NASA SP-7011 (64)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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NASA SP-7011 (64)

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 May, 1969

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

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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);
b. AIAA entries identified by their *IAA* accession numbers (A69-10000 series), and
c LC entries identified by a number in the A69-80000 series

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American Institute of Aeronautics and Astronautics, Inc
750 Third Avenue, New York, N Y 10017

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

L C Entries

Articles listed are available in the journals in which they appeared They may be borrowed or consulted in libraries maintaining sets of these journals In some instances reprints may be available from the journal offices

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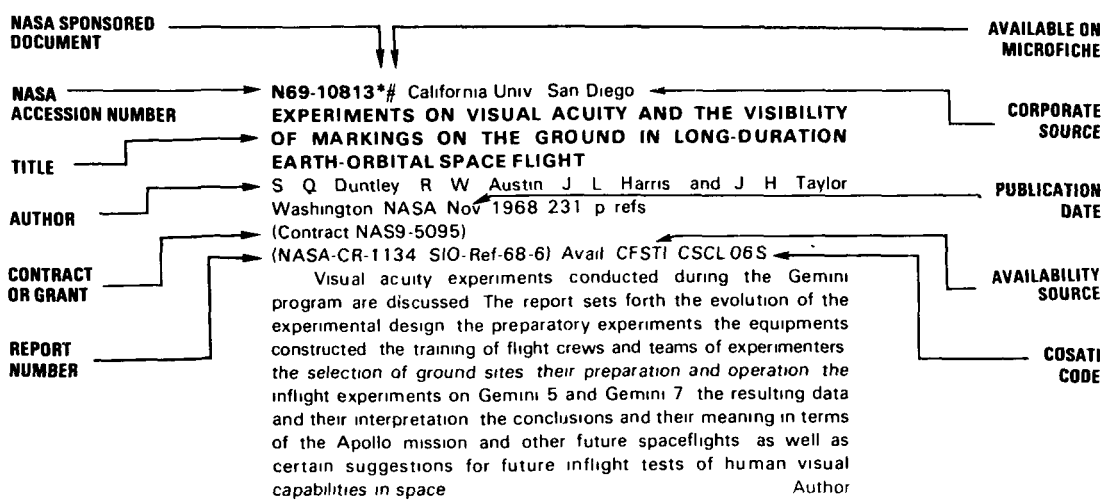
TYPICAL CITATION AND ABSTRACT



AEROSPACE MEDICINE AND BIOLOGY

a continuing bibliography JUNE 1969

STAR ENTRIES

N69-19608*# Bellcomm, Inc., Washington, D. C.
LAUNCH-MAN SEQUENCING FOR EXTENDED MISSION EFFECTIVENESS STUDY
L. D. Nelson 16 *Dec* 1968 27 p
(Contract NASw-417)
(NASA-CR-100321, TM-68-1033-6) Avail: CFSTI CSCL 06S

The possible man mission resupply schedules that exist subject to a set of fixed constraints and capable of several sets of desired properties are determined. Those schedule types which maximize various measures of effectiveness are singled out. Three of the fixed constraints aid in defining an initial segment of a man mission resupply schedule. the derived eleven initial segments partition all admissible mission profiles into eleven classes, the classes and the schedules are analyzed via their initial segments. The analyses are performed by constructing charts exhibiting the capabilities of the initial segments with respect to the 54 sets of desired properties reducing the charts by deleting every initial segment less capable than some remaining segment, and extracting the maximum duration entry for each set of desired properties. Other measures of effectiveness analyzed are number of astronauts exposed, mission duration/number of launch vehicles, and number of astronauts/number of launch vehicles. Author

N69-19619*# National Aeronautics and Space Administration, Washington, D. C.
INFORMATION PROCESSING IN THE FUNCTIONAL VISUAL FIELD [INFORMATIEVERWORKING IN HET FUNKTIONEEL GEZICHTSVELD]
A. F. Sanders. Dec. 1967. 13 p. refs. Transl. into ENGLISH of the Rept. No. IZF-1967-6, 1967. 16 p.
(NASA-TT-F-11408, IZF-1967-6) Avail: CFSTI CSCL 06P

It was found that performance in a number of visual tasks does not linearly decline as a function of visual angle. Instead, there are stepwise drops at two visual angles, which prove to be the boundaries of the areas where inspection by means of peripheral vision and eye movements are sufficient to obtain optimal performance. The drops are explained in terms of strategies in processing visual information, which are thought to vary from grouping signals at small visual angles to successive handling at very large angles. This theory is reevaluated in the light of more recent notions on visual coding and recoding. The relation between grouping and perceptual organization is especially considered. It is concluded that earlier reported work is restricted to the macrostructure of the functional visual field. Author

N69-19626# United Kingdom Atomic Energy Authority, Harwell (England)
RADIOLOGICAL PROTECTION PROBLEMS OF TRITIUM
E. Dietrich and L. A. Koenig. [1968] 13 p. refs. Transl. into ENGLISH from Atompraxis (Germany) no. 13, 1967 p. 454–457
(NP-tr-1703) Avail: CFSTI

The properties of tritium that are important in radiological protection are described. The hazards from tritium are internal since it emits very low energy beta particles. Tritium can enter the body via the lungs, the skin, and the intestinal tract. Most frequently tritium is taken in as water or water vapor. Radiological protection measurement problems are described and the most common methods of solving them are discussed. Protection factors relative to tritium-containing water vapor are examined. The techniques used at the Karlsruhe research reactor for tritium control are summarized. NSA

N69-19635# Wisconsin Univ., Madison. Dept. of Radiology
TRANSMISSION SCANNING WITH SUP 99M TC AND SUP 137 CS
James A. Sorenson and Russell C. Briggs. 22 Jul. 1968. 3 p. ref. Presented at the Annual Meeting of the Radiological Soc. of Am., Chicago, Ill.
(Contract AT(11-1)-1422)
(COO-1422-24, CONF-681201-1) Avail: CFSTI

Methods are described for making transmission images of the human chest using ^{99}Tc or ^{137}Cs as the radiation source. A rectilinear scanner was used. Good transmission scans were obtained with a 10 mCi ^{99}Tc source but the 6 hr half-life of ^{99}Tc requires that a new source must be prepared each day. The high energy of a ^{137}Cs source resulted in poor contrast between bone, water, and air space. NSA

N69-19642*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
A SYSTEMS ANALYSIS OF A REGENERATIVE CABIN ATMOSPHERE CONTROL SYSTEM
Robert D. Averill (M. S. Thesis—Va. Univ.) Aug. 1968 135 p. refs.
(NASA-TM-X-61517) Avail: CFSTI CSCL 06K

A systems analysis of a regenerative cabin atmosphere control system of the type suitable for earth-orbiting manned missions up to 1 year in length is presented. A typical atmospheric control system was selected based on recent studies of the most suitable components which were currently available. An extensive review of the literature indicated that very few pertinent references were available on the subject of the closed-loop response of atmospheric control systems for life support. A dynamic nonlinear

model of the cabin atmosphere control system was developed and this was simplified to a small-excursion linear model for purposes of applying classic stability criteria The nonlinear model was programed on an electronic analog computer and sample cases were run at various conditions The study demonstrated that the cabin atmosphere control system model was basically stable but that recovery from large transients was marginal due to component limiting Author

N69-19646*# Techtran Corp , Glen Burnie Md
THE EFFECT OF TEMPERATURE ON THE CONTENT OF VOLATILE ACIDS IN SEEDS AND LEAVES OF OIL-BEARING PLANTS [VLIYANIYE TEMPERATURY NA SODERZHANIYE LETUCHIKH KISLOT V SEMENAKH I LIST'YAKH MASLICHNYKH RASTENIY]
L P Zhdanova Washington NASA Mar 1969 6 p refs Transl into ENGLISH from Dokl Akad Nauk SSSR (Moscow), v 182, no 3 1968 p 719–722
(Contract NASw-1695)
(NASA-TT-F-12125) Avail CFSTI CSCL 06A

The content of volatile fatty acids and hydroxy acids in the seeds and leaves of oil-bearing plants is investigated as a function of the various temperature conditions under which the plants mature The sunflower poppy, and flax were the plants used in the tests The results of the tests are summarized It was found that lower temperatures facilitate the accumulation of fatty acids, and that the leaves are apparently the primary source of low fatty and hydroxy acids for the mature seeds Author

N69-19700* Darling (R E) Co Inc Bethesda Md
STUDY OF HOSE AND CONNECTORS IN LIFE SUPPORT SYSTEMS Final Report, 23 Feb 1968–1 Mar 1969
W R Sylvester R C Dougherty and C J Vallery 25 Feb 1969 56 p
(Contract NAS9-7764)
(NASA-CR-99541 REDAR-RER-121) Avail CFSTI CSCL 06K

The scope of work covered in this report (1) the investigation of non-flammable materials capable of fabrication into flexible oxygen hose for spacecraft life support systems (2) the design and prototype fabrication of a hose connector and (3) the fabrication of a flame barrier for protecting oxygen hose A thorough discussion of flammability testing and material evaluation is included Author

N69-19714*# National Aeronautics and Space Administration Washington, D C
AEROSPACE MEDICINE AND BIOLOGY A CONTINUING BIBLIOGRAPHY WITH INDEXES
Feb 1969 198 p
(NASA-SP-7011(60)) Avail CFSTI CSCL 06

Subject coverage is concentrated on biological, psychological, physiological and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space References describing similar effects on biological organisms of lower order are included as well as such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors Applied research is emphasized, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion Each entry is accompanied by its abstract KW

N69-19760# Commissariat a l Energie Atomique Grenoble (France) Centre d Etudes Nucléaires
METABOLISM AND INTERNAL DECONTAMINATION IN A RAT OF A RADIOACTIVE ZIRCONIUM-NIOBIUM SALT [METABOLISME ET DECONTAMINATION INTERNE, CHEZ LE RAT, D'UN SEL DE ZIRCONIUM-NIOBIUM RADIOACTIF]
Michel Gavend, Jean-Pierre Rinaldi, and Renaud Rinaldi Jan 1969 20 p refs In FRENCH, ENGLISH summary
(CEA-R-3703) Avail CFSTI

A study in a rat of the metabolism of a salt of ^{95}Zr-^{95}Nb injected by the intravenous route has allowed to display the following points (1) the fast decrease of the blood concentration of radioisotopes the durable accumulation of radioisotopes in the bone, and the strong urinary elimination during the first hours A study of the possibilities of internal decontamination of ^{95}Zr-^{95}Nb was also carried out Among all the tested chemicals, only zirconium citrate seems effective Author (ESRO)

N69-19819# Sloan-Kettering Inst for Cancer Research, New York
METHODS AND APPLICATIONS OF QUANTITATIVE COMPUTER-ANALYZED SCANNING, APPENDIX 1
J S Laughlin P J Kenny D A Weber A J Dwyer K Mayer et al 1968 31 p refs Presented at the Symp on Med Radioisotope Scintigraphy Salzburg Austria 6–15 Aug 1965
(Contract AT(30-1)-910)
(NYO-910-76-APP-1, CONF-680804-6) Avail CFSTI

A program of metabolic studies was carried out with quantitative procedures during the past decade with a variety of radioisotopes and labeled compounds These studies demonstrated the capabilities of labeled pharmaceuticals, not only for kinetic studies, but also for diagnostic and localization purposes Data display options included digital scans, computer-analyzed scans and photoscans The radioisotopes used included ^{198}Au colloids, ^{18}F ^{52}Fe and ^{59}Fe as ferrous citrate ^{99}Tc as sulfur colloid, ^{99}Tc pertechnetate and ^{85}Sr Seven features of the quantitative scanning method are illustrated with both research and diagnostic examples Author (NSA)

N69-19844# Library of Congress Washington, D C Aerospace Technology Div
ONE-YEAR TEST OF LIFE SUPPORT SYSTEMS
Boris Mandrovsky *In its* Foreign Sci Bull Vol 5 No 2 Feb 1969 p 1–12 refs (See N69-19843 09-34)
Avail CFSTI

A one year sealed chamber experiment conducted in the Soviet Union is described Its purpose was to determine the ability of human subjects to survive on artificial life support systems in a chamber of limited size for extended periods of time Air and water were regenerated by physicochemical life support systems food consisted of vacuum-dried products and fresh vegetables from a 'cosmic' greenhouse The success of the experiment was considered to be of value in solving the problem of supporting human life beyond the confines of the earth Author

N69-19845# Library of Congress, Washington, D C Aerospace Technology Div
BIOLOGICAL EFFECTS OF MAGNETIC FIELDS
Vladimir Mutschall *In its* Foreign Sci Bull Vol 5, No 2 Feb 1969 p 13–36 refs (See N69-19843 09-34)
Avail CFSTI

The results of the latest Soviet research on the biological effects of magnetic fields are reviewed Physiocochemical effects on animals and humans are discussed Author

N69-19846# Library of Congress Washington, D C Aerospace Technology Div
TOXICITY AND ELECTRON CONFIGURATION

Janice Smith *In its* Foreign Sci Bull, Vol 5 No 2 Feb 1969 p 37–45 refs See N69-19843 09-34)
Avail CFSTI

Recent work on the relationship between toxicity of elements and their electron configuration is reviewed Preliminary studies of the correlation between toxicity (measured by various indices) and the physiocochemical properties of elements are described It was concluded that more clarification of the relationship between toxicity and the relative stability of various electron configurations is needed Author

N69-19853# Library of Science Washington, D C Aerospace Technology Div
ATRANES A NEW CLASS OF PHYSIOLOGICALLY ACTIVE COMPOUNDS

Seraphim Parandjuk *In its* Foreign Sci Bull, Vol 5 No 1 Jan 1969 p 56–60 refs (See N69-19851 09-34)
Avail Issuing Activity

Recent open-source Soviet literature dealing with the synthesis, structure properties, and physiological activity of atranes is reviewed Author

N69-19894# Battelle-Northwest Richland Wash Pacific Northwest Lab
THE USAEC DIVISION OF BIOLOGY AND MEDICINE VOLUME 1 BIOLOGICAL SCIENCES Annual Report, 1967
R C Thompson ed, Paulette Teal ed, and Evelyn G Swezea ed May 1968 261 p refs
(Contract AT(45-1)-1830)
(BNWL-714-Vol-1) Avail CFSTI

The status of research projects in the Division of Biology and Medicine at Battelle-Northwest is reported The research activities in the following areas are included radiation effects studies ^{90}Sr studies in miniature swine, inhalation studies, space nuclear systems studies, radioelement toxicity studies radioelement removal studies molecular and cellular level studies terrestrial ecology studies and aquatic ecology studies NSA

N69-19902*# Environmental Research Associates Randallstown Md
CORRELATION STUDY OF THE SIMULATION OF GEMINI EXTRAVEHICULAR ACTIVITY WITH FLIGHT RESULTS
Harry L Loats Jr G Samuel Mattingly and G M Hay Washington NASA Feb 1969 199 p refs
(Contract NAS1-7142)
(NASA-CR-1146, ERA-67-7) Avail CFSTI CSCL 22A

The water immersion simulation of the Gemini EVA utilized full-scale mockups of the Gemini vehicle including portions of the Agena target vehicle with valid replicas of ancillary EVA equipment such as tools astronaut maneuvering unit etc All important items were maintained in a neutrally bouyant condition Bio-instrumentation was incorporated into the Gemini flight suits and continuous voice and film records were obtained The water immersion simulation of the Gemini extravehicular activity provided a valid training time line for performance of complex extravehicular tasks and provided adequate measures of the level of work entailed A second capability evidenced as a result of the program was the method for evaluating various competitive hardware concepts such as tools and motion restraints The technique used in the preflight evaluation and training was to perform the simulation run with ERA subjects prior to actual performance of the training run by the astronaut This technique permitted pre-evaluation of hardware in a repetitive manner and served to assess the validity of the water simulation mode Factors such as drag-damping and orientational stability were compensated by variation of the mockup orientation and configuration Author

N69-20001 Massachusetts Inst of Tech, Cambridge Electronics Lab
LINGUISTICS
In its Electron Lab Res Activities 15 Jul 1968 p 221–240 refs (See N69-19981 09-34)
(Contract DA-28-043-AMC-02536(E) Grant NIH MH-13390-02)
Avail CFSTI

Compatibility between phonetic clicks and ejectives in a variety of the Hottentot language is studied by analyzing the velar glottalic affricative type clicks that are different from the rest of the click phonemes and by transposing this classification into our system of distinctive features Stridency turns out to be the true distinctive feature of the dialect affricates and of the four clicks described Also discussed is the vowel system in Faroese language G G

N69-20003 Massachusetts Inst of Tech Cambridge Electronics Lab
COMMUNICATIONS BIOPHYSICS
In its Electron Lab Res Activities 15 Jul 1968 p 251–282 refs (See N69-19981 09-34)
(Contract DA-28-043-AMC-02536(E), Grants NIH 1-PO1-GM-14930-02, NIH 5-TO-1-GM-01555-02)
Avail CFSTI

Marked and consistent changes in click evoked potentials of the deep rat cortex showed a high correlation with changes of sleep and wakefulness The marked increase in all components of the deep response appear generally to be less variable than the more complex changes in the surface responses G G

N69-20009*# Naval Medical Research Inst, Bethesda, Md Dept of Microbiology
EFFECTS OF HIGH AND LOW BAROMETRIC PRESSURES ON SUSCEPTIBILITY AND RESISTANCE TO INFECTION Quarterly Status Report, 1 Oct –31 Dec 1968
Francis B Gordon and James D Gillmore 31 Dec 1968 22 p refs
(NASA Order R-21-010-010)
(NASA-CR-100360, A-3061A(AS-1), QSR-14) Avail CFSTI CSCL 06S

Animal chamber technology was advanced to allow body temperature maintenance of mice under H_2 environments and a new host–virus test system was developed, Coxsackie B virus–adult mouse Exposure of mice to 100% O_2 at 3 3 psia before aerosol challenge with *Chlamydia trachomatis* did not result in the increased mortality rate seen in mice exposed after aerosol challenge A reduction in mortality in mice injected intraperitonially with *C psittaci* is present in those groups exposed to 77% O_2 after, or before and after injection Exposure of strain A/HeJ mice to hyperoxia and hypoxia following intravenous inoculation of the carcinogen dibenzanthracene resulted in a significantly greater incidence of pulmonary adenomas in the hyperoxic group K R G

N69-20033# Ohio State Univ Columbus Dept of Aviation
EXPERIMENTAL TRAINING PROGRAM UTILIZING AN INTEGRATED VFR-IFR CURRICULUM Final Report
M Faster and W Hubbard Aug 1968 198 p
(Contract FA67WA-1814)
(FAA-DS-68-24) Avail Issuing Activity

A curriculum which combines the teaching of the private pilot flight skills with those necessary for full instrument privileges in the National Airspace System was designed and evaluated The evaluation consisted of implementing the curriculum using an experimental group of zero time students and comparing their flight performances with those of two control groups The private pilot control group and the instrument rating control group used the

appropriate FAA approved school curriculum The integrated VFR-IFR curriculum called for 75 total flight hours in about 60 periods A key feature of this curriculum was the introduction of all pertinent maneuvers using instrument references first and then followed by visual references The relationships between the two sources of information were emphasized The experimental curriculum, although producing a superior private pilot failed to develop the complex skills judgment and command ability necessary for the instrument rating Author

N69-20048 California Inst of Tech Pasadena
VISUAL ACUITY AND EYE MOVEMENTS
David Scott Gilbert (Ph D Thesis) 1968 188 p
Avail Univ Microfilms HC $8 60/Microfilm $3 00 Order No 68-12739

Evidence supports the hypothesis that eye movements serve to improve acuity By measuring eye movements during a simple acuity task and during a control non-acuity task we have shown that certain patterns of eye movement are characteristic of acuity tasks Similarly, specific patterns of eye movement are generated during spatial localization tasks The observations provide circumstantial evidence for the existence of mechanisms by which eye movements mediate acuity and spatial localization information Through a comparison of acuity for stabilized retinal images with acuity for normal retinal images we have found that eye movements improve acuity very slightly at most, and that even this small improvement may be adequately accounted for by the residual fadeout effects commonly observed during prolonged viewing of stabilized images Dissert Abstr

N69-20134# RAND Corp Santa Monica Calif
AIRCREW RATIO STUDIES A CONTINUATION
Alan J Gross Dec 1968 69 p ref
(Contract F44620-67-C-0045)
(AD-680763 RM-5843-PR) Avail CFSTI CSCL 5/9

