMAN BLOOD [VLIIANIE ZVUKOVOGO UDARA, SOZDAVAEMOGO SVERKHZVUKOVYM SAMOLETOM, NA UROVEN' KORTIKOSTEROIDOV V KROVI U CHELOVEKA]

B M Mirzoev

IN AVIATION AND SPACE MEDICINE [AVIAKOSMICHESKAIA MEDITSINA]

Edited by V V Parin and I M Khazen

Moscow, Moskovskoe Fiziologicheskoe Obshchestvo (Sektsiia Aviatsionnoi i Kosmicheskoi Meditsiny, Trudy, No 1), 1967, p 354, 355. In Russian

Test of the effect of the sonic boom on the corticosteroid level in blood on four healthy subjects in an observation post located under the trajectory of supersonic aircraft causing sonic booms ranging from 1 to 8 4 kg/m^2 The corticosteroid level (up to 20 γ %) on the first day exceeded that of the later days This is attributed to the general excitement due to the novelty of the situation The hydrocortisone and corticosterone levels showed no changes These results prove that sonic booms up to 8 4 kg/m^2 do not affect the adrenohypophysial system in any significant way. I. P.

A69-14210 #

SOME PECULIARITIES OF THE ORIENTING REACTION TO THE EFFECT OF SONIC PRESSURE PULSES [NEKOTORYE OSOBENNOSTI ORIENTIROVOCHNOI REAKTSII PRI VOZDEISTVII ZVUKOVYKH IMPUL'SOV DAVLENIIA]

V S Kuznetsov

IN AVIATION AND SPACE MEDICINE [AVIAKOSMICHESKAIA MEDITSINA].

Edited by V V Parin and I M Khazen

Moscow, Moskovskoe Fiziologicheskoe Obshchestvo (Sektsiia Aviatsionnoi i Kosmicheskoi Meditsiny, Trudy, No 1), 1967, p 364-368 In Russian

Study of some indices of the human orienting reaction in order to determine the degree of discomfort when subjected to sonic boom simulation A single sonic boom caused a depression of the α-rhythm and the appearance of higher pulse rate frequencies. The sonic boom causes a pronounced orienting reaction characterized by an elevation of the general tonus and an increased preparedness for stimulus perception It is noted that the determination of the degree of discomfort must involve the psychophysiological sensations of the subjects in addition to the objective recording of physiological functions. I P

A69-14229 #

CHANGES IN CARDIAC FUNCTION DURING ORTHOSTATIC TESTS AND PROBLEMS IN PREDICTING THE REACTIONS OF COSMONAUTS IN FLIGHT [IZMENENIIA FUNKTSII SERDECHNOGO AVTOMATIZMA PRI PROBE DLITEL'NOGO STOIANIIA I VOPROSY PROGNOZIROVANIIA REAKTSII KOSMONAVTOV V POLETE]

R M Baevskii and O P Kozerenko

IN MATHEMATICAL METHODS OF ANALYZING HEART RHYTHM [MATEMATICHESKIE METODY ANALIZA SERDECHNOGO RITMA]

Moscow, Izdatel'stvo Nauka, 1968, p 62-68 In Russian

Comparative analysis of data obtained before and during the flights of the cosmonauts Bykovskii and Tereshkova to determine the validity of the hypothesis that ability to adapt to weightlessness may be predicted from the individual's reaction to orthostatic tests Variational pulsometry was used to show changes in cardiac rhythm related to changes in sympathetic and parasympathetic innervation, and cardiointervalography was used in evaluating transient processes Orthostatic tests were of 15-min duration, with the subject standing at attention, and were conducted before and after various training exercises and experiments Tereshkova's reactions were found to be unsatisfactory after three-day hypodynamia, showing transient slow waves not seen in Bykovskii, and demonstrating that her adaptational capacity was not as great, as measured by orthostatic tests In flight, Bykovskii's cardiac function was, in the main, quite stable, while Tereshkova's hemeostatic mechanisms functioned less adequately, and her cardiac indices were less stable It is postulated that it is possible to predict cardiac reactions to space flight on the basis of orthostatic tests, especially those conducted after prolonged hypodynamia G V

A69-14260

CIRCADIAN RHYTHMS AND THE EFFECTS OF LONG-DISTANCE FLIGHTS

Stanley R Mohler (Federal Aviation Administration, Aeromedical Applications Div , Washington, D C), J Robert Dille, and Harry L Gibbons (Federal Aviation Administration, Civil Aeromedical Research Institute, Oklahoma City, Okla)

Air Line Pilot, vol 37, Dec 1968, p 15-17

Description of some of the implications of flights covering a time-zone change of four or more hours between the place of departure and the place of landing, with a special consideration of the effects on circadian rhythms Since the disruption of the circadian rhythms may adversely affect human performance, a number of studies have been conducted in order to determine the point at which airline pilots become impaired to an unsafe degree As a result of this study, airline crews were rescheduled with consideration given to night departure times and multiple landings with intercontinental flights To assess biological changes in occupants not concerned with aircrew duties, scientists conducted tests on a subject who has flown from Minneapolis to Korea The investigators found that the diurnal biochemical excretion pattern synchronized gradually with Korean time, reaching a time displacement of nine hours from Minneapolis time by the eleventh day, a rate of adjustment of approximately one hour per day It is concluded that a long-distance traveler should definitely pace himself during the asynchronous period if he wishes to receive the least biological and mental strain P v.T

A69-14469

THE TOLERANCE OF MAN TO IMPACT

Arthur E Hirsch (U S Department of Transportation, National Highway Safety Research Center, Washington, D C)

(New York Academy of Sciences, Conference on Prevention of and Protection Against Accidental Explosion of Munitions, Fuels and Other Hazardous Mixtures, New York, N Y , Oct 10-13, 1966) New York Academy of Sciences, Annals, vol 152, Oct 28, 1968, p 168-171 12 refs

Review and consolidation of existing impact/injury data in an effort to provide an estimate of human tolerance to instantaneous accelerations Graphical data are presented to show that whole-body impact against flat unyielding objects at velocities of about 10 ft/sec is likely to result in some injuries in a group, and that impact at about 20 ft/sec is likely to result in some fatalities in a group G V

A69-14470

RESPONSE OF THE BODY TO MECHANICAL FORCES - AN OVERVIEW

Henning E von Gierke (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio)

(New York Academy of Sciences, Conference on Prevention of and Protection Against Accidental Explosion of Munitions, Fuels and Other Hazardous Mixtures, New York, N Y , Oct 10-13, 1966) New York Academy of Sciences, Annals, vol 152, Oct 28, 1968, p 172-186 22 refs

Survey of the experimental possibilities inherent in the use of a mechanical model of the human body in considering the body's response to blast and to relate this response to the response to other mechanical stress environments Emphasis is given to the necessity of designing a model and establishing its general validity Once the general validity of a model is established, it allows the calculation of its response to very complex input functions by computer techniques, including functions that cannot be reproduced in the laboratory by presently available environmental simulators but are expected in operational situations, or emergency conditions The model technique is also useful in planning animal experimentation and in extrapolating human safety criteria from the results of animal responses Finally, the model provides the capability of analyzing numerically the mechanical effectiveness and detailed mode of action of a protection or restraint system coupled with a biological system G V

A69-14482

THE EFFECT OF HYPOXIA ON BRAIN γ-AMINOBUTYRIC ACID LEVELS

J D Wood, W J Watson, and A J Ducker (Defence Research Board, Defence Research Establishment, Toronto, Canada)

Journal of Neurochemistry, vol 15, 1968, p 603-608 7 refs

Discussion of the results of experiments in which animals were exposed to hypoxic environments either by supplying them with breathing mixtures low in oxygen or by exposing them in a decompression chamber to simulated altitude Both methods of producing hypoxia brought about significant increases in brain GABA levels A linear relationship was found between the oxygen content of the gas mixture and the elevation of GABA level G V

A69-14511 #

PORTABLE LIFE SUPPORT SYSTEMS FOR EXTRA-VEHICULAR ACTIVITIES

R C. Reid (Massachusetts Institute of Technology, Dept of Chemical Engineering, Cambridge, Mass) and D L Richardson (Arthur D Little, Inc , Cambridge, Mass)

American Institute of Chemical Engineers, Annual Meeting, 61st, Symposium on Aerospace Life Support Systems, Part I, Los Angeles, Calif., Dec. 1-5, 1968, Paper 42 C 19 p 34 refs
$0 50.

Discussion of new and old concepts which may be applicable for use in portable astronaut life support systems It now appears that a workable, lightweight system is possible. It is pointed out that oxygen is best supplied from very high-pressure storage tanks, CO_2 removed with LiOH or by membrane permeation, and metabolic heat by water evaporation However, optimum specific techniques to accomplish these steps are not at all clear, due to the fact that the research and engineering of portable life support systems are not yet complete M. M.

A69-14533

GROUPS UNDER STRESS PSYCHOLOGICAL RESEARCH IN SEALAB II

Ronald Radloff (National Naval Medical Center, Naval Medical Research Institute, Bethesda, Md) and Robert Helmreich (Texas, University, Austin, Tex)

Research supported by the U S Navy, Grants No Nonr(G)-00012-66, No Nonr(G)-00030-66, Contract No N 00014-67-A-0126-0001
New York, Appleton-Century-Crofts, Division of Meredith Corp , 1968 270 p 156 refs
$5 50

This book is concerned with the measurement and explanation of individual and group responses to the stress of a two-week period of living and working on the ocean floor at a depth of 205 ft In studying this exotic setting, an orientation was developed which may be applicable to the general study of social phenomena in natural settings The SEALAB II project seemed to the authors to be an excellent natural laboratory for research into psychological stress, combining advantages of both the laboratory and the field Considerations which were weighed in evaluating the research potential of the project are (1) the aquanauts were under real and prolonged stress, (2) the subjects did not perceive themselves to be in a psychological research project, and there were minimal demand characteristics from psychological research, (3) there was a relatively stable environment, since all aquanauts lived in the same environment and performed the same work, (4) facilities for observation were available, in that, remote TV and audio monitoring, observers, and facilities for systematic collection of data were provided, (5) complete background information was available on each subject prior to participation in the project, (6) there was an adequate number of subjects - i e , 28 men divided into three teams, (7) since all participants worked at similar tasks under similar conditions, it was possible to define objective performance criteria and to relate these to background and situation variables, (8) facilities were available and plans were formulated to transfer all data to punch cards for computer processing Emphasis is given to the planning of the data collection program and to the experimental results obtained, with a chapter devoted to the new potentials in field research of this type of environmental study G V

A69-14692 *

DISPERSION AND ATTENUATION OF SMALL ARTIFICIAL PRESSURE WAVES IN THE CANINE AORTA

Max Anliker Eric Ogden (Stanford University, Dept of Aeronautics and Astronautics, Stanford, NASA, Ames Research Center, Div of Environmental Biology, Moffett Field, Calif), and Michael B Histand

Circulation Research, vol 23, Oct 1968, p 539-551 36 refs
Grant No NGR-05-020-223

Description of a method for determining the elastic behavior of large blood vessels in the canine aorta in terms of their transmission characteristics for small sinusoidal pressure signals The method is new insofar as it uses transient signals of the form of finite trains of sine waves that are superimposed on the naturally occurring pressure fluctuations and are generated by an electrically driven impactor or by a pump Its application to the thoracic aortas of 18 mature mongrel dogs anesthetized with pentobarbital has shown that dispersion and attenuation data for frequencies between 40 and 200 cps can be obtained without requiring either Fourier-transform computations or resolution of reflection interference M M

A69-14811

POSSIBILITIES AND PROBLEMS FOR BIOLOGY IN THE AGE OF SPACE FLIGHT [MOGLICHKEITEN UND PROBLEME DER BIOLOGIE IM ZEITALTER DER RAUMFAHRT]

Wolfgang Briegleb (Deutsche Versuchsanstalt fur Luft- und Raumfahrt, Institut fur Flugmedizin, Bad Godesberg, West Germany)

IN WISSENSCHAFTLICHE GESELLSCHAFT FUR LUFT- UND RAUMFAHRT, YEARBOOK 1967 [WISSENSCHAFTLICHE GESELLSCHAFT FUR LUFT- UND RAUMFAHRT, JAHRBUCH 1967]
Edited by Hermann Blenk and Werner Schulz
Cologne, Wissenschaftliche Gesellschaft fur Luft- und Raumfahrt, 1968, p 136-145 44 refs In German

Review of some problems in biological space research which are of importance at the present time Microecology and weightlessness are examined as important factors to be considered before making definitive statements about human space flight, and especially before attempted landings on the moon or planets Problems associated with infection of astronauts by extraterrestrial organisms and the necessity for quarantine of persons, animals, and objects returning after contact with extraterrestrial objects are considered The question is raised as to the reasons why neither the Russians nor the Americans have landed a microbiological detector on the moon in conjunction with the soft-landing tests It is suggested that prolonged zero-g conditions could, through simulation, cause a change in the microorganisms present in the astronauts' bodies at lift-off sufficient to produce deleterious effects G V

A69-14908 *

METABOLISM.

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A69-14976

Edited by P L Altman and D S Dittmer.
Bethesda, Md , Federation of American Societies for Experimental Biology, 1968 757 p 6026 refs
$20

An extensive revision and updating of an earlier work on standard values in nutrition and metabolism - consisting of 117 tables, diagrams, and charts - is offered for the specialist or serious student in metabolic studies The composition of materials taken into the plant or animal, the ways in which these materials become part of the organism, the energy exchange, and the metabolic end products are considered in detail. Some tables show how a superabundance or a deficiency of some apparently minor component may profoundly influence a life process, and certain internal and external modifiers of metabolism are presented Metabolic pathways with intermediate products are diagramed to show as clearly as possible the multiple steps that may occur in several ways and over very short periods of time G V

A69-14976 *

PSYCHOCHEMICAL RESEARCH STUDIES IN MAN
Arnold J Mandell (California, University, Dept of Psychiatry and Human Behavior and Dept of Psychobiology, Irvine, Calif) and Charles E Spooner (California, University, School of Medicine, La Jolla, Calif)
Science, vol 162, Dec 27, 1968, p 1442-1453 177 refs
NIMH Grants No MH-14360-01, No MH-10836, Grant No NsG-237-62

Evaluation of the current state of the art in theory and methodology in some areas of research attempting to relate biochemical phenomena to brain function in man, with particular relevance to behavioral states The reservations that a critical witness must have about the establishment of any substance as a physiological modulator or transmitter in the central nervous system are discussed Four of the many research strategies currently in use are described, with examples As compared with other areas of research in biology, the kinds of assumptions, operations, and conclusions extant in this field are crude However, by comparing work from earlier decades in this area with current activities, it becomes clear that the psychochemist is benefiting from the basic advances in chemistry and biology P v T

A69-14978 *

AMINO ACID COMPOSITION OF ORGANIC MATRIX IN CALCAREOUS OOLITES
Richard M Mitterer (Southwest Center for Advanced Studies, Geosciences Div , Dallas, Tex)
Science, vol 162, Dec 27, 1968, p 1498, 1499 20 refs
Grant No NsG-269-62

Examination of the organic matter in some modern and fossil oolites has shown that it contains protein, with a high content of acidic amino acids Artificial oolites from a water-processing plant contained no amino acids The protein matrix may influence the formation of natural oolites by concentrating calcium ions (Author)

A69-15152

GENETIC BACKGROUND OF CIRCADIAN RHYTHMS
R Barcal, J Sova (Charles University, Medical Faculty, 1st Medical Clinic, Plzeň, Czechoslovakia), M Krizanovska (SKODA Works, Computer Centre, Plzeň, Czechoslovakia), J Levy (Charles University, Medical Faculty, Institute of Social Medicine, Plzeň, Czechoslovakia), and J Matousek (Charles University, Medical Faculty, Institute of Medical Physics, Plzeň, Czechoslovakia)
Nature, vol 220, Dec 14, 1968, p 1128-1131 6 refs

Attempt to devise a method of expressing the concordance or discordance of a biological phenomenon in time between the individuals of separate twin pairs The method is intended to be suitable both for the basal physiological research of medical genetics, and for the study of biological rhythms - e g , in human biometeorology Various parameters were recorded for eight pairs of male twins aged between 20 and 21, of which four were monozygotic and four were dizygotic F R L

A69-15183

EXAMPLES OF HYBRID ELECTROPNEUMATIC AND ELECTRO-HYDRAULIC SERVOSYSTEMS II - THE ELECTROHYDRAULIC GUIDANCE SYSTEM FOR THE SECOND STAGE OF THE DIAMANT [EXEMPLES D'ASSERVISSEMENTS MIXTES ELECTRO-PNEUMATIQUE ET ELECTRO-HYDRAULIQUE II - LE BLOC ELECTRO-HYDRAULIQUE DE PILOTAGE DU 2e ETAGE DIAMANT]
J -P Blondel (Société D B A , Division Air-Equipment, Paris, France)
(Société Française des Mécaniciens, Société Française des Electriciens, and Association Française de Régulation et d'Automatisme, Conférence, Paris, France, Apr 10, 1968)
Revue Française de Mécanique, Apr -June 1968, p 50-56
In French

Description of the electrohydraulic guidance system for the second stage of the three-stage Diamant rocket used for orbiting satellites The second stage consists of a solid propellant system with four independent one-degree-of-freedom propulsion nozzles Guidance of the engine is accomplished by orientation of the thrust vector The complete servosystem with three electrical inputs and four mechanical outputs is described Limitations on the performance of the servosystem are discussed M G

A69-15185

EXAMPLES OF ELECTROHYDRAULIC SERVOSYSTEMS [EXEMPLE D'ASSERVISSEMENT DE NATURE ELECTRO-HYDRAULIQUE]
C Libois (Société d'Optique, Précision Electronique et Mécanique, Levallois-Perret, Hauts-de-Seine, France)
(Société Française des Mécaniciens, Société Française des Electriciens, and Association Française de Régulation et d'Automatisme, Conférence, Paris, France, May 8, 1968)
Revue Française de Mécanique, Apr -June 1968, p 67-74
In French

Description of an electrohydraulic servosystem applied to the telecontrol of a radar antenna Various possible design approaches to an electrohydraulic telecontrol system are discussed, and the advantages and disadvantages of each are noted The principal components used in the system are examined, in particular, the variable-output pump assembly, the hydraulic motor, and the pump control servojack A survey is also presented of the other major uses of electrohydraulic systems M G

A69-15299 *

HIGH-TEMPERATURE CAPACITORS FROM PYROLYTIC BORON NITRIDE
R E. Stapleton and R A Lindberg (Westinghouse Electric Corp , Aerospace Electrical Div., Advanced Systems Dept , Lima, NASA, Lewis Research Center, Space Power Systems Div , Cleveland, Ohio).
Space/Aeronautics, vol 50, Dec 1968, p 75, 76

Results of a research program conducted to evaluate the feasibility of fabricating a high-temperature (1100°F) capacitor comparable in size, weight, and electrical characteristics to conventional lower-temperature capacitors. Four high-temperature, high-purity dielectric materials were tested, including single-crystal aluminum oxide, polycrystalline aluminum oxide, hot-pressed beryllium oxide, and pyrolytic boron nitride. Pyrolytic boron nitride was selected as the optimum material yielding the thinnest wafers The use of alternatingly interconnected thin-film electrodes resulted in a nearly maximum capacitance for a given volume. A high-capacitance unit was fabricated by stacking five wafers on top of each other. Data are given for the dissipation factor and capacitance change with temperature T M