A probability model was developed for aircrew ratios that accounts for unscheduled as well as scheduled sorties Considered are factors of aircraft and crew utilization reserve crew requirements and unscheduled sortie requirements A Poisson distribution is assumed for the number of unscheduled sorties and a probability distribution is assumed for the number of planes per sortie Formulas are derived for the number of scheduled flights during the flying period for a generalized crew ratio for the additional crews expected to be scheduled and for variance in number of additional crews A JOSS program is given for calculating aircrew ratios based on the model The basic parameters are (1) sortie rate per day per aircraft (2) proportion of time a crew is scheduled to fly (3) proportion of time a crew is scheduled in reserve Tables are provided for determining the crew ratios when these parameters are varied It can be concluded from the model that crew ratios increase as (1) the proportion of unscheduled sorties increases (2) crew unavailability increases and (3) sortie rates increase Also, reserve crew scheduling affects crew sensitivity when the reserve scheduling proportion is relatively high Author (TAB)

N69-20138# School of Aerospace Medicine Brooks AFB Tex
BEHAVIORAL AND CIRCULATORY RESPONSES TO X-IRRADIATION DELIVERED AT 200 RADS PER MINUTE TO WHOLE BODY AND TRUNK ONLY Technical Report, Jun –Nov 1967
Paul H Chapman Sep 1968 13 p refs
(AD-680843 SAM-TR-68-111) Avail CFSTI CSCL 6/18

Macaca mulatta monkeys performing a continuous avoidance task received high energy x-irradiation delivered to either whole body or trunk only at a dose rate of 200 rads per minute Prior to and during the 88-minute period of irradiation, performance and blood pressure were monitored in both groups of subjects Results support the concept that at this dose rate of radiation exposure immediate behavioral changes seen after absorption of relatively low superlethal doses reflect radiation effects on structures located within the trunk of the subject No significant synergism between head and trunk effects appears to exist At higher doses, prominent signs of direct central nervous system damage determine the behavioral effect A phase of partially reversible hypotension is demonstrated after 1,200 to 1,600 rads are delivered at this dose rate This hypotension appears to be due largely to an effect of radiation on trunk structures Author (TAB)

N69-20169*# Aztec School of Languages Inc Acton Mass
PHYSIOLOGICAL PROBLEMS DURING PROLONGED WEIGHTLESSNESS [FIZIOLOGICHESKIYE PROBLEMY DLITEL'NOY NEVESOMOST]
N N Gurovskiy et al Washington NASA Mar 1969 8 p Transl into ENGLISH of Russian Conf Paper Presented at the 3d Intern Symp on the Basic Environ Probl of Man in Space Geneva 15–19 Nov 1968
(Contract NASw-1692)
(NASA-TT-F-12100) Avail CFSTI CSCL 06S

Physiological problems which occur during prolonged weightlessness are discussed in terms of an analysis of the data obtained from the short-term weightlessness experiment of two dogs on board the Kosmos-110 The phenomena discussed (weight loss, disorder in ionic equilibrium loss in water of the tissues, etc) are used to explain how protective measures must be taken for future prolonged space flights Author

N69-20199*# National Aeronautics and Space Administration Washington, D C
NOTES ON THE STRUCTURE AND FUNCTION OF THE BRAIN TABLE OF CONTENTS, ABSTRACT, PREFACE AND INTRODUCTION
S A Sarkisov Mar 1969 24 p refs Transl into ENGLISH from the book "Ocherki Po Strukture i Funktsii Mozga" Moscow, Medicine Publishing House, 1964 p 3–17 Prepared by Frank C Farnham Co
(NASA-TT-F-12210) Avail CFSTI CSCL 06P

A general picture is presented of the entire human and animal central nervous system Three factors determine the general structure and functional organization of the central nervous system (1) the character and location of the receptors of the given organ, (2) the character and location of neurons forming the connections between afferent and efferent formations of the nervous system (3) the character and distribution of the efferent apparatus The structure of the cortex of the cerebral hemispheres is studied in the following subchapters (1) the convolutions of the cerebral hemispheres (with illustrations of the inner and outer surfaces) (2) cyto- and myelo-architecture, and (3) myelo-architecture of the cortex It is stated that the grey matter is richer in blood vessels than the white matter and that the density of the capillary network is related to the number of nerve cells It is also stressed that the blood circulation in the brain and the spinal cord is mutually dependent on the circulation of the cerebrospinal fluid Author

N69-20205# Army Foreign Science and Technology Center, Washington D C
GROWTH OF MICROORGANISMS IN MEDIA WITH PETROLEUM FUELS
N N Grechushkina 1968 9 p refs Transl into ENGLISH from Vestn Mosk Univ Ser Vi Biol Pochvoved (Moscow) v 23 no 2 1968 p 122–124
(AD-680804 FSTC-HT-23-785-68) Avail CFSTI CSCL 6/13

It was ascertained that representatives of both Mycobacteria and Pseudomonas can grow in kerosene TS-1 and T-1 diesel and

hydrogenated fuels Mycobacteria mucosum and M lacticolum grow well in kerosene and hydrogenated fuels Diesel fuel with a sulfur content of 1 6% was utilized slightly by them gasoline was not used at all Pseudomonas grow well in kerosene TS-1 and T-1 and diesel fuel and hydrogenated fuel and gasoline B-70 Thus of all tested microorganisms, only the strain Pseudomonas pyocyaneum can grow in aeronautical gasoline The intensity of growth of various strains of the same bacteria in the same fuel is not uniform Author (TAB)

N69-20224*# Texas Christian Univ , Fort Worth Dept of Psychology

FRACTIONATION OF DISTANCE IN SIMULATED SPACE

Robert P Markley, Bill R Brown and Malcolm D Arnoult 30 Nov 1968 27 p refs

(Grant NGR-44-009-018)

(NASA-CR-73306) Avail CFSTI CSCL 05I

Sixteen subjects (S) made halving and doubling judgments of the distance of an object over two ranges in a simulated outer space The psychophysical functions obtained were consistent with previous findings The effects of response procedure relative effectiveness of distance cues distance range differences and Ss accuracy in judgments were discussed Author

N69-20236# Army Medical Research Lab Fort Knox Ky

COUPLING EFFECTS AND PERFORMANCE IN VIGILANCE TASKS Progress Report

Jimmy L Hatfield and David R Soderquist 30 Aug 1968 27 p refs

(AD-680912 USAMRL-789) Avail CFSTI CSCL 5/10

This investigation examined the performance of 32 Ss on two (auditory and visual) 90-min vigilance tasks Conventional and TSD indices were obtained as a function of coupling sense mode and time on task Order effects correlations between sense modes and possible effects of observing responses were also examined Hits and false alarms were noted There was no significant decline in d over time on task for either sense mode or coupling condition In general, data on conventional measures of performance was similar for both auditory and visual tasks, regardless of the coupling conditions Significant cross-modality correlations were obtained The results are discussed in terms of expectancy theory and an observing response model Author (TAB)

N69-20251# Charles F Kettering Research Lab Yellow Springs, Ohio

SPECTRAL LIGHT REQUIREMENTS OF ALGAE Final Report, 1 Jul 1965–1 Jul 1967

Thomas E Brown Oct 1968 228 p refs

(Contract DA-19-129-AMC-565(N))

(AD-680972 TR-69-45FL 82) Avail CFSTI CSCL 6/3

Seventeen species of algae representing ten taxonomic divisions were individually grown in white light and light of nine separate 10 nm bandwidths corresponding to the major absorption peaks of known photoactive pigments Energy levels of the incident light were equalized through the entire series approximating 15 000 ergs/sq cm/sec Measurements of growth pigmentation photosynthesis, respiration and where possible morphology and structure were made following seven to ten days continuous exposure to the light regimes The rates of photosynthesis and subsequent respiration were determined using the same full light regime as for growth Light enhancement characteristics and wavelength requirements are shown for these parameters and compositions of specific illumination sources are suggested Author (TAB)

N69-20259# Army Medical Research Lab Fort Knox Ky

IMPULSE DURATION AND TEMPORARY THRESHOLD SHIFT Interim Report

Michel Loeb and John L Fletcher 25 Sep 1968 20 p refs

(AD-680916 USAMRL-791) Avail CFSTI CSCL 6/19

Subjects were exposed, on different test days to 166 dB (peak normal incidence) impulses 34 58 72 or 96 microsec in duration spaced 1 sec apart For each pulse duration the subjects were first exposed to one pulse, then the number of pulses was doubled on successive days until the temporary threshold shift (TTS) following exposure exceeded 30 dB Intercorrelations of numbers of impulses required to reach criterion TTS at each duration were obtained There is reason to believe that if one exceeds allowable TTS in the speech range frequencies with this kind of impulse noise there is a chance of producing permanent high frequency loss Author (TAB)

N69-20260# Pasadena Foundation for Medical Research Calif Dept of Laser Biology

THE EFFECT OF LASER ENERGY ON CELLS IN TISSUE CULTURE Annual Summary Report

Donald E Rounds 6 Jan 1969 20 p refs

(Contract DA-49-193-MD-2564)

(AD-680946, REPT-1) Avail CFSTI CSCL 6/18

Ruby laser irradiation causes nonpigmented cells to deposit an agent into the surrounding culture medium which can promote RBC agglutination blood clotting WBC chemotaxis and stimulation of cell growth Blue and green laser wavelengths produce mitochondrial swelling in beating rat heart cells Morphological changes suggest that a toxic substance is lost from these structures which results in nuclear pycnosis and death of the cell A variety of drugs were observed to photosensitize individual mitochondria to an argon laser microbeam These included various forms of tetracycline DNP, amytal and NaF Author (TAB)

N69-20288# School of Aerospace Medicine Brooks AFB Tex

THE CALCULATION OF RETINAL BURN AND FLASHBLINDNESS SAFE SEPARATION DISTANCES Summary Report, Nov 1966–Feb 1968

R G Allen T J White D J Isgitt D E Jungbauer and J H Tips Sep 1968 54 p refs

(AD-680842 SAM-TR-68-106) Avail CFSTI CSCL 6/5

The report describes a method for calculating safe separation distances from a nuclear fireball from the standpoint of permanent injury (chorioretinal burns) and temporary effects (flashblindness) Weapon characteristics atmospheric transmission and the interaction of radiant energy with the eye are discussed Predicted safe separation distances from a nuclear flash for humans are presented as functions of observer altitude height of burst weapon yield and day or night conditions Author (TAB)

N69-20298# Federal Aviation Administration Oklahoma City, Okla Office of Aviation Medicine

PERIPHERAL VISION CUES THEIR EFFECT ON PILOT PERFORMANCE DURING INSTRUMENT LANDING APPROACHES AND RECOVERIES FROM UNUSUAL ATTITUDES

Paul E Young, A Howard Hasbrook N S Daniels T L Dalbow and R J Melton May 1968 20 p refs

(AM-68-12) Avail CFSTI

A previous study utilizing a Convair 340 aircraft simulator showed that peripheral vision cues relating to bank angle significantly improved pilot performance while flying high altitude holding patterns during simulated instrument conditions This current study explores the effects of similar peripheral vision cues on the performance of 20 ATR pilots during a more exacting task (simulated instrument landing approaches) in a Boeing 720 jet aircraft simulator Recoveries from unusual attitudes were also investigated Results of the study suggest that peripheral vision cues (1) improve control of bank angle during instrument approaches, (2) may be safely substituted in an emergency for a failed attitude

indicator and (3) result in significantly less time being required for recovery from unusual attitudes Significantly no reversals were observed during recoveries utilizing peripheral vision cues
Author

N69-20303# Federation of American Societies for Experimental Biology Washington D C Life Sciences Research Office
A STUDY OF FACTORS THAT AFFECT THE PERFORMANCE OF ARMY FLIGHT CREW PERSONNEL Interim Report
Jan 1969 46 p refs
(Grant DAHC19-68-C-0001)
(AD-681239) Avail CFSTI CSCL 6/19

The study was conducted as a portion of a comprehensive review of the biomedical aspects of human performance to provide the Office of the Chief of Research and Development with the most current information on the performance of the soldier The report identifies the need for performance requirements and reviews the factors that influence the performance proficiency of Army flight crew personnel
Author (TAB)

N69-20318*# Aztec School of Languages Inc Acton Mass
INVESTIGATIONS OF THE ORIGIN OF NYCTITROPIC MOVEMENTS OF LEAF ORGANS [UNTERSUCHUNGEN UBER DIE ENTSTEHUNG DER SCHLAFBEWEGUNGEN DER BLATTORGANE]
W Pfeffer Washington NASA Jan 1969 183 p refs Transl into ENGLISH from Akad Wiss (Leipzig) Abhandl Math -Nat Kl v 30 1907 p 257–472
(Contract NASw-1692)
(NASA-TT-F-11949) Avail CFSTI CSCL 06C

Research was conducted on the origin of circadian movement periodicity and the significance of light cycling while temperature and other external conditions were maintained constant and at suitable levels Different types of specimens with good nyctitropic activity and among these primarily deciduous leaves were taken into consideration A few results are summarized below The nyctitropic movements of the leaves and blossoms irrespective of whether they are carried out as the result of growth of variation are photonastic or thermonastic reaction phenomena which occur because of the daily change of illumination and/or temperature Accordingly the nyctitropic movements disappear in plants which are brought into constant illumination and temperature and do not appear at all in plants which were raised at a constancy of illumination and temperature After the elimination of the nyctitropic movements the organs are however only without movement if autonomous movements leave them which where they are present, occur as a rule in a much shorter rhythm
B P

N69-20319# Joint Publications Research Service Washington D C
TRANSLATIONS ON EASTERN EUROPE SCIENTIFIC AFFAIRS, NUMBER 40
25 Feb 1969 67 p refs Transl into ENGLISH from various Foreign articles
(JPRS-47526) Avail CFSTI

Fifty years of operation of the medical faculty at the State University in Sofia, Bulgaria are reviewed Specifically the faculty achievements, and workings of the neurological and psychiatric departments are discussed An assessment is made of analog computer technology in East Germany The status of analytical chemistry in Hungary is reviewed The philosophy and personnel involved with the Polish Academy of Science are presented The treatment of mustard gas injuries is briefly discussed
B P

N69-20358# Oregon State Univ Corvallis Radiation Center
METABOLISM AND PHARMACOLOGY OF INORGANIC AND FLUORINE CONTAINING COMPOUNDS Final Report, 1 Jul 1964–30 Jun 1967
Frank N Dost Donald J Reed Arthur Finch and Chih H Wang Wright-Patterson AFB Ohio (AMRL) Aug 1968 105 p refs
(Contract AF 33(615)-1799)
(AD-681161 AMRL-TR-67-224) Avail CFSTI CSCL 6/20

Studies have been made of the toxicology and chemistry of nitrogen trifluoride tetrafluorohydrazine chlorine trifluoride bromine pentafluoride and oxygen difluoride Lethality of each agent by inhalation has been determined as well as estimates of lethality after intraperitoneal administration Experimental evidence suggests that the lethal effect of interhalogens is by corrosive local destruction of pulmonary surfaces, resulting in failure of gas exchange Oxygen difluoride is thought to pass intact into the pulmonary cells where it reacts with biochemical reducing systems to ultimately cause cell death and structural failure The nitrogen fluorides both cause intrinsically lethal levels of methemoglobin formation but other pharmacologic activity by these compounds or their derivatives may also contribute to their toxic activity
Author (TAB)

N69-20360# Army Medical Research Lab Fort Knox Ky
LASER-INDUCED CHANGES IN THE IMPLICIT TIME AND OSCILLATORY POTENTIALS OF THE MANGABEY Progress Report
Arthur E Jones Albert H Bryan and Calvin K Adams 4 Oct 1968 16 p refs
(AD-680913 USAMRL-793) Avail CFSTI CSCL 6/5

The ERG of the mangabey was found to be altered by a single laser pulse of low energy density (0 2 J/cm2) which irradiated a large retinal area ERGs recorded 6 or more days post-exposure showed a depression or absence of the third oscillatory potential The implicit time of the b wave was significantly shorter ($p < 001$) post-exposure Replication of the study with testing at 6-10 days and 6 months post-exposure revealed statistically significant post-exposure ERG changes persisting up to 6 months
Author (TAB)

N69-20361# Systems Research Labs Inc San Antonio Tex
RESEARCH WITH THE PRIMATE EQUILIBRIUM PLATFORM IN A RADIATION ENVIRONMENT Technical Report, Jan –Sep 1967
Donald J Barnes Aug 1968 15 p refs
(Contract AF 41(609)-2724)
(AD-680748 SAM-TR-68-81) Avail CFSTI CSCL 6/18

A revised Primate Equilibrium Platform (PEP II) was designed and constructed to further investigate the effects of pulsed ionizing radiation on the equilibrium function Twenty rhesus monkeys were trained to maintain a platform-horizontal position by the manipulation of a joy stick Thirteen of the primates received an approximate midhead dose of 1,000 rads and 6 received an approximate midhead dose of 2,500 rads One animal was omitted from the final results owing to a technical problem After irradiation, 13 animals were tested for 1 hour and the remaining 6 animals were tested for 3 hours as these were actually two separate experiments 4 months apart The major dependent variable was the time spent on horizontal per trial Results demonstrated a definitive dose-level effect in the occurrence of early performance decrement The operational significance of this finding as well as the recovery phenomenon seen in all cases, indicates the importance of continued research in this area
Author (TAB)

N69-20371# Aerospace Medical Research Labs Wright-Patterson AFB Ohio
MUSCLE FUNCTION AND THE SPACE ENVIRONMENTS OF WEIGHTLESSNESS AND ACCELERATION Final Report, Dec 1965–May 1967
Stanley J Myers Jun 1968 31 p refs
(AD-680801 AMRL-TR-67-162) Avail CFSTI CSCL 6/19

Little is known about the effects of prolonged weightlessness and acceleration on the muscular system This survey reviews basic

muscle physiology and discusses the possible effects of these space flight stresses on muscle function Anatomical biochemical and electrophysiological methods for evaluating the state of the muscular system are reviewed A selected annotated bibliography concerned with the effects of weightlessness and acceleration on muscle is also included Author (TAB)

N69-20384# Eye Research Foundation of Bethesda Md
CHROMATICITY AND LUMINANCE EFFECTS ON VISUAL DETECTION Final Report, 1 Apr 1967–31 Mar 1968
Carl R Cavonius Rudolf Hilz and Jerome H Kravitz Nov 1968 55 p refs
(Contract DA-49-193-MD-2839)
(AD-680938 ERF-RR-2/68-CR) Avail CFSTI CSCL 5/10

Wavelength discrimination functions were measured with square-wave grating test objects in which alternate sets of bars were illuminated with two different wavelengths When both wavelengths are made equal in brightness, the wavelength difference required to detect the grating increases monotonically with grating spatial frequency Since this relation is approximately constant across the visible spectrum the shape of the wavelength discrimination function tends to be preserved at high spatial frequencies although much higher wavelength differences are needed to detect the high frequency gratings Introducing a detectable brightness mismatch between the two wavelengths results in (1) a reduction of the wavelength difference needed to detect a hue difference between adjacent grating bars and (2) a minimum in the threshold wavelength difference versus spatial frequency function Under these conditions wavelength difference no longer increases monotonically with spatial frequency The resulting functions resemble those previously reported for threshold luminance contrast versus spatial frequency The relation of these results to form detection and to lateral inhibition is discussed Author (TAB)

N69-20385# Applied Psychological Services Wayne Pa Science Center
A PORTABLE TEST BATTERY FOR COMPARATIVELY EVALUATING OPERATOR PERFORMANCE IN FULL-PRESSURE SUIT ASSEMBLIES Final Report, Jun 1967–Mar 1968
Arthur I Siegel and Richard S Lanterman Wright-Patterson AFB Ohio AMRL Oct 1968 89 p refs
(Contract F33615-67-C-1755)
(AD-680825 AMRL-TR-68-74) Avail CFSTI CSCL 6/17

Recommendations for a portable battery of tests to assess human mobility in full-pressure suits are presented The literature was reviewed to determine the types of instruments and tests employed by prior investigators Task analyses were performed on three advanced vehicles to determine the body member-movement families most frequently involved A set of tests and measurements is suggested for those member-movement families found to be most frequently involved in advanced flight Necessary future steps for realizing the portable battery are suggested The test battery recommended includes the Purdue Peg Board for finger dexterity a specially designed apparatus for the strength of various body movements a single dimension tracking task for various coordination tests a Leighton Flexometer and direct measurement devices for range of movement and static anthropology measurements Author (TAB)

N69-20386# Hamilton Standard Windsor Locks Conn
ENGINEERING DESIGN STUDY OF A SPACE SUIT WITH AN INTEGRATED ENVIRONMENTAL CONTROL SYSTEM Final Report, 1 Jul 1967–30 Jun 1968
Douglas C Howard Wright-Patterson AFB Ohio AMRL Oct 1968 167 p
(Contract F33615-67-C-1946)
(AD-680826 AMRL-TR-68-122) Avail CFSTI CSCL 6/11

Continued success in coping with the space environment has led to increased crewman confidence in his ability to perform useful work during extraterrestrial missions Future missions will require advanced suit/life-support-system concepts Such a concept might logically take the form of a space suit for extravehicular activity with an integrated environmental control system A design study of this concept has been performed and drawings prepared in sufficient detail to permit fabrication of a working model in a suitably equipped model shop Integration of the environmental control system within the hard torso of the suit assembly resulted in a system having a packaging density approaching 80 percent and able to pass through a 27 inch diameter hatch The system will support a crewman working at 375 Kcal/hour for an indefinite time to a recharge in space capability Author (TAB)

N69-20441# Air Force Systems Command Wright-Patterson AFB Ohio Foreign Technology Div
APPLICATION OF THE METHOD OF CHARACTERISTICS FOR THE CALCULATION OF FLOW AROUND BLUNTED CONES BY A SUPERSONIC STREAM OF AIR
R A Gzhelyak et al 24 May 1968 14 p refs Transl into ENGLISH from Vychislitel naya Tsentr Sb Rabot (Moscow) no 7, 1967 p 197–205
(AD-681268 FTD-HT-23-40-68) Avail CFSTI CSCL 20/4

This article deals with the application of the method of characteristics to calculations of a supersonic region of the flow near a blunt body and is based on the available data obtained from the detailed analyses of dissociation and ionization processes taking place behind a shock wave Boundary conditions on the body and shock wave are used in the form which coincides with the case of a perfect gas with constant heat capacities because all physicochemical processes are considered frozen when passing through a shock front Calculations of the flow field between the body and shock wave were carried out progressively by regions bounded by the reflected characteristics The results of the calculations of the air flow past blunt cones are presented as an illustrative example and are compared with those for an equilibrium flow The comparison of pressure and density distributions along blunt cones is presented in graphical form TAB

N69-20447# Air Force Systems Command, Wright-Patterson AFB Ohio Foreign Technology Div
THE CONNECTION OF METRICS OF VISUAL AND AUDIO SPACES FOR A METHOD OF TRANSFORMING AN IMAGE INTO SOUND
V G Grishin 3 May 1968 10 p refs Transl into ENGLISH from the book Vsesoyuznaya Nauchn Sessiya Posvyashchennaya Dnyu Radio (220) Sekts Bioniki Dokl Moscow 1966 p 55–60
(AD-681260 FTD-HT-23-1666-67) Avail CFSTI CSCL 6/4

The author elsewhere proposed and studied experimentally methods for image-to-sound conversion aiming at unburdening the vision of operators It is of interest to study the given transformation algorithm from the point of view of general criteria of the pattern recognition theory without direct connections with operator psychology Consequently the criteria, such as the interval between the classes of images and metric parameters of classes in N-dimensional index spaces within which one can realize (as points) arbitrary classes are investigated mathematically Technical limitations are compared with the results of mathematical simplifications of the exact theory Author (TAB)

N69-20448# Human Engineering Labs Aberdeen Proving Ground Md
THE EFFECT OF ATTENTION ON AUDITORY EVOKED POTENTIALS

Lynn C Oatman Oct 1968 48 p refs
(AD-681207 HEL-TM-15-68) Avail CFSTI CSCL 6/16

Click-evoked potentials were recorded from unanesthetized cats with electrodes chronically implanted in the auditory cortex cochlear nucleus and round window The clicks (irrelevant stimuli) were presented continuously as background before, during and after the presentation of a visual discrimination task (relevant stimuli) which attempted to alter the attentive state of the animals The mean peak-to-peak amplitudes of averaged click-evoked responses from six adult female cats were significantly smaller during attention to the visual discrimination stimuli when compared with the pre-discrimination and control periods This relationship was present at all electrode placements for five experimental animals with middle ear muscles cut as well as one control animal with middle ear muscles intact The results suggest that during attention a central inhibitory mechanism independent of middle ear muscles modifies click-evoked responses possibly via the olivo-cochlear bundle which terminates on the hair cells in the cochlea Author (TAB)

N69-20483# Stanford Univ , Calif Dept of Computer Science
MACHINE LEARNING OF HEURISTICS
Donald Arthur Waterman (Ph D Thesis) Dec 1968 226 p refs
(ARPA Order SD-183 ARPA Order 457)
(AD-681027 SU-CS-118 SU-AI-74) Avail CFSTI CSCL 6/4

First a method of representing heuristics as production rules is developed which facilitates dynamic manipulation of the heuristics by the program embodying them This representation technique permits separation of the heuristics from the program proper provides clear identification of individual heuristics is compatible with generalization schemes and expedites the process of obtaining decisions from the system Second procedures are developed which permit a problem-solving program employing heuristics in production rule form to learn to improve its performance by evaluating and modifying existing heuristics and hypothesizing new ones either during a special training process or during normal program operation Third the above-mentioned representation and learning techniques are reformulated in the light of existing stimulus-response theories of learning and five different S-R models of human heuristic learning in problem-solving environments are constructed and examined in detail Experimental designs for testing these information processing models are also proposed and discussed Finally the feasibility of using the aforementioned representation and learning techniques in a complex problem-solving situation is demonstrated by applying these techniques to the problem of making the bet decision in draw poker This application, involving the construction of a computer program demonstrates that few production rules or training trials are needed to produce a thorough and effective set of heuristics for draw poker Author (TAB)

N69-20489# School of Aerospace Medicine Brooks AFB Tex
EFFECT OF HEAD VERSUS TRUNK FISSION-SPECTRUM RADIATION ON LEARNED BEHAVIOR IN THE MONKEY, NOVEMBER 1967–FEBRUARY 1968
Paul H Chapman and Robert J Young Aug 1968 17 p refs
(AD-680740 SAM-TR-68-80) Avail CFSTI CSCL 6/18

Twenty-two Macaca mulatta monkeys trained to a discrete avoidance task were divided into three groups for exposure to either head only trunk only or whole-body radiation with a pulsed fission source A total dose of 6 250 rads was delivered in a 20-msec pulse Trained behavior and blood pressure were monitored continuously during the first hour postirradiation Results indicate that (1) head or trunk irradiation will produce deterioration in performance (2) early performance decrement results primarily from a direct effect of radiation on cephalic structures (3) this head effect is dose-rate dependent (4) trunk effects are significant in producing a more uniform early decrement and a more severe later decrement and (5) the hypotensive response seen immediately after whole-body radiation is secondary to radiation effects within the trunk Author (TAB)

N69-20509# Aerospace Medical Research Labs Wright-Patterson AFB Ohio
VISUAL SEARCH AND DETECTION UNDER SIMULATED FLARE LIGHT Final Report
Robert Hilgendorf Aug 1968 24 p refs
(AD-681129 AMRL-TR-68-112) Avail CFSTI CSCL 6/16

Preliminary laboratory research on methods for evaluation aerial flare sources and for optimizing their placement are described Ten subjects performed target acquisition (detection and recognition) tasks under simulated flare light and ten, serving as controls under simulated daylight conditions Generally target acquisition required an average of approximately 90 seconds under four simulated Mark 24 flares dropped 0 25 mile apart and ignited at 2 000 feet, compared with an average of about 15 seconds under simulated sunlight (simulating those light conditions characteristic of a partly cloudy day) Target location contributed significantly to response times There were no statistically significant differences in response times between the two types of targets used (trucks and antiaircraft weapon sites) Author (TAB)

N69-20512# System Development Corp , Santa Monica, Calif
A MATHEMATICAL MODEL OF TRANSFORMATIONAL GRAMMARS
Seymour Ginsburg and Barbara Partee (Calif Univ Los Angeles) 18 Jun 1968 61 p refs
(Contract F19628-67-C-0008 Grant AF-AFOSR-1203-67)
(AD-680784 SDC-TM-738/048/00 SR-21 AFCRL-68-0470) Avail CFSTI CSCL 5/7

A mathematical model of transformational grammars is presented which incorporates most current versions Among other things the model has a formal definition of transformations and a general scheme for ordering them Numerous examples are given to illustrate the theory Author (TAB)

N69-20519 School of Aerospace Medicine Brooks AFB Tex
UNIQUE ALTITUDE CHAMBER FOR INFECTIOUS DISEASE RESEARCH UNDER AEROSPACE PROFILES, AUGUST 1959–MARCH 1968
E Staten Wynn Lawrence F Busch, and Irving Davis Sep 1968 27 p
(AD-680820, SAM-TR-68-94) Avail CFSTI CSCL 6/12

An altitude chamber has been developed which is adapted to infectious disease research Long-term mammalian experimentation can be carried out under pressures ranging from ambient to 50 000 ft simulated altitude oxygen contents ranging from near 100% to as low as compatible with mammalian life PCO2 up to 10% and temperature from ambient to 10C Recorders continuously register these parameters and the relative humidity A lock allows entry without interruption of the experiments Personnel safety features include individual oxygen regulators an intercommunication system windows for visual monitoring manually operated valves for emergency recompression an external location of electrical connections and switches fireproof clothing and a sprinkler system automatically activated by ultraviolet radiation A high-intensity unltraviolet unit initially used for decontamination of exhaust gases is being replaced by an incinerator Ample penetrations are available for telemetry or other instrumentation Use of gases such as helium as well as low-level cobalt-60 radiation can be instituted with minor modifications Author (TAB)

N69-20520# School of Aerospace Medicine Brooks AFB Tex
AUDIOMETER MODIFICATION AND PULSE-TONE TECHNIC FOR PURE-TONE THRESHOLD DETERMINATION, 15 NOVEMBER 1967–1 MARCH 1968
Vernon C Bragg and Frederick G Collins Sep 1968 12 p refs
(AD-680743 SAM-TR-68-91) Avail CFSTI CSCL 6/16

The ears of twenty-five people having normal hearing were tested by a single-descent pulse-count procedure of threshold determination Pulse trains were produced by a modified telephone dial which keyed a manual audiometer Six frequencies were tested Results were compared with thresholds obtained using a fixed-frequency instrument of the Bekesy type No significant differences were found between threshold measures made by the two methods Test-retest by the pulse-count procedure indicated that reliability compared favorably with that of other threshold measures The test is recommended for use in clinical audiometry particularly where assurance is needed that the subject hears at *least at a given level Among examples of its uses are testing* candidates for flight training and bone-conduction testing to predict results of middle ear surgery Author (TAB)

N69-20524# Army Medical Research Lab Fort Knox Ky Biophysics Div

CORNEAL INJURY PRODUCED BY CARBON DIOXIDE LASER RADIATION Final Report

Howard M Leibowitz and George R Peacock 16 Aug 1968 40 p refs

(AD-680915 AMRL-787) Avail CFSTI CSCL 6/5

The pathological effects upon the eye of exposure to infrared laser radiation emitted by a CO2 laser was studied A total of 142 rabbit eyes was irradiated at varying dose levels and each was observed for a period of two months Within the limits of the power outputs and exposure times considered clinically detectable ocular damage was limited to the cornea Five clinical levels of corneal *injury were defined and the dosage of CO2 laser radiation capable of* producing each level of injury was determined Author (TAB)

N69-20534# School of Aerospace Medicine, Brooks AFB Tex

THE USE OF YELLOW LENSES IN AIR FORCE OPERATIONS

Benjamin Kislin, J W Miller Benjamin G Martin and Richard H Dohrn Sep 1968 44 p refs

(AD-681119 SAM-TR-68-93) Avail CFSTI CSCL 17/8

It was suggested that yellow lens spectacles would provide aircrew in defoliation missions with an easier recognition capability in distinguishing treated areas from virgin jungle Correspondingly *spectrophotometric analyses of filter lenses and photographic* transparencies of terrain were made Also the yellow Kalichrome C ophthalmic lens during low-level training flights at 500 to 1 000 ft and at speeds of 450 to 500 kn were evaluated by F-4 pilots TAB

N69-20536# Little (Arthur D) Inc Cambridge Mass

WATER VAPOR REMOVAL SYSTEM Final Report, 15 Nov 1965–15 Mar 1968

John M Ketteringham and Heinz P Beutner Wright-Patterson AFB, Ohio AMRL Oct 1968 101 p refs

(Contract AF 33(615)-3385)

(AD-681164, AMRL-TR-68-42) Avail CFSTI CSCL 6/11

An *investigation has been undertaken of a novel method* for the dehumidification of air that would be of particular utility in manned space enclosures The method relies on the unique permeation behavior of gas vapor mixtures through microporous membranes under a pressure gradient Under appropriate conditions a microporous membrane can become virtually semipermeable to the vapor component (water) of a gas-vapor mixture (humid air) A search was made for the most suitable microporous membrane for this purpose The fundamental characteristics of the permeation process were studied for selected membrane materials Prototype dehumidification units were then constructed of the best membrane *material a porous silica glass and tested A prototype approximating* a one-man capacity was submitted for evaluation Author (TAB)

N69-20546# Whirlpool Corp St Joseph Mich Life Support Dept

STORAGE-DISPENSER DEVICE FOR CUBES ABOARD A SPACE VEHICLE

John J Symons and Norman G Roth and William J Martin Oct 1968 13 p

(Contract F41609-67-C-0059)

(AD-680840 SAM-TR-68-62) Avail CFSTI CSCL 6/11

The purpose of the study was to determine the feasibility of *constructing a food cube dispenser-storage device that would* provide a higher food-to-package weight and volume ratio than that achieved with present feeding systems for long-endurance spacecraft flights The program included a literature search the formulation and screening of possible concepts Author (TAB)

N69-20564# Oregon Univ Portland Dental School

ORAL IMAGE INTENSIFIER FOR MILITARY USE Annual Summary Report

Bhim Sen Savara William L Parker and James W Irwin Sep 1968 10 p refs

(Contract DADA17-67-C-7168)

(AD-680967) Avail CFSTI CSCL 6/12

An oral image intensifier with peripheral equipment was designed and prototyped The device utilizes a small number of short X-ray pulses which form an image inside the mouth on a phosphor covering the end of a fiber optic bundle The fiber optic bundle is curved and carries the low light level image outside of the mouth to a small image intensifier which amplifies the image to a visual level A closed circuit TV system further amplifies the image and presents it on a monitor When the project is completed the entire system will fit into one or two medium sized suitcases Author (TAB)

N69-20575# Food and Drug Research Labs Inc , Maspeth, N Y

BIOCHEMICAL DEFENSE MECHANISMS AGAINST PULMONARY IRRITANTS Final Report, 15 Jul 1966–15 Jul 1967

Steven Carson and Richard E Goldhamer Wright-Patterson AFB Ohio AMRL Oct 1968 129 p refs

(Contract AF 33(615)-5309)

(AD-680823, AMRL-TR-67-212) Avail CFSTI CSCL 6/16

Studies were performed in which mammalian mucociliary apparatus has been characterized under normal conditions following exposure to three irritant gases i e 100 per cent oxygen ozone(O2) and nitrogen dioxide (NO2) Investigations were made in normal and treated animals providing physical electrophysiological, biochemical and morphologic data of effects due to exposure A method for in vitro microscopic observation of viable cilia and adjacent mucus blanket has been described in terms of ciliary beat and movement of particles embedded in the mucus In vitro volumetric estimation of mucus thickness was compared to electrical resistance measurements in the attempt to provide an in vivo *method to determine mucus depth alterations in treated animals* Polarographic studies of oxygen dependent enzymes were carried out on pooled stripped epithelial tissue of untreated animals and comparison made with tissues exposed to ozone and nitrogen dioxide Exposure to 100 per cent oxygen caused a significant but selflimiting decrease in mucus velocity and viscosity Acute exposure to nitrogen dioxide (35 and 75 micrograms per kilogram) caused marked dose dependent changes in velocity and viscosity Exposure to 0 5 ppm ozone for a 14 day period resulted in general mucostasis and elevated viscosity levels Author (TAB)

N69-20576# School of Aerospace Medicine, Brooks AFB Tex

BEHAVIORAL AND PHYSIOLOGICAL RESPONSES OF MACACA MULATTA MONKEYS TO SUPRALETHAL DOSES OF RADIATION

Robert J Young Paul H Chapman Donald J Barnes G Carroll Brown and Charles M Hurst Sep 1968 33 p refs
(AD-680746 SAM-TR-68-73) Avail CFSTI CSCL 6/18

Eighteen primates (Macaca mulatta) were trained to a Multiple Avoidance Program (MAP) Tasks requiring visual auditory and tactile discriminations were included in this program Thirteen behavioral and three physiologic variables were analyzed for radiation effects at dose levels of 2 500 3 750 and 5 000 rads up to 1 hour after irradiation The analysis of all variables demonstrated a significant change across time (irradiation effect) When an analysis of variance was accomplished no significant statistical differences were found between dose levels for any of the variables examined in this paper possibly because of the small number of subjects per group In two future reports the data examined in this experiment will be compared with subsequent data gathered on the identical variables and dose levels at differing dose rate and neutron-gamma ratios Author (TAB)

N69-20585# RAND Corp Santa Monica Calif
PREREQUISITES FOR CHEMICAL THERMODYNAMIC MODELS OF LIVING SYSTEMS
James C DeHaven Nov 1968 127 p refs
(Contract F44620-67-C-0045 Proj RAND)
(AD-680760 RM-5691-PR) Avail CFSTI CSCL 6/1

A discussion of the mathematical techniques and physicochemical concepts involved in the construction of certain types of biological models for use in computer simulation The basic tools employed are a mathematical method and a computer program to calculate the composition of multiphased chemical systems given the values of certain combinations of state-determining parameters (chemical inputs temperature pressure) A steady-state approach is used because the scientific basis of thermodynamics is better developed than that of kinetics the mathematical treatment is easier and many biological systems are either in or closely approach steady states in their chemical composition Selection of a physiological function or subsystem to be investigated depends on (1) the availability of technological tools (2) established data (3) whether it is conveniently factorable from a larger system so that it can be studied over a range of conditions when removed from its normal environment (4) no feedback effects as a result of changes in the subsystem An illustrative model of respiratory gases interacting with an aqueous phase is constructed Author (TAB)

N69-20593# Texas Univ Austin Radiobiological Lab
VISUAL ACUITY PERFORMANCE OF NORMAL AND CHRONIC FOCAL-HEAD IRRADIATED MONKEYS
A A McDowell and W Lynn Brown Randolph AFB, Texas School of Aviation Medicine Dec 1958 5 p refs Sponsored by USAF
(AD-681070 SAM-59-5) Avail CFSTI CSCL 6/18

Monkeys were tested on each of eight visual acuity problems presented in order of increasing difficulty The results of the study reflected differences between chronic focal-head irradiated monkeys and normal monkeys with respect to performance on these problems Most efficient performance was shown by the control animals, intermediate efficiency of performance by the animals with previous focal-head irradiation of the posterior association areas and least proficient performance by the animals with previous focal-head irradiation of the frontal association areas Author (TAB)

N69-20596# School of Aerospace Medicine Brooks AFB Tex
NEAR VISUAL ACUITY UNDER LOW-LEVEL RED AND WHITE LIGHT Technical Report, Oct–Jan 1968
Richard H Dohrn Oct 1968 15 p refs
(AD-680845, SAM-TR-68-119) Avail CFSTI CSCL 6/16

The near visual acuity of 17 subjects between the ages of 35 and 45 years was measured under white light and red light of a 0 1 ft-L luminance level The near visual acuity was significantly better under white light for the acuity demands of 20/30 20/40 and 20/50 The visual acuity was equally good under red or white light when the acuity demand was 20/70 or larger, and the visual acuity was equally poor under red or white light when the acuity demand was 20/20 Author (TAB)

N69-20603# Systems Research Labs Inc Dayton Ohio
DEVELOPMENT OF VISUAL SIMULATION MODIFICATIONS FOR FIELD EVALUATION Final Technical Report, Jul 1967–Jun 1968
Larry D Holden Wright-Patterson AFB Ohio AF Human Resources Lab Oct 1968 102 p refs
(Contract F33615-67-C-1965)
(AD-681175 AFHRL-TR-68 3) Avail CFSTI CSCL 5/9

The purpose of this effort was to develop modifications on an SMK-23 Visual Simulator Attachment for determining the training value of various types of visual simulation system configurations This report documents the required modifications to the SMK-23 television system to convert it from projected field sequential color operation to projected high resolution monochrome Also documented is the replacement of the projection system with a high resolution monochrome lens-monitor system A comparative evaluation of the original SMK-23 television system and the two modified display systems is presented An improved SMK-23 model lighting system is described which enhances the television display contrast and yet uses only 20% of the original light power Author (TAB)

N69-20639# Commissariat à l Energie Atomique, Fontenay-aux-Roses (France) Centre d Etudes Nucléaires
STRONTIUM-90 CONTENT OF HUMAN BONE COLLECTED IN 1967 [TENEUR EN STRONTIUM 90 D'OS HUMAINS PRELEVES EN 1967]
Lucien Jeanmaire and Francois Patti Jan 1969 13 p In FRENCH ENGLISH summary
(CEA-R-3681) Avail CFSTI