A69-15304 *

FLUORESCENCE STUDIES OF SUBSTRATE AND SUBUNIT INTERACTIONS OF THE β_2 PROTEIN OF ESCHERICHIA COLI TRYPTOPHAN SYNTHETASE
Michel E Goldberg (Institut Pasteur, Service de Biochimie Cellulaire, Paris, France), Sheldon York, and Lubert Stryer
Biochemistry, vol 7, Oct 1968, p 3662-3667 14 refs
NSF Grant No GB-5905, Grant No NGR-05-020-137

Description of an experiment which demonstrates that the substrate and subunit interactions of the β_2 protein of Escherichia coli tryptophan synthetase have a marked influence on the fluorescence properties of the pyridoxal phosphate prosthetic groups bound to the enzyme A new, strong fluorescence emission is observed on binding of L-serine, one of the substrates, to the β_2 protein The emission, termed the aqua band, exhibits an excitation peak at 424 mμ and an emission peak at 500 mμ. M G

A69-15309 *

INDICATIONS FOR THE DESIGN OF POROUS GAS DIFFUSION ELECTRODES ARISING FROM ANALYSES OF THEIR ELECTRODE KINETICS

John O'M Bockris, B Cahan (Pennsylvania, University, Electrochemistry Laboratory, Philadelphia, Pa), and S Srinivasan (New York, State University, Dept of Surgery, Electrochemical and Biophysical Laboratories, Brooklyn, N Y)

Energy Conversion, vol 8, Nov 1968, p 111, 112 7 refs
NASA-supported research

Application of the electrodic theory of porous electrodes to the design of high power-density electrodes for electrochemical energy converters The features common to all models are discussed, and the electrochemical engineer is advised to provide situations in which the thickness of the meniscus layer and the distance which the escaping ions have to travel to reach the "bulk" electrolyte are both minimized It is noted that for a given rate of reaction, an electrode mechanism in which the Tafel slope is low will give substantially higher power densities than one in which the Tafel slope is high B.H

A69-15310 *

THE EFFECT OF OXYGEN-SUPPLY IMPURITIES ON THE PERFORMANCE OF A HYDROGEN-OXYGEN FUEL CELL

J C Jones (NASA, Manned Spacecraft Center, Houston, Tex) and J E Cox (Houston, University, Houston, Tex)

Energy Conversion, vol 8, Nov 1968, p 113-115 7 refs

Experimental evaluation of the effect of inert diluent impurities in the reactant oxygen supply on the performance of a hydrogen-oxygen fuel cell The experimental method involved the operation of single cells with three reactant oxygen supply purity levels Constant load was maintained and change in cell performance was measured as voltage degradation with time during the test run Inert blanketing of the oxygen electrode may be responsible for the voltage degradation After each test run, significant immediate voltage recovery was observed when the oxygen electrode was purged (Author)

A69-15312

SOLAR CELL OUTPUT AS A FUNCTION OF ANGLE OF INCIDENCE FOR BOTH UNPOLARIZED AND LINEAR POLARIZED LIGHT

G Seibert (European Space Research Organization, European Space Research and Technology Centre, Delft, Netherlands)

Energy Conversion, vol 8, Nov 1968, p 121-123

The short-circuit current of covered and uncovered silicon "solar" cells was measured at radiation densities up to 5 solar constants for different angles of incidence It was observed that under illumination with linear polarized "white" light the angle of the polarizing filter, at which the cell output showed a maximum or minimum, varied with the angle of incidence This effect is independent of the wavelength (Author)

A69-15313

DISSOCIATING GAS AS A WORKING FLUID FOR SPACE PLANT

H Cheung (California, University, Lawrence Radiation Laboratory, Livermore, Calif)

Energy Conversion, vol 8, Nov 1968, p 125-128 7 refs
AEC-sponsored research

An inert-gas Brayton cycle requires a larger radiator than does a Rankine cycle operating at the same temperature For power plants in the megawatt range operating between 5 and 500 psia and under 4000°R, replacing the inert gas with a dissociating gas would reduce the Brayton cycle radiator area by a factor of four Nevertheless, the Brayton cycle must still operate at somewhat higher temperatures to be competitive with the Rankine cycle when radiator area is the primary consideration (Author)

A69-15314

RECENT DEVELOPMENTS IN VARIATIONAL METHODS FOR NON-EQUILIBRIUM FLOWS

H W Butler and R L Rackley (West Virginia University, Mechanical Engineering Dept , Morgantown, W Va)

Energy Conversion, vol 8, Nov 1968, p 129-133 16 refs
NSF Grant No GK-461

Several recent developments in the field of nonequilibrium thermodynamic processes have occurred which involve the application of variational methods Some of the earlier work by Glansdorff and Prigogine has been extended to apply to a wide range of irreversible processes In these developments, certain restrictive conditions have been assumed in order to arrive at suitable forms for the functional to be minimized In their earlier development, Glansdorff and Prigogine required a very special, inverse-temperature dependence of the thermal conductivity and the viscosity in order to develop their minimum principle In their most recent work, this limitation has been removed through the introduction of fluctuation theory Recent work by the authors has led to the extension of these methods to include applications to viscous, heat conducting flows with quite general boundary conditions Particular applications to some simple flows have been made to test the validity of the mathematic as well as the thermodynamic methods (Author)

A69-15315 *

ESTIMATION OF THE CHEMICAL COMPATIBILITY OF ALLOYS WITH LEAD TELLURIDE AND TIN TELLURIDE THERMOELECTRIC MATERIALS

Fritz Wald (Tyco Laboratories, Inc , Waltham, Mass)

Energy Conversion, vol 8, Nov 1968, p 135-140 27 refs
Contract No NAS 5-9149

A method is presented which allows an estimation of whether a thermoelectric material based on lead-telluride or tin-telluride will chemically react with a given metallic alloy This method involves a comparison of the heats of formation of a mixture of tellurides which would be formed by the alloy upon reaction, relative to the heats of formation of lead-or-tin telluride The heats of formation are evaluated from electronegativity differences based on experimentally determined reactions of lead and tin telluride with elemental metals Such estimations of heats of formation obviously contain large absolute errors It can, however, be shown that for the nine alloys investigated good agreement between the prediction of reaction and the behavior found experimentally indeed exists (Author)

A69-15316

WATER- AND HEAT-TRANSPORT MECHANISM IN THE H_2O-REMOVAL SYSTEM FOR FUEL-CELL UNITS [UEBER DEN WASSER- UND WAERMETRANSPORTMECHANISMUS IM H_2O-ENTZUGS-SYSTEM FUER BRENNSTOFFZELLEN-AGGREGATE]

R Klink (Brown, Boverie et Cie AG, Physikalisches Laboratorium, Baden, Switzerland) and H G Plust (Deutsche Automobil GmbH, Forschungslaboratorium, Esslingen, West Germany)

Energy Conversion, vol 8, Nov 1968, p 145-149 12 refs In German

This investigation concerns design parameters for water-removal units used in connection with H_2/O_2-fuel cell systems to remove the water of the reaction from the electrolyte The measurements of the H_2O-removal flow density show a pronounced dependence on the thickness of the removal cavity This is explained on the basis of an increasing convection, which determines the water and heat transfer at $d > 2$ mm The boundary layers caused by this convection determine the value of the H_2O-removal flow (Author)

A69-15322 #

DESIGN ASPECTS OF SUBLIMING SOLID REACTION CONTROL SYSTEMS.

W. L Owens, Jr. (Lockheed Aircraft Corp , Lockheed Missiles and Space Co., Sunnyvale, Calif)

Interagency Chemical Rocket Propulsion Group and American Institute of Aeronautics and Astronautics, Solid Propulsion Conference, 3rd, Atlantic City, N.J , June 4-6, 1968, AIAA Paper 68-516 20 p 45 refs.
Members, $1 00, nonmembers, $1 50.

The paper attempts to formalize the design aspects of subliming solid reaction control systems When practical, the basic relations are presented in the form of easy to use nomograms Topics covered are propellant selection, nozzle performance, propellant sublimation area, power requirements, capillary pressure drop, dynamic response, and valveless design. Much of the propellant data necessary for motor design is presented in tabular form An extensive study of the literature for low Reynolds number ($Re < 10^4$) nozzle performance has been carried out, and the results are presented in graphical form. Experimental results from a superheated subliming solid study are given for ammonium carbamate at temperatures up to 1860°F The influence of propellant sublimation area on system performance is analyzed An analog of the system is presented which forms the basis of a computer program for the prediction of dynamic system response (Author)

A69-15325 *

EFFECT OF HYDROGEN ADAPTATION ON FLUORESCENCE IN NORMAL AND MANGANESE-DEFICIENT ALGAE

Erich Kessler (Florida State University, Dept of Biological Science, Institute of Molecular Biophysics, Tallahassee, Fla)

Planta, no 81, 1968, p 264-273 31 refs
Grant No NGR-10-004-018

Study of the fluorescence of normal and manganese-deficient algae (Ankistrodesmus braunii and Chlorella fusca) under hydrogen-adapted conditions This work extends earlier studies by Kessler et al (1957) on the effect of manganese deficiency on aerobic fluorescence Results of the present work indicate that, in addition to system I, system II of photosynthesis is at least partly active in H_2-adapted and photoreducing algae M G

A69-15330

SECONDARY CELLS WITH LITHIUM ANODES AND IMMOBILIZED FUSED-SALT ELECTROLYTES

Hiroshi Shimotake, George L Rogers, and Elton J Cairns (Argonne National Laboratory, Argonne, Ill)

(American Chemical Society, Spring National Meeting, 155th, San Francisco, Calif , Mar 31-Apr 5, 1968)
I & EC - Industrial and Engineering Chemistry, Process Design and Development, vol 8, Jan 1969, p 51-56 17 refs
AEC-sponsored research

Secondary cells with a liquid-lithium anode, a fused LiF-LiCl-LiI eutectic electrolyte immobilized as a rigid paste, and a liquid bismuth or tellurium cathode have been investigated in both the discharge and charge modes of operation The lithium/bismuth cell operating from 380 to 485°C yielded current densities up to 2 2 A/cm^2, and a maximum power density of 0 57 W/cm^2 at 0 6 V The cell contained an amount of lithium equivalent to 0 25 A-hr, the fully discharged cathode alloy composition was 41 at % Li in Bi The lithium/tellurium cell operating at 475°C yielded a short-circuit density of 2 2 A/cm^2, and a maximum power density of 1 W/cm^2 at 0 9 V This cell contained an amount of lithium equivalent to 6 36 A-hr, the fully discharged cathode alloy composition was 71 6 at % Li in Te These performances suggest many applications, including special vehicle propulsion and energy storage (Author)

A69-15332 *

MAGNITUDE ESTIMATES OF ROTATIONAL VELOCITY DURING AND FOLLOWING PROLONGED INCREASING, CONSTANT, AND ZERO ANGULAR ACCELERATION

Brant Clark and John D Stewart (NASA, Ames Research Center, Moffett Field, Calif)

Journal of Experimental Psychology, vol 78, no 2, 1968, p 329-339 24 refs

Description of an experiment in which velocity of rotation was observed by ten observers in a rotating simulator during and following accelerations about a vertical axis which varied between 5° to 1 5°/sec^2 and 006 to 030°/sec^3 and continued for 2 to 3 min Trials with zero acceleration were also included Magnitude estimates of velocity of rotation increased and then declined during the constant accelerations, while more complex effects occurred during increasing accelerations Aftereffects and an autokinetic effect were also observed The current theory of vestibular function is discussed in the light of these results M G

A69-15333 *

CELLULAR LOCALIZATION OF ACETYL-COENZYME A SYNTHETASE IN YEAST

Harold P Klein and Linda Jahnke (NASA, Ames Research Center, Exobiology Div , Moffett Field, Calif)

Journal of Bacteriology, vol 96, Nov 1968, p 1632-1639 23 refs

Study of the subcellular sites of the enzyme acetyl-CoA synthetase which is involved in lipid synthesis in Saccharomyces cerevisiae. Direct assays are performed for the enzyme in the microsomal fraction of the cells of Saccharomyces cerevisiae The data suggest that during aerobic, but not anaerobic, growth on glucose, the enzyme moves from the microsomal fraction into the mitochondrial fraction. It is further suggested that the enzyme leaves the mitochondria when the cells become older, but while they are still viable M G

A69-15388 *#

SPACE FLIGHT NUTRITION [NAHRUNG FUR DEN WELTRAUMFLUG]

John R Bannister (NASA, Goddard Space Flight Center, Greenbelt, Md)

Weltraumfahrt Raketentechnik, vol 19, Nov -Dec 1968, p 167-171 In German

Discussion of biological, psychological, and technological requirements in the creation of nutrition programs for astronauts Preservation and reconstitution techniques, such as dehydration and freeze-drying are examined, and the disposal of wastes is considered It is concluded that, apart from technological considerations, the major requirement of future space flight diets will be to achieve as close an approximation to "normal" earth diets as possible, in terms of nutritional balance, appetite appeal, and psychological satisfaction Space diets of the various flights are reviewed and evaluated from all these points of view B H

A69-15506 *#

RESISTOJET BIOWASTE UTILIZATION - EVALUATION AND SYSTEM SELECTION

R V Greco and R M Byke (McDonnell Douglas Corp , McDonnell Douglas Astronautics Co , Huntington Beach, Calif)

(American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 6th, New York, N Y , Jan 22-24, 1968, Paper 68-121)
Journal of Spacecraft and Rockets, vol 6, Jan 1969, p 37-43
Contract No NAS 1-6702

[For abstract see issue 06, page 967, Accession no A68-17539]

LC ENTRIES

A69-80221
THE EFFECT OF NOISE ON THE HUMAN ORGANISM [DIE WIRKUNG DES LARMS AUF DEN MENSCHLICHEN ORGANISMUS]
E Degen
Die Heilberufe vol 20 Jun 1968 p 175–178 In German

Noise may be measured objectively using the physical laws of frequency and amplitude and subjectively as sensation Defects can occur in the ear as temporary or permanent loss of hearing Because of the sense relationships between the eye and the ear noise may result in a visual impairment Common effects indicate that responses may occur in the vegetative and circulatory systems as well as in the nervous system Annoying disturbances of the psyche may occur which degenerate and impair health (the international definition of the status of optimum psychic and physical well-being) The present goal is to preserve this state of health

A69-80222
EFFECT OF CARBON SUPPLY ON THE RESPONSE OF *CHLORELLA PYRENOIDOSA* TO BLUE AND RED LIGHT [VLIIANIE USLOVII UGLERODNOGO PITANIIA NA OTNOSHENIE CHLORELLA PYRENOIDOSA K DEISTVIIU SINEGO I KRASNOGO SVETA]
N V Trukhin (USSR Acad of Sci Inst for Biol of Inland Waters Yaroslav Region)
Fiziologiia Rastenii vol 15 Jul–Aug 1968 p 652–657 13 refs In Russian

The effect of CO_2 concentration in the atmosphere on the growth and chemical composition of *Chlorella* grown under intense conditions in red or blue light was studied The biological mass increase of the alga grown in blue light was lower than that in red light of equal quantum intensity The decrease of the growth rate as measured by biological mass was greater in blue light than in red light when the CO_2 content was below the threshold value The chemical composition of *Chlorella* under favorable conditions of carbon supply did not depend on the spectral composition of the light With decrease of the CO_2 concentration the total amount of nitrogen in the alga decreased and the carbohydrate content increased The chemical composition of the alga began to change at higher concentrations of CO_2 in red light as compared to blue light The mechanism of action of the spectral composition of light on the alga was discussed It was suggested that blue light activates heterotrophic CO_2 assimilation

A69-80223
THE PARTICIPATION OF ASCORBIC ACID, HYDROGEN PEROXIDE AND IRON IN THE REDUCTION OF NITRATES BY CHLORELLA [OB UCHASTII ASKORBINOVOI KISLOTY, PEREKISI VODORODA I ZHELEZA V VOSSTANOVLENII NITRATOV KHLORELLOI]
I N Trubachev (USSR Acad of Sci Inst of Physics Krasnoyarsk)
Fiziologiia Rastenii, vol 15 Jul–Aug 1968 p 658–664 31 refs In Russian

The results obtained in the present work are in accordance with the concept that nitrite reduction in plants involves an induced reduction reaction Hydrogen peroxide which is formed as an intermediate of aerobic respiration or introduced extraneously can be activated by a peroxidase biocatalyst (iron ions) and univalently oxidizes the hydrogen donor viz ascorbic acid producing its free radical which reduces the hydrogen acceptor nitrite produced as a result of nitrate reduction

A69-80224
REGULARITIES OF APPEARANCE OF GROWTH-INHIBITING SUBSTANCES IN A *CHLORELLA* SP K CULTURE AND THE EFFECT OF THE ATTENDANT BACTERIAL MICROFLORA ON THE PROCESS [ZAKONOMERNOSTI POIAVLENIIA INGIBIRUIUSHCHIKH ROST VESHCHESTV V KUL'TURE CHLORELLA SP K I VOZDEISTVIE NA ETOT PROTSESS SOPUTSTGUIUSHCHEI BAKTTERIAL'NOI MIKROFLORY]
M I Tauts (USSR Acad of Sci K A Timiriazev Inst of Plant Physiol Moscow)
Fiziologiia Rastenii vol 15 Jul–Aug 1968 p 665–673 20 refs In Russian

The effect of substances of the culture medium of the division rate and productivity of *Chlorella* sp K was studied in sterile cultures as well as in cultures growing under natural conditions of bacterial microflora The bacteria considerably weakened the inhibiting properties of the medium In sterile cultures the maximal inhibiting effect with respect to cell number was 50% and with respect to accumulation of biological mass 30% In the presence of bacteria the respective values were 20% and 10% The nature of the growth curve at high light intensities and in the presence of mineral nutrients was completely determined by the inhibiting substances in the medium It was concluded that the stimulation of inhibition of algal growth depends on the total amount of organic matter in the nutrient medium the excretion rate of which is determined by the totality of the growth conditions

A69-80225
INFLUENCE OF HYPEROXIA ON PERIODIC BREATHING OF FROGS [PRO VPLYV HIPEROKSII NA PERIODYCHNE DYKHANNIA ZHAB]
T O Arefeva (UkrSSR Acad of Sci O O Bohomolts Inst of Physiol Dept of Pathol of Hypoxical and Hyperoxical States Kiev)
Fiziolohichnyi Zhurnal, vol 14 Jul–Aug 1968 p 487–493 25 refs In Ukrainian

The investigation was carried out concerning the influence of hypoxia on periodic breathing of frogs (*Rana esculenta* L) caused by circulatory hypoxia The conditions of circulatory hypoxia were created by ligature of lung arteries common carotid arteries and chest aorta The degree of disturbance in the function of the frog respiratory center depended on the degree of the blood circulation disturbance The greatest disturbances in the respiratory function were observed with the ligatures on lung arteries, in this case there appeared periodic breathing Hyperoxia resulted in disappearance of periodic breathing in frogs with investigated types of circulated insufficiency Increasing the saturation of frogs blood by oxygen appeared to cause the removal of the hypoxia state and normalization of the respiratory center function The results of the investigation showed an important role of dermal respiration in the removal of hypoxia without lung circulation of the blood being excluded