This report follows report CEA-R-3381 and presents the strontium-90 content of human bones collected in 1967 in the Paris area The main trend is much the same as during 1966, contamination levels are decreasing in infants up to 5 years old Beyond this age the values are the same or slightly increased Author (ESRO)

N69-20651# School of Aerospace Medicine, Brooks AFB, Tex
BATCH FEEDING STUDIES ON HIGH-SOLIDS ACTIVATED SLUDGE FOR TREATING CONCENTRATED HUMAN WASTE, JANUARY–JUNE 1967
Michael J Ryan and Richard L Miller Sep 1968 21 p refs
(AD-681127 SAM-TR-68-108) Avail CFSTI CSCL 6/11

As part of a continuing Air Force research effort toward the development of a biologic waste management system for closed environments studies were conducted on a miniaturized activated sludge process for treating concentrated human wastes During a 40-day continuous run, a prototype sludge reactor was fed batchwise (daily) with an increasing quantity of mixed human waste Removal of chemical oxygen demand (COD) and the quality of the clarified process effluent were monitored as functions of time and the feeding rate Author (TAB)

N69-20667# Scientia Research Labs Inc Seattle Wash
MICROBIOLOGIC STUDIES OF THE ACTIVATED SLUDGE PROCESS FOR THE RECYCLING OF HUMAN WASTES Final Report, 1 Jun 1963–31 Dec 1964

Robert W Okey and Frederic T Santler Brooks AFB Tex School of Aerospace Med Sep 1968 50 p refs
(Contract AF 41(609)-1974
(AD-681126 TR-68-77) Avail CFSTI CSCL 6/11

A study of the metabolic characteristics of the bacteria present in activated sludge has been carried out The organisms were isolated employing standard bacteriologic technics After isolation, the isolates were examined in Warburg studies and in substrate depletion studies The substrates studied were the common constituents of human feces and urine and additional materials such as cellulose and soaps and detergents not easily replaced in remote environments Author (TAB)

N69-20679# Aerospace Medical Div Aeromedical Research Lab (6571st) Holloman AFB N Mex

AUDITORY SENSITIVITY IN THE RHESUS (MACACA MULATTA) AND THE WHITE-THROATED CAPUCHIN (CEBUS CAPUCHINUS) MONKEYS A COMPARISON OF THREE TECHNIQUES Final Report, Feb 1967–Feb 1968

Leslie W Dalton Jr Oct 1968 64 p refs
(AD-681135, ARL-TR-68-14) Avail CFSTI CSCL 6/16

Audiograms were determined in 8 cebus and 4 rhesus monkeys using conditioned suppression the Galvanic Skin Response (GSR) and the Evoked Cortical Response (ECR) The 3 procedures were compared as to sensitivity, reliability rapidity, and complexity Author (TAB)

N69-20682# Japan Atomic Energy Research Inst Ibaraki Div of Health, Physics and Safety

MICRODOSIMETRY THE NEW CONCEPT OF THE DOSIMETRY

T Numakunai S Ohtani and K Kawai Aug 1968 44 p refs In JAPANESE, ENGLISH summary
(JAERI-4047) Avail CFSTI

Problems of radiation dosimetry and quality factor were discussed, along with fundamental concepts of radiation biology, chemistry and many other fields New concepts of microdosimetry, microscopic distribution of energy transfer and density in irradiated medium and correlations between these informations and final effects were proposed Two theories of microdosimetry were introduced and some characteristics included in the primary energy transfer were discussed Author

N69-20699# School of Aerospace Medicine Brooks AFB Tex

RADIOPROTECTION WITH 2-(1 DECYLAMINO) ETHANETHIOSULFURIC ACID IN THE RHESUS MONKEY Technical Report, Feb –May 1968

Robert M Paull and George S Melville, Jr Sep 1968 14 p refs
(AD-680844, SAM-TR-68-110) Avail CFSTI CSCL 6/18

An attempt was made to provide radioprotection of the Macaca mulatta primates by the use of 2-(1 decylamino) ethanethiosulfuric acid, a long chain, lipid-soluble compound The animals were divided into seven groups two drug control groups one radiation control group and four treatment groups Each treatment group received a different dosage of drug or had a different latent period between administration of the drug and total-body irradiation Clinical parameters were monitored and one animal from three of the treatment groups as well as two drug controls were necropsied and examined for signs of radiation damage or drug toxicity Survival times were compared between treated animals and controls Results indicate that this compound given as described does not afford the predicted degree of radioprotection Author (TAB)

N69-20703# Armed Forces Radiobiology Research Inst , Bethesda Md

EFFECT OF MIXED GAMMA-NEUTRON RADIATIONS ON THE SPECTRAL ABSORPTION OF INDOCYANINE GREEN

L W Davis J A Brown and T A Strike Sep 1968 14 p refs
(AD-681372 AFRRI-TN68-7) Avail CFSTI CSCL 6/18

Blood from beagles and aqueous solutions of indocyanine green were separately irradiated with mixed gamma-neutron radiations at five doses from 0 53 to 48 kilorads The light absorption of the irradiated dye in combination with irradiated blood was characterized In addition unirradiated dye was mixed with irradiated blood and similarly studied The shape of the absorption spectrum was the same for all samples the absorptivity of unirradiated dye was unaffected by mixing with irradiated blood and the absorptivity of irradiated injectable solutions (5 mg/ml) was unchanged Author (TAB)

N69-20826 Michigan State Univ East Lansing

VOWEL RECOGNITION THRESHOLD AS A FUNCTION OF TEMPORAL SEGMENTATION

Richard LaVern Powell (Ph D Thesis) 1968 140 p
Avail Univ Microfilms HC $6 60/Microfilm $3 00 Order No 68-11089

The purpose of this study was to determine the vowel recognition threshold as a function of temporal segmentation for certain vowels Previous studies had suggested three milliseconds as the vowel recognition threshold as a function of temporal segmentation Each of the vowels was recorded when phonated by a speaker sitting in a sound treated room A Lissajous figure produced on an oscilloscope as well as a 125 Hz tone presented through earphones aided the speaker in attaining vowels with 125 Hz fundamentals These vowels were each presented ten times to *eight doctoral students with normal hearing for validation* A modified psychophysical method of minimal change was selected as the means for attaining the vowel recognition threshold as a function of temporal segmentation Dissert Abstr

N69-20885*# Martin Co Baltimore Md Research Institute for Advanced Studies

A STUDY OF THE CHEMOSYNTHETIC GAS EXCHANGER Quarterly Progress Report, 24 Sep 1968–22 Jan 1969

Leonard Bongers 22 Jan 1969 41 p refs
(Contract NASw-1596)
(NASA-CR-100417 QPR-7) Avail CFSTI CSCL 06M

Energy mobilization in autotrophic grown hydrogen bacteria derives ultimately from the oxidation of hydrogen Oxygen consumption is thus a measure of the amount of energy delivered to the biosynthetic process and the ratio of the rate of oxygen consumption over the rate of CO_2 consumption is a measure of the efficiency of the biosynthetic process The consumption ratio (O/C) of cell suspensions of *Hydrogenomonas eutropha* was studied with particular reference to the growth rate The best efficiencies (O/C between 2 and 3) were observed with cultures growing at the maximum growth rate When the rate of growth was limited by the supply of inorganic nutrients or by CO_2 a less efficient conversion was obtained (O/C values between 3 and 5) An evaluation of gas consumption characteristics suggested that under excellent growth conditions the oxidative and assimilatory activities are well balanced and that under these conditions about 5 moles of ATP are expended in the conversion of 1 mole of CO_2 to new cell material Author

N69-20909*# Space/Defense Corp Birmingham Mich

[ON THE DEVELOPMENT OF A POTATO RESPIROMETER FOR BIO-RHYTHM STUDIES] Technical Report, 4 Nov 1968–4 Feb 1969

Paul J Heberlein and Jeffry S Life 6 Mar 1969 18 p refs
(Contract NASw-870)
(NASA-CR-100413, TR69-103) Avail CFSTI CSCL 06B

Biorhythmic studies on teleost fishes under the influence of arginine vasotocin established an inverted swimming pattern in response to a photostimulus from below The development and evaluation of single and multi-specimen respirometers contained for later use in the Apollo Applications program Fabrication of respirator bench models has been started G G

N69-20912# Joint Publications Research Service, Washington D C
BIOTELEMETRY GIVES MEDICAL DATA ON SPACE FLIERS
V Parin 10 Mar 1969 4 p Transl into ENGLISH from Nedelya (Moscow), no 3 1968 p 5
(JPRS-47607) Avail CFSTI

The problem of collecting and processing medical information during manned space flights is discussed A system for recording data during prolonged space flights includes chest bands with mounted electrodes for obtaining electrocardiograms respiratory pickups and seidmocardiographic sensors Telemetric channels from the spaceship transmit successively electroencephalograms electrooculograms dynamograms and written signals An onboard computer converts oscillograms into quantitative indicators or symptom-signs of medical information for transmission over telemetric channels to earth or to a physician onboard the spaceship G G

N69-20915*# Miami Univ Coral Gables Fla School of Medicine
REPORT OF TOXIC EFFECTS OF FLUORINE FOLLOWING SHORT-TERM INHALATION
M L Keplinger 31 Dec 1968 273 p
(Grant NGR-10-007-012)
(NASA-CR-100415) Avail CFSTI CSCL 06T

The toxic effects from short-term (ranging from 5 to 60 minutes) exposures to fluorine were determined in experimental animals and in the human subject Special equipment including a chamber for exposures was designed and built to handle fluorine safely Analytical methods for the determination of the concentration of fluorine in air were developed Signs of intoxication from high concentrations of fluorine in air were marked irritation of the mucous membranes of the eyes and respiratory tract and some irritation to the skin The LC50 (concentration calculated to kill 50% of the animals) was determined for 5 15 30, or 60 minutes of exposure in rats, mice guinea pigs and rabbits There were no significant differences between the LC50 s for the different species of experimental animals Exposure of volunteer human subjects caused irritation of the eyes and nose Irritation of the eyes was the most sensitive index of a subjective effect Concentrations of 25 ppm were slightly irritating after five minutes of exposure 50 ppm was irritating within one or two minutes, and 75 to 100 ppm were very irritating within a few seconds Author

N69-20924*# Aztec School of Languages Inc , Acton Mass Research Translation Div
MEASUREMENT OF ABSORBED RADIATION DOSES DURING FLIGHTS OF SPACE VEHICLES [OB IZMERENII POGLOSHCHENNYKH DOZ RADIATSII PRI PODETAKH KOSMICHESKIKH KORABLEY]
B M Makhmudov Washington NASA Mar 1969 8 p refs Transl into ENGLISH from Vestn Mosk Univ Ser III Fiz -Astron (Moscow) v 23, no 2 1968 p 11–16
(Contract NASw-1692)
(NASA-TT-F-12162) Avail CFSTI CSCL 06R

Radiation doses are given which were received by the astronauts Gagarin Titov, Nikolayev Popovich Schirra Cooper Bykovskiy, Tereskhova Yegorov Feoktistov Komarov, Leonov, and Belyayev during their space flights The results suggest an absence of radiation hazards for manned space flights at altitudes from 200 to 400 km and an absence of intense chromospheric bursts Extrapolated daily radiation doses incident in space vehicle cabins are given for flight altitudes up to 2000 km Author

N69-20987# Comitato Nazionale per l'Energia Nucleare Rome (Italy)
IMPROVED METHODS FOR THE MEASUREMENT OF GAMMA EXPOSURE RATE IN THE NATURAL RADIATION ENVIRONMENT
A Cardinale and L Frittelli 12 Nov 1968 36 p refs
(RT/FI(68)54) Avail CFSTI

The separate contributions to the exposure rate due to the natural gamma background radiation can be measured directly in the field, by means of spectrometric methods Though these methods are rather crude and unsophisticated good precision can be obtained by using proper elaboration systems In this report a calibration method is discussed for measurements of exposure rate, using a NaI(Tl)3 × 3 detector The system of elaborating field spectra for giving exposure rate is discussed too Some results obtained are compared with the data furnished by a very sensitive ionization chamber Author

N69-21031# Entelek Inc Newburyport Mass
COMPUTER-ASSISTED INSTRUCTION A SURVEY OF THE LITERATURE Annual Technical Report, Oct 1966–Jul 1968
Albert E Hickey ed 1 Oct 1968 161 p refs
(Contract N00014-68-C-0236)
(AD-681079 TR-8) Avail CFSTI CSCL 5/9

A survey and synthesis of literature pertaining to computer-assisted instruction and published prior to July 1968 are given Principal headings include An Overview of CAI, Applications of CAI Major CAI Centers, Systems, Programming Languages, Theory of Instruction Stimulus and Performance Factors, Program Generation and Evaluation, and Administration of CAI Author (TAB)

N69-21074*# Aztec School of Languages Inc Maynard Mass Research Translation Div
CONTRIBUTIONS ON THE DEVELOPMENT MECHANICS OF EMBRYOS [BEITRAGE ZUR ENTWICKELLUNGSMECHANIK DES EMBRYO]
Wilhelm Roux Washington NASA Mar 1969 46 p Transl into ENGLISH from Arkhiv fuer Mikroskopische Anatomie (USSR) v 29 1887 157–212
(Contract NASw-1692)
(NASA-TT-F-12068) Avail CFSTI CSCL 06C

Experiments and observations conducted on frog ova are reported with the intention of determining the phases and processes which govern embryo development The following questions are considered, how and in what material shifts occur after the copulation of the two pronuclei which are definitive in the development of the future embryo and the black and white poles at each end of the ovem axis correspond after fertilization to the ventrocephalic and dorso, caudal directions of the embryo Relevant literature is considered and a numbered summary is provided including illustrations Author

N69-21079# European Atomic Energy Community, Ispra (Italy) *Joint Nuclear Research Center*

USE OF THE CERENKOV EFFECT IN THE DETECTION AND ASSAY OF BETA-EMITTING RADIONUCLIDES IN BIOLOGICAL SPECIMENS [UTILISATION DE L EFFECT CERENKOV POUR LA RECHERCHE ET LE DOSAGE DE RADIO-NUCLIDES EMETTEURS BETA DANS LES ECHANTILLONS BIOLOGIQUES]

V Camera and H Tanguy 1968 8 p refs In FRENCH ENGLISH summary

(EUR-4084 F) Avail CFSTI

A rapid and simple method for the measurement of Sr^{90} + Y^{90} and P^{32} in biological materials is described The determinations are done on aqueous solution using the Cerenkov effect The time required for urine analysis is about 90 min and the sensitivity with good precision is in the range of 20 pc of Sr^{90} + Y^{90} per liter and 70 pc of P^{32} per liter Author

N69-21080*# Techtran Corp Glen Burnie Md

DETERMINATION OF THE NUMBER OF FREE PHOSPHATE GROUPS IN E COLI RIBOSOMES BY OPTICAL METHODS [OPREDELENIYE KOLICHESTVA SVOBODNYKH FOSFATNYKH GRUPP V RIBOSOMAKH E COLI OPTICHESKIMI METODAMI]

V I Permogorov et al Washington NASA Mar 1969 Transl into ENGLISH from Molekul Biol Akad Nauk SSSR Inst Radiats i Fiz -Khim Biol (Moscow) v 2 no 2 1968 p 276–281

(Contract NASw-1695)

(NASA-TT-F-12118) Avail CFSTI CSCL 06M

The effect of acridine orange on the structure of *E coli* ribosomes was examined It was shown that the native structure of ribosomes was destroyed in response to dyeing when the ratio of the number of dye molecules to the number of binding sites was high At low ratios such destruction did not take place The spectrophotometric titration and the induced optical rotatory dispersion measurements at low ratios of dye to binding sites indicated that in the RNA of intact *E coli* ribosomes approximately 20 per cent of the phosphate groups were able to bind the acridine orange molecules Author

N69-21109*# Aztec School of Languages Inc Acton Mass

CONTRIBUTIONS TO THE KNOWLEDGE OF INDIRECT *VISION 1 STUDIES ON THE SPATIAL SENSE OF THE* RETINA [BEITREGE ZUR KENNTNISS DES INDIRECTEN SEHENS 1 UNTERSUCHUNGEN UEBER DEN RAUMSINN DER RETINA]

Aubert and Foerster Washington NASA Mar 1969 24 p Transl into ENGLISH from Arch Ophthalmol (Berlin) vol 3 1857 p 1–37

(Contract NASw-1692)

(NASA-TT-F-12074) Avail CFSTI CSCL 06E

Using as a point of departure E H Weber s studies on the sense of touch studies were carried out on a series of experiments designed to shed light upon the spatial sense of the retina The method consisted of recognizing letters and numbers at various distances from the eye through a blackened tube light being provided by a jumping spark in order to eliminate irrelevant considerations resulting from accomodation to light Author

N69-21132*# Aztec School of Languages Inc Maynard Mass *Research Translation Div*

PHYSIOLOGICAL SYSTEMS ANALYSIS OF TEMPORARY EYE MUSCLE DISTURBANCE DUE TO STRESS IN AIR AND SPACE TRAVEL [EINE PHYSIOLOGISCHE SYSTEMANALYSE VON STRESSINDUZIERTER VORUBERGEHENDER AUGENMUSKELSTORUNG UND DEREN BEDEUTUNG IN DER LUFT- UND RAUMFAHRT]

Leonard Michael Fenning Washington NASA Mar 1967 13 p refs Transl into ENGLISH from German Reprint W 68-30

(Contract NASw-1692)

(NASA-TT-F-12105) Avail CFSTI CSCL 06S

Attention is directed to the lateral heterophoria as well as the binocular evaluation of landing distances and similar calculations of remoteness It was determined that in certain flight conditions esophorias i e latent strabismus towards the inside or exophorias appear which could lead to landing mistakes In the case of exophoria we have short landings In the case of exophoria overflying of the landing field The changes of the optical perception which occur in such conditions of stress can be at first roughly divided into two groups of causes (1) mechanical shifting of the eyeballs during the acceleration phases and (2) increase of the inner pressure of the skull on the cardiovascular and the cerebro-spinal liquid system caused by physical and emotional stresses Author

N69-21144*# Aztec School of Languages Inc Acton Mass Research Translation Div

CONGENIAL DOUBLE FORMATIONS IN THE FROG AND THEIR ORIGINS [UEBER DOPPELBILDUNGEN BEIM FROSCH UND DEREN ENTSTEHUNG]

G Born Washington NASA Feb 1969 5 p Transl into ENGLISH from Breslauer Arzliche Z (West Ger) no 14 22 Jul 1882 p 162–163

(Contract NASw-1692)

(NASA-TT-F-12049) Avail CFSTI CSCL 06C

Investigated was the relationship between artificial fertilization and the occurrence of 12 double formations among approximately 2000 developed eggs of a female frog It was determined that over-maturity of the frog eggs was responsible for the abnormal development a limited number of overripe eggs were penetrated by two spermatozoa after the normal spawning time G G

N69-21146# Nuklearni Institut Jozef Stefan Ljubljana (Yugoslavia)

EXCRETION OF NITROGEN COMPOUNDS FROM RAT LARGE INTESTINE AFTER WHOLE-BODY IRRADIATION IN ABSENCE OF STRESSORS

A Logar I Kregar and D Lebez Oct 1968 7 p refs

(NIJS-R-544) Avail CFSTI

Increase in nonprotein nitrogen excretion was found 3 hrs after 600 R and 1 hr and 3 hrs after 1200 R This increase is thought to be ascribed to the effect of ionizing rays Compared with previous results it can be assumed that anesthesia and stress due to the conditions of irradiation partially protect the organism from the development of gastrointestinal syndrome Author

N69-21149*# Naval Aerospace Medical Inst Pensacola Fla

THE SOMATIC CHROMOSOMES OF THE MONGOLIAN GERBIL (MERIONES UNGUICULATUS)

Steven P Pakes 3 Jan 1969 11 p refs

(NASA Order-W-12766)

(NASA-CR-100458 NAMI-1056 Rept-4) Avail CFSTI CSCL 06M

From the study of bone marrow cells after intraperitoneal injection of colchicine it was determined that the diploid number of chromosomes for the Mongolian gerbil is 44 The karyotype was constructed by arranging the chromosomes into four distinct groups and includes 32 meta- or submetacentric and 10 acrocentric autosomal chromosomes The X element was identified as a large submetacentric chromosome and the Y element as a medium-sized submetacentric chromosome The study was initiated to characterize the somatic chromosomes of the Mongolian gerbil prior to conducting experiments concerned with the effects of various environmental factors encountered in space flight on mammalian chromosomes Author