A69-80226
THE EFFECT OF MUSCLE WORK AND SOME BIOLOGICALLY ACTIVE SUBSTANCES ON CORTICOSTEROID CONTENT IN THE SUPRARENALS AND BLOOD [VLIIANIE MYSHECHNOI DEIATEL'NOSTI I NEKOTORYKH BIOLOGICHESKI AKTIVNYKH VESHCHESTV NA SODERZHANIE KORTIKOSTEROIDOV V KROVI I NADPOCHECHNIKAKH]

N A Stoliarova (P F Lesgaft Inst of Phys Cult Dept of Biochem , Leningrad USSR)

Fiziologichescii Zhurnal SSSR, vol 14 Jul 1968, p 838–842 18 refs In Russian

In experiments on albino rats it was shown that short term intensive muscle work increased corticosteroids in the suprarenals and blood whereas prolonged work decreased their contents In previously trained animals corticosteroid content was higher both at rest and during muscle work Injection of eleuterococcus extracts or pangamic acid facilitated the maintenance of higher corticosteroid content in some of the animals although their effect was not complete as compared with training The data obtained indicated an adaptogenic role of pangamic acid and especially of eleuterococcus extracts

A69-80227
DIFFERENTIATION OF HYPO- AND HYPEROXIC RESPIRATORY MIXTURES IN MAN [O RAZLICHENII CHELOVEKOM DYKHATEL'NYKH SMESEI S PONIZHENNYM I POVYSHENNYM SODERZHANIEM KISLORODA]

I S Breslav and E N Salatsinskaia (USSR, Acad of Sci I P Pavlov Inst of Physiol Lab of Physiol of Respiration Leningrad)

Fiziologicheskii Zhurnal SSSR vol 14 Jul 1968 p 850–856 15 refs In Russian

Under the conditions of active choice studies were made on the reaction of 31 healthy subjects to respiratory mixtures with various oxygen content The subjects avoided (negative choice) mixtures in which oxygen content was 12% and lower In the presence of CO_2 (3 5%), the threshold of negative choice in relation to hypoxic mixtures increased It was suggested that differentiation of respiratory mixtures with a decreased oxygen content in man is based on the development to a certain degree of hypoxemia No evident differentiation between oxygen and usual air was revealed in the subjects studied

A69-80228
EFFECT OF AGE ON INTESTINAL ABSORPTION IMPLICATIONS FOR DRUG ABSORPTION IN THE ELDERLY

A Douglas Bender (Smith Kline and French Labs Res and Develop Div Philadelphia Pa)

Journal of the American Geriatrics Society, vol 16 Dec 1968 p 1331–1339 34 refs

Studies dealing with the influence of increasing age on intestinal absorption are reviewed Interest in these studies has resulted from statements that increasing age is accompanied by a delay and a reduction in drug absorption There are however no data to support this conclusion Nevertheless data from studies of the absorption of sugars fats and vitamins in subjects of different ages may be relevant to the problem of drug absorption as are the other changes in gastrointestinal function that occur with advancing age In the elderly there is a reduction in gastric pH which in the case of some drugs affects the solubility and thus will influence the rate of absorption Furthermore, there is a reduction in intestinal blood flow which would tend to delay or reduce drug absorption Possibly there is a reduction in the number of absorbing cells in the intestine with a consequent loss of absorbing surface in the aged this may explain the reported reduction in passive diffusion in the aged A modification of special transport mechanisms is suggested by the fact that the absorption of galactose, 3-methyl glucose calcium and thiamine is reduced with increasing age All of these factors tend to imply that drug absorption in the elderly is reduced Fortunately perhaps the reduction in absorption is accompanied by decreased metabolism and decreased excretion Thus limited absorption from the intestine is balanced by delayed elimination of drugs

A69-80229
INVESTIGATION OF THE ECONOMY AND CAPACITY OF CIRCULATION IN MIDDLE AGED MEN SPIROERGOMETRIC DATA IN 40 TO 50 YEAR OLD MEN IN CONNECTION TO PHYSICAL EXERCISE AND BODY WEIGHT [UNTERSUCHUNGEN UBER DIE OKONOMIE UND LEISTUNGSFAHIGKEIT DES KREISLAUFS IM MITTLEREN LEBENSALTER ERGOSPIROMETRISCHE ERGEBNISSE BIE 40- BIS 50-JAHRIGEN MANNERN IN BEZIEHUNG ZUR KORPERLICHEN AKTIVITAT UND ZUM KORPERGEWICHT]

Hans Schwalb (Munich U Inst fur die Prophylaxe der Kreislaufkrankh West Germany)

Archiv fur Kreislaufforschung, vol 56 Aug 1968 p 151–235 218 refs In German

Performance tested by spiroergometry, blood pressure and stroke volume determined by radiological means in 247 healthy males ranging in age from 40 to 50 yr was related to body weight and to the extent of physical exercise which was determined by history taking The following parameters were determined body height, the absolute and the relative body weight oxygen uptake pulse rate oxygen uptake per pulse beat (oxygen pulse) blood pressure and the diastolic stroke volume (determined by radiokymography) On the basis of correlations between cardiac size and oxygen pulse and the correlations between cardiac size oxygen pulse and body dimensions the ratios of oxygen pulse/body weight oxygen pulse/body height stroke volume/body weight stroke volume/body height and stroke volume/oxygen pulse were calculated The oxygen uptake per pulse beat at medium and submaximal stress levels served as a measure for the economy and the efficiency of the circulatory system Physical stress was tested in a horizontal position with the bicycle ergometer with increasing stress levels, each lasting six min The test group was subdivided into different groups on the basis of a work- and spare time history and on the basis of body weight Physical exercise, relative body weight and performance capacity usually are closely interrelated The amount of physical exercise at work was found to be less important for the economy and the performance range of the circulatory system, than the extent and the type of spare time physical exercise However individuals performing physical work had a significantly lower diastolic blood pressure and arterial mean pressure during physical stress At this age level, too with the regular performance of various endurance sports similar qualitative alterations of the circulatory system as are well known in younger competition athletes are principally to be expected However the quantitative differences between physically active and inactive individuals are considerably smaller Males who regularly subject themselves to the endurance stresses of suitable sports demonstrate as compared to less active persons a significantly lower pulse rate and a larger oxygen pulse at rest and during physical stress and also demonstrate a slight increase of stroke volume a more favorable relationship between cardiac size and oxygen pulse a significantly lower diastolic pressure and arterial pressure An additional elevation of the performance of these persons results from relatively lower body weight Regular activity without physical endurance stresses however only produces an insignificant increase of the cardiac-circulatory system performance as compared to the effects of a pronounced lack of physical exercise Over-weight persons as compared to persons of normal weight with identical physical activity have an identical oxygen pulse and a slightly larger stroke volume in relation to body height They do however, have

a significant decrease of the oxygen pulse and of the stroke volume in relation to body weight Only over-weight persons who regularly subject themselves to sports with endurance stresses show an approximately proportional adaptation, on the basis of body weight *of their performance to the increased body weight Thus body* weight at this age was as important a factor for physical performance as the extent of physical activity The improvement of absolute circulatory system performance due to regular exercise in the presence of over-weight frequently also fails to produce an effective increase of physical performance as compared to persons of normal weight

A69-80230
MUSCLE ACTIVITY AND KINESTHETIC POSITION RESPONSES

Andree J Lloyd (U S Army Med Res Lab , Fort Knox Ky)
Journal of Applied Physiology, vol 25 Dec 1968 p 659–663 21 refs

Ten right-dominant and ten left-dominant male subjects were measured to determine the relationship of ipsilateral and contralateral muscular activity during active and passive positioning of the lower legs to the accuracy of positioning to specified angles Accuracy of positioning was significantly influenced by the goal positions and by the mode of movement The range of greatest accuracy occurred from extension through 50° of flexion As the degree of flexion increased from 60° to 100° the errors of positioning also increased in magnitude Although no statistically significant relationships were determined to occur between position accuracy and the amount of contralateral muscular activity as measured by the electromyogram it was determined that this low-level muscular activity does exist in the muscles of normal human subjects Contrary to previous findings increased contralateral muscle activity occurred only during the passive limb movements and more specifically during passive movements of the nondominant limb It was concluded that a certain minimum of muscle activity was required for the kinesthetic mediation of accurate limb positioning

A69-80231
ELASTICITY OF HUMAN LUNGS IN RELATION TO AGE

James M Turner Jere Mead and Mary Ellen Wohl (Harvard School of Public Health Dept of Physiol Boston, Mass)
Journal of Applied Physiology, vol 25, Dec 1968, p 664–671 38 refs
Grant PHS GM-409

The relationship between age and lung elasticity was reinvestigated with an improved technique for measuring esophageal pressure and found reductions of static recoil pressures throughout the age range of 20 to 60 yr An increase in functional residual capacity/total lung capacity (FRC/TLC) ratio was also found with increasing age which it is believed can be accounted for almost entirely by the changes in lung elasticity The possibility that the changes in lung elasticity are primarily the result of alterations in the contribution of elastin to the overall volume-pressure behavior of lungs was discussed

A69-80232
MUSCLE TEMPERATURE DURING SUBMAXIMAL EXERCISE IN MAN

B Saltin A P Gagge and J A J Stolwijk (Yale U and John B Pierce Found Lab New Haven, Conn)
Journal of Applied Physiology vol 25 Dec 1968 p 679–688 27 refs
NASA Contract 9-7140 and Grant NIH UI-00426

Quadriceps muscle temperatures (T_m) were measured by thermocouples inside indwelling Teflon catheters (six cm deep) and needle probes (used intermittently) on four healthy male subjects dressed in shorts, while pedaling a bicycle ergometer (50 r p m) at 27, 46 and 72% of maximal oxygen uptake (4 38 l /min) and at 10° 20° and 30° air temperature (T_a RH < 40%) There are marked temperature gradients within the muscles studied With the onset of exercise T_m rises rapidly from resting levels of 35° ± 2° and within three to five min is above the rectal temperature (T_r) and reaches a relative equilibrium after 10 to 20 min of exercise The difference Tm–Tr after 30 to 60 min of exercise is 0 65°C in ambient temperatures of 10 and 20°C and 0 95°C in a 30°C environment The value of Tm–Tr is independent of the level of exercise T_r increased linearly with the relative work load and averaged 37 5 38 1, and 38 7°C at the three submaximal work loads Skin temperature (T_s) is principally related to T_a and unrelated to T_r or V_{O2} Skin sweating observed over 15 min periods correlated well with Tm Tr and metabolic rate (all r = 0 85) and has a better multiple correlation (r = 0 94) with T_m and T_s However, during steady-state exercise T_m and T_r are so closely correlated (r = 0 9) that it is impossible to assign with our present data any unique role to either T_m or T_r in the control of regulatory skin sweating

A69-80233
MECHANICAL PROPERTIES OF ALVEOLAR WALLS

Hiroshi Fukaya C J Martin A C Young and Shigeaki Katsura (Wash U School of Med Dept of Physiol and Biophysics and Firland Sanat Inst of Respirat Physiol Seattle)
Journal of Applied Physiology, vol 25 Dec 1968 p 689–695 21 refs
Grant PHS HE-01892 and Boeing Employees Good Neighbor Fund supported research

The length-tension relationships of the alveolar wall in cat lung were studied by stretching and releasing pieces of lung tissue in a saline bath The tissue was later identified by serial histologic sections across the longitudinal axis of the tissue Alveolar wall demonstrated stress relaxation the magnitude of which was proportional to the final force and the rate of extension Stress recovery was also demonstrated at lengths greater than the initial length With repeated cycling about the length-tension loop tissue compliance increased up to the third or fourth circuit (adaptation) Adaptation was seen again when the tissue was subjected to greater force The length-tension curve was nonlinear with a pathway different on extension than on release (hysteresis) Hysteresis decreased on repeated cycling about the loop and increased with greater final force Adaptation and a part of hysteresis involve the same molecular rearrangement seen in stress relaxation Not all hysteresis however can be explained as stress relaxation

A69-80234
MEASUREMENT OF DISTRIBUTION OF CARDIAC OUTPUT

Shigekoto Kaihara Philip D Van Heerden Tohru Migita and Henry N Wagner Jr (Johns Hopkins Med Institutions Div of Nucl Med Baltimore, Md)
Journal of Applied Physiology vol 25 Dec 1968 p 696–700 15 refs
Grants PHS GM 10548 and PHS IF05-TW-1077-01

The distribution of cardiac output can be measured after injection of a suitable indicator into the systemic circulation by measuring the distribution of the indicator within the organs of the body The validity of using various labeled microspheres as such an indicator was tested in dogs Macroaggregated albumin labeled with ^{131}I and carbonized microspheres with diameters of 15 50 80 and 190μ labeled with ^{46}Sc ^{85}Sr, and ^{169}Yb were studied When carbonized particles with diameters of more than 50μ were injected into the left atrium they mixed well with blood within the heart and were subsequently trapped by peripheral vascular beds The microspheres were completely extracted during

the first transit through capillary beds Other microspheres or other sites of injection showed either incomplete trapping or incomplete mixing The use of microspheres labeled with two different radionuclides was also validated as a means of measuring the distribution of cardiac output of the same animal under different conditions The distribution of cardiac output could thus be measured under experimental pathological conditions with each animal as its own control

A69-80235
HIGH-G ENVIRONMENT AND RESPONSES TO GRADED EXERCISE

H Bjurstedt, G Rosenhamer and O Wigertz (Karolinska Inst Fac of Med Dept of Aviation Med Stockholm Sweden)
Journal of Applied Physiology, vol 25 Dec 1968 p 713–719 16 refs
Swed Med Res Council supported research

Ventilatory and circulatory responses to graded leg exercise on a bicycle ergometer (300 600 and 900 kpm /min i e 49 98 and 147 w for six min at each work load) were studied in eight healthy untrained subjects in the sitting position at normal gravity (+1 G_z) and at +3 G_z The effect of increased G on the average work performed by the leg muscles was calculated to be negligible At the highest work load mean expired minute volume oxygen uptake heart rate and arterial lactate levels for the sixth min of exercise were 19 6 l /min 241 ml /min 32 beats/min and 1 43 m_M/l higher at +3 G_z than at +1 G_z, the increases were statistically significant except for arterial lactate No electrocardiogram (ECG) abnormalities occurred at +3 G_z even at the highest work load An increase in the work load from 600 to 900 kpm /min at +3 G_z caused leveling off of oxygen uptake and rise of arterial lactate in two subjects and, in another inability to complete the work because of exhaustion It is concluded that during leg exercise with increasing work loads on the bicycle ergometer while in the sitting position at +3 G_z the oxygen transport to working muscles is limited primarily by disturbances in the pulmonary gas exchange the exaggerated hydrostatic pressure differences in this condition present a greater handicap to the pulmonary than the systemic circulation

A69-80236
CARDIORESPIRATORY CHANGES IN COLLEGE WOMEN DUE TO A SEASON OF COMPETITIVE BASKETBALL

Wayne E Sinning and Marlene J Adrian (Springfield Coll Mass)
Journal of Applied Physiology vol 25 Dec 1968 p 720–724 15 refs
Springfield Coll Fac supported research

Seven members of a women s collegiate basketball team and eight women not competing in interschool athletics were tested at the beginning and end of the season for maximal oxygen uptake (V_{02}) submaximal exercise V_{02} maximal exercise ventilation submaximal ventilation maximal heart rate submaximal exercise heart rate systolic diastolic and pulse pressure after maximal exercise forced vital capacity forced expiratory volume at 0 5 and 1 0 sec percent forced vital capacity expired at 0 5 and 1 0 sec , maximal voluntary ventilation at 80 respiratory cycles per min and hemoglobin Team members participated in 25 organized practices and seven games over a 66-day period Only maximal V_{02} for basketball group showed a significant change an increase from 34 4 to 38 8 ml /kg per min Participation in basketball led to an improved cardiorespiratory function as measured by the maximal V_{02} but selected pulmonary and cardiovascular measurements showed no concomitant improvement Comparison of these results with results from other studies indicated the basketball participants had not approached their potential physical condition

A69-80237
ORGAN LACTIC DEHYDROGENASE IN ALTITUDE-ACCLIMATIZED RATS

A T Miller Jr and D M Hale (N C U School of Med Dept of Physiol Chapel Hill)
Journal of Applied Physiology vol 25 Dec 1968 p 725–728 10 refs
Contracts DA-49-193-MD-2371 and AF 41(609)-3125

Continuous exposure of adult male albino rats to a simulated altitude of 18 000 ft for two to four mo had no effect on the lactic dehydrogenase activity or isozyme pattern of brain heart, liver diaphragm and gastrocnemius muscle Daily injections of lactate or pyruvate in doses sufficient to raise their concentration in body water above the highest reported in exercising ischemic muscle were likewise without effect on the activity and isozyme pattern of the enzyme It is concluded that changes in lactic dehydrogenase play no role in the process of altitude acclimatization in the albino rat

A69-80238
EXPERIMENTAL HYPOXIC PULMONARY EDEMA IN THE RAT

Thomas F Whayne Jr and John W Severinghaus (Calif U San Francisco Med Center Cardiovascular Res Inst San Francisco)
Journal of Applied Physiology, vol 25 Dec 1968 p 729–732 15 refs
Grants PHS HE-06285 PHS 1-F2-HE-31 887 and PHS 5-K6-HE-19 412

An early form of pulmonary edema perivascular edema cuffs frequently containing red cells has been induced in young Long-Evans rats by breathing 8 0% oxygen either at rest for 45 min -three hr or during exercise for 10 min (swimming in 36° C water) Methylene blue in the swimming bath demonstrated that aspiration only occurred in animals allowed to drown Patchy atelectasis and occasional alveolar edema occurred in both the resting and exercising groups In the 20 or 23 swimming animals showing edema 43% of the vessels over 20-μ diameter were involved The possibility that high pressure causes pulmonary arterial walls to leak was tested in normal isolated rat lungs Polystyrene beads 12–35μ in diameter were infused into anesthetized rats to completely obstruct the terminal vascular bed Blood was then forced into the pulmonary artery *in vitro* at a nonpulsatile pressure of 100 mm Hg for 10 min While no flow left the open veins and the capillary pressure was presumed to be atmospheric seven of eight lungs showed perivascular edema cuffs with hemorrhage

A69-80239
EFFECT OF MUSCULAR CONTRACTION ON CHOLESTEROL OXIDATION

Manuel R Malinow Phyllis McLaughlin and Anne Perley (Ore U Med School Portland and Ore Reg Primate Res Center Dept of Cardiovascular Physiol Beaverton)
Journal of Applied Physiology vol 25 Dec 1968 p 733–735 9 refs
Grant PHS FR-00-163 and USV Pharm Corp supported research

Cholesterol-26-^{14}C was injected intravenously in adult male Sprague–Dawley rats and adult female squirrel monkeys (*Saimiri sciurea*) The animals were anesthetized and the muscles of the hindlegs were stimulated electrically under isotonic or isometric conditions the CO_2 of the expired air was collected and assayed for radioactivity Muscular contraction increased oxidation of cholesterol the increase was proportional to the rate and strength of stimulation but no differences between isotonic and isometric contractions were apparent