N69-21164# Federal Aviation Administration, Oklahoma City Okla

PILOT RESPONSE TO PERIPHERAL VISION CUES DURING INSTRUMENT FLYING TASKS

A Howard Hasbrook and Paul E Young Feb 1968 22 p refs (FAA-AM-68-11) Avail CFSTI

To more closely associate the visual aspects of instrument flying with that of contact flight a study was made of human response to peripheral vision cues relating to aircraft roll attitude Pilots ranging from 52 to 12 000 flying hours experience were tested in a multi-engine aircraft simulator Data on aircraft bank angle, heading altitude peripheral vision cue signals, pilot eye movement and additional workload accomplishment were obtained during simulated flights involving a typical instrument flying maneuver Results suggest that substantial gains can be achieved in instrument flying capability by use of peripheral vision cues as they relate to provision of continuous roll attitude (bank angle) information The data also indicate such cues may be useful in preventing inadvertent entry into steep banks and subsequent loss of control when turbulence prevents visual interpretation of the conventional attitude indicator Author

N69-21174# California Univ Los Angeles Biotechnology Lab

SOME DESIGN ASPECTS OF AN EXPERIMENTAL FLUIDIC CONTROL SYSTEM

Horst Arp Aug 1968 27 p refs
(Contract V1005P-9779)
(PB-180954 TR-44 Rept-68-44) Avail CFSTI CSCL 06B

To provide an idea about typical design procedures the development of a fluidic control system is described The system is intended to sequence and coordinate the movements of upper extremity prostheses or servo-manipulators The general method of approach is outlined by a block diagram Important portions of the circuitry are given in detail The design of a simple pneumatic force to pressure transducer is discussed a movement control subsystem suitable for fluidic implementation is shown to be derived from a basic servomechanism concept and the logic circuitry for a movement coordination system is developed Finally some suggestions are made as to the utilization of a pneumatic stepping motor device to improve the positioning accuracy and to provide for a reliable hold function of pneumatic actuators Author (USGRDR)

N69-21200*# Naval Aerospace Medical Inst Pensacola Fla

MOTION SICKNESS SUSCEPTIBILITY UNDER WEIGHTLESS AND HYPERGRAVITY CONDITIONS GENERATED BY PARABOLIC FLIGHT

Earl F Miller II Ashton Graybiel Robert S Kellogg, and Robert D O Donnell 13 Jan 1969 16 p refs
(NASA Order W12396)
(NASA-CR-100462 NAMI-1057) Avail CFSTI CSCL 06P

Motion sickness as provoked by parabolic flight maneuvers and induced by active head movements during the hypergravity phases in certain subjects did not occur in any of the five subjects witout functional labyrinths Among the 25 normal pilot-type subjects great inter- and intra-individual differences were found in susceptibility to motion sickness under the different force environments used in this study Acute motion sickness developed in four subjects merely as a result of the oscillations of g-load encountered in the parabolic maneuvers while the remaining 21 were symptom free These 21 and the most resistant subject among the other four were tested on other and separate occasions to determine the effect upon their susceptibility of standardized head movements during (1) the hypergravic phase (2) the weightless phase of the parabola while they were restrained in an aircraft seat and (3) the weightless phase while they were rotated in a chair Four of the six subjects tested under condition 1 were completely unaffected Head movements during weightlessness under condition 2 provoked severe symptoms in five and moderate symptoms in one of twelve subjects tested The 15 subjects rotated in weightlessness under condition 3 revealed either a marked positive or negative change in susceptibility relative to that measured by a similar method under terrestrial conditions Author

N69-21222*# Aztec School of Languages Inc , Acton, Mass Research Translation Div

CONTRIBUTION TO KNOWLEDGE OF THE ORIGIN OF NYCTITROPIC MOVEMENTS [BEITRAGE ZUR KENNTNIS DER ENTSTEHUNG DER SCHLAFBEWEGUNGEN]

W Pfeffer Washington NASA Jan 1969 129 p refs Transl into ENGLISH from Abhandl Saechs Akad Wiss Leipzig Math Naturw Kl (Berlin) v 34 1915 p 3–154
(Contract NASw-1692)
(NASA-TT-F-11940) Avail CFSTI CSCL 06F

A detailed discussion is presented on the capability for autonomous circadian movement cycling in several nyctitropic plants The methods of bandaging and automatic recording are described Experiments were performed on *Tulipa* and *Crocus* blossoms pinnate leaflets of *Albizzia* lophantha *Calendula* arvensis and *Bellis* perennis blossoms *Phaseolus* vulgaris leaves, *Flemingia* (Moghania) congesta leaves, and the joint of the main leaf stem of *Mimosa* speggazzinii Examples of the presence and absence of circadian autonomous movements are given, and the interaction of these movements with altionastic reactions is discussed Influences from the illuminated lamina were found to cause photonastic stimulus of the darkened joint and to deter the onset of darkness rigor It was determined that autonomous circadian movement capability does not exist in *Tulipa* gesneriana *Albizzia* lophantha or *Flemingia* congesta and does exist in *Phaseolus* vulgaris and *Calandula* arvensis Since all of these plants do exhibit nyctitropic movements it is concluded that nyctitropic movements do not require autonomous movement activity N E N

N69-21223*# Oregon State Univ Corvallis

SYSTEMATIC DESCRIPTION AND KEY TO STREPTOMYCES ISOLANTS FROM CHILE, ARIZONA, AND ANTARCTICA DESERT SOILS

W B Bollen and Sumie Nishikawa Pasadena Calif JPL 18 Feb 1969 215 p refs Prepared for JPL
(Contracts NAS7-100, JPL-950783)
(NASA-CR-100445) Avail CFSTI CSCL 06M

Sixty-seven isolants from Chile Arizona and Antarctica desert soils have been examined Of these thrity-seven have been identified nine were cultured on the various media but these could not be classified and were designated indeterminate twenty could not be subcultured from the original slants With the exception of two non-sporulating cultures all the streptomycete cultures isolated from Antarctica desert soil were identified as *Streptomyces longisporoflavus* The non-sporulating cultures may be variants of *S longisporoflavus* as their colony characteristics are similar to other cultures which have been identified as *S longisporoflavus* The materials and methods used to characterize the isolants listed in this report are identical to those described in the first of the reports on the streptomycetes Author

N69-21232# Joint Publications Research Service Washington D C

CYBERNETICS AND REGULATION THEORY

11 Mar 1969 13 p refs Transl into ENGLISH from Dokl Akad Nauk SSSR (Moscow) v 184 no 1 1969 p 28–29 51–54
(JPRS-47617) Avail CFSTI

CONTENTS

RECOGNITION OF THE TERMINAL STATE FOR ALMOST ALL AUTOMATA A D Korshunov p 1–4 refs (See N69-21233 10-05)

2 OPTIMAL QUESTIONNAIRES WITH UNEQUAL VALUE OF THE QUESTIONS P P Parkhomenko p 5–11 refs (See N69-21234 10-19)

N69-21233# Joint Publications Research Service Washington D C

THE UPPER ESTIMATES OF LENGTHS OF SHORTEST HOMOGENEOUS EXPERIMENTS WITH RESPECT TO RECOGNITION OF THE TERMINAL STATE FOR ALMOST ALL AUTOMATA

A D Korshunov *In its* Cybernetics and Regulation Theory 11 Mar 1969 p 1–4 refs (See N69-21232 10-05)

Avail CFSTI

The problem of recognition of the terminal state of an automaton is investigated in this article Let us assume that a completely defined nonintial automaton which is a sealed black box is given and that the experimenter can obtain information about the state of this automaton only by supplying input letters and observing the ouptut letters On the basis of these observations the experimenter must determine the state in which the investigated automaton is found that is the state of the automaton after the effect of the last input letter on it The procedure for determining the terminal state of an automaton after introducing the appropriate finite series of input letters and observing the results at the output of the automaton is called an experiment in recognition of the terminal state or simply an experiment The experiment is said to be homogeneous if the experimenter selects the input series before beginning the experiment and does not change it during the course of the experiment Author

N69-21255*# Aztec School of Languages, Inc Acton Mass Research Translation Div

STUDIES ON THE INDUCTION OF DORSIVENTRALITY IN BROOD BODY SEEDLINGS OF THE MARCHANTIA 5. THE REVERSIBILITY OF DORSIVENTRALITY INDUCED BY EXTRINSIC FACTORS [UNTERSUCHUNGEN UEBER DIE INDUKTION DER DORSIVENTRALITAET BEI DEN BRUTKOERPERKEIMLINGEN DER MARCHANTIEEN 5 DIE UMKEHRBARKEIT DER DURCH AUSSENFAKTOREN INDUZIERTEN DORSIVENTRALITAET]

Hans Fitting Washington NASA Mar 1969 108 p refs Transl into ENGLISH from Jahr fuer Wiss Botan (West Ger), v 86, 1938 p 107–227

(Contract NASw-1692)

(NASA-TT-F-12039) Avail CFSTI CSCL 6C

Studies on the reversibility of the dorsiventrality (leaves) induced by extrinsic factors are discussed with consideration of relevant literature Experiments were mainly concerned with the liveworts *Marchantia* polymorpha and *Lunularia* Gaining insight into the behavior of the *Marchantia* brood body seedlings is reported and especially the question of when and how photoinduction and geoinductions of seedling dorsiventrality are irreversibly stabilized The author proceeds from the assumption (as opposed to the work of Mirbel Pfeffer and Dachnowski) that unilateral dorsiventrality induced in brood bodies by extrinsic factors is completely reversible that however they are entirely independent of the visible germination of the brood bodies and of the morphological development of dorsventrality in the seedlings It becomes stable under certain physiologically comprehensible conditions Author

N69-21264# National Physical Lab Teddington (England) Ship Div

THE BIOLOGY OF NO 3 TOWING TANK OF SHIP DIVISION NPL

I Hartley (Salford Univ) Nov 1968 19 p refs

(NPL-SHIP-130) Copyright Avail CFSTI

The growth of organisms at 60–65° F in a water tank filled in 1957 and still containing the same water is analysed and their significance as drag reducing agents is discussed ESRO

N69-21266# National Physical Lab Teddington (England) Div of Computer Science

FRAGMENTATION OF PATTERNS OCCURRING WITH TACHISTOSCOPIC PRESENTATION

C R Evans Nov 1968 19 p refs

(NPL-COM-SCI-40) Copyright Avail CFSTI

An experiment in which a total of 200 subjects were shown four different patterns with tachistoscopic presentation is described Statistical results are given and a theory of the fragmentation of patterns is presented in which the human perceptual process can be likened to a working classificatory hierarchy ESRO

N69-21286# National Defense Research Organization TNO The Hague (Netherlands) Medical Biological Lab

INDUCTION AND REJOINING OF BREAKS IN THE DEOXYRIBONUCLEIC ACID OF HUMAN CELLS IRRADIATED AT VARIOUS PHASES OF THE CELL CYCLE

P H M Lohman Aug 1968 22 p refs

(MBL-1968-15) Avail CFSTI

The induction and rejoining of single strand breaks in the DNA of asynchronous and synchronized cultures of human kidney cells (T-cells) were investigated The assessment of breaks was carried out with a modified alkaline sucrose gradient technique The cells were lysed on top of the gradient in the presence of tri-isopropyl-naphtalene sulphonic acid (TIPNS) and 4-amino salicyclic acid (PAS) The sedimentation pattern of DNA was studied after X-irradiation with doses up to 40 krad Breaks could be detected by irradiating cells with doses higher than 5 krad With synchronous cell populations the smallest induction of breaks was found in the DNA of cells progress from late S to early G2 More breaks were induced in early S and G1 The rejoining of breaks in the DNA was studied during incubation of the cells at 37°C after X-ray exposures to 5 and 20 krad The capacity of rejoining breaks seems to fluctuate slightly in the different phases of the cell cycle being most effective in early S and minimal in G2 phase Author

N69-21309# National Defense Research Organization TNO The Hague (Netherlands) Medical Biological Lab

REPORT OF A VISIT TO THE UNDERWATER MEDICINE SYMPOSIUM, "UEBERLEBEN AUF SEE" [VERSLAG VAN EEN BEZOEK AAN HET DUIKHEDISCH SYMPOSIUM "UEBERLEBEN AUF SEE"]

E Meeter and O Brocades Zaalberg Jun 1968 18 p refs In DUTCH ENGLISH summary Meeting held at Kiel 4–5 May 1968

(MBL-1968-10) Avail CFSTI

The contents of the papers read at the second international diving-medical symposium held at Keil Germany are summarized Diving in shallow waters as well as deep diving operations were discussed Specifically, the papers covered diving history and qualifications for divers, breathing studies exercise tolerance barotrauma oxygen toxicity cold exposure, and decompression U S Sealab operations inert gas mixtures CO_2 in organisms under high pressure and behavior of microorganisms under high pressure and deep-diving mammals as well as various animal experiments under conditions simulating the effects of deep diving Transl by K W

N69-21310# Aktiebolaget Atomenergi Stockholm (Sweden)

REPORT ON THE PERSONNEL DOSIMETRY AT AB ATOMENERGI DURING 1967

J Carlsson and T Wahlberg Dec 1968 11 p refs
(AE-342) Avail CFSTI

This report presents the results of personnel dosimetry at AB Atomenergi during 1967 The external total body gamma dose for all employees (quarterly doses $\leq$ 100 mrem are not reported) corresponds to 140 manrem The highest external total body gamma dose during 1967 to one person was 5700 mrem 24700 gamma films and 3900 neutron films were evaluated 1988 urine analyses and 989 measurements of body activity were made Author (ESRO)

N69-21316# Oxford Univ (England)
DECOMPRESSION SICKNESS AND INERT GAS NARCOSIS Final Scientific Report, 1967–1968
W D M Patton and E B Smith Sep 1968 9 p refs
(Contract F61052-67-C-0077)
(AD-681042) Avail CFSTI CSCL 6/19

A summary is given of research activities and results in the following areas Effects of gases in producing decompression sickness distribution and intensity of bubble formation as a function of time effects of anesthetic gases on mice physiological effects of high pressure on mice experiments with luminous bacteria body temperature of mice exposed to raised partial pressures of different gases oxygen poisoning, properties of gases TAB

N69-21343# Institute for Perception RVO-TNO Soesterberg (Netherlands)
APPLICABILITY OF FOURIER TRANSFORMATION UPON CONTRAST SENSITIVITY FUNCTIONS
A van Meeteren and J J Vos [1968] 28 p refs
(IZF-1968-20) Avail CFSTI

Contrast sensitivity functions of the eye are converted by Fourier transformation into psychophysical line-spread functions The Fourier transforms were computed with a digital computer (PDP7) for retinal illuminations of 001 to 1000 troland The linearity of the spatial filtering by the eye and the interpretation of the Fourier transforms as weighting functions of the spatial organization is discussed Normalized to unity in their centers the weighting functions are stripped of the sensitivity aspect and represent spatial organization only Simultaneously the normalization factor can be interpreted as an elementary sensitivity These normalization factors in fact are nothing but the area under the corresponding contrast sensitivity functions They prove to be proportional to the square root of the retinal illumination below 1 troland levelling off at 100 troland This result can be interpreted as a generalization of the De Vries–Rose law respectively of Weber s law The weighting functions demonstrate lateral inhibition Author

N69-21344# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)
STRUCTURE OF THE REPLICATIVE FORM OF BACTERIOPHAGE PHI CHI 174 7 THE RENATURATION OF DENATURED DOUBLE STRANDED PHI CHI DNA
P H Pouwels, J van Rotterdam, and J A Cohen [1968] 28 p refs
(TDCK-S2607-III, MBL-1968-11) Avail CFSTI

Denatured double stranded ΦX DNA is formed after exposure of a closed circular duplex to an alkali and reneutralization of the alkali Under conditions which are optimal for the renaturation of linear phage DNA denatured double stranded ΦX DNA cannot be renatured Renaturation will proceed very rapidly however in alkaline solution at 50°C Breakage of a phosphodiester bond in denatured double stranded ΦX DNA will lead to (a) native double stranded DNA formed in buffers of low ionic strength at 0°–30°C (b) single stranded DNA formed in buffers of low ionic strength at temperatures exceeding 30°C (c) a heterogeneous product presumably consisting of partially renatured DNA formed in buffers of high ionic strength These results suggest that the nature of the product of denatured double stranded ΦX DNA in which a phosphodiester bond is broken is primarily determined by environmental conditions such as temperature and ionic strength Author

N69-21345# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)
THE MICROTHREAD TECHNIQUE A SIMPLE SYSTEM FOR STUDYING THE AEROSOL-STABILITY OF MICROBES [DE MICROTHREAD TECHNIQUE EENEENVOUDIG SYSTEEM VOOR ONDERZOEK VAN DE AEROSOL STABILITEIT VAN MICRO-ORGANISMEN]
R Boeringa and H C Bartlema Dec 1968 24 p refs In DUTCH, ENGLISH summary
(TDCK-52606-III MBL-1968-12) Avail CFSTI

An apparatus for the microthread technique was constructed for studying the survival of aerosolized micro-organisms during their exposure to air Aerosol particles of the test organisms were captured on spider threads and exposed to the environmental air simulating a pure airborne state of the adherent particles The loss of viability was studied and the numbers of test and tracer organisms were determined Author

N69-21349*# IIT Research Inst Chicago Ill
LIFE IN EXTRATERRESTRIAL ENVIROMENTS Quarterly Status Report, 1 Dec 1968–28 Feb 1969
28 Feb 1969 14 p
(Contract NASr-22, Proj L6023)
(NASA-CR-100503 IITRI-L6023-16) Avail CFSTI CSCL 06M

Investigations of the effects of daily freeze-thaw cycles and ultraviolet irradiation on the survival of bacteria airborne in dust clouds of soil are presented Representative types of bacteria present in spacecraft assembly areas or normally indigenous to humans were used Bacillus cereus B subtilis Escherichia coli and Staphylococcus aureus These organisms were inoculated into a limonite coated soil (collected in the Sonoran Desert Arizona) and were irradiated daily with a Mars daily total equivalent ultraviolet flux over the 2400 to 2800 A region a value of 298 μWcm^{-2} Concurrently the organisms were also exposed to a daily freeze-thaw cycle of 16-hr at −65°C and 8-hr at 30°C The data indicates that the ultraviolet flux at the surface of Mars may not be as effective a sterilizing agent as previously assumed Author

N69-21371# Joint Publications Research Service Washington D C
BRIGHT FUTURE OF CYBERNETICS PREDICTED
V Glushkov 11 Mar 1969 7 p Transl into ENGLISH from *Znannya Ta Pratsya (Kiev) no 1, 1969 p 4–6*
(JPRS-47612) Avail CFSTI

Thoughts on predicting the widespread use of computers in the near future are presented Areas mentioned in which cybernetics will in the next twenty years have an important role are economics the State Planning Commission other ministries banks all large enterprises design engineering and the national economy Since it is difficult for specialists with fixed scientific orientation to retrain it is concluded that cybernetics is a young science for the youth FOS

N69-21380*# National Aeronautics and Space Administration Langley Research Center Langley Station Va
JET SHOES

John D Bird Howell D Garner Ernest D Lounsberry and David F Thomas Jr inventors (to NASA) Issued 7 Jan 1969 (filed 24 Feb 1967) 7 p Cl 244-4
(NASA-Case-XLA-08491, US-Patent-3 420,471 US-Patent-Appl-SN-619520) Avail US Patent Office

An apparatus is described for attachment to the feet of a person desiring extravehicular space locomotion having a fluid thruster controlled by the toes of the person Toe end heel attachment elements are utilized for securing a base that supports the thruster and a control circuit therefore to each foot The control circuit is either electric having a switch for energizing a solenoid valve permitting fluid to flow through a nozzle or fluidic having a syringe connected to a relay that operates a valve permitting fluid to flow through the nozzle

Official Gazette of the U S Patent Office

N69-21386*# Naval Aerospace Medical Inst Pensacola Fla
MOTION SICKNESS PRECIPITATED IN THE WEIGHTLESS PHASE OF PARABOLIC FLIGHT BY CORIOLIS ACCELERATIONS
Ashton Graybiel Robert S Kennedy and Robert S Kellogg 18 Feb 1969 12 p refs
(NASA Order R-93)
(NASA-CR-100502 NAMI-1061) Avail CFSTI CSCL 06S

Nineteen normal persons and three deaf subjects with bilateral loss of labyrinthine function (L–D subjects) were exposed to Coriolis accelerations during the brief periods of weightlessness in parabolic flight by having them move their heads while rotating in a Barány chair at 30 rpm None of the L–D, but all except three of the normal subjects experienced motion sickness Only one of eight subjects selected on the basis of insusceptibility to symptoms in standard parabolic flights was free of symptoms the other seven were motion sick and completed on the average only six parabolas Two of three subjects selected primarily on the basis of low susceptibility to Coriolis acceleration in a slow rotation room were symptom free one was motion sick but his level of symptoms did not reach the end point of severe malaise during ten parabolas In addition to demonstrating susceptibility to motion sickness when exposed to Coriolis acceleration in the weightless phase of parabolic flight, the findings are important in emphasizing the difficulty in predicting susceptibility to motion sickness in novel force environments Author