A69-80240
NORMAL DISTRIBUTION OF CARDIAC OUTPUT IN THE UNANESTHETIZED, RESTRAINED RHESUS MONKEY
Ralph P Forsyth Alan S Nies Felix Wyler John Neutze and Kenneth L Melmon (Calif U San Francisco Med Center, Div of Clin Pharmacol and Cardiovascular Res Inst Depts of Med and Pharmacol San Francisco)
Journal of Applied Physiology vol 25 Dec 1968 p 736–741 16 refs
Grants PHS HE-06285 PHS HE-5251 PHS HE-09964 PHS GM 01791 and PHS 1-K3-HE-12 974-03

The distribution of blood-borne radioactively labeled microspheres injected into the left ventricle of the heart was used to calculate the distribution of cardiac output in 19 unanesthetized male rhesus monkeys restrained in primate chairs Thirteen of these monkeys were sitting upright six had been tilted to a supine position an hour before the experiment began Highest blood flow per 100 g tissue in both groups was to the kidney and then (in decreasing order) to the heart spleen and pancreas The supine animals had significantly higher blood flows to the skin and kidney Microsphere injections did not affect the circulatory variables studied and minimal numbers of spheres escaped the systemic microcirculation to enter the lungs vena cava or portal veins In two other monkeys regional flow was determined after two additional injections with different nuclide labels 1 and 24 hr after the first flow to most major organs remained within ± 16% of the base-line measurement

A69-80241
HEAT-INDUCED HYPERVENTILATION
Ralph Gaudio Jr and Neil Abramson (Aerospace Med Res Labs Wright-Patterson AFB Ohio)
Journal of Applied Physiology vol 25 Dec 1968 p 742–746 23 refs

Ten healthy male subjects were exposed seated and at rest to 54°C DB-40°C WB to the limit of their endurance (25–56 min) On another occasion each man was exposed for an equal time to 27° C DB-17°C WB Minute volume (V_E) respiratory rate (f) heart rate (HR) rectal skin and body (T_b) temperatures were measured before during and after exposure Venous blood was drawn immediately before and after for pH P_{CO_2} and lactic acid Tidal volume (V_T) was calculated from V_E and f During heat exposure mean HR rose 64 beats/min and mean T_b rose 3°C Mean V_E and V_T rose steadily and were significantly ($P < 05$) elevated over corresponding cool values throughout the exposure period while f increased only slightly In the heat mean P_{CO_2} fell (44 ± 3–33 ± 4 mm Hg) and mean pH rose (7 383 ± 017 7 461 ± 037) significantly ($P < 005$) lactic acid rose significantly (P 01) from 1 22 ± 0 24 to 1 60 ± 0 45 mm /l These results demonstrate that heat-induced hyperventilation develops rapidly when thermal equilibrium is impossible and that the V_E rise is due to increases in V_T Lactic acid increases are probably related to hypocapnia

A69-80242
PREDICTION OF BODY DENSITY FROM SKIN-FOLD AND GIRTH MEASUREMENTS OF 17-YEAR-OLD BOYS
Ernest D Michael Jr and Frank I Katch (Calif U Dept of Phys Educ Santa Barbara)
Journal of Applied Physiology, vol 25 Dec 1968 p 747–750 25 refs
Grant UC 152 1967–68

The body density of 48 Caucasian high school boys age 17 was determined by the underwater weighing method Six subcutaneous skin-fold fat and 11 circumferential girth measurements were taken on the subjects The mean body density was 1 074 g /ml (SD ± 0 018) which corresponded to 11 3% by weight of fat The correlation between mean body density and iliac skin-fold thickness resulted in a correlation coefficient of 0 86 When iliac and chest skin folds were combined in a stepwise regression analysis the correlation between density and skin folds was 0 88 The addition of thigh and buttock girths increased the coefficient to 0 89 The range of r between density and 11 circumferential girths was 0 17–0 73 The predictability of body density and percent body fat of 17-yr -old boys was not improved when girth measurements were added to the regression formula with skin-fold measurements

A69-80243
CONTINUOUS ANALOG COMPUTER ANALYSIS OF VENTRICULAR PERFORMANCE
Donald O Nutter and Jack D Capehart (Aerospace Med Res Labs Environ Med Div and Aeron Systems Div Analog Computation Div Wright-Patterson AFB Ohio)
Journal of Applied Physiology vol 25 Dec 1968 p 775–782 7 refs

An analog computer program for the continuous derivation of ventricular function data from pressure flow and dimension signals is presented The program includes circuits for (1) digital logic control and counting (2) integration differentiation and peak detection of physiological curves (3) averaging of derived functions and (4) production of analog voltage envelopes representing time intervals or peak amplitudes Computed functions include derivatives of pressure and flow power curves ventricular and ejected volumes ventricular wall tension and circumferential fiber velocity

A69-80244
INDIRECT MEASUREMENT OF ARTERIAL BLOOD PRESSURE BY DOPPLER ULTRASONIC SPHYGMOMANOMETRY
H F Stegall M B Kardon and W T Kemmerer (USAF School of Aerospace Med Biodyn Branch Brooks AFB Tex and Aerospace Med Lab (Clin) Gen Surg Serv Lackland AFB Tex)
Journal of Applied Physiology, vol 25 Dec 1968 p 793–798 10 refs
USAF supported research

Accurate sphygmomanometry in shock in infants or in high noise environments is not ordinarily feasible but if an ultrasonic Doppler-shift sensor is substituted for the usual stethoscope the detection of systolic and diastolic end-points becomes relatively easy In normotensive subjects Doppler-shift sphygmomanometry appears to be slightly more accurate than the conventional Korotkoff method and is sufficiently similar in application that little retraining of hospital personnel is necessary The device is used to detect motion of arterial walls under a cuff it is lightweight pocket-portable and relatively inexpensive

A69-80245
COMPARISON OF ELASTICITY OF AN ARTERY IN VIVO AND IN EXCISION
J S Lee W G Frasher and Y C Fung (Calif U Dept of AMES (Bioeng) San Diego La Jolla and Southern Calif U Cardiovascular Res Lab Los Angeles)
Journal of Applied Physiology, vol 25 Dec 1968 p 799–801 5 refs
Grants AF-AFOSR-1186-67 and PHS HE-11152

A simple method of measuring the elasticity of an artery is presented A segment of an artery was anchored at two ends and plucked at the middle in the manner of a slingshot The force of plucking and the deflection of the midpoint were measured The results show that the effect of cutting an artery on its elasticity is small

A69-80246
IS THERE A MOTOR-CONSTANCY MECHANISM?
D Legge and Judith M Pottinger (London U U Coll Dept of Psychol Great Britain)
British Journal of Psychology, vol 59 Nov 1968 p 349–359
12 refs
Med Res Council supported research

Two experiments were conducted to investigate the extent to which subjects can compensate for the effects of elbow angle on the mechanical efficiency of the elbow muscle-joint system Subjects were found to be able to match movements made in different directions and made from different starting-points but unable to match isometrically produced torques made under comparable conditions The results are compatible with the hypothesis that subjects possess a limited motor-constancy mechanism operating on the basis of temporal modulation of muscle activity

A69-80247
THE ILLUSIONS AND GANZ'S THEORY OF CONTOUR DISPLACEMENTS
H L Wagner (South Wales and Monmouthshire U Coll Dept of Psychol Cardiff Great Britain)
British Journal of Psychology vol 59 Nov 1968 p 361–367
20 refs
Soc Sci Res Council supported research

Ganz s theory of contour displacements is summarized and it is pointed out that its success or failure in explaining the illusions depends upon establishing the identity of the illusions and figural after-effects Evidence is quoted which casts doubt on Ganz s claims for such an identity Moreover it is shown that predictions from Ganz s theory about some common illusions do not correspond with observed phenomena

A69-80248
AN EXPERIMENTAL AND THEORETICAL APPRAISAL OF THE INAPPROPRIATE SIZE-DEPTH THEORIES OF ILLUSIONS
Gerald H Fisher (Newcastle upon Tyne U Dept of Psychol Great Britain)
British Journal of Psychology, vol 59 Nov 1968 p 373–383
24 refs

Many explanations have been proposed to account for the distortions evident in illusions Important examples of these suggest that the apparent size of a stimulus is determined by its apparent distance The Muller–Lyer figure is frequently used to illustrate this principle Problems are raised which make it difficult to explain the illusion in this way Figures embodying depth features similar to those in the Muller–Lyer illusion are illustrated These may be seen in depth and they will reverse in aspect also If the inappropriate size-depth theories are valid, illusory distortions should be seen in them The apparent lengths of lines bounded by arrowheads are measured they are inconsistent with the outcome expected if their sizes were determined from their apparent locations in depth Detailed consideration is given to the implications of the findings for the inappropriate size-depth theories Particular reference is made to the perspective carpentered environment and size-constancy theories It is concluded that these theories fail to explain why illusions appear in two-dimensional figures

A69-80249
RELATIONS BETWEEN MOTION SICKNESS SUSCEPTIBILITY, THE SPIRAL AFTER-EFFECT AND LOUDNESS ESTIMATION
J T Reason (Leicester U , Dept of Psychol Great Britain)
British Journal of Psychology vol 59 Nov 1968 p 385–393
15 refs
Min of Defence (Air) supported research

This paper reports two experiments designed to elucidate those sensory characteristics which influence motion sickness susceptibility In the first a positive and significant correlation was obtained between the score derived from a biographical motion sickness questionnaire (MSQ) and the rate at which spiral after-effect persistence increased as a logarithmic function of the induction period (SAE slope score) A positive but insignificant relation was also found between the MSQ score and the slope of the sensation cupulogram The second experiment revealed a significant concordance between the MSQ score the SAE slope score and the slope of the psychophysical function describing individual loudness estimates of a 1 000 c p s tone The notion of receptivity was advanced to account for these findings

A69-80250
PHENOMENAL SIMULTANEITY AND THE PERCEPTUAL MOMENT HYPOTHESIS
D A Allport (Aberdeen U Dept of Psychol , Great Britain)
British Journal of Psychology, vol 59, Nov 1968 p 395–406
35 refs
Sci Res Council supported research

Successive brief visual stimuli falling within a critical time interval are phenomenally simultaneous This paper examines two models of perceptual sampling which purport to account for phenomenal simultaneity The first is Stroud's (1955) theory that the sensory input is quantized into successive discrete summation periods or moments (the Discrete Moment Hypothesis) An alternative model which has not generally been considered represents the moment as a continuous running sample of the input (the Travelling Moment Hypothesis) Two experiments on phenomenal simultaneity are reported which provide a critical test between these two hypotheses The results were entirely incompatible with the discrete moment model which is therefore rejected The travelling moment model accounted well for the results These also suggest a possible relation between the limits of phenomenal simultaneity and the critical duration of brightness summation

A69-80251
TWO-FLASH FUSION THRESHOLD THE INFLUENCE OF AGE, PSYCHOPHYSICAL METHOD, INSTRUCTIONS, VIEWING CONDITIONS, SEX AND SUBJECT VARIABILITY
L A Pearson and J E Tong (Auckland U Dept of Psychol , New Zealand)
British Journal of Psychology, vol 59 Nov 1968 p 407–414
12 refs

In a series of studies with normals concerned with the time interval required for two successive light flashes to be perceived as one flash (TFF threshold) it was found that age and psychophysical method are related significantly to the TFF score binocular viewing requires a shorter inter-flash interval for fusion than monocular viewing handedness has no significant relation to monocular score, sex and instructions are not significant variables but results suggest the importance of strict experimental control Age is also related to vacillation around the fusion point The data indicate that theoretical excursions with the psychopathology of TFF could be premature

A69-80252
ON THE RELATIVE EFFECTS OF DIFFERENT SOURCES OF VARIATION IN DICHOTIC LISTENING PERFORMANCE
James Inglis (Queen s U Dept of Psychol Kingston, Ontario, Canada)
British Journal of Psychology vol 59 Nov 1968 p 415–422
40 refs
Grants PHS HD02250 OMHF 25 and OMHF 59

Among the many possible sources of variation in dichotic listening performance, two in particular have been accorded considerable theoretical importance The influence of order effect has usually been regarded as an index of the functioning of some short-term storage process The influence of ear asymmetry has commonly been taken to reflect perceptual functioning Most published studies have examined only one or other of these influences, so that they have even come to be viewed as alternative explanations of differential accuracy in dichotic listening performance It is contended here that these alternatives are not in fact mutually exclusive but merely define different sources of variation in the phenomena studies A number of different comparisons must be made before the relative importance of each of these sources of variance in dichotic listening performance can be determined

A69-80253
THE EFFECTS OF ANXIETY ON THE RELATION BETWEEN REACTION TIME AND STIMULUS LIGHT INTENSITY
C G Costello (Calgary, U Dept of Psychol Canada)
British Journal of Psychology, vol 59 Nov 1968 p 437–442 13 refs
Wallace Labs supported research

A number of investigators have found that under normal conditions reaction times (RT) grow shorter with an increase in stimulus intensity Other investigators have found a flattening of the curve relating RT to stimulus light intensity and in some instances a paradoxical increase in RT at high intensities for schizophrenics subjects with independently measured weak nervous systems and subjects administered caffeine The latter findings have been interpreted in terms of the development of transmarginal inhibition consequent upon high levels of excitation having been reached The findings of the study reported here suggest that these paradoxical relations between RT and stimulus intensity do not occur in subjects classified as anxious on the basis of the Taylor Manifest Anxiety Scale They suggest that they do occur when subjects are threatened with shock for poor performance The effect, however appears to be a transitory one disappearing with repeated testing

A69-80254
AGE DIFFERENCES IN THE INTEGRATION OF PROGRESSIVELY CHANGING VISUAL PATTERNS
M Schnall (Clark U Worcester Mass)
Human Development, vol 11 no 4 1968 p 287–295 19 refs
Grant PHS HD-01931

Series of 11 discrete pictures depicting intermittent steps in progressive changes of position and size of figures were shown to 80 subjects aged 7, 9 11 and 18 yr A Geometric and a Concrete version of the stimuli were used Each series was shown to one of two equated sub-groups within each age group The subject gave verbal descriptions after viewing the series Subordinate (integrative) descriptions involving the use of active verbs were distinguished from descriptions of discrete states Integration increased with age and was greater for the Concrete than Geometric series Only college-age subjects spontaneously mentioned causal relations between objects Findings are discussed in terms of developmental changes in availability and flexibility of integrative concepts

A69-80255
AUDITORY EVOKED RESPONSES
Gastone G Celesia (Wis U , Med Center Dept of Neurol and Veterans Admin Hosp , Madison)
Archives of Neurology, vol 19, Oct 1968 p 430–437 19 refs
Grant PHS NB 03360 and NIH supported research

Average evoked potentials to auditory stimulation were recorded from the cortex of cats Responses were obtained from every cortical region explored Responses from the auditory cortical areas proved to have a specific morphology which permitted their differentiation from volume conducted events In animals with chronically implanted electrodes simultaneous recordings of auditory responses from the scalp and the cortex was carried out In alert animals the evoked potentials obtained from the scalp did not correlate with cortical responses During light sleep barbiturate and deep chloralose anesthesia and extracranial response clearly reflected potentials originated from the cortex Relevance of these findings to human auditory evoked responses is discussed

A69-80256
VARIABILITY OF NERVE CONDUCTION VELOCITY DETERMINATIONS IN NORMAL PERSONS
Joseph C Honet (Wayne State U , Dept of Phys Med and Rehabil Detroit Mich), Robert H Jebsen and Edward B Perrin (Wash , U School of Med Dept of Phys Med and Rehabil Seattle)
Archives of Physical Medicine and Rehabilitation vol 49 Nov 1968 p 650–654 10 refs
Grant VRA RT-3

In normal healthy persons nerve conduction velocities determined serially over different time intervals with and without removing the electrodes revealed an increasing variability in the difference between the observations before and after the interval as the length of the interval was increased For a single nerve there was a maximum standard deviation of 5 8 M /sec or a coefficient of variation of about 10% at intervals of greater than one wk A comparison of this standard deviation with those determined from repeated blind observations on the same photograph by the same reader (2 0 to 3 0 M /sec) suggested that the variations observed clinically are due to errors of nonrepeatability in film reading and to errors in distance measurement as well as to possible biologic variability By combining the conduction velocities of several nerves for study at one sitting the standard deviation of the difference between paired observations can be reduced to a maximum of 3 3 M /sec for normal persons thereby illustrating the probable usefulness of this procedure in clinical efforts to measure the effects of disease or treatment in individual patients

A69-80257
MUSCLE SYNERGIES IN MOTOR PERFORMANCE
F Ray Finley Roy W Wirta and Kevin A Cody (Temple U Moss Rehabil Hosp , Krusen Center for Res and Eng Philadelphia Pa)
Archives of Physical Medicine and Rehabilitation, vol 49 Nov 1968 p 655–660
Am Congr of Rehabil Med , 45th Ann Session Miami Beach Aug 30, 1967
Contract Nonr 4292(00) and Grant VRA RD-2169-M

Previous myocoder-computer studies have described myoelectric patterns under conditions of variable load and position The present studies were conducted to determine the effect of practice of a specific motor activity on myoelectric patterns Using specially designed equipment four subjects performed a simple positioning activity over a practice period of eight days Simultaneous myoelectric activity was recorded from six muscles of the upper extremity and performance was recorded on an oscillograph which provided data for detailed study and analysis Computer statistical analysis of the myoelectric signals and the performance data permitted comparisons between subjects as well as description of individual variation These observations have particular relevance to the design criteria for control circuits of myoelectrically controlled prostheses In addition they are pertinent as reference information when studying pathomechanics and when assessing or developing regimens for neuromuscular reeducation

A69-80258
RADIATION DAMAGE AND RADIATION PROTECTION OF THE EYE [STRAHLENSCHADIGUNG UND STRAHLENSCHUTZ AM AUGE]
W Ruther G Kowáacs K W Jacobi, E H Graul and H Neubauer (Phillips-U Inst fur Strahlenbiol and Med Isotopenanwendung Marburg/Lahn and U-Augenklin Cologne West Germany)
Wehrmedizin vol 6 no 5/6 1968 p 72–76 50 refs In German

The lens has a special position as regards radiation damage It is the most radiosensitive part of the eye Cloudiness once incurred is irreversible and may necessitate, depending upon the degree of severity surgical removal of the cataract Neutrons are more effective than all other forms of radiation so far as the production of cataracts is concerned It is possible to draw suitable conclusions regarding effective protection against radiation from a knowledge of the source and type of radiation and of the biological changes It is possible to achieve such protection by mechanical screening and by biological-chemical compounds A number of appropriate mechanical screening methods are described for each type of radiation The eye may also be protected from radiation damage by the use of biological-chemical radioprotective compounds The protective effect covers the time of development and the intensity of lenticular opacities and also the degree of maturity of the cataract It is possible to diminish keratitis conjuctivitis and alopecia caused by radiation

A69-80259
EFFECTS OF CHLORPROMAZINE ON MOTOR REFLEXES OF THE CHRONIC SPINAL CAT
R D Hudson (Brown U Div of Biol and Med Sci Providence R I)
Archives Internationales Pharmacodynamie et de Thérapie vol 124 Aug 1968 p 442–450 14 refs
Grant PHS MH-13525

The effects of chlorpromazine (CPZ) were tested upon spinal motor reflex mechanisms in the chronic low spinal (T6) and chronic hemisectioned spinal (T10) cat Animals were used 10 to 13 days following spinal cord section Doses of CPZ (1 to 32 mg/kg) administered intravenously in the low spinal (T6) animal produced no significant effect on the basal patellar reflex On the other hand facilitation and inhibition of the patellar reflex produced by direct electrical stimulation of spinal cord segment T7 were significantly depressed The contralateral patellar reflex in animals with a chronic hemisectioned spinal cord (T10) was depressed by doses of CPZ (1 to 16 mg/kg) while the ipsilateral reflex was resistant to all doses administered Evidence is cited confirming the necessity of an intact neuroaxis for the observation of myotatic reflex depression by CPZ However certain other spinal reflexes are illustrated which are depressed by CPZ in the presence of chronic spinal cord transection

A69-80260
INFLUENCE OF AN ANTIBACTERIAL SOAP ON VARIOUS EFFLUENTS FROM AXILLAE
A Dravnieks B K Krotoszynski (IIT Res Inst Olfactronics and Odor Sci Center Chicago Ill) W E Lieb and E Jungermann (Armour Grocery Prod Co Res and Develop Dept Chicago Ill)
Journal of the Society of Cosmetic Chemists vol 19 Aug 19 1968 p 611–626 7 refs

The effects of an antibacterial soap on the density of axillary bacterial population primary and secondary odor intensity and water production were investigated over a period of several weeks on four subjects kept on a controlled skin-care regime The soap contained 0 75% hexachlorophene and 0 75% 3 4 4 trichlorocarbanilide The antibacterial soap significantly depressed the bacterial population and the odor intensities from both sources The soap had no systematic influence on the rate of water production A thesis was advanced to explain the origin of odor and the factors controlling its intensity Novel techniques were used to collect axillary effluents and to measure odor intensity from gas chromatographically-resolved primary vapors

A69-80261
YOM KIPPUR, AIR FRANCE, DORMITORY FOOD, AND THE EATING BEHAVIOR OF OBESE AND NORMAL PERSONS
Ronald Goldman, Melvyn Jaffa, and Stanley Schachter (Columbia U New York N Y)
Journal of Personality and Social Psychology, vol 10 Oct 1968 p 117–123 10 refs
Grant NSF GS732

Three field studies designed to test the generalizability of experimental findings on the eating behavior of obese and normal subjects are presented These studies examine the relationship of weight deviation to fasting on Yom Kippur toleration of institutional food and adjustment to time-zone changes Conforming to laboratory-generated expectations, fat Jews prove to be more likely to fast on Yom Kippur, fat students to be more intolerant of dormitory food and fat fliers to more easily adjust to time-zone changes than do their normal counterparts

A69-80262
A COMPARATIVE STUDY OF THE INHIBITORY ACTION ON THE OXYGEN-EVOLUTION SYSTEM OF VARIOUS CHEMICAL AND PHYSICAL TREATMENTS OF *EUGLENA* CHLOROPLASTS
Sakae Katoh (Tokyo U Fac of Sci Dept of Biophysics and Biochem, Japan) and Anthony San Pietro (Charles F Kettering Res Lab Yellow Springs Ohio)
Archives of Biochemistry and Biophysics vol 128 Nov 1968 p 378–386 25 refs
Grant NIH GM-10129

As a means to evaluate the various chemical and physical treatments known to inhibit preferentially the oxygen evolution system of chloroplasts *Euglena* chloroplasts were inactivated by these treatments and then examined for the presence of an ascorbate-supported and DCMU- or atrazine-sensitive photoreduction of NADP This activity was observed with heat-inactivated chloroplasts from *Euglena* Chloroplasts whose Hill activity was abolished completely by incubation at acidic pH or by aging showed a significant rate of NADP photoreduction on addition of ascorbate alone the photoreduction was sensitive to poisons, such as DCMU and atrazine Along with the inhibition of oxygen evolution capacity the activities which involved only photosystem I were also impaired to some extent by the treatments Ascorbate was markedly effective in restoring the photoreduction activity of NADP with the chloroplasts which were inactivated by incubation at alkaline pH or treatment with detergents However the ascorbate-supported NADP photoreduction by these inactivated chloroplasts was not sensitive to the poisons On the other hand, an apparent activation of the activities which involved only photosystem I suggested that these treatments caused some structural modification around photosystem I There was no significant reactivation of NADP photoreduction by ascorbate with chloroplasts inactivated by irradiation with ultraviolet light or treatment with linolenic acid The mechanisms of inactivation of the Hill reaction by these treatments must be different from those involved in the treatments mentioned above The possibility that inactivation caused by heat-treatment was due to free fatty acid which was released by the action of a heat-activated lipase was ruled out by a comparative study of the effect of ascorbate and serum albumin on NADP photoreduction by the heated and linolenic acid-treated chloroplasts

A69-80263
REEVALUATION OF OXIDATIVE PHOSPHORYLATION IN CARDIAC MITOCHONDRIA FROM NORMAL ANIMALS AND ANIMALS IN HEART FAILURE

George E Lindenmayer Louis A Sordahl and Arnold Schwartz (Baylor U Coll of Med Dept of Pharmacol, Houston, Tex)

Circulation Research vol 23 Sep 1968, p 439–450 39 refs
Grants PHS HE 07906-06 PHS HE 05435-08P8 PHS GM 00670-07 PHS K_3HE 11 875-04, Tex and Houston Heart Assns supported research

For an adequate evaluation of mitochondria from diseased hearts basic characteristics of isolation storage media ultrastructure and type of assay were first determined using mitochondria from normal animals A proteinase procedure yielded mitochondria from small laboratory animals with low respiratory control and marked permeability changes The isolation medium yielding the most stable mitochondria with the highest respiratory control contained 0 18M KCl 10mM EDTA, and 0 5% to 1% bovine serum albumin at pH 7 2 Heart failure in guinea pigs and rabbits was produced by varying degrees of stenosis of the ascending aorta An aberration in respiratory control was found in mitochondria from hearts in severe failure The quantitative differences between normal and experimental respiratory control values were greatest when the highest possible normal respiratory control levels were obtained The difference between mitochondria prepared by a proteinase method from control and failing hearts was minimal No changes in oxidative phosphorylation were noted in mitochondria from hearts arrested by nitrogen suggesting that acute hypoxia does not irreversibly damage energy-liberating reactions It is concluded that severe heart failure is characterized by defects in mitochondrial oxidative phosphorylation, and that techniques of isolation or assay or both are probably not causing the abnormalities

A69-80264
THE EVALUATION OF THE CARDIOPULMONARY PATIENT FOR AIR TRAVEL

Robert B Stonehill and Raymond M Murray (Ind U, School of Med, Indianapolis)

Journal of the Indiana State Medical Association vol 61 Nov 1968 p 1531–1534

With the increasing popularity of air travel, more and more ambulatory cardiopulmonary patients are going to ask their physicians for advice concerning commercial flying An informed opinion can be made of the patient s ability to utilize this means of transportation, utilizing technics and procedures readily available in office practice The physician may determine that special considerations will be required to aid in the safety of his patient such as supplemental oxygen special diets or aid in the ticketing and boarding procedures These requirements should be made known to the airline, well in advance of the proposed trip Cooperation in this respect from the airlines has generally been excellent

A69-80265
RESPONSE OF PLASMA INSULIN AND GROWTH HORMONE TO CARBOHYDRATE AND PROTEIN FEEDING

Johanna A Pallotta and Patricia J Kennedy (Veterans Admin Hosp, Radioisotope Serv Bronx N Y)

Metabolism, vol 17 Oct 1968 p 901–908 18 refs

Twelve male patients were fed diets of glucose protein starch and combinations of protein with either glucose or starch Protein was a weak stimulus to insulin production compared to carbohydrate which is a powerful insulin secretagogue Combination feedings led to a synergistic effect on insulin secretion Protein caused a greater plasma insulin response in the two patients with maturity-onset diabetes than it did in non-diabetic subjects Protein feeding led to a rise in plasma human growth hormone (HGH) at the second to the fourth hr After glucose or starch there was a rise in plasma HGH at the fourth to fifth hr following an initial suppression HGH responses were blunted when combinations of carbohydrate and protein were fed These interrelationships are discussed

A69-80266
EFFECTS OF COFFEE INGESTION ON ORAL GLUCOSE TOLERANCE CURVES IN NORMAL HUMAN SUBJECTS

Leonard J Feinberg Herschel Sandberg, Oscar De Castro and Samuel Bellet (Philadelphia Gen Hosp, Div of Cardiol Pa)

Metabolism, vol 17, Oct 1968 p 916–922 41 refs
Grant NIH HE 5165-11 and Sugar Res Found supported research

Oral glucose tolerance tests were performed on 23 normal subjects and then repeated one wk later On one occasion the test meal consisted of glucose dissolved in water and flavored with lemon juice, on the other occasion five gm of instant coffee were also added to the meal The order of administration of the respective meals was randomized Serial blood samples were obtained and analyzed for blood glucose concentration serum free fatty acid levels and the serum immunoreactive insulin values Paired comparisons of the data were made and the following results were obtained (1) the subjects ingesting coffee plus glucose had significantly lower blood glucose levels 30 and 60 min postprandium than those consuming the glucose solution without coffee, (2) three hr after ingestion of the test meal the free fatty acid levels of the subjects receiving coffee with glucose were significantly higher than those receiving glucose without coffee and (3) no statistically significant differences between the two groups were found at any time period for the serum immunoreactive insulin levels It is possible that coffee ingestion reduced the peak posprandial blood glucose levels by mobilizing a hormone from the gastrointestinal tract such as secretin, pancreozymin or the newly discovered substance with glucagon-like immunoreactivity described by previous investigators

A69-80267
COLOR GENERALIZATION IN CAT FOLLOWING DISCRIMINATION TRAINING ON ACHROMATIC INTENSITY AND ON WAVELENGTH

Nancy K Mello (NIMH Natl Center for Prevent and Control of Alcoholism Chevy Chase, Md)

Neuropsychologia vol 6, Dec 1968 p 341–354 29 refs
Grant AFOSR 544-64

Cats learned to discriminate between two wavelengths of comparable intensities [(S+) 450 mμ vs (S–) 550 mμ] in fewer training sessions than were previously required to learn a discrimination between two achromatic intensities [(S+) 1 5 vs (S–) 2 5 ND] in an identical training situation (chain DRO VI 1) Postdiscrimination generalization gradients to eight wavelengths and to seven greys indicated that a comparable degree of stimulus control was achieved for each visual stimulus dimension These findings confirm and extend previous data concerning the color discrimination capacity of cats However, it appears that cats require explicit discrimination training on the dimension of wavelength in order for color to produce consistent control of responding during generalization tests Following discrimination training on only achromatic intensity generalization tests with novel color stimuli (of a source intensity comparable to the achromatic stimuli) showed some response control by intensity Following reinforcement of responses to a single wavelength [(S+) 450 mμ] only one cat s performance suggested stimulus control by wavelength during generalization tests with eight colors of comparable physical intensity

Generalization gradients to wavelengths of unequal intensities seemed to be based on the dimension of relative brightness as inferred from comparison of these gradients with electrophysiological data on the photopic spectral sensitivity of cat rather than on the basis of relative physical intensity Until cats were trained to discriminate between two wavelengths, color appeared to be an irrelevant dimension in comparison with intensity

A69-80268
EVOKED REISTANCE SHIFTS IN UNANESTHETIZED CATS
Robert Galambos and Ricardo Velluti (Yale U , Dept of Psychol New Haven, Conn)
Experimental Neurology, vol 22, Oct 1968 p 243–252
NASA Grant NSG-374 Grants PHS TW-1009 and PHS GM-1106

A new phenomenon the evoked resistance shift (ERS) that is time-locked to the sensory evoked potential (EP) was studied in cats with chronically implanted electrodes The ERS disappeared at nearly all cerebellar vermis and cerebral cortical electrode sites shortly after implantation but persisted for times up to several months at subcortical nuclei In the auditory system the ERS magnitude and capacity for functional recovery (response to increased stimulus repetition rate) varied, being smallest at medical geniculate and largest at medullary nuclei (cochlear nucleus superior olive) Barbiturate anesthesia failed to alter the subcortical ERS after auditory or visual stimulation The data demonstrate that brain regions differ in respect to ERS size stability, sensitivity to drugs and trauma and capacity for functional recovery They also show that the events responsible for the electrical EP are not identical with those responsible for the ERS

A69-80269
DETERMINATION OF TOTAL BODY WATER BY DEUTERIUM OXIDE DILUTION AND CRYOSCOPY
G C Walsh, B M Carruthers, M Seraglia, and Marlene Olson (Shaughnessy Hosp , Dept of Med and Clin Invest Unit, Vancouver, Brit Columbia, Canada)
Journal of Laboratory and Clinical Medicine vol 72, Nov 1968 p 836–841 11 refs
G D Searle and Co of Canada Ltd supported research

Total body water was determined in human subjects by administering deuterium oxide (D_2O) orally as the tracer substance and after equilibrium had occurred determining the dilution of the tracer by measuring the change in freezing point of the serum water with a sensitive osmometer Error from variations in base-line readings of the cryoscope were minimized by straddling the serum sample with a control of double distilled water The administration of D_2O orally rather than intravenously did not appear to add another variable in the determination of total body water Variation in total body water in nine subjects considered to be normal in respect to fluid and electrolyte balance over a period of three to six wk was determined

A69-80270
ON THE SIGNIFICANCE OF HEART FREQUENCY, BODY TEMPERATURE AND SWEAT LOSS OF HUMANS DURING HEAT WORK AS CRITERIA FOR EVALUATION OF LOAD LEVEL [UBER DIE BEDEUTUNG VON HERZFREQUENZ, KORPERTEMPERATUR UND SCHWEISSABGABE DES MENSCHEN BEI HITZEARBEIT', ALS KRITERIEN ZUR BEURTEILUNG DER BELASTRUNGSHOHE]
H G Wenzel (Max-Planck-Inst fur Arbeitsphysiol , Dortmund West Germany)
Arbeitsmedizin Sozialmedizin Arbeitshygiene vol 3, Mar 1968 p 76–80 39 refs In German

The stress of working in heat was evaluated in humans by several methods It was not clear however how well suited the selected various load criteria were for such evaluations During 97 multi-hour experiments in a climatic chamber, heart frequency sweat loss and body temperatures were measured in naked men who performed differential heavy work at various combinations of environmental temperature and humidity This partly caused a compensation of the heat balance in the body and a continuous heat accumulation The characterized limitations between groups of climatic conditions were investigated through whether or not one or more of the investigated physiological values reached the determined values The rectal temperature the average skin temperature and the pulse frequency of subjects were adjusted in the process of work in the climatic limitations of values which were independent of the climatic composition during given work However they were dependent on the severity of performed work The sweat loss of subjects differed also at the given work load of the climatic limitation after relevant combinations of environmental temperature and humitidy Under the conditions of the experiment the values of sweat loss were consequently regarded as no definite indication of differential thermal stress with or without continuous heat accumulation during the height of the pulse frequency and the mentioned body temperature of such a differentiation during all investigated climatic conditions as long as the severity of the work was considered

A69-80271
EFFECT OF CYSTEAMINE AND OTHER CHEMICAL RADIOPROTECTORS ON CHEMOLYSINE FORMATION OF IMMUNOCOMPETENT CELLS
T Soumerska (Min of Public Health Sofia Bulgaria)
Doklady Bolgarskoi Akademii Nauk, vol 20 no 10 1967 p 1113–1116 8 refs

The effect of the antiradiation cystamine gamma-isothiuronium butyramidine, and serotonin-creatinine on the immunological response was studied in mice One group of animals received single doses of antiradiation drugs simultaneously with intravenous injection of an erythrocytic suspension another group received a daily dose of radioprotectors Single doses of the drugs produced no effect on the degree and quality of the immune response Repeated administration of cystamine reduced the intensity of the immune response but when the amount of hemolysin producing cells was correlated with the average weight of the spleens of the sub-test group the maximum was proved to be higher in the animals treated with cystamine It could be assumed that the effect of cystamine in animals subjected to primary antigen injection stimulated proliferation of spleen cells

A69-80272
THE ROLE OF NORMAL FLORA IN NATURAL RESISTANCE TO B-STREPTOCOCCAL INFECTION IN CHILDREN
Nancy E Lattimore (Fla U Coll of Med , Gainesville)
Journal of the Florida Medical Association, vol 55 May 1968, p 427–430

The bacterial interference phenomenon was investigated among the normal flora of the human throat with the Group A, Beta-hemolytic streptococcus (B-strep) as the pathogen target The normal flora of the throats of healthy children as well as those with upper tract symptoms was quantitatively and qualitatively compared The normal flora in the healthy children was not found to be quantitatively different from that of the test population Data showed that alpha inhibitory activity was less frequently seen in children who harbored B-strep than in the control group which did not harbor the pathogen Further studies are necessary to confirm these findings

A69-80273
USE OF THE IODINE AZIDE TEST IN OCCUPATIONAL HEALTH [KORISCENJE JODAZIDNOG TESTA UGLJEN DISULFIDA U HIGIJENI I MEDICINI RADA]
D Durić Ljubica Graovac-Leposavić and I Rezman (Dragomir Karajović Inst of Occupational Med and Radiol Protect Beograd Yugoslavia)
Arhiv za Higijenu Rada i Toksikologiju vol 19 no 2 1968 p 245–250 16 refs In Slovak

The validity of the iodine azide test as an exposure test for carbon disulphide was studied in various departments of the viscose rayon factory at Loznica The results obtained showed that this is an excellent test of exposure to the CS_2 concentrations above MAC values During these investigations the phenomenon of recovery and non-recovery in exposed workers was observed, and after studies of several years it was concluded that the appearance on non-recovery represents an early sign of poisoning which precedes by a few months the clinical symptoms of intoxication This simple test was also applied in the department with a relatively high hazard for the evaluation of the efficacy of respirators and the A type filters The capacity of the filters was tested in relation to CS_2 concentration humidity and temperature The method is simple efficient and very cheap The studies performed showed that the iodine azide test is usefully applicable in industrial hygiene sanitation and early diagnosis of CS_2 poisoning

A69-80274
HYPERBARIC OXYGEN [L'OXYGENE HYPERBARE]
P Mathe and Joly
Revue des Corps de Santé des Armées terre mer Air, vol 9 Jun 1968 p 319–332 42 refs In French

A discussion was presented on the therapeutic potentialities of hyperbaric oxygenation (HO) HO facilities physiological factors underlying its potential therapeutic use oxygen toxicity and clinical applications were discussed Practical use of HO was considered to be still at the experimental stage, and numerous unsolved problems seem to make its clinical application largely empirical Installation and operation of HO facilities were thought to be too costly and require highly trained specialized personnel, but the wide therapeutic possibilities presented by HO seemed to warrant the installation of clinical hyperbaric facilities for hospital use as well as for research needs