N69-21390# Boeing Scientific Research Labs Seattle Wash Plasma Physics Lab
ANOMALOUS PREDICTION OF QUANTUM PROCESSES BY SOME HUMAN SUBJECTS
Helmut Schmidt Feb 1969 48 p refs
(D1-82-0821) Avail Issuing Activity

The inherent randomness of quantum processes was used in a device which generates the numbers 1 2 3 4 in random sequence Preliminary tests suggested that at least one person could under psychologically favorable conditions predict the number which the device would generate next with a probability slightly higher than the expected 1/4 To test this hypothesis two experiments were conducted in which carefully preselected persons were asked to guess repeatedly the number to be generated next The results indicate that some subjects have the ability to predict the random numbers better than quantum theory permits However, less drastic explanations of the high number of hits recorded are considered, such as recording errors non-randomness of the generated numbers fraud by the test subject, or the occurrence of the high score as the result of a chance fluctuation Author

N69-21406# Defence Research Medical Labs Toronto (Ontario)
THE TRANSIENT RESPONSE OF AN M-LOOP SERIES FILTER SYSTEM WITH SPECIAL APPLICATION TO THE DECOMPRESSION PROBLEM IN MAN LINEAR MODEL
R A Stubbs and R S Weaver Sept 1968 23 p refs
(DRET-620) Avail Issuing Activity

A theory of body tissue gas saturation and desaturation based on a linear pressure flow law was developed in terms of electrical analogues The response of an electronic analogue computer based on this linear model was found to be in complete agreement with the theory Comparisons of the electronic computer predictions of decompression schedules with those obtained from the experimentally validated pneumatic computer showed good agreement for relatively shallow dives or short exposure times The electronic computer is not in agreement with the pneumatic computer however for deep dives and long exposure times this was demonstrated to be due to the non-linear behaviour of the pneumatic computer By inference the behaviour of the human body is believed to be non-linear with regard to gas transfer in the tissues Developments based on non-linear theories are presented in another report Author

N69-21455# Joint Publications Research Service, Washington, D C
GRAPH THEORY APPLIED TO AQUATIC ORGANISM COMMUNITIES
V V Menshutkin 20 Mar 1969 10 p refs Transl into ENGLISH from Zh Obshch Biol (Moscow) no 1, Jan –Feb 1969 p 42–49
(JPRS-47689) Avail CFSTI

The structure of complexes of heterotrophic animals in a community in terms of the theory of graphs is examined Concepts of the trophic network and energy balance of the population and community of aquatic organisms underlie the construct Methods of the theory of graphs are used to calculate the ratio of the biomass and the production of the consortium populations comprising the community under constant conditions The model of a symbiotic complex consisting of three populations illustrates that at a certain parameter ratio the intermediate trophic link can heighten the efficiency of energy transmission by the community as a whole A community complex consisting of four populations is also analyzed and the cases are demonstrated in which it is advisable to suppress a predator and in which this is disadvantageous in regard to obtaining maximum catches of individuals in the population undergoing destruction by the predator The proposed method of theoretical study of communities is visual and uncomplicated but the area of its application is restricted to stationary conditions and to the region of linear (consortive) relationships in the trophic network Author

N69-21473*# National Aeronautics and Space Administration Ames Research Center Moffett Field Calif
BALANCED BELLOWS SPIROMETER
George R Holden and Joseph R Smith Jr inventors (to NASA) Issued 7 Jan 1969 (filed 21 Aug 1964) 6 p Cl 128-2 08
(NASA-Case-XAR-01547, US-Patent-3,420,225, US-Patent-Appl-SN-39343) Avail US Patent Office

A bellows type spirometer is described which can operate properly under the influence of acceleration forces in any direction A balanced bellows spirometer comprises a center wall with a bellows mounted on each side of the wall The bellows are pivotally connected to opposite edges of the center wall and a passage through the center wall interconnects the two bellows chambers into one composite chamber An inlet is provided into one bellows and an outlet is provided from the other bellows The two bellows are mechanically interconnected so that the tendency of either bellows to move toward or away from the center wall under the influence

of acceleration is resisted by an equal and opposite tendency of the other bellows to move under the influence of the same acceleration As a result the bellows are not moved by acceleration forces and yet are free to expand and contract under the forces of air pressure Official Gazette of the U S Patent Office

N69-21474# National Defense Research Organization TNO The Hague (Netherlands)
INTERDEPENDENCY OF SUCCESSIVE RESPONSES IN A PSYCHOPHYSICAL EXPERIMENT
W A Wagenaar [1968] 19 p refs
(IZF-1968-21 TDCK15240-III) Avail CFSTI

Serial non-randomness in a sequence of responses in a psychophysical experiment is measured in such a way that three single factors causing non-randomness could be identified These factors were sequential response bias generally favoring repetition of previous responses constant response bias in favor of one of the two response alternatives, and fluctuations of the threshold inducing clustering of correct responses It is argued that the accuracy of a threshold measurement is less than generally assumed as the mentioned factors increase the variance of experimental results to an unknown extent The use of parametric methods for testing the significance of differences should be avoided therefore Author

N69-21478*# National Aeronautics and Space Administration Washington, D C
TELEOPERATOR CONTROL An AEC-NASA Technology Survey
William R Corliss and Edwin G Johnsen Dec 1968 169 p refs
(NASA-SP-5070) Avail CFSTI CSCL 06B

A comprehensive survey on engineering problems in teleoperator control and man machine integration is given The various technical chapters are divided into (1) control theory (2) man-machine interface, (3) control hardware, and (4) displays Design principles and configurations cover the wide range between hot-cell master slaves to walking machines and their varying electronic subsystems G G

N69-21501*# National Aeronautics and Space Administration Marshall Space Flight Center, Huntsville, Ala
SIMULATION OF PACKAGE TRANSFER CONCEPTS FOR SATURN 1 ORBITAL WORKSHOP
Charles B Nelson Washington Mar 1969 15 p
(NASA-TN-D-5111) Avail CFSTI CSCL 06B

Investigated was the problem of manual transferring massive packages in a zero-g environment from the Saturn docking adapter into the crew quarter areas of the Saturn stage Only a single handrail was to be used to assist the astronaut during package manipulation Preliminary transfer simulation studies with a six degree of freedom simulator established the efficiency of the pole and the basic man/package transfer technique Analysis and correlation of data from the simulations indicated that a combination of package parameter size and mass (moment of inertia) effected package maneuverability, a package with a moment of inertia 3 to 4 0 N–m-sec^2 (300 to 350 in –lbf–sec^2) appeared to be the upper limit for one man to transfer within a reasonable time frame G G

N69-21528# School of Aerospace Medicine Brooks AFB Tex
EARLY EFFECTS OF 150-MeV PROTON IRRADIATION IN RHESUS MONKEYS
Joseph E Traynor and Alan M Siegel Sep 1968 16 p refs
(AD-681465 SAM-TR-68-87) Avail CFSTI CSCL 6/18

Rhesus monkeys were exposed to 150-Mev proton irradiation at 11 rads per minute After exposure the animals were observed for clinical changes and mortality Hematologic studies were performed up to 80 days after exposure On the basis of acute median lethal dose mean survival time clinical observations and blood cell depression an RBE of unity was assigned when comparing the 150-Mev proton exposures with 2-Mev x-ray exposures A decrease in median lethal dose was noted with lowered dose rate when proton exposures at 57 rads per minute and 11 rads per minute were compared Author (TAB)

N69-21533# Army Medical Research Lab Fort Knox Ky Biophysics Lab
LASER-INDUCED CATARACTOGENESIS 1 CLINICAL AND ELECTROPHORETIC ALTERATIONS Final Report
Anthony J Luzzio and Howard M Leibowitz 8 Oct 1968 25 p refs
(AD-681899, USAMRL-795) Avail CFSTI CSCL 6/5

Irradiated animals were followed clinically by examination with the slit-lamp biomicroscope and indirect ophthalmoscope Laser-induced cataracts were extracted using a cryoprobe and electrophoretic analysis performed on the lens proteins The clinical course and characteristics of laser-induced lens opacities and of the accompanying ophthalmic sequelae are described An alteration in the electrophoretic mobility of the lens proteins of laser-induced cataracts is presented Author (TAB)

N69-21551# School of Aerospace Medicine Brooks AFB Tex
THE EFFECT OF HIGH CONCENTRATIONS OF CARBON DIOXIDE ON BLOOD SEROTONIN LEVELS IN MAN CHRONIC HYPERCAPNIA
Edward D Gordon Jr Sep 1968 14 p refs
(AD-681501 SAM-TR-68-107) Avail CFSTI CSCL 6/19

Whole blood serotonin levels in young men were investigated during exposure to a 4% carbon dioxide environment (PICO2 = 29 9 mm Hg) for a 10-day period No significant change in serotonin levels was found in those men acting as outside controls at ambient (0 03%) carbon dioxide but there was a 34 0% decrease (P < 01) of serotonin levels in men exposed to 4% carbon dioxide Exposure to 4% carbon dioxide produced throbbing headaches (day 1-2) and nausea (day 4-6) Serotonin levels after an initial depression tended to return to control levels during the 4% carbon dioxide exposure period Observed correlation between carbon dioxide and serotonin suggests that the role of carbon dioxide in control of cerebral circulation may be mediated through serotonin Author (TAB)

N69-21609# School of Aerospace Medicine Brooks AFB Tex
DOSE RATE EFFECT OF LD50/30 IN MICE EXPOSED TO COBALT-50 GAMMA IRRADIATION
Joseph E Traynor and Edwin T Still Oct 1968 12 p refs
(AD-682288 SAM-TR-68-97) Avail CFSTI CSCL 6/18

LD50/30 determinations were made on Swiss Webster female mice exposed to cobalt-60 gamma irradiation at five dose rates between 2 25 and 200 rads per minute The results are analyzed by the Bateman formula which makes a very accurate estimation of the LD50/30 in mice in the dose rate range studied Preliminary data are presented which indicate that this formula will apply to dose rates as low as 100 rads per day Author (TAB)

N69-21622# School of Aerospace Medicine Brooks AFB Tex
EYE OPACITIES IN FLYING PERSONNEL
Benjamin C Martin Thomas J Tredici and James F Culver Sep 1968 9 p *Its* Rev 9–68
(AD-682286 SAM-TR-68-101) Avail CFSTI CSCL 6/5

An eleven-year summary of eye opacities found at the USAF School of Aerospace Medicine is presented The type of opacity its location and its etiology are stated along with the type of flight rating which the patient held and his disposition as regard flying status Author (TAB)

N69-21635# School of Aerospace Medicine Brooks AFB Tex
STRESS RESPONSE AS A PREDICTOR OF RADIOSENSITIVITY IN PRIMATES
Horace E Hamilton and George S Melville Jr Nov 1968 12 p refs
(AD-682285 SAM-TR-68-122) Avail CFSTI CSCL 6/18

Macaca mulatta primates were standardized and then subjected to stress in the form of prolonged breathing of an air atmosphere saturated with ethanol vapor Significant changes ($P < 01$) were noted in their urine volumes and the excretion of electrolytes and 17-hydroxycorticoids The primates were then irradiated with a lethal dose (1 100 R) of gamma radiation Their survival times were recorded and tested for correlation with body weights urine volumes excretion of electrolytes and corticoids and post-stress blood alcohol levels The changes in the Na/K urinary ratio were found to be significantly ($P < 01$) related to the respective postirradiation survival times but no significant correlation between survival time and the other measurements was detected Author (TAB)

N69-21636# City Univ of New York
MATHEMATICAL THEORY OF MOLECULAR CONTROL SYSTEMS Final Report
Sumner N Levine Jan 1969 9 p refs Prepared in Cooperation with State Univ of N Y Stony Brook
(Grant AF-AFOSR-1396-68)
(AD-681517 AFOSR-69-0140TR) Avail CFSTI CSCL 6/1

The major emphasis of this report is related to problems associated to theory and mechanism of blood clotting The first study relates to the thermodynamics of protein adsorption onto surfaces This study provides a uniform theory of the interaction between proteins and surfaces which takes into account both surface energy and surface charge among other factors Further studies were undertaken of the mathematical treatment of the cascade theory of blood coagulation taking into account the regulation provided by negative feedback mechanisms This work provides an important extension of our earlier studies Other studies related to bio-electrodes with reference to their applications in energy conversion in physiological environment and as sensing devices Author (TAB)

N69-21639# George Washington Univ Alexandria Va Human Resources Research Office
SOME INTERACTIONS OF SPEECH RATE, SIGNAL, DISTORTION, AND CERTAIN LINGUISTIC FACTORS IN LISTENING COMPREHENSION
Thomas G Sticht Dec 1968 14 p refs Presented at Psychonomic Soc Meeting St Louis Nov 1968 *Its* Profess Paper 39–68
(Contract DA-44-188-ARO(D)-2)
(AD-681795) Avail CFSTI CSCL 5/10

The paper reports an experiment designed to determine the effects of speech rate signal distortion and certain linguistic factors on listening comprehension The results indicate that both speech rate and signal distortion may affect listening comprehension with the latter effects becoming more noticeable with material of low redundancy Linguistic cues such as inflection and syntax tended to aid listening comprehension Author (TAB)

N69-21663# Library of Congress Washington D C Aerospace Technology Div
THE BIOLOGICAL ROLE OF NITROGEN AND SPACECRAFT CABIN ATMOSPHERES
Boris Mandrovsky *In its* Foreign Sci Bull Vol 5 No 3 Mar 1969 p 1–17 refs (See N69-21661 10-34)
Avail CFSTI

The recent announcement that a Soviet scientist discovered that animals and higher plants assimilate nitrogen from the air has been acclaimed by the Soviet press as a major scientific breakthrough but the backdating of this discovery to 1951 and certain recent articles suggest that it may be a move in a power struggle between two schools of thought on the design of spacecraft cabin atmospheres Author

N69-21664# Library of Congress Washington D C
ELECTROLYTIC THEORY OF PHOTOSYNTHESIS
Boris Nartsissov *In its* Foreign Sci Bull Vol 5 No 3 Mar 1969 p 18–24 refs (See N69-21662 10-34)
Avail CFSTI

Soviet scientists believe that the process of photosynthesis in the live leaf begins with a stage of water electrolysis in the chloroplasts, where electrolytic cells are formed by alternating films of chlorophyll and carotene The potentials of these two pigments are + 0 15 and − 0 15 *v* respectively under laboratory conditions Experimental studies were conducted for the purpose of modeling the electrolysis of water in cells formed by platinum electrodes coated with the above pigments Author

N69-21669*# Aztec School of Languages Inc Acton Mass Research Translation Div
STUDIES ON THE INDUCTION OF DORSIVENTRALITY IN GERMINATING BROOD BODIES OF MARCHANTIA AND LUNULARIA 1 INDUCTORS AND THEIR EFFECTS [UNTERSUCHUNGEN UEBER DIE INDUKTION DER DORSIVENTRALITAET BEI DEN KEIMENDEN BRUTKOERPERN VON MARCHANTIA UND LUNULARIA 1 DIE INDUKTOREN UND IHRE WIRKUNGEN]
Hans Fitting Washington NASA Mar 1969 48 p refs Transl into ENGLISH from Jahrb fuer Wiss Botan (West Ger) v 82, 1936 p 333–376
(Contract NASw-1692)
Avail CFSTI CSCL 06F

A method is described which makes it possible to grasp experimentally the question as to which factors of the extrinsic environment bring about dorsiventral structure of the Thalli germinating from morphologically isolateral brood bodies In addition to unilaterally incident light which up to now was considered to be the only inductor of dorsiventrality, two other factors must be considered as inductors of dorsiventrality in the germinating brood bodies of Marchantia and Lunularia the force of gravity and the substratum It is shown that the morphological outcome of the seedlings depends on the intensities of these three factors light gravitational force and the substratum It is also shown that if these factors are permitted to act on each other, and/or if they exert a multilateral effect on the brood bodies, then Thalli are obtained which indicate a more or less isolateral formation or even a rare isolateral formation Author

N69-21670*# Aztec School of Languages Inc , Acton Mass Research Translation Div
STUDIES ON THE INDUCTION OF DORSIVENTRALITY IN MARCHANTIA BODIES 2 THE FORCE OF GRAVITY AS AN INDUCTOR OF DORSIVENTRALITY [UNTERSUCHUNGEN UEBER DIE INDUKTION DER DORSIVENTRALITAET BEI DEN MARCHANTIEENBRUTKOERPERN 2 DIE SCHWERKRAFT ALS INDUKTOR DER DORSIVENTRALITAET]
Hans Fitting Washington NASA Mar 1969 46 p refs Transl into ENGLISH from Jahrb fuer Wiss Botan (West Ger), v 82 936 p 696–740
(Contract NASw-1692)
(NASA-TT-F-12037) Avail CFSTI CSCL 06F

Additional experimental research was carried out to further confirm the influence of gravity on the induction of dorsiventrality in Marchantia and Lunularia brood bodies Ungerminated brood bodies were exposed unilaterally to the force of gravity for a certain length of time in darkness They were then subjected to rotation experiments in a clinostat with a horizontal axis A physiological dorsiventrality was induced which is expressed in a corresponding morphological monosymmetry during germination (in light) The period of presentation for the force of gravity in the ungerminated Marchantia was six hours in the Lunularia, geoinduction took at least 12 to 16 hours B P

N69-21682*# Midwest Research Inst , Kansas City Mo
BIOMEDICAL APPLICATIONS OF AEROSPACE-GENERATED TECHNOLOGY Quarterly Report, 1 Dec 1968–28 Feb 1969
David Bendersky, Wilbur E Goll and Donald Roberson 28 Feb 1969 27 p refs
(Contract NSR-26-002-083, MRI Proj 3217-E(A))
(NASA-CR-100499 QR-3) Avail CFSTI CSCL 06B

Transfer of aerospace-generated technology to the nonaerospace biomedical field is accomplished by a biomedical applications team, along with five participating institutions and their staffs The team and the research staffs identify potential solutions to the problems modify the original technology to adapt it to the biomedical problem and document and disseminate the successfully transferred problems Research material considered for transfer included computerized X-ray photograph enhancement apparatus for learning research and training of mentally retarded children temperature telemetry system for internal organs an electrical sensor for bacteria detection and bloodless perfusion in limb implantation B G D

N69-21685# Federal Aviation Administration Oklahoma City Okla Dept of Transportation
THE MAN IN THE MAINTENANCE RELIABILITY SYSTEM, FOURTH ANNUAL MAINTENANCE SYMPOSIUM
Harry A Turnpaugh 5 Dec 1968 282 p refs Symp held at Oklahoma City 3–5 Dec 1968
Avail Issuing Activity

A series of 20 oral presentations some including visual aids, are covered Topics drawn from industrial military, and international aeronautical reliability program experience include the training and certification of aircraft mechanics development of managerial competance for reliability programs the role of the design engineer in reliability programs the development of new effectiveness criteria and reviews of various implemented programs K R G

N69-21689# George Washington Univ , Alexandria Va Human Resources Research Office
DETERMINANTS OF TACTUAL PERCEPTION OF FINGER-DRAWN SYMBOLS REAPPRAISAL
Douglas S Holmes, Jon E Roeckelein and Joseph A Olmstead Sep 1968 19 p refs *Its* Profess Paper 37–68
(Contract DA-44-188-ARO(D)-2)
(AD-681666) Avail CFSTI CSCL 6/16

Previous investigators have reported finding individual differences in perception of symbols drawn by finger on the skin Some have presented alternative formulations of the determinants of tactual perception of symbols The paper analyzes some of the conceptual and methodological issues involved and presents a third *formulation* Author (TAB)

N69-21690# Ballistic Research Labs , Aberdeen Proving Ground, Md
TWELVE EYE SAFETY NOMOGRAPHS
Paul H Deitz Dec 1968 21 p refs
(AD-681906, BRL-TN-1709) Avail CFSTI CSCL 13/12

A set of nomographs is given to aid in the derivation of probability of retinal damage by a pulsed laser beam as a function of range for different conditions of atmospheric turbulence and attenuation Author (TAB)

N69-21707# Institute for Perception RVO-TNO, Soesterberg (Netherlands)
ON THERMAL COMFORT WEARING AVIATION HELMETS, ESPECIALLY IN HELICOPTERS [OVER THERMISCH COMFORT BIJ HET DRAGEN VAN VLIEGHELMEN, IN HET BIJZONDER IN HELICOPTERS]
N J L v, d Valk, J J Vos, and J Varkevisser 1968 9 p In DUTCH ENGLISH summary
(TDCK-52198III IZF-1968-19) Avail CFSTI