A69-80275
PHYSIOPATHOLOGICAL ASPECTS OF WATER IMMERSION [ASPETTI DI FISIOPATOLOGIA DELL'IMMERSIONE SUBACQUEA]
G Fradá (Palermo U Ist di Med del Lavoro Italy)
Lavoro Umano vol 20 Feb 1968 p 56–78 36 refs In Italian

A detailed review was presented on the different physiopathological aspects of underwater diving in particular breathhold diving and underwater diving with breathing devices containing air or oxygen The data reported included respiratory hematologic cardiovascular neurological and biochemical responses to underwater diving

A69-80276
HYPOTHALAMIC NEUROSECRETION UNDER REPEATED EXPOSURES TO HIGH ENVIRONMENTAL TEMPERATURES [GIPOTALAMICHESKAIA NEIROSEKRETSIIA PRI POVTORNYKH VOZDEISTVIIAKH VYSOKOI TEMPERATURY OKRUZHAIUSHCHEI SREDY]
E S Makhmudov and V A Khodzhimatov (USSR Acad of Med Sci , Uzbek Inst of Reg Med Tashkent)
Fiziologicheskii Zhurnal SSSR, vol 54 Apr 1968 p 421–425 12 refs In Russian

The data indicated that during prolonged repeated exposures of dogs to high environmental temperatures and insolation considerable changes took place in the neuroendocrine regulatory systems and the regulated processes These changes accounted for the adaptation of the organism to extreme conditions

A69-80277
CHANGES IN THE ORGANISM RESISTANCE TO EXTREME STRESS DURING LONG-TERM ACCLIMATIZATION TO HYPOXIA [IZMENENIE USTOICHIVOSTI ORGANIZMA K EKSTREMAL'NYM VOZDEISTVIIAM V PROTSESSE DLITEL'NOI AKKLIMATIZATSII K GIPOKSII]
N A Agadzhanian and A V Sergienko (Min of Health Inst of Med -Biol Problems Moscow USSR)
Fiziologicheskii Zhurnal SSSR, vol 54 Apr 1968 p 496–501 20 refs In Russian

The minimum time necessary for high altitude acclimatization was studied in rats and rabbits Long-term up to 45 days high altitude (3 200 m) acclimatization induced a sharp rise in the resistance to acute hypoxia to the combined effect of hypoxia and high temperature and to acceleration An increase in the resistance to stress was already noted on the 15th day at high altitude however resistance reached its maximum approximately on the 30th day Animals acclimatized to a simulated altitude of 1 200 m in the pressure chambers showed marked hemodynamic disturbances affecting primarily the brain vessels These findings confirmed experimental data obtained previously which showed that the minimum time for human adaptation to high altitude environments inducing a higher tolerance to stresses such as acceleration acute hypoxia high temperature and physical overloads was 26–28 days

A69-80278
BRINGING 'EM BACK ALIVE FROM SPACE
Melville Leonard and Lorena O Connor
Air Force and Space Digest vol 51 May 1968 p 62–65

The need for space rescue systems were stressed The two basic categories of rescue missions base-launched rescue and self-rescue were discussed and different proposed operational systems that would enable crew survival after spacewrecks were reviewed

A69-80279
COMPARISON OF PORTABLE AND DARK ROOM AUTOKINETIC MOVEMENT
B J Farrow John F Santos L Johnson and James R Haines (The Menninger Found Topeka Kan)
Perceptual and Motor Skills vol 27 Oct 1968 p 343–350 9 refs
Grant PHS MH 03924

A portable apparatus for producing autokinetic (AK) movement is described and compared with the standard dark room method Use of the portable apparatus results in a smaller amount and expanse of apparent movement but the test-retest reliabilities are of the same order of magnitude as in the dark room method The portable apparatus provides several advantages to the AK researcher It is easy to handle it can readily be disassembled it eliminates the ventilation and light-proofing problems inherent in achieving a totally darkened room This apparatus automatically measures the latency of onset of AK movement The importance of controlling or measuring the latency of onset of AK movement is demonstrated

A69-80280
ORDER EFFECTS IN CONCOMITANT ATTRIBUTE JUDGMENTS (SHAPE AND SIZE)
Peter K Leppmann Roy B Mefferd Jr and Betty A Wieland (Veterans Admin Hosp Psychiat and Psychosomat Res Lab Houston Tex)
Perceptual and Motor Skills vol 27 Oct 1968 p 360–362

This experiment was designed to determine whether judgment of one stimulus attribute would exert an influence on the judgment of a second attribute as a function of the relative phenomenal strength of the two attributes One group of subjects was instructed to judge the apparent shape of a Necker cube and then to judge the apparent relative size of its two faces Another group made the size-judgment first then the shape-judgment For most subjects the two judgments were not independent and were influenced by which of the attributes was judged first

A69-80281
FLUCTUATIONS IN PERCEPTUAL ORGANIZATION AND ORIENTATION AND PERCEPTION OF APPARENT MOVEMENT
Roy B Mefferd Jr (Veterans Admin Hosp Psychiat and Psychosomat Res Lab and Baylor U Coll of Med Houston Tex)
Perceptual and Motor Skills vol 27 Oct 1968 p 368–370 6 refs

Three main percepts of a static flat stimulus were reported one veridical and two with apparent internal depth but which varied in the degree of perceptual organization In one of these the entire stimulus formed a single perceptual unit which reversed perspective as a unit in a fashion similar to a Necker cube This percept elicited no reports of apparent movement but the other percept did In the latter the offset central section formed one perceptual unit that was blurred and the sharp distinct parts on either side of it formed another unit The central unit underwent figure-ground reversals while the adjacent slats of both elements changed orientation independently The changes in apparent position accompanying the latter fluctuations were often perceived as being due to movement of the central section in the frontal plane

A69-80282
PROACTION IN THE RECOVERY FROM PRACTICE UNDER VISUAL DISPLACEMENT
J R Devane (N Y State U Cortland)
Perceptual and Motor Skills vol 27 Oct 1968 p 411–416

Two experiments to test a proaction theory of recovery from visual displacement learning without apparent re-afference are presented In Exp I the recovery of subjects following two successive displacements was compared with that of subjects following one displacement The recoveries differed significantly in over-all extent but did not differ significantly in trend In Exp II the recoveries of subjects following two successive displacements in which the first would by the proaction hypothesis lead to different recoveries were significantly different both in over-all extent and in trend It is concluded that the recovery from practice under visual displacement is largely a proaction effect

A69-80283
PERFORMANCE OF SIMULATED MILITARY TASKS AT HIGH ALTITIDE
Joyce L House and Robert J T Joy (U S Army Res Inst of Environ Med Natick Mass)
Perceptual and Motor Skills vol 27 Oct 1968 p 471–481 11 refs

To determine the effects of high altitude on the ability of infantrymen to integrate a series of important psychomotor skills and physical performance tasks 23 soldier volunteers were tested on a simulated combat course at sea level and high altitude (Pike s Peak 14 110 ft) The task measured included weapon loading and firing identification of hostile objects remembering a message grenade throwing and running and simple and complex reaction time In addition the effectiveness of two drugs codeine and phenformin in reducing the adverse effects of acute exposure to high altitude was evaluated The main effect of acute exposure to 14 110 ft was on time required to complete tasks in contrast high elevation had little effect on accuracy of performance Neither codeine nor phenformin was effective in improving performance

A69-80284
APPARENT DISTANCE IN MONOCULAR SLANT AND SHAPEJUDGMENTS
A H Smith (Defence Res Estab Toronto Canada)
Perceptual and Motor Skills, vol 27 Oct 1968 p 482

Experiments are reported which investigate whether subjects would report as a change in distance a change in retinal stimulation due to slanting the distal stimulus and if so would their distance judgments be related to their judgments of slant or of shape or both In experiment I both after judging slant and shape the forms were judged more distant the more slanted they were ($P < 0.05$ one-tailed sign test for 32 of 40 pairs of angles differences not significant for eight pairs) The results of experiment II were similar ($P < 0.05$ one-tailed sign test for 27 of 40 pairs of angles differences not significant for 13 pairs) Distance judgments following slant judgments did not differ significantly from those following shape judgments ($P > 0.05$ two-tailed sign test) In both experiments the rectangle tended to be judged more distant than the triangle In only one instance however was the correlation between distance and slant or shape judgments significant

A69-80285
STABILITY AND HABITUATION OF NONSPECIFIC GSRs
Charles Kaiser and Robert Roessler (Houston U and Baylor U Coll of Med Houston Tex)
Perceptual and Motor Skills vol 27 Oct 1968 p 495–498 13 refs
NASA Grant NGR 44-003-031 Grants AF-OSR-727-65 and NIH MH6960-08

Nonspecific galvanic skin responses (GSRs) were recorded during periods of stimulation (sound and light) and resting in a group of medical and dental students Testing occurred on four occasions over a three-mo period There was significant stability of frequency over testing Habituation occurred during both light and sound stimulation periods in the first testing but not in the remaining three testings Alert subjects produced significantly more nonspecific GSRs than drowsy subjects

A69-80286
ANXIETY, STRESS AND MOTOR LEARNING
A V Carron (Saskatchewan U Saskatoon Canada) and W R Morford (Calif State Coll Hayward)
Perceptual and Motor Skills, vol 27 Oct 1968 p 507–511 14 refs

The interactive effects of stress and anxiety upon motor learning were examined One hundred and twenty subjects (60 high-anxious and 60 low-anxious) were divided into three groups Control Stress Early and Stress Late All groups were given 35 20-sec trials a day for a period of two days on the stabilometer An electric shock was administered to the two experimental groups early or late in learning The shock stressor had no effect upon the amount learned in any experimental groups The results were discussed in relation to drive theory

A69-80287
SOMATIC RESPONSES AND PERFORMANCE LEVELS DURING ANTICIPATORY PHYSICAL-THREAT STRESS
Barbara L Drinkwater M Marilyn Flint and Troy S Cleland (Calif U Santa Barbara)
Perceptual and Motor Skills, vol 27 Oct 1968 p 539–552 20 refs
Grants UC 265, UC 140, and UC 536

Twenty general aviation pilots flew a series of simulated instrument flights under stress and non-stress conditions During flight muscle action potentials from the masseter muscle and eye blink were monitored The relationship of these two measures of somatic activity to each other and to performance scores was determined on an inter- and intra-individual basis Both linear and curvilinear coefficients were computed Levels of somatic activity rose significantly from the control to stress flight Individual reliability of blink rate and intra-individual reliability of masseter activity and blink rate were significant across flights A significant curvilinear relationship was present between blink rate and masseter tension In general performance errors were fewer in those subjects with lower levels of somatic tension and during flight sectors in which masseter activity was low or moderate High error scores were found in those sectors in which blink rate was low or moderate

A69-80288
DISRUPTION EFFECTS IN HUMAN SHORT-TERM MEMORY SOME NEGATIVE FINDINGS
Walter Sloboda and Edward E Smith (St Elizabeths Hosp Behavorial and Clin Studies Res Center Washington D C)
Perceptual and Motor Skills, vol 27 Oct 1968, p 575–582 8 refs

Previous research has demonstrated that white noise disrupts human memory if it is administered with the to-be-remembered material The present experiment investigated the effects of a two sec burst of white noise on memory when it was administered during the retention interval (RI) Subjects attempted to recall seven digits after a 2- or 12-sec RI For the two-sec RI white noise was either present or absent For the 12-sec RI white noise occurred either during the first two sec the middle two sec the last two sec or not at all The results indicated that neither the temporal location nor even the presence of white noise had any effect on recall and that these negative findings could not be attributed to subjects filtering out the white noise at an autonomic or central level

A69-80289
ILLUSIONS AND PERSPECTIVE
Thomas Farrimond (Waikato U Hamilton New Zealand)
Perceptual and Motor Skills vol 27, Oct 1968 p 589–590

Some visual illusions are regarded as dependent on size-constancy or upon trends of central-tendency It is suggested that a perspective theory may still be valid if considered with an additional element involving subjects previous visual experiences

A69-80290
PERCEPTION BIBLIOGRAPHY 62 PSYCHOLOGICAL ABSTRACTS, 1942, VOLUME 16
R B Ammons and C H Ammons (Mont U Missoula)
Perceptual and Motor Skills, vol 27 Oct 1968 p 607–610 113 refs

One hundred and thirteen references to work on perception are listed alphabetically

A69-80291
EFFECTS OF STIMULUS CHARACTERISTICS ON PERCEPTION OF ANGULAR CHANGE
Brian E Schutrumpf and Alfred G Klipple (Transportation Dept U S Bur of Public Roads, Traffic Systems Div Washington D C)
Perceptual and Motor Skills vol 27 Oct 1968 p 615–618 5 refs

A study was made of the effects of four variables (stimulus dimension interstimulus interval percentage of change and direction of change) on the accuracy of judgments of size changes in visual angles Ten subjects in a darkened room reported judgments of the relative size of successive pairs of projected figures The accuracy of these judgments was affected by direction of change and percentage of change but not directly by stimulus dimension or inter-stimulus interval Significant interactions were found for stimulus dimension by direction of change direction of change by percentage of change and direction of change by interstimulus interval

A69-80292
EFFECT OF PRIOR SEEN MOTION ON SEQUENTIAL SIZE DISCRIMINATION
Thomas R Scott W Lloyd Milligan (VA Hosp Columbia S C), and Harry G Karras (S C U Columbia)
Perceptual and Motor Skills vol 27 Oct 1968 p 619–622 7 refs

The object of the experiment was to discover whether prior viewing of a rotating spiral would influence size comparison of two circles presented successively immediately after the spiral Under conditions which elicit an aftereffect of 2 00 mm /sec it was concluded that there was no appreciable effect on size comparison Findings suggest the operation of two independent processes one for spatial location (size), and one for motion

A69-80293
DIFFERENTIAL PHENOMENAL EFFECTS OF INVOLUNTARY EYE MOVEMENTS
Roy B Mefferd Jr (Veterans Admin Hosp Psychiat and Psychosomat Res Lab and Baylor U Coll of Med Houston Tex)
Perceptual and Motor Skills, vol 27 Oct 1968 p 623–626 6 refs

Fixation of a point on a flat stimulus of alternating white and black bars of different widths and indistinct boundaries yielded reports indicating complete compensation of the effects of the involuntary eye movements at the fixation point but visualization of (i e the non-compensation of) nystagmus and saccadic eye movements in the periphery The effect was greater with binocular than monocular regard indicating imperfect synchronization of the eyes

A69-80294
EFFECTS OF COGNITIVE APPRAISAL OF STRESS ON HEART RATE AND TASK PERFORMANCE
Richard I Thackray and David W Pearson (FAA, Civil Aeromed Inst Oklahoma City, Okla)
Perceptual and Motor Skills, vol 27 Oct 1968 p 651–658 12 refs

The effects of threat of shock on heart rate and motor performance were studies on subjects differing in previously expressed fear of shock Twenty-four high fear-of-shock (HFS) and an equal number of low fear-of-shock (LFS) subjects were given 15 training trials on a conventional pursuit rotor Following training one third of the subjects were informed that during subsequent trials shock would be administered if performance fell below training levels one third were told that shock would be randomly

administered and the remaining third served as a control No shocks were actually administered HFS subjects revealed significantly greater heart-rate acceleration and performance impairment but only under the condition in which subjects were told that receipt of shock would be contingent on prior performance level

A69-80295
DETERMINANTS OF TACTUAL PERCEPTION OF FINGER-DRAWN SYMBOLS REAPPRAISAL

Douglas S Holmes Jon E Roeckelein and Joseph A Olmstead (The George Washington U, Human Resources Res Office Washington D C)

Perceptual and Motor Skills, vol 27 Oct 1968 p 659–672 10 refs

Army Dept supported research

Previous investigators, most notably Krech and Crutchfield and Natsoulas and Dubanoski have reported finding individual differences in perception of symbols drawn by finger on the skin Natsoulas and Yonge have presented alternative formulations of the determinants of tactual perception of symbols This paper analyzes some of the conceptual and methodological issues involved and presents a third formulation Failure to find individual differences with 46 subjects in the present study supports the conclusion that individual differences previously reported can be attributed to errors occurring under conditions of ambiguity

A69-80296
RETINAL BURNS FROM INTENSE LIGHT SOURCES

C J Bartleson (Eastman Kodak Co Res Labs Rochester, N Y)

American Industrial Hygiene Association Journal, vol 29 Sep –Oct 1968 p 415–424 13 refs

Radiant energy can cause eye injury Data relating to the radiant energy thresholds for thermal damage to the retina of the eye are reviewed and a method of computing retinal irradiance is discussed The need for additional data for moderately intense sources is emphasized

A69-80297
THE EVALUATION OF LASER HAZARDS

David H Sliney and William A Palmisano (U S Army Environ Hyg Agency Radiation Serv Directorate Edgewood Arsenal Md)

American Industrial Hygiene Association Journal, vol 29 Sep –Oct 1968 p 425–431 9 refs

Recent developments in laser technology have produced greater energy and power outputs in an ever-increasing variety of lasers of differing wavelengths A variety of hazards exist to individuals working at or in the vicinity of laser operations A program of hazard evaluation and control has been conducted by the authors in a variety of laser installations The principal hazards of laser radiation to the eye due to both direct and reflected viewing are discussed Criteria are given for determining the hazards of a given laser by evaluating the effects of the laser output characteristics (power or energy output wavelength emergent beam diameter and divergence) and the effects of various environmental factors (output or laboratory setting ambient lighting etc) Methods of measuring or calculating the light intensity at a given point and guidelines for control of hazards are given

A69-80298
PROTECTION AGAINST TOXIC ROCKET FUELS

Wallace B Frierson (George C Marshall Space Flight Center NASA Med Center Marshall Space Flight Center Ala)

American Industrial Hygiene Association Journal vol 29 Sep –Oct 1968 p 456–460

Exposures to toxic rocket propellants usually are the result of spills leaks and improper storage or handling of these fuels Potentially exposed persons should be examined at intervals commensurate with their exposures but at least annually Considerable information which is useful in evaluating the adequacy of control measures can be obtained by compiling and analyzing clinical laboratory results physical findings and subjective complaints A detailed treatment procedure for acute exposures to these fuels or oxidizers is described

A69-80299
THE PREDICTABILITY OF HEART RATE IN SEQUENTIAL WORK

Richard B Chase (Calif U Graduate School of Business Admin Prod and Operations Lab Ergonomics Sect Los Angeles)

American Industrial Hygiene Association Journal, vol 29, Sep –Oct 1968 p 490–494 11 refs

In order that heart rate achieve its full potential as a measure of bodily load for work design the sensitivity of the index must be investigated under various work configurations This study evaluates the use of averaging procedures for procedures for predicting the mean heart rate for a series of uninterrrupted tasks from equivalent tasks performed with rest pauses Two kinds of dynamic tasks—cranking and walking—were performed at moderate caloric intensities The results indicate that averaging of heart rates for separately performed tasks will underestimate the mean heart rate of equivalent tasks performed in series This difference was found to increase in a nonlinear and nonmonotonic fashion as the task approaches the end of a series

A69-80300
SPATIAL AND VERBAL COMPONENTS OF THE ACT OF RECALL

Lee R Brooks (McMaster U Hamilton Ontario Canada)

Canadian Journal of Psychology, vol 22, Oct 1968 p 349–368 8 refs

Grant NRC APA 210

Research presented in this paper shows that while a person is recalling a line diagram he can more readily signal information about that diagram by speaking than by spatially monitored output (e g pointing to correct items in a column of symbols) When recalling a sentence, he can more readily signal information about that sentence by spatially monitored output than by speaking These results suggest that spatial and verbal information is recalled and processed in a modality-specific manner Recall of verbal information is most readily disrupted by concurrent vocal activity recall of spatial information is most readily disrupted by concurrent spatially monitored activity The differential conflict occurs even though the concurrent activity is a recoding of the information that is being recalled

A69-80301
EFFECTS OF COMPLEXITY, ASSOCIATION VALUE, AND LEARNING ON THE RECOGNITION OF RANDOM SHAPES

Richard H Price (Ind U Bloomington)

Canadian Journal of Psychology, vol 22 Oct 1968, p 388–398 11 refs

Two experiments were performed to examine effects of stimulus complexity association value and amount of learning on recognition of random shapes Results were evaluated using the area under the operating characteristic as the recognition measure Both experiments indicated that increases in complexity and association value of stimuli resulted in poorer recognition performance Increases in amount of learning in Experiment II

improved recognition performance Separate analyses of hit rate (HR) and false alarm rate (FAR) indicated that complexity affected only HR, learning affected both HR and FAR and association value affected only FAR An explanation of the association value effect based on the retention and use of verbal traces in recognition is offered

A69-80302
AVERAGE EVOKED POTENTIALS AND UNCERTAINTY RESOLUTION
Emanuel Donchin (NASA Ames Res Center Moffett Field Calif)
Psychonomic Science, vol 12 Sep 5 1968 p 103 5 refs
NASA Contract NsG-623 and Grant NSF GB 1844

Two subjects were presented with a series of near threshold flashes of light and instructed to report for each flash in which of eight different positions it appeared and the degree to which they were certain about this judgment Average evoked potentials to the flashes were also recorded from the occiput A positive-going wave with latency to the peak of 250 msec appeared when the subject was certain about his judgment whether or not he was correct

A69-80303
AMPLITUDE OF VISUAL EVOKED POTENTIALS AS A FUNCTION OF ILLUMINANCE
J M Fuster and G Sierra (Calif U Brain Res Inst Los Angeles)
Psychonomic Science vol 12 Sep 5, 1968 p 105–106 8 refs
Grants PHS NB 04133 and PHS K3-MH-25,082

Recording electrodes were implanted in the lateral geniculate body and striate cortex of rabbits and cats Primary evoked responses to a brief light flash were recorded from the two locations in the unanesthetized animal Both at geniculate and cortical levels a power function was found to express satisfactorily in the two species the relationship of response amplitude to illuminance although a log function generally provided almost as good a fit for the data

A69-80304
ABSOLUTE JUDGMENTS IN SPEEDED TASKS QUANTIFICATION OF THE TRADE-OFF BETWEEN SPEED AND ACCURACY
Robert G Pachella (Johns Hopkins U Baltimore, Md) Dennis F Fisher, and Robert Karsh (U S Army Human Eng Labs Aberdeen Md)
Psychonomic Science, vol 12 Oct 5 1968 p 225–226 5 refs

Subjects engaged in making absolute judgments were gradually forced to increase the speed of their responses Information transmission decreased linearly as criterion time was decreased from 1 0 sec to 0 4 sec

A69-80305
THE INFLUENCE OF EXPOSURE TIME ON COLOR DISCRIMINATION
Michael H Siegel (Ripon Coll Dept of Psychol Wis)
Psychonomic Science, vol 12 Oct 5 1968, p 227–228

An experiment was performed to determine the influence of exposure duration on color discrimination The current study substantiated earlier research results and established that changes in fixation are responsible for discrimination scores improving at longer exposures

A69-80306
AN ADAPTATION-LEVEL THEORY ACCOUNT OF A RELATIVE-SIZE ILLUSION
Frank Restle and Coleman T Merryman (Ind U Bloomington)
Psychonomic Science, vol 12 Oct 5, 1968 p 229–230
Grants PHS MH-12541 and NSF GB 2848

A horizontal line (L) looks shorter with large boxes (B) at the ends than with small B This illusion was measured by having the subjects judge the length of L on a six-point scale Six different lengths of L were combined factorially with six sizes of B to form 36 stimuli and 51 subjects made four judgments each Mean judgment increased smoothly with L and decreased with B Data were fitted using Adaptation-Level formulas and the weight of B was found to be approximately 14% However B had almost no effect on the judgment of very short L

A69-80307
THE RATE OF ASSIMILATION OF VISUAL INFORMATION
D Alan Allport (Aberdeen U Great Britain)
Psychonomic Science, vol 12 Oct 5 1968 p 231–232 6 refs
Med Res Council supported research

The rate of uptake of information from a brief visual presentation was previously investigated by a method of backward masking for two types of visual characters (digits and Landolt C s) The results showed that encoding of information from the Landolt C s occurred two to three times more slowly than for the overlearned but more complex numerals Additional practice failed to reduce this disparity A second experiment showed that it was not due to restricted cue size although more severe size restriction did reduce still further the rate of uptake of information

A69-80308
THE AUTOKINESIS OF AN AFTER-IMAGE
Leonard Brosgole (St John s U Jamaica N Y)
Psychonomic Science, vol 12 Oct 5 1968 p 233–234

An after-image was found to move autokinetically in the absence of voluntary eye movements Its direction of motion coincided with that of a normally viewed stimulus The apparent movement of such a stabilized image could not be explained in terms of local sign theory

A69-80309
RANDOM SHAPE RECOGNITION AT BRIEF EXPOSURE DURATIONS
Herbert J Clark (AFSC Aerospace Med Div Aerospace Med Res Labs Wright-Patterson AFB Ohio)
Psychonomic Science, vol 12 Oct 5 1968 p 245–246 10 refs

Two groups of subjects were tested in a forced-choice recognition test for memory of 20 random shapes having two levels of complexity and two levels of association value (A) One group viewed each shape for 0 25 sec and the other group viewed each shape for 0 50 sec Shapes of high A were recognized more accurately ($p < 01$) than shapes of a low A while the effects of complexity and exposure duration were statistically insignificant Consideration of the characteristics of the distractor shapes paired with the observed shapes during the forced-choice recognition test suggested that they may also have influenced recognition accuracy If simple and complex distractor shapes are not equated for amounts of stimulus confusion introduced into the recognition test that test may be biased against simple shapes

A69-80310
SIGNAL DETECTION IN A PAIRED-ASSOCIATE LEARNING TASK
R H Hickson (Ark U, Fayetteville)
Psychonomic Science, vol 12 Oct 5, 1968 p 253–254 9 refs

A paired-associate learning task was modified to produce a yes-no signal detection task The correct response syllable was presented with the stimulus syllable for 10 25 50 or 75% of trials with an incorrect or noise member on remaining trials This produced differences in rate of identification of correct signals as well as differences in signal sensitivity d, and decision criteria

A69-80311
ORDER OF RECALL IN SHORT-TERM MEMORY
Harvey A Taub and Richard A Monty (Syracuse VA Hosp N Y and U S Army Human Eng Labs Aberdeen Proving Ground Md)
Psychonomic Science vol 12 Oct 5 1968 p 259–260

Short-term recall of letter sequences color-coded into two halves was measured as a function of color presented first alphabet half presented first order of report and blocks of trials Analysis of the first half of the subjects reports suggested that reports which reversed the colored halves were superior to an ordered report of the colors except in trial block one when the letters presented first in a sequence were from the first half of the alphabet Trends from the second half of a report were in the direction of more accurate recall with reversed as compared to ordered reports

A69-80312
PRESTIMULUS AND POSTSTIMULUS CUING OF RECALL ORDER IN THE MEMORY SPAN
James V Hinrichs (Iowa U Iowa City)
Psychonomic Science, vol 12 Oct 5 1968 p 261–262

Permutations of nine-digit sequences were recalled in either forward (F) or backward (B) order with order of recall cued either before the sequences (Prestimulus Cuing) or after the sequences (Poststimulus Cuing) Prestimulus Cuing produced significantly better recall than Postimulus Cuing and F recall was superior to B recall with a significant interaction between the two main effects The shapes of the serial position curves for F and B recall were relatively unchanged by the position of cuing recall order although the level of performance was lower in the Prestimulus Cuing condition

A69-80313
FACILITATION OF RECALL BY STRUCTURE IN SERIALLY PRESENTED NONSENSE STRINGS
Daniel C O Connell Catherine L Stubbs and Mary Ann Theby (St Louis U Mo)
Psychonomic Science vol 12 Oct 5 1968 p 263–264 10 refs

Serial presentation of nonsense strings with immediate written recall was studied in a 3 by 2 factorial design structure (none morphology morphology and syntax) and rate of presentation (one and three sec /item) Only the main factors were significant recall was facilitated by structure and by the slower presentation rate

A69-80314
MONITORING EYE MOVEMENTS WHILE STUDYING THE EFFECTS OF RESPONSE FAMILIARIZATION ON PAIRED-ASSOCIATE LEARNING
T E Moore and P D McCormack (Carleton U Dept of Psychol Ottawa Canada)
Psychonomic Science vol 12 Oct 5 1968 p 269–270 10 refs
Grant NRC APA-78

Three groups of subjects were required to learn a 10-item paired-associate (PA) list subsequent to relevant response pretraining (Group R) irrelevant pretraining (Group IRR) and no pretraining (Group N) Eye movements were monitored during the first 6 to 12 PA trials Subjects of Group R showed superior learning and an earlier convergence of response and stimulus fixation functions than either of the other two groups All subjects exhibited a transition from S–R to S–R–S viewing as learning progressed These findings were discussed in the light of a two-stage notion of verbal PA learning

A69-80315
THE EEG OF PILOTS (SECOND REPORT)
Hayao Hori and Hirofumi Furuya
Reports of Aeromedical Laboratory, vol 8 Mar 1968 p 121–128 14 refs In Japanese

The aim of this report is to establish an evaluation standard for pilot electroencephalograms (EEGs) Due to previous work the EEGs of pilots are classified in categories Normal 90% Borderline 9% Slightly abnormal 1% Abnormal 0% The high voltage slow (HVS) or high voltage fast (HVF) EEG was found in some pilots but they have flight experience of about 1 000 hr without an accident The only one case in jet pilots show spike-wave-complex EEG who was diagnosed as Petit Mal Epilepsy and eliminated from pilot duty As the result a proposal of the evaluation standard EEG s for pilots made as follows (1) the S-W-C or /and Forcal Spike EEG are not suitable for a pilot (2) if the HVS or /and HVF EEG are found it is necessary to give both neuropsychiatric and psychological examinations and (3) the other EEG patterns will be qualified as a suitable one for pilots

A69-80316
AN EXPERIMENTAL STUDY ON THE DISCRIMINATION OF FIGURE PROPORTION
Norifusa Iwataki
Reports of Aeromedical Laboratory, vol 8 Mar 1968 p 129–134 In Japanese

The so-called vertical-horizontal visual illusion was investigated on four geometric figures The greatest illusion was observed on the figure composed of one verticle and horizontal line (⊥ type figure) Next were triangles and trapezoids Rectangles evoked the least illusion and its estimated value of illusion was about 3%

A69-80317
EFFECTS OF CORIOLIS STIMULUS DURING MILD CENTRIFUGAL G LOAD UPON STICK PERFORMANCE
Masaaki Iwane Mikio Ono and Michiko Sawada
Reports of Aeromedical Laboratory vol 8 Mar 1968 p 135–141 12 refs In Japanese

Influences of Coriolis stimulation in a mild g field upon spatial orientation and accompanying stick performance are especially important for piloting maneuvers of aircraft pilots In order to elucidate this problem 20 non-pilot adult healthy volunteers (including 18 males and 2 females) were given mild centrifugal g load (up to +1 1 gz) by means of human centrifuge and simultaneous Coriolis stimulation (right- and leftward face turn) Electro-cardiograms electronystagmograms and stick performance as well as subjective complaints of the subjects were studied Under conditions of clockwise rotation of centrifuge even at six r p m or composed g level of 1 14 g, it was frequently noted that subjects tend to move the stick to right-forward direction when their face was turned leftward It is thought to be dangerous that if this kind of operation could be done by pilots during circling or turning of aircraft at low altitude further investigations about experienced pilots would be necessary

A69-80318
RELATIONSHIPS BETWEEN SEASONAL VARIATION OF BASAL METABOLIC RATES AND DIETARY COMPOSITION IN AIRMEN VOLUNTEERS
Ryohei Yurugi Michihiko Iizuka Haruo Ikegami Teruko Akiyama and Chieko Sakakibara
Reports of Aeromedical Laboratory, vol 8 Mar 1968 p 142–149 13 refs In Japanese

Monthly basal metabolic rates (BMR) and an analysis of dietary intake were made during a year in seven airmen The main results were (1) Slight seasonal variations in BMR higher in winter and lower in summer were observed Mean magnitude of

variation rates was 7 7% which was lower than those reported in previous literatures (2) Components of dietary intake were nearly constant qualitatively and quantitatively all through the year It was noted that total caloric intake (3 255 cal /day) protein intake (116 g /day) and fat intake (64 g /day) has become higher in recent years in Japan and (3) It was thought that the narrowing tendency of seasonal variation rate in Japanese BMR will depend on the improvement of nutritional intake especially increasing fat intake in diet

A69-80319
METHOD OF ESTIMATING WHOLE-BODY COLD TOLERANCE AND ITS RELATION TO SEASONAL VARIATION OF BMR
Ryohei Yurugi Michihiko Iizuka Teruko Akiyama Fumitaka Kawashima and Chieko Sakakibara
Reports of Aeromedical Laboratory, vol 8 Mar 1968 p 150–156 11 refs In Japanese

In order to evaluate the whole-body cold tolerance in daily life critical temperature (Tc) in naked airmen and heat production increase (ΔM)-skin temperature decrease (ΔTs)-relationships in clothed (ca 1 7 clo) airmen during cold exposure were studied At Tc the main physiological reaction of temperature regulation viz increase in heat production by increasing metabolism and a decrease in skin temperature as a result of vasoconstriction in the skin came into operation It was recognized that both Tc and ΔM-ΔTs-relationships were useful as evaluating physiological whole-body cold tolerance because they could express the insulative and metabolic response to cold exposure Critical temperatures in naked Japanese were lower than that of white man indicating stronger insulative response in Japanese It was also shown that close relationship between $\Delta M/\Delta Ts$ and seasonal variation of basal metabolic rates may exist in Japanese

A69-80320
THE STUDY OF RELATIONSHIP BETWEEN MORALE SCORE AND PERSONALITY PATTERNS BY YATABE–GUILFORD PERSONALITY INVENTORY IN AIRMEN, AIRCRAFT MAINTENANCE CAREER FIELD, JASDF
Yukiko Kakimoto Sakurako Takigawa Yoshifusa Kurihara Norifusa Iwataki and Hayao Hori
Reports of Aeromedical Laboratory vol 8 Mar 1968 p 157–168 Many refs In Japanese

This report was designed to study the correlation between the morale by questionnaire and personality patterns revealed by Yatabe-Guilford s Personality Inventory (Y–G Test) on 319 personnel of the JASDF The main results were as follows (1) the percentage of D type and E type of Y–G Test (depending on Tujioka s classification) showed a significant difference between the high morale and low morale groups (2) the profiles of Y–G Test in three groups (high middle and low morale) showed marked differences These differences were attributed to the following factors D (depression) C (cyclic tendency) I (inferiority feelings) N (nervousness) O (objectibility) Co (cooperativeness) A (ascendance) and S (social introversion) and (3) the D type groups (Y–G Test) showed a high score for the attitude toward supervision fellow workers and job satisfaction

A69-80321
EXPERIMENTAL STUDY ON READING EFFICIENCY OF ROUND AND VERTICAL TYPE DISPLAYS IN AIRCRAFT
Sadahito Aramaki Kiyohisa Niwa Hiroko Hagihara and Yukoh Nagasawa
Reports of Aeromedical Laboratory vol 8 Mar 1968 p 169–178 6 refs In Japanese

Comparison of reading efficiency and reading reliability between round and vertical type instruments were investigated Vertical type instruments were found to be superior to the round type The vertical type altitude indicator showed double to triple efficiency in reading The replacement of round type instruments with the vertical type gives pilots no problem in adaptation and training

A69-80322
TRANSIENT CHANGES IN OXYGEN CONSUMPTION, CARBON DIOXIDE ELIMINATION AND R Q DURING AND AFTER ACUTELY INDUCED HYPOXIA TO RABBITS
Haruo Ikegami Mamoru Furuya and Chieko Sakakibara
Reports of Aeromedical Laboratory vol 8 Mar 1968 p 179–183 10 refs In Japanese

Hypoxia was induced in five rabbits by inhalation of a gas mixture containing 8 4% of oxygen in nitrogen in order to determine the length of period which would be required to attain a new steady state from the view point of gas metabolism The results obtained and the conclusion were as follows (1) oxygen consumption did not change significantly during hypoxia and increased afterwards (2) CO_2 elimination and the respiratory quotient increased markedly in early phase of hypoxia and attained a new steady state 25 min after onset of hypoxia They decreased to below the control level after hypoxia and recovered in 30 min and (3) it was concluded that 30 min are necessary to attain to a new steady state in acute hypoxia of moderate degree

A69-80323
AN EXPERIMENTAL STUDY ON THE LIQUID CONDITIONING JACKETS
Yoshiro Hagiwara Yoshihiro Ogihara Yutaka Mine and Sueyoshi Tokutome
Reports of Aeromedical Laboratory vol 8 Mar 1968 p 184–188 In Japanese

By the uncomfortableness due to high inside temperature and relative humidity some special clothing such as pressure suits antiexposure suits firefighting suits and rocket fuel handlers protective garments become an unbearable burden for the wearers Some experimental water cooling jackets were made of plastic film and plastic film reinforced by textile Temperature of water circulated for cooling skin temperature and inside and outside air temperature of the jackets were measured The pattern of the jacket and material needs future development to cut down the weight and to strengthen the jacket for practical use

A69-80324
THE SURVEY ON THE PHYSIOLOGICAL FUNCTION OF THE AGED PILOT OF JASDF
Ichiro Saito Takao Watanbe Yoshihisa Yamazaki Kenji Nakahara and Yoshinori Kurihara
Reports of Aeromedical Laboratory vol 8 Mar 1968 p 189–194 11 refs In Japanese

This report is the result of the survey on the physiological function of the 99 aged pilots who have been examined from November 1, 1965 to October 31 1966 The number of pilots aged between 45 to 49 50 to 54 and 55 to 59 are 81 16 and 2 respectively Though the average height and body weight of pilots are superior to that of the average Japanese male the higher Rohler's index and increased thickness of subcutaneous fat layer suggest the tendency to obesity among pilots It may be related to the appearance of urinary sugar leftward deviation of QRS axis and positive stress test of the electrocardiogram Concerning visual acuity even the pilots cannot be spared from the aging process and hearing disturbance was shown for the high pitch sound (4 000 and 6 000 Hz) It is recommended that the pilots should continue physical training even after the age of 45