After the introduction of green aircraft helmets instead of white ones for crew members of military helicopters, complaints have been heard about headache when flying in the sun for long periods This report gives the results of a comparison of heat development within white and green helmets measured during normal flights These results lead to the advice to re-introduce the white helmet Author

N69-21711# Air Force Systems Command Wright-Patterson AFB Ohio Foreign Technology Div
PROBLEM OF TEACHING MACHINES TO IDENTIFY EXTERNAL SITUATIONS
M A Zyzerman E M Braverman and L I Rozonoer Mar 1968 14 p refs Transl into ENGLISH from Samoobuchayushchiesya Avtomat Sistemy (USSR), 1966 p 3–8
(AD-681674, FTD-MT-24-17-68) Avail CFSTI CSCL 6/4

A method for machine recognition of external stimulae based on so-called potential functions is proposed in the paper dealing with artificial intelligence Individuals can recognize events and patterns, and teach others to do so frequently without being able to explain how the process of recognition comes about For instance an illiterate person can be shown letters a and b and taught to recognize these letters irrespective of their shape This process of information transfer is therefore based not on explanation but on demonstration This technique can be applied to learning pattern-recognition machines, designed to respond to audio or visual commands The problem of teaching the automaton to classify correctly a given input can be defined either in the deterministic or in the probabilistic domain The report describes the application of potential functions to the probabilistic domain and in conjunction postulates a third theorem It is concluded that it is in principle

possible to apply the demonstration technique to training of automata and that a rigorously scientific, rather than an empirical approach to the solution of this problem is possible
Author (TAB)

N69-21749# Air Force Systems Command Wright-Patterson AFB, Ohio Foreign Technology Div
THE CONTEMPORARY STATE OF THE PATTERN RECOGNITION PROBLEM
V A Kovalevskii Mar 1968 24 p refs Transl into ENGLISH from Kibern Dok Akad Nauk SSSR (Moscow) no 5 1967 p 78–86
(AD-681809 FTD-HT-23-155-68) Avail CFSTI CSCL 6/4

This article surveys 32 citations (23 Soviet) covering the period up to 1967 Despite the fact that works devoted to the pattern recognition problem have been published for at least 12 years and in increasing number as a scientific discipline this problem still can not be considered clearly outlined Different authors examine different statements of recognition problems the overwhelming majority generally proceed without a statement and thus, work on the solution of a problem that can not be formulated The absence of a sufficiently general statement of the pattern recognition problem impedes the comparison of patterns because of the difficulty of systematizing numerous and very diverse works Therefore a statement of the problem that is proposed, evidently embraces the majority of individual problems of recognition and allows us to examine them from a certain single point of view
TAB

N69-21773*# National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio
PERFORMANCE AND CAVITATION DAMAGE OF AN AXIAL-FLOW PUMP IN 1500° F (1089 K) LIQUID SODIUM
Dean C Reemsnyder Walter S Cunnan and Carl Weigel Washington Apr 1969 25 p refs
(NASA-TN-D-5138) Avail CFSTI CSCL 13L

A low headrise axial flow pump was operated in liquid sodium at temperatures to 1500° F for 558 hr to investigate pump performance and blade cavitation damage in alkali metals The research rotor had nine insertable blades of three different materials, a blade tip diffusion factor of 0 40 and a hub tip radius ratio of 0 77 Overall performance was obtained and a 200 hr cavitation endurance test was conducted in 1500° F sodium at 3450 rpm Post-test blade inspection indicated that there was slight cavitation damage and that the Ni–Cr-base superalloy (René 41) was more cavitation damage resistant to high temperature sodium than either 316 or 318 stainless steel
Author

N69-21795# Speech Communications Research Lab Inc , Santa Barbara, Calif
SOME PHYSIOLOGICAL PARAMETERS FOR PROSODIC DESCRIPTION
David J Broad Oct 1968 221 p refs
(Contract N00014-67-C-0118)
(AD-682242 SCRL-Monograph-3) Avail CFSTI CSCL 6/16

The objective of the study is to investigate the physiological parameters of voice production in regard to the problem of the description of the prosodic aspect of spoken language The parameters considered include the length thickness and medial compression of the true vocal folds the tension of the vocalis muscle the resistance of the glottis to the flow of air the subglottic pressure the volume velocity of glottal airflow and the motions of the laryngeal cartilages In a study of the mechanics of the laryngeal cartilage system the degrees of freedom of the cartilage motions are isolated and employed to describe the motions mathematically It is shown how four quantities which are measurable in a laryngoscopic view depend on the degrees of freedom The resulting equations are solved to show that it should be possible to evaluate the degrees of freedom from the laryngoscopically measurable dimensions The relations between the degrees of freedom and changes in the lengths of the intrinsic laryngeal muscles are outlined An experimental study was conducted to investigate the behavior of some of the physiological parameters of voice production during prosodic variations in the voice
Author (TAB)

N69-21819# Purdue Univ Lafayette Ind School of Electrical Engineering
SPECIFIC IMPEDANCE OF THE CEREBRAL CORTEX AT VARIOUS DEPTHS DURING SPREADING DEPRESSION
C U Hoffman and F J Clark Dec 1968 166 p refs
(Contract N00014-67-A-0226)
(AD-682239 TR-EE68-38) Avail CFSTI CSCL 6/16

Specific impedance at various depths in the cerebral cortex was measured at 1 6 kHz using a novel thin film coaxial microelectrode technique which permitted measurement of the impedance of very small volumes of tissue (0 01 cubic mm) Experiments using rats indicated that spreading depression produces increases in specific impedance 3 - 4 times the resting level increases which are more than 10 times greater than changes previously reported The impedance locus in the complex plane was loop shaped very similar to the cross-section of an airfoil Significant changes in specific impedance were also produced by asphyxia and by releasing cerebospinal fluid pressure
Author (TAB)

N69-21836# Air Force Systems Command Wright-Patterson AFB Ohio Foreign Technology Div
SOME QUESTIONS OF THE STATISTICAL THEORY OF SHAPE IDENTIFICATION
A G Frantsuz Feb 1968 18 p refs Transl into ENGLISH from the book Nauchnyi Sovet Po Kompleksnoi Probleme Kibernetika Bionika Moscow Nauka 1965 p 23–32
(AD-682066 FTD-HT-23-1619-67) Avail CFSTI CSCL 6/4

An analysis of the statement of certain problems in mathematical statistics arising in connection with the problem of form recognition is given The problem in particular is concerned with the theory of estimates with respect to small samples in the case of multi-variate distributions, synthesis of secondary characteristics describing an object from primary characteristics reduction of the number of characteristics to a given number with minimal loss of information
Author (TAB)

N69-21843# Aerospace Medical Div Aerospace Medical Research Labs (6570th), Wright-Patterson AFB Ohio
CLEARANCE AND PERFORMANCE VALUES FOR THE BARE-HANDED AND THE PRESSURE-GLOVED OPERATOR
John W Garrett Aug 1968 153 p refs
(AD-681457 AMRL-TR-68-24) Avail CFSTI CSCL 5/5

The report summarizes hand and arm dimensional, clearance, and strength data of 27 adult males wearing the A/P22S-2 full-pressure suit Thirty-six measures were obtained under each of three conditions bare-handed gloved and unpressurized, and gloved and pressurized The data are both summarized for all subjects and reported independently by glove size worn Uses of the data are suggested and specific design values recommended
Author (TAB)

N69-21860# Goteborg Univ (Sweden) Dept of Otolaryngology
EFFECT OF NOISE AND TOXIC AGENTS ON THE INNER EAR Final Scientific Report, 1 Aug 1967–31 Jul 1968

Hans Engstrom Dec 1968 7 p
(Contract F61052-67-C-0090)
(AD-681834) Avail CFSTI CSCL 6/16

Under the contract there has been made an extensive study on the normal and pathologically altered inner ear of animals and man The normal inner ear has been studied by light electron and scanning electron microscopy and new techniques have been developed for these studies The same techniques have also been used for the pathological ears Damage to the inner ear has been produced by noise and ototoxic agents In man autopsy material has been used but a special technique has been developed to get optimal fixation Author (TAB)

N69-21896# Danish Academy of Technical Sciences Copenhagen
HORIZONTAL JET DILUTION STUDIES BY USE OF RADIOACTIVE ISOTOPES
Jens Hansen and Hans Schroeder 1968 27 p refs *Its* Acta Polytech Scand Civil Eng and Bldg Construct Ser No 49
(PB-180787 APS-CI-49) Avail CFSTI

Sewage discharge into receiving water often involves use of hydraulic jets in order to obtain an effective mixture of effluent and ambient water The background for the present study is that existing theories on jet dilution processes have only poor experimental support and that already presented experimental results are not in satisfactory agreement The radioisotope tracer technique is found convenient for laboratory purposes since dilution measurements are easily and accurately carried out by use of either sampling technique or in-situ measurements Improvements in initial jet dilution may be obtained by using special disturbance arrangements placed in front of the jet orifice Author (USGRDR)

N69-21901# School of Aerospace Medicine Brooks AFB Tex
EFFECTS OF PROLONGED REDUCED PRESSURE ON THE GROWTH AND NITROGEN CONTENT OF TURNIPS (BRASSICA RAPAL)
R L Mansell G W Rose B Richardson and R L Miller Sep 1968 20 p refs
(AD-681499, SAM-TR-68-100) Avail CFSTI CSCL 6/3

Photosynthetic plants are being considered for possible use in atmosphere regeneration and for food supply in extended manned space missions The effects of potential spacecraft atmospheres on the growth of such plants is important in planning their use This study investigates the effects of reduced total pressure on one plant, the turnip (Brassica rapa L) During 21-day exposures to total pressures of 380 and 700 mm Hg seedlings and mature turnip plants were periodically harvested and analyzed The rate of seedling growth, as measured by dry weight increase, was found to be slightly but significantly greater at 380 than at 700 mm Pressure had no effect on either growth rate or top/root ratio of the older plants The fact that percent dry weight (ratio of dry weight to fresh weight) was significantly less at 380 mm suggested an effect of pressure on transpiration pattern Percent total and protein nitrogen decreased with age at both pressures In roots the rate of decrease was unaffected by pressure but in plant tops the rate of decrease was significantly greater at 380 mm This variance indicates a moderate but fundamental effect of pressure on plant metabolism and composition It was concluded that the effects of reduced pressure were not sufficient to limit the future potential of plants in aerospace applications Author (TAB)

N69-21904# School of Aerospace Medicine, Brooks AFB Tex
SIMULTANEOUS MEASUREMENT OF BLOOD PARAMETERS USING RADIOCHROMIUM-LABELED RED CELLS AND RADIOIRON LABELED PLASMA
Donald F Logsdon, Jr James F Green Guy M Strong, and John W Harper Oct 1968 12 p refs
(AD-682287 SAM-TR-68-113) Avail CFSTI CSCL 6/1

Separate procedures for the measurement of erythrokinetics ferrokinetics and blood volume have previously been reported The technic described in this paper measures these parameters simultaneously thereby reducing the volume of blood and number of samples needed to be drawn and decreasing the possibility of artifactual variations in parameters Values obtained by this technic are in good agreement with those resulting from the separate studies Author (TAB)

N69-21925*# National Aeronautics and Space Administration Manned Spacecraft Center Cape Canaveral Fla
ELECTRODE FOR BIOLOGICAL RECORDING
Joe L Day and Maxwell W Lippitt Jr inventors (to NASA) Issued 7 Jan 1969 (Filed 31 Dec 1964) 6 p Cl 128-2 06
(NASA-Case-XMS-02872 US-Patent-3 420 223 US-Patent-Appl-SN-422864) Avail US Patent Office

An electrode is described for detecting potential differences generated by parts of the human body It consists of an electrochemically reversible silver chloride anodized silver disk which contacts the skin through an electrode paste on one face of the disk A lead wire is soldered to the opposite face, and this connection is then coated with an epoxy resin to preclude contact of it with the paste This prevents spurious electrical activity which would spoil the quality of the signal
Official Gazette of the U S Patent Office

IAA ENTRIES

A69-21304
DEPENDENCE OF TILT-TABLE AND ACCELERATION TOLERANCE ON BODY BUILD AND PHYSICAL FITNESS [DIE ABHANGIGKEIT DER ORTHOSTASE- UND BESCHLLUNIGUNGSTOLERANZ VON KORPERBAU UND LEISTUNGSFAHIGKEIT]
K E Klein, H Bruner, J Eichhorn, J Schotte, L Vogt (Deutsche Versuchsanstalt fur Luft- und Raumfahrt, Irstitut fur Flugmedizin, Bad Godesberg, West Germany), F Backhausen, D Jovy (Deutsche Versuchsanstalt fur Luft- und Raumfahrt, Institut fur Flugmedizin, Bad Godesberg, Koln, Deutsche Sporthochschule, Sportphysiologisches Institut, Cologne, West Germany), and H M Wegmann (Deutsche Versuchsanstalt fur Luft- und Raumfahrt, Institut fur Flugmedizin, Bad Godesberg, West Germany, Illinois, University, Medical Center, Z Z Research Resources Laboratory, Chicago, Ill)
Internationale Zeitschrift fur angewandte Physiologie einschliesslich Arbeitsphysiologie, vol 26, 1968, p 205-226 50 refs In German
(DVL-834)

Experimental study comparing the tilt-table and acceleration tolerance of highly trained athletes and physically inactive students During a 90° tilt lasting 20 min and two additional respiratory movements, the number of faints and the average cardiovascular responses did not differ significantly for the two groups, except for a lower heart rate for the athletes During linear increase at the rate of 1 g per 15 sec, the average $+G_2$ tolerance (blackout level) was almost identical in both groups Statistically significant coefficients of the product-moment calculation are worked out for both groups
B H

A69-21310 *
HYPOTHALAMIC MOTIVATIONAL SYSTEMS - FIXED OR PLASTIC NEURAL CIRCUITS?
Elliot S Valenstein, Verne C Cox, and Jan W Kakolewski (Fels Research Institute, Yellow Springs, Ohio)
Science, vol 163, Mar 7, 1969, p 1084
NIH Grants No M-4529, No MH-4947, Grant No NsG-437

Description of a procedure for modifying the behavior elicited by hypothalamic stimulation It is shown that the new behavior can compete effectively with the initial behavior and is elicited by identical stimulus parameters It is concluded that there is considerably more plasticity in establishing connections between hypothalamic circuits and motivated behavior than commonly advanced interpretations of "stimulus bound" behavior suggest The conclusion that the relationship between the activation of the hypothalamic neural circuits and stimulus-bound behavior is plastic is confirmed by experimentation with a great variety of behavior patterns B H

A69-21465
PHOTOCHEMICAL REACTION MECHANISMS FOR PRODUCTION OF ORGANIC COMPOUNDS IN A PRIMITIVE EARTH ATMOSPHERE
R A Raff and G M Meaburn (U S Armed Forces Radiobiology Research Institute, U S Defense Atomic Support Agency, Bethesda, Md)
Nature, vol 221, Feb 1, 1969, p 459, 460 19 refs

Discussion of reactions whereby a primitive earth atmosphere might have given rise to reduced compounds of C and N A number of a priori assumptions are made as to the origin and composition of such an atmosphere Among these assumptions are a steady-state atmospheric composition determined by the state of release of gases from the crust, the condensation of water into oceans, the loss of H_2 into space, the reduction of N_2, CO, and CO_2, and the solution of CO_2 in water and its deposition as limestone A number of photochemical reactions are considered It is suggested that the primary reduced compounds of nitrogen formed by reactions of N atoms were HCN and NH_3 G R

A69-21466 *
REGIONAL UPTAKE OF ^{3}H-MELATONIN FROM BLOOD OR CEREBROSPINAL FLUID BY RAT BRAIN
Fernando Anton-Tay and Richard J Wurtman (Massachusetts Institute of Technology, Dept of Nutrition and Food Science, Cambridge, Mass)
Nature, vol 221, Feb 1, 1969, p 474, 475 10 refs
PHS-NASA-supported research

Investigation of the ability of melatonin to gain access to the central nervous system. The distribution of ^{3}H-melatonin in rat brain was examined after injection into the blood or cerebrospinal fluid (CSF) It was found that ^{3}H-melatonin is selectively localized within certain brain regions, and that a much larger fraction of the administered material remains in the brain after its placement in the CSF than when it is injected into the blood G R

A69-21908 *#
NON-CONTACT METHOD OF MEASURING SMALL EYE-MOVEMENTS AND STABILIZING THE RETINAL IMAGE
D H Kelly, H D Crane, J W Hill, and T N Cornsweet (Stanford Research Institute, Menlo Park, Calif)
Optical Society of America, Spring Meeting, San Diego, Calif , Mar 11-15, 1969, Paper 8 p
NASA-supported research

Extensions of Cornsweet's (1958, 1966) stabilization technique, based on tracking the edge of a blood vessel in the optic disk, for stabilized-image experiments In the present work, a small spot of blue light is imaged on the fundus, and scanned in a circle around the optic disk at high speed Variations in reflectance along this circular raster are detected by a photomultiplier tube and are digitized for further processing A selected frame of this digital video signal is stored in a magnetic-core array and is correlated with subsequent frames to generate eye-movement information in real time The correlation algorithm distinguishes horizontal, vertical, and torsional motions of the fundus pattern Analog displacement signals fed back to a servomechanism can thus cause the raster to track the fundus pattern, locking to the position of the selected frame Such closed-loop signals can be used simultaneously to move a stimulus pattern in stabilized-image experiments M G

A69-21931 #
COMPUTER ANALYSIS TECHNIQUES FOR SPACECRAFT ADSORPTION BEDS
R L. Blakely and B N Taylor (McDonnell Douglas Corp , McDonnell Douglas Astronautics Co , Huntington Beach, Calif)
American Institute of Chemical Engineers, National Meeting, 64th, Symposium on Adsorption - Part III, New Orleans, La , Mar 16-20, 1969 Paper 19 C. 23 p. 6 refs
$0 50

Discussion of studies concerning the heat and mass transfer characteristics of CO_2 adsorption beds for a spacecraft CO_2 removal system Attention is given to methods and techniques used to prepare a digital computer program for absorption bed analysis The computed values are compared with experimental data It is found that the equations and techniques used are adequate for determining the transient performance of spacecraft adsorption beds Equilibrium isotherm data may be used to determine the instantaneous surface pressures of the absorbent material if an idealized particle is subdivided into a number of layers, or it may be used for the entire particle if intraparticle diffusion is negligible A one dimensional model is satisfactory for beds which do not have internal heat exchangers G.R

A69-22358 #
MANUFACTURING ASPECTS OF TECHNOLOGY FEASIBILITY SPACECRAFT STERILIZATION AND BIOASSAY PROGRAM
John P. McDonald, Ramon McKinney, and David M. Shuford (Martin Marietta Corp , Denver, Colo)

A69-22540

IN ADVANCED TECHNIQUES FOR MATERIAL INVESTIGATION AND FABRICATION, SOCIETY OF AEROSPACE MATERIAL AND PROCESS ENGINEERS, NATIONAL SYMPOSIUM AND EXHIBIT, 14TH, COCOA BEACH, FLA., NOVEMBER 5-7, 1968, PROCEEDINGS. [A69-22301 09-15]
North Hollywood, Calif , Western Periodicals Co (Science of Advanced Materials and Process Engineering Proceedings. Volume 14), 1968, II-3B-5 (19 p.)