A69-80325
QUESTIONAIRE SURVEY OF APPROACH LIGHT
Norifusa Iwataki
Reports of Aeromedical Laboratory vol 8 Mar 1968 p 195–198
In Japanese

Twenty-seven pilots opinions on approach lights were surveyed by the questionaire method Approach lights were evaluated as a very useful visual aid on landing under low visibility The Calvert bar system was evaluated as the best pattern of approach lights Strobo-flashing lights provided a benefit for visual approach under low visibility The glare was not so disturbing On the final stage of a precision approach however approaching lights might have too much glare for pilots

A69-80326
EFFECTS OF STIMULUS TRANSIENCY IN A CONTINGENT DISCRIMINATION SITUATION
Mymon Goldstein Ronnie S Rappaport and Dennis W Schaefer (Long Island U Dept of Psychol Brooklyn N Y)
Psychonomic Science vol 12 Sep 15 1968 p 123–124

Correct alternatives were determined by recurrent and/or transient auxiliary stimuli in a two-choice situation administered to humans One of two transiency treatments proved more difficult than the recurrence treatments

A69-80327
ACCURACY OF DELAYED AIMING RESPONSES
Dennis H Holding (Exeter U Dept of Psychol Great Britain)
Psychonomic Science, vol 12 Sep 15 1968 p 125–126
Sci Res Council supported research

Stylus aiming responses were made in the dark after the brief illumination of a target and during or before the target exposure Response accuracy was measured as a function of length of delay and of the duration of target exposure Error increased linearly with logarithmically increasing delay and within the limits investigated decreased with logarithmic increase of exposure duration

A69-80328
THE ORIENTING RESPONSE AND DIRECTION OF STIMULUS CHANGE
Alvin S Bernstein (N Y, State U Downstate Med Center Dept of Psychiat Brooklyn)
Psychonomic Science vol 12 Sep 15 1968, p 127–128 10 refs
Grant NIMH 1-F3-MH-34 080

Following habituation to a given stimulus intensity rearousal of the galvanic skin response orienting response (OR) was significantly greater to a stimulus change involving an increase in intensity than to an equal absolute amount of change involving a decrease in intensity This was true both in normal and chronic schizophrenic samples Thus both the direction in which stimulus change occurs as well as the degree of change involved are important variables in triggering the (OR)

A69-80329
UNDERESTIMATION OF DICHOTIC CLICK RATES RESULTS USING METHODS OF ABSOLUTE ESTIMATION AND CONSTANT STIMULI
Seymour Axelrod and Lawrence T Guzy (N Y State U Dept of Psychiat Buffalo)
Psychonomic Science, vol 12 Sep 15 1968 p 133–134
(Eastern Psychol Assn, Washington D C Apr 1968)
Grants PHS NB 06862 and PHS K3-MH-5787 United Health Found and Graduate School, SUNYAB supported research

In Experiment 1 subjects made absolute estimates of monotic and dichotically-alternating click rates In Experiment 2 subjects compared monotic and dichotic rates in a constant-stimuli procedure Results of both experiments were similar to those obtained with a different method and reported earlier relative underestimation of dichotic rates was small at 1/sec increased rapidly as dichotic rate was increased to 5 to 10/sec and then leveled off

A69-80330
DELAY AND THE DIGIT PROBE
A D Baddeley (Appl Psychol Res Unit Cambridge Great Britain)
Psychonomic Science vol 12, Sep 1968, p 147–148 7 refs
Brit Med Res Council supported research

The Waugh and Norman probe technique was used to study retention of a seven digit sequence after a delay of 0 2, 4 8, or 16 sec filled with letter copying Results showed (1) rapid forgetting reaching an asymptote at 15 to 20 sec, (2) forgetting occurred at all serial positions and (3) forgetting was a function of number of intervening items regardless of whether these were digits to be retained or letters to be copied

A69-80331
MOTIVATION AND LONG-TERM MEMORY
Barbara Ann Heinrich (Wash, U Seattle)
Psychonomic Science, vol 12, Sep 15 1968 p 149–150 7 refs

This experiment investigated the effects of motivation on long-term memory It was hypothesized that when subjects are highly motivated to recall a nonsense syllable list they learned one wk earlier they recall the list better than subjects who are not motivated before recalling the same list Motivation was found to have an effect only when introduced during the actual learning of the list one wk before recall It had no effect on trace utilization when introduced just prior to recall one wk after learning

A69-80332
POSSIBLE OLFACTORY TRANSDUCTION OF RADIATION-INDUCED AVERSION
Walter H Riege (Calif, U, Berkeley)
Psychonomic Science, vol 12 Oct 15 1968 p 303–304 10 refs
NASA supported research

After whole-body X irradiation (280 kvp 4 8 mA, 48 r) for one-half hr, rats showed an ostensible aversion to previously preferred Saccharin drinking even when they had been anesthetized during the exposure The sequelae of low-dose irradiation, however, were not observed for eight days of testing in rats that had their nasal passages occluded with paraffin and breathed through oral-tracheal tubes while they were anesthetized and irradiated Possibly the nasal occlusions and the short-lasting hypoxia subdued the radiation effect at the olfactory epithelium so that the trace-conditioned aversion failed to develop

A69-80333
AN ANALYSIS OF THE EFFECT OF GLUTETHIMIDE ON REM DENSITY
Clyde Allen Anthony Kales (Calif, U School of Med Brain Res Inst and Depts of Psychol and Psychiat Los Angeles) and Ralph J Berger (Calif U Crown Coll, Dept of Psychol Santa Cruz)
Psychonomic Science, vol 12 Oct 15 1968 p 329–330 9 refs
Grants PHS NB-12808 PHS 5TI MH-6415 and Contract PHS PH-43-66-59

A non-barbiturate hypnotic glutethimide (Doriden) was administered to nine normal subjects in either 500 or 1 000 mg doses just prior to their bedtime Various measures of eye movement

density during subsequent rapid eye movement (REM) sleep periods showed significant decreases from baseline to drug nights and increases from baseline and drug nights to drug withdrawal nights The hypothesis that decreases and increases in the percentage of stage REM sleep (as a function of glutethimide administration and withdrawal respectively) are accompanied by concomitant decreases and increases in REM densities was supported

A69-80334
SYMPATHOADRENAL RESPONSE TO HYPOXIA

E J Becker and F Kreuzer (Nijmegen, U , Dept of Physiol The Netherlands)

Pflugers Archiv European Journal of Physiology vol 304 no 1 1968 p 1–10 20 refs
First Intern Symp on Exercise Biochem Brussels, Belgium Jun 6–8, 1968

The effect of hypoxia on the sympathoadrenal system of man was investigated by measuring the epinephrine norepinephrine and hydroxmethoxymandelic acid excretion of healthy adults confined to a low pressure chamber simulating 3 000 to 4 000 m of altitude It was found that norepinephrine excretion remained essentially the same as at sea level conditions but epinephrine and hydroxymethoxymandelic acid excretion increased significantly during exposure to low oxygen tension In an earlier study at actual high altitude (Dutch Monte Rosa expedition 1963 4,560 m) a reversed excretion pattern was observed i e norepinephrine excretion increased significantly with no change in epinephrine excretion It was suspected on the basis of evidence found in the literature, that the different nature of the physical and particularly emotional stress factors operating at real and at simulated high altitude might be responsible for the different pattern of catecholamine excretion Subsequent experiments performed in the low pressure chamber at sea level conditions (mock runs) showed a similar response as in the low pressure chamber at reduced pressure which pointed to the importance of emotional factors during confinement to the chamber Some other factors of possible importance in daily life which might affect the results of this study were also investigated and it was found that consumption of moderate amounts of coffee as well as moderate smoking did not cause increased excretion of catecholamines or hydroxymethoxymandelic acid

A69-80335
RELATIONSHIP BETWEEN OXYGEN CONSUMPTION, HIGH ENERGY PHOSPHATES AND THE KINETICS OF THE OXYGEN DEBT IN EXERCISE

P E di Prampero and R Margaria (Milan, U Dept of Physiol Italy)

Pflugers Archiv European Journal of Physiology vol 304 no 1, 1968, p 11–19 26 refs
Ital Natl Council of Sci (CNR) supported research

The oxygen consumption together with lactic acid production and concentration of adenosine diphosphate (ADP), adenosine triphosphate (ATP) and creatine phosphate was measured during exercise and recovery on an isolated dog gastrocnemius Oxygen debt contraction and payment followed an exponential path with a half reaction time of about 20 sec The concentration of ATP and ADP at steady state seemed to be unaffected by the intensity of the exercise when this was submaximal and no appreciable production of lactic acid took place The concentration of creatine phosphate in muscle at steady state decreased with the intensity of the exercise The ratio of the oxygen consumption at steady state to the alactic oxygen debt was identified with the speed constant of the resynthesis of phosphagen in muscle the half reaction time of this process was 17 to 20 sec The total alactic oxygen debt amounted to about 50 ml /kg of muscle These figures were in good agreement with earlier data found in man

A69-80336
THE DARK-DISCHARGE OF THE EYE IN THE UNRESTRAINED CAT

A Cavaggioni (Parma U Ist di Fisiol Umana, Italy)

Pflugers Archiv European Journal of Physiology vol 304 no 1, 1968 p 75–80 9 refs
Grant AF Eoar 67-7 and Consiglio Nazl delle Ric supported research

The discharge of the ganglion cells of the retina of unrestrained cats in darkness (dark-discharge) was recorded with large electrodes Evidence was presented of sudden variations of the dark-discharge apparently spontaneous, as well of variations occurring concomitantly with the onset of the alert state of the animal

A69-80337
SOME PROPERTIES OF SKIN CONDUCTANCE AND POTENTIAL

D T Lykken, R D Miller and R F Strahan (Minn U Minneapolis)

Psychophysiology vol 5 Nov 1968 p 253–268 13 refs
Minn , U supported research

Skin conductance (SC) and skin potential (SP) were measured simultaneously from opposite hands during a stress period and a subsequent prolonged relaxation in 19 subjects With the subjects relaxed, toward the end of the session simultaneous measures of SC and SP were taken between various combinations of two active and two drilled reference electrodes on both hands It was found that SC measured with the external voltage connected in series-adding with the endogenous SP (i e positive pole to the active electrode) was some 13% higher than when measured in reverse polarity Supplementary experiment showed that this "rectification effect could be entirely attributed to the effect of the endogenous potential A method of estimating SC from SP readings with no external current source was shown to give results equivalent to values measured in the usual way These and other findings support the claim that steady-state electrodermal properties fit a simple model consisting of a variable voltage and a variable resistance in series Within-subject correlations of SC and SP were high for subjects with low average SCs lower for high-SC subjects who seemed less able to relax The data suggest that SP may be an inverted-U shape function of arousal and perhaps that the beta process" which drives the tonic SP downward with increasing arousal, may begin to function at much lower levels of arousal for some subjects than for others Phasic responses obtained at the end of the session when some subjects were apparently asleep suggest that when the subject is drowsy or in light sleep, both the SCR and the SPR have lengthened and variable latencies, and the SPR is uniformly a large negative going (alpha) response Uniphasic beta SPRs were rather consistently obtained when the pre-stimulus tonic SP was already high

A69-80338
CONDITIONED HEART RATE DECELERATION UNDER DIFFERENT DIMENSIONS OF RESPIRATORY CONTROL

Walter H Riege and L J Peacock (Ga U , Athens)

Psychophysiology vol 5 Nov 1968 p 269–279 14 refs
Contract AF-AFOSR-257-65

In the present experiment, the period following a simple non-aversive signal-detection task established a heart rate deceleration as the uncontrolled respiration During this period subjects of three experimental groups controlled part of their respiratory cycle for 20 sec Respiratory control was either sustained inhalation sustained exhalation or maintained shallow resting cycle, while control subjects exercised no respiratory restraint The non-aversive stimulation excluded excessive heart rate acceleration and permitted a conditioning stimulus to coincide with onset of

relaxation in the postdecision period Only in experimental subjects was a significant conditional deceleration of heart rate found Conditional deceleration occurred in addition to a gradual drop in heart rate level during the experiment When respiratory activity was not controlled a biphasic response of heart rate was observed

A69-80339
A NOTE ON SMOKING AND HEART RATE

Rogers Elliott (Dartmouth Coll Dept of Psychol Hanover N H) and Richard Thysell (Waterloo U Ontario Canada)

Psychophysiology vol 5 Nov 1968 p 280–283 6 refs
Grant PHS HD01571 and Natl Health and Welfare Dept supported research

The effect of a cigarette on the heart rate (HR) of habitual smokers was assessed after brief abstinence and after regular smoking with controls of sham smoking and deep breathing Smoking and only smoking caused elevations in HR of about 20 beats per min The effect mimics habituation and its dissipation which may take about an hour proceeds more slowly after continual smoking than after smoking a single cigarette after a few hours abstinence

A69-80340
PATTERNS OF GALVANIC SKIN RESPONSES TO SIGNAL AND NON-SIGNAL STIMULI

Joseph Germana and George Chernault (Va Polytech Inst Dept of Psychol Blacksburg)

Psychophysiology vol 5 Nov 1968 p 284–292 18 refs
NASA Grant NGR 47-004-006

Two studies investigating the specific features of galvanic skin responses (GSRs) to signal and non-signal stimuli are reported The results of Exp I indicate that stimuli which have instructed behavioral associates (signal significance) produce GSRs which are both multiphasic and relatively persistent in nature Multiple GSRs are produced by the initial presentation of a signal stimulus and the persistence of the overall response appears to have at least a short-term effect on baseline Exp II was designed to investigate the possible independence of these two characteristics through the manipulation of response certainty The results suggest that multiplicity and persistence may be separable features of the response to signal stimuli in which the latter may be a correlate of response novelty

A69-80341
EXTRAVERSION AND SENSORY THRESHOLD

Stuart L Smith (London U Great Britain)

Psychophysiology, vol 5 Nov 1968 p 293–299 11 refs
Tobacco Res Found supported research

It was predicted that Introverts would have lower auditory thresholds than Extraverts in line with other physiological differences between these groups Using an ear-choice technique and controlling the factor of guessing the prediction was verified using non-patients who score at the two ends of the Eysenck Personality Inventory The extraverted behavior of hysterics and psychopaths has been thought to have partly a constitutional or physiological basis and this experiment points in that direction

A69-80342
ELECTRODERMAL LEVELS AND FLUCTUATIONS DURING NORMAL SLEEP

Alfred J R Koumans Bernard Tursky and Philip Solomon (Harvard Med School Boston Mass)

Psychophysiology vol 5 Nov 1968 p 300–306 19 refs
Contract Nonr-1866(29) and Grant NIMH MH-04172(06)

All night recordings of skin potential (SP) and skin resistance (SR) levels and rapid electrodermal fluctuations (REFs) were taken from a group of college students during two nights of normal sleep An attempt was made to associate changes in these measures with stages of sleep as identified by EEG patterns Electrodermal levels could differentiate between wake and sleep but could not clearly identify individual sleep stages or rapid eye movement (REM) periods REFs were found to increase in number during slow wave sleep and decrease during Stage I REM periods This diminution of REFs occurred consistently about six min before the onset of each REM period and then returned at a lower rate a few minutes after the termination of the REM period

A69-80343
LONG TERM CONDITIONING OF ORIENTING RESPONSES

Elliot N Gale (N Y State U Buffalo) and Albert F Ax (Lafayette Clin Detroit Mich)

Psychophysiology, vol 5 Nov 1968 p 307–315 9 refs
NASA Contract NAS 2-1031

The Russian literature suggests that as stable conditional responses develop orienting responses (ORs) adapt Prior research by Gale and Stern indicated that in a differential conditioning situation the OR becomes conditioned (COR) and conditioned responses in the form of anticipatory responses (CAR) develop The Russian literature suggests an inverse relationship between these two responses As the CAR evolves the COR extinguishes In the present study conditioning in the electrodermal and peripheral vasomotor systems was assessed utilizing 300 trials of conditioning The results indicate that the COR does not extinguish in a series this long, nor does the CAR increase in amplitude as predicted Rather the two CRs evolve in a similar manner Possible explanations for the obtained results are discussed

A69-80344
VALIDATION OF A PSYCHOPHYSIOLOGICAL TEST OF APTITUDE FOR LEARNING SOCIAL MOTIVES

Albert F Ax and Jacqueline L Bamford (Lafayette Clin Psychophysiol Lab Detroit Mich)

Psychophysiology, vol 5 Nov 1968 p 316-332 13 refs
NASA Contract NAS 2-1031 and Contract USDL 81-24-66-14

Sixty-three Negro subjects were classified into two relatively higher and lower motivation groups based on their history of employment (from interview data) or on vocational training school teachers ratings They were subjected to a single session of discriminative classical autonomic conditioning involving tones and pain and given intelligence personality, and level of aspiration tests It was found that 18 variables each individually statistically significant when combined by means of a discriminant function analysis classified 92% of the subjects into their correct criterion (motivation) groups It was concluded that the working hypotheses were strongly confirmed and that the two assumptions were supported Implications of these findings if confirmed by replication are (1) that a fundamental human aptitude for learning motives exists and can be measured (2) having measures of aptitude enables exploration of its relationships to other aptitudes and characteristics and (3) knowledge of these relationships will make it possible (a) to more accurately predict human performance involving motivation (b) to more appropriately select and place personnel (c) to devise more practicable training procedures for developing socially desirable motives and (d) to provide persons unprepared for self-support with more appropriate vocational training

A69-80345
FINGER BLOOD FLOW IN ANTARCTICA
E J Elkington (Dept of External Affairs Antarctic Div Melbourne Australia)
Journal of Physiology, vol 199 Nov 1968 p 1–10 14 refs

Finger blood flow was estimated by strain-gauge plethysmography before and during a one hr immersion in ice water on 25 men throughout a year at Wilkes Antarctica A total of 121 satisfactory immersions were made Blood flow before and during immersion decreased significantly in the colder months of the year and the increase caused by cold-induced vasodilation (CIVD) became less as the year progressed The time of onset blood flow at onset and frequency of the cycles of CIVD showed no significant relation to the coldness of the weather (as measured by mean monthly wind chill) or the time in months Comparisons of blood flow before and after five field trips (average duration 42 days) on which cold exposure was more severe than at Wilkes station gave similar results The results suggest that vasoconstrictor tone increased This interpretation agrees with previous work on general acclimatization in Antarctica but contrasts with work elsewhere on local acclimatization of the hands

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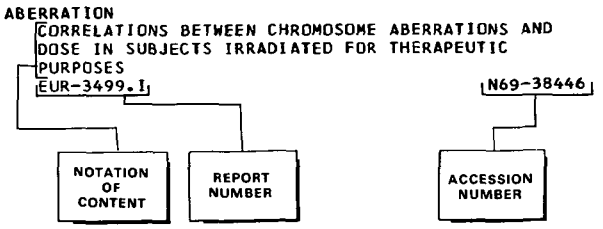

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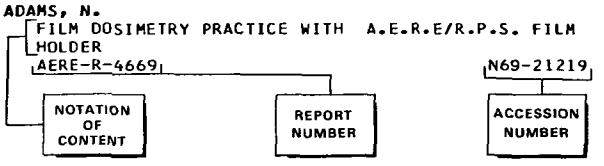

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