Description of a bioassay program which was performed during the assembly of the Technology Feasibility Spacecraft (TFS) The problems involved in determining the biological burden on a full-scale spacecraft were identified under operational conditions The effectiveness of the sampling techniques were studied, including their compatibility with assembly activity and personnel Standard cleaning techniques employed during assembly were found to be effective in decontamination Handling during assembly operations was found to contribute far more contaminants than fallout Coupon sampling, as applied during this assembly effort, was the least satisfactory sampling technique used. Normal handling of coupons did not occur, and the frequency of ruined samples was high. The bioburden was determined to be approximately 1×10^7 microorganisms Accumulative counts were not obtained because of the schedule disruption produced by assembly activities Other problems encountered are discussed, and solutions are proposed Motivation of assembly personnel, highly detailed assembly planning, and the use of standard cleaning procedures are recommended to decrease biological contamination on the spacecraft (Author)

A69-22540

CHANGES IN ACID-BASE BALANCE INDUCED BY 100 PERCENT GRADIENT HEADWARD ACCELERATION
Spencer Shropshire, Jr , Anthony R Dowell, Michael McCally, Shirley A Pohl, and George L Bowles (USAF, Systems Command, Aerospace Medical Div , Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio)
Aerospace Medicine, vol 40, Mar 1969, p 237-242 27 refs

The effects of high gradient acceleration upon acid-base balance were evaluated in six baboons and nine human volunteers After a 1-hr ride on a short-radius centrifuge, humans showed a mean increase of 1 0 nmole/liter of arterial $[H^+]$, ($p < 0$ 01), and the baboons' arterial $[H^+]$ rose 12 0 nmole/liter ($p < 0$ 01) Serum potassium rose in each group, while bicarbonate ion fell Centrifugation caused excess lactate production in the baboons (1 75 nmole/liter) The changes in hydrogen ion were felt to result from proton donors produced from anaerobic metabolism The magnitude of acceleration used is easily tolerable and comparable to that which has been proposed as a countermeasure to weightlessness during prolonged space flight (Author)

A69-22541

APPLYING THE PRINCIPLES OF PHYSIOLOGICAL MODELING IN SPACE BIOLOGY AND MEDICINE
V V Parin and E B Shulzhenko (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR)
Aerospace Medicine, vol 40, Mar 1969, p 242-244 8 refs

Discussion of an evolutionary approach to the problems of space physiology through the development of comparative research methods The means by which mathematical, physical, and physiological modeling can be combined for the analysis of functional changes during varying gravity conditions are elaborated The method is applied to a study of the effects of transverse accelerations on cardiovascular changes and their relation to hemodynamic shifts of pulmonary circulation The results obtained under centrifuge and modeling conditions were similar It is concluded that a study of the evolution of a given function makes it possible to establish the development of structural and functional shifts in the circulation apparatus, their sequence, and the process by which regulatory mechanisms are reconstructed, as well as to reveal their dependence on new gravity conditions B H

A69-22542 *

PRELIMINARY CLINICAL REPORT OF THE MEDICAL ASPECTS OF APOLLOS VII AND VIII
Charles A Berry (NASA, Manned Spacecraft Center, Houston, Tex)
Aerospace Medicine, vol 40, Mar 1969, p 245-254

Preliminary clinical report of the significant medical data gathered on the missions of Apollo 7 and 8 Preventive medical activities in the preflight period and inflight treatment procedures are discussed Cardiovascular findings and hematological and biochemical analyses conducted during both pre- and postflight examinations are reported It is concluded that the Apollo spacecraft is capable of supporting man adequately in the space environment from a physiological point of view, and that radiation levels have not been proven to be significant in the flights thus far B H

A69-22543

EFFECT OF COOL-DEHUMIDIFIED INSPIRED AIR ON THE PHYSIOLOGIC RESPONSES TO A HOT, HUMID ENVIRONMENT
Ralph Gaudio, Jr (USAF, Systems Command, Aerospace Medical Div , Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio)
Aerospace Medicine, vol 40, Mar 1969, p 254-257 16 refs

Study of the physiological effects of breathing cool dehumidified air in a hot-humid environment which have operational significance to aircrews, where both the specific physiological responses and tolerance limits are known The mean values for tolerance time, heart rate, temperature changes, and sweat loss are tabulated It is concluded that while there was a lack of objective improvement in the physiological parameters, the subjects reported a reduction in feelings of anxiety with the addition of cool-air breathing However, cool-air breathing cannot be considered a versatile and generally applicable thermal protective device B H

A69-22544

STUDIES OF AMPLITUDE VARIATION IN THE ULTRA-LOW FREQUENCY BALLISTOCARDIOGRAM WITH SPECIAL REFERENCE TO CARDIOVASCULAR REACTIVITY
J Eldrid Smith (United Air Lines, Inc , Medical Dept , Washington, D C)
Aerospace Medicine, vol 40, Mar 1969, p 258-263. 5 refs

Discussion of the amplitude variations in ultralow-frequency ballistocardiograms of young, normal airline stewardesses and applicants in relation to cardiovascular reactivity Results showed the same variation as in a similar group of young males It is concluded that the amplitude variations were due to factors of emotional and cardiovascular reactivity, and were more pronounced in the preemployment group The HK/HI ratio on the acceleration curve showed no alteration with reactivity, and may thus be a stable measurement of abnormality in an older age group The effect of Propranolol on cardiovascular reactivity is discussed as an important diagnostic adjunct It is concluded that situational stresses associated with the increase in blood flow rates have a characteristic clinical picture in young adults B H

A69-22545

STUDIES ON THE INFLUENCE OF FAST TRANSPORTATION ON THE CIRCADIAN EXCRETION PATTERN OF THE KIDNEY IN HUMANS
F Gerritzen, Th Strengers, and Stephanie Esser (KLM - Royal Dutch Airlines, Medical Dept , Schiphol Airport, Netherlands)
Aerospace Medicine, vol 40, Mar 1969, p 264-271 23 refs

Research supported by the Stichting De Drie Lichten and Stichting voor Medisch Wetenschappelijk Onderzoek

Study of the effect of rapid global transportation on the circadian rhythmic patterns in human body functions, with particular attention to kidney excretion Analysis of the data confirms the homeostatic character of the rhythmic behavior of the body functions, and indicates that the pituitary adrenal cortical system is of major importance in the maintenance of the circadian rhythm B H

A69-22546

HUMAN ENGINEERING OF THE SST - MAN'S ROLE IN ADVANCED AIRCRAFT OPERATIONS

S. J Gerathewohl (Federal Aviation Administration, Office of Aviation Medicine, Research Planning Branch, Washington, D C) and J Gannett (Boeing Co , Seattle, Wash)
(International Academy of Aviation and Space Medicine, International Congress on Aviation and Space Medicine, 17th, Oslo, Norway, Aug 5-8, 1968)
Aerospace Medicine, vol. 40, Mar 1969, p 271-278 16 refs

Description of a human engineering program established during the early design phase of an SST aircraft to achieve maximum human efficiency and man/machine compatibility The program involves the development of specifications, requirements, and related criteria for equipment and flight deck design, work space layout, and procedures associated with pilot performance Some aspects of the pilot's role in advanced aircraft operations are outlined, and some specific examples of advanced flight instrumentation applicable to the SST are presented B H

A69-22547 #
EFFECTS OF MMH UPON THE CORNEA AND STUDIES ON THE BLOOD-AQUEOUS BARRIER TO MMH
Gordon H Takahashi and Charles E Dasher (USAF, Systems Command, Aerospace Medical Div , School of Aerospace Medicine, Brooks AFB, Tex)
Aerospace Medicine, vol 40, Mar 1969, p 279-283 13 refs

Examination of the effect of the monomethylhydrazine (MMH) on the cornea Results show that once MMH enters the in vivo arterial system it easily passes through the blood-aqueous barrier to enter the aqueous humor bathing the endothelial layer of the cornea It was observed grossly that the dog corneas became edematous within 5 to 6 hr after MMH entered the anterior chamber Using an in vitro clamped rabbit cornea, marked corneal swelling occurred within 15 to 20 min after exposure to MMH at concentrations of (10^{-2} to 10^{-4} moles per liter) Exposure to lower concentrations of MMH (10^{-5} to 10^{-7} moles per liter) resulted in a greater lag time (20 to 60 sec), but once the swelling began the rates of change were nearly identical over the period of observation The rate of corneal swelling is reduced if L-arginine is added to the MMH containing medium Removal of the MMH containing medium will also reduce the rate of swelling if accomplished soon enough (Author)

A69-22548
THERMAL REGULATION IN X-IRRADIATED DOGS SUBJECTED TO HEAT STRESS
R A E Thomson, S M Michaelson, and W J Quinlan, Jr (Rochester, University, School of Medicine and Dentistry, Dept of Radiobiology and Biophysics, Rochester, N Y)
Aerospace Medicine, vol 40, Mar 1969, p 283-286 8 refs
AEC-supported research

Study of two groups of X-ray irradiated dogs subjected to heat stresses approximately seven years and one to two years after the irradiation The study was conducted to determine the thermoregulatory ability of the irradiated animals Nonirradiated dogs served as controls Differing thermoregulatory responses of the two groups are compared, and it is concluded that latent injury in the irradiated dogs is suggested by the differing patterns. B H

A69-22549
DEVELOPMENT OF AN AVIATION COMBAT CRITERION
George M Rickus, Jr and James R Berkshire (U S Naval Aviation Medical Center, Aerospace Medical Institute, Pensacola, Fla)
Aerospace Medicine, vol. 40, Mar 1969, p 287-289 6 refs.

Discussion of the development of a combat criterion for naval aviators and flight officers An analysis is given of the completed and returned (57%) questionnaires sent to all combat deployed flight surgeons Frequency distributions of 17 selection and training variables are shown to indicate that only Peer Rating has possible value as a screening device to prevent potentially inadequate performers from reaching the fleet B H

A69-22550 #
VORTEX TUBE AS A THERMAL PROTECTIVE DEVICE
Robert E Van Patten and Ralph Gaudio, Jr (USAF, Systems Command, Aerospace Medical Div , Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio)
Aerospace Medicine, vol 40, Mar 1969, p 289-292 17 refs

Description of an experiment using the Ranque vortex tube as a cooling device in an MA-3 ventilating garment Results show that during equal timed exposures, vortex-tube air cooling significantly reduced heart rate, rectal temperature, and sweat loss, and increased sweat evaporation It easily doubled exposure time in an environment where tolerance is limited B H

A69-22552 *
REGENERABLE CARBON DIOXIDE SORBENTS
F Tepper, R Udavcak, F Vancheri, and K Ball (Mine Safety Appliances Research Corp , Evans City, Pa)
Aerospace Medicine, vol 40, Mar 1969, p 297-300
Contract No NAS 1-5277

An experimental program is underway to evaluate regenerable sorbents for CO_2 removal in space-cabin environments Isotherms were generated for a number of different activated carbons at CO_2 partial pressures equivalent to those likely to be encountered in a space-cabin environment Activated carbon, with a low CO_2 capacity, would not be a likely sorbent candidate Some experimental work was done with coprecipitated gels as CO_2 sorbents, but the results were inconclusive Ion exchange resins were found to be effective in removing CO_2 from humid air, and were comparable to molecular sieves operated in dry air Weak base secondary amine resins could be thermally/vacuum regenerated at reasonably low temperatures, while strong base resins of the quaternary ammonium type were not thermally regenerable After thermal regeneration of the weak base ion exchange resins, it was found to be necessary to reactivate them with water (Author)

A69-22553
EFFECT OF MILD HYPOXIA ON MENTAL PERFORMANCE ASSESSED BY A TEST OF SELECTIVE ATTENTION
G R. Kelman, T J Crow, and A E Bursill (Aberdeen, University, Dept of Physiology and Dept of Psychology, Aberdeen, Scotland)
Aerospace Medicine, vol 40, Mar 1969, p 301-303

Study of the effect of very mild hypoxia, such as occurs at an altitude of 8000 ft, on an aspect of psychomotor skill, namely selective attention The experimental subjects were 44 healthy medical students, aged between 19 and 25 years The results failed to confirm any decrement in psychomotor performance at a simulated altitude of 8000 ft P v T

A69-22554
EPIDEMIOLOGY OF AERIAL APPLICATION ACCIDENTS
G Anthony Ryan and John D Dougherty (Harvard University, Harvard School of Public Health, Daniel and Florence Guggenheim Center for Aerospace Health and Safety, Boston, Mass)
Aerospace Medicine, vol. 40, Mar 1969, p 304-309 11 refs

Analysis of 383 aircraft accidents involving aerial application operations or "crop-dusting " The aircraft were grouped into five classes high- and low-wing monoplanes, biplanes, helicopters, and a small miscellaneous group The accidents of each group were examined with respect to type of accident, phase of operations, amount of damage to the aircraft, and degree of injury to the crew The age and experience of the pilots were also examined It was found that there were marked differences between classes of aircraft in the incidence of death and injury, helicopters had a much lower rate than fixed-wing aircraft The proportion of deaths occurring in accidents to high-wing monoplanes was four times as great as in low-wing monoplanes, biplanes, or helicopters Differences between classes were also found in the types of accidents occurring, the phase of operations in which they occurred, and the causes of accidents The distributions of the age and experience of the pilots in each class were not found to be greatly different (Author)

A69-22555 #
BLOOD GLUCOSE DURING HIGH-PERFORMANCE AIRCRAFT FLIGHT.

A69-22556

Jerry F Meyer (USAF, Systems Command, Aerospace Medical Div , School of Aerospace Medicine, Biodynamics Branch, Brooks AFB, Tex)
Aerospace Medicine, vol 40, Mar 1969, p 310-315 26 refs

Investigation of the occurrence of fasting hypoglycemia during high-performance aircraft flights Blood samples were drawn from seven normal male subjects with an automatic blood sampler at intervals before, during, and after two-hour flights in an NF-100F aircraft and a six-hour flight in a C-97 for measurement of blood glucose levels No incidence of hypoglycemia was found Most subjects showed a significant increase in blood glucose at or just prior to takeoff in the NF-100F, never reaching hyperglycemic levels There was no secondary rise on landing No significant changes were seen during the C-97 flight The initial increase at takeoff probably represents an epinephrine effect partially inhibited by the slight increase in altitude and hyperventilation Possible factors during flight affecting blood glucose are discussed P v T

A69-22556

MEDICAL EVALUATION OF MISSILE FUEL HANDLERS
William H King, Richard L Byyny, Richard A Ellerby, and Carlton R Williams (USAF, Aerospace Medical Service, Vandenberg AFB, Calif)
Aerospace Medicine, vol 40, Mar 1969, p 315-317 7 refs

Review of the results of occupational medical examinations of 140 missile-fuel handlers Seventeen individuals had abnormal results in screening tests of the liver function Two were found to have some degree of fatty metamorphosis of the liver by biopsy The possible influences of previous liver disease, other occupational exposures, and alcohol consumption are discussed At present, there is no specific indicator to evaluate possible low-grade exposure to hydrazine P v T

A69-22557

T-WAVE INVERSION OF THE ECG OF HEALTHY INDIVIDUALS WITH VAGOTONIA
R Iglesias, R Echenique, and G Gonzalez (Instituto Politécnico Nacional, Escuela Superior de Medicina, Clinica ANDA, Mexico City, Mexico)
Aerospace Medicine, vol 40, Mar 1969, p 318-320 25 refs
Translation

Demonstration of the appearance of electrocardiographic T-wave changes related to bradycardia in otherwise healthy individuals These alterations return to normal after the administration of atropine or with the tachycardia produced by modest exercise The significance of nonspecific T-wave changes associated with "vagotonia" is not fully understood Although not apparently related to organic heart disease, long-term longitudinal studies are needed to clarify this point P v T

A69-22675

OCULOMOTOR CONTROL SYSTEM (SURVEY).
A. I Laurıngson and N G. Proskuriakova
(Avtomatika i Telemekhanika, July 1968, p 72-85)
Automation and Remote Control, July 1968, p 1079-1089 37 refs
Translation
[For abstract see issue 21, page 3918, Accession no A68-40361]

A69-22721

SPACE BIOLOGY TESTS IN MARCH 1967 [LES EXPERIENCES DE BIOLOGIE SPATIALE DE MARS 1967]
R Grandpierre
(Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Meeting, Paris, France, Feb 26, 1968)
Revue de Médecine Aéronautique et Spatiale, vol 7, 4th Quarter, 1968, p 217-219 9 refs In French

Summary of results obtained in French investigations of the different processes involved in the weightless flight of animals Some of the factors investigated are the state of vigilance and attention, the sensorial and motor reaction time, muscular tone at rest, and the electrical activity of muscles in movement M M

A69-22722

THE MONKEY AS A BIOLOGICAL PAYLOAD [POINTE BIOLOGIQUE SINGE]
C de Lisle (Sud-Aviation, Paris, France)
(Société Française de Médecine Aéronautique et Spatiale, Meeting, Paris, France, Feb 26, 1968)
Revue de Médecine Aéronautique et Spatiale, vol 7, 4th Quarter, 1968, p 220-223 In French

Brief description of some of the principal problems and stages of a project for the study of the behavior of monkeys in the high atmosphere under conditions of weightlessness Problems connected with biological measurements on monkeys in flight, the logic systems, and the protection of equipments against vibrations are discussed, and the results of tests prior to launching are cited M M

A69-22723

USE OF PRIMATES IN SPACE RESEARCH [UTILISATION DES PRIMATES DANS LES RECHERCHES SPATIALES]
F Gallouin, J L Belugou, and Fondanesche
(Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Meeting, Paris, France, Feb 26, 1968)
Revue de Médecine Aéronautique et Spatiale, vol 7, 4th Quarter, 1968, p 224-226 In French

Discussion of criteria to be followed in the selection, purchase, and handling of primates for space research It is noted that primates can be used not only as controls in observations of disorders experienced by man, but also as pioneers It is pointed out that, in the very near future, primates will be called upon the participate in space research in greater numbers M M

A69-22724

RESULTS OF TESTS PERFORMED ON PRIMATES PLACED IN A STATE OF WEIGHTLESSNESS [RESULTATS DES EXPERIENCES EFFECTUEES SUR DES PRIMATES PLACES EN ETAT DE NON-PESANTEUR]
Chastelier
Revue de Médecine Aéronautique et Spatiale, vol 7, 4th Quarter, 1968, p 227-235 In French

Description of the results of tests performed in 1967 on macaque monkeys placed in a state of weightlessness in a sounding rocket The results obtained tend to demonstrate that the complete elimination of all acceleration results in a sizable increase in the level of vigilance, whose characteristics resemble more those of a state of inhibition than a state of somnolence It would also seem that a remainder of some tenths of g would be sufficient to maintain a normal vigilance level M M

A69-22725

ACCLIMATION TO ALTITUDE AND TO EXHAUSTING MUSCULAR WORK [ACCLIMATEMENT A L'ALTITUDE ET TRAVAIL MUSCULAIRE EPUISANT]
M V Strumza
(Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Meeting, Paris, France, Oct 17, 1968)
Revue de Médecine Aéronautique et Spatiale, vol 7, 4th Quarter, 1968, p 236-238 In French
Research supported by the Direction des Recherches et Moyens d'Essais

Investigation of the possibility that acclimation to altitude hypoxia may improve certain performances, prolonging the capacity for muscular work The tests were performed on white Wistar rats running on a treadmill under various experimental conditions The results showed that acclimation to altitude in the Wistar rat appreciably prolongs the duration of resistance to muscular effort under hypoxia, although this duration is less when breathing normal oxygen M M

A69-22726

SIGNIFICANCE OF EXTERNAL MECHANOGRAMS IN THE INTERPRETATION OF SYSTOLIC MURMURS WHEN EVALUATING FLIGHT PERSONNEL [INTERET DES MECANOGRAMMES EXTERNES DANS

L'INTERPRETATION DES SOUFFLES SYSTOLIQUES LORS DE L'EXPERTISE DU PERSONNEL NAVIGANT]
R Carre, J Kermarec, J -C Canicave, and J Pernod
(Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Meeting, Paris, France, Oct 17, 1968)
Revue de Medecine Aeronautique et Spatiale, vol 7, 4th Quarter, 1968, p 239-243 In French

Discussion of the features of the various types of systolic murmurs used in the evaluation of flight personnel Different types of systolic murmur are reviewed, and their phonocardiographic definition is given Several tracings of specific systolic murmurs are shown M M

A69-22727
EXPERIMENTAL INVESTIGATION OF THE METABOLIC RELATIONSHIPS BETWEEN HYPOXIA AND HYPOGLYCEMIA [ETUDE EXPERIMENTALE DES RELATIONS METABOLIQUES ENTRE L'HYPOXIE ET L'HYPOGLYCEMIE]
P M Pingannaud and R Didkovski
(Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Meeting, Paris, France, Oct 17, 1968)
Revue de Medecine Aeronautique et Spatiale, vol 7, 4th Quarter, 1968, p 244, 245 8 refs In French

Experimental investigation of the effects of hypoxia on glucide metabolism in Wistar rats Due to the fact that hypoglycemia entails an increase in oxygen consumption, the experimental results made possible an analysis of the changes in the energy expenditure observed, in hypoxia, under the action of insulin It was found that, with a decrease in the hydrogen partial pressure, there is a reduction in the changes in energy expenditure Everything occurs as though hypoxia were a factor serving to economize the available oxygen M M

A69-22728
CLINICAL CASE - EPILEPSY ACQUIRED BY A FIGHTER PILOT [CAS CLINIQUE - EPILEPSIE ACQUISE CHEZ UN PILOTE DE CHASSE]
R Pannier and P Francoz (Service de Médecine Aéronautique, Hôpital d'Instruction des Armées, Versailles, France)
(Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Meeting, Paris, France, Oct 17, 1968)
Revue de Medecine Aeronautique et Spatiale, vol 7, 4th Quarter, 1968, p 246-250 In French

Observation of epilepsy acquired by a 25-yr old jet fighter pilot without a personal or family medical history A series of tests failed to reveal a causative agent for the belated epilepsy A left carotid arteriograph revealed the existence of an enormous posterior temporal angioma characterized by entangled branches, with the veins being the site of a huge dilation due to arterial and venous short circuits M M

A69-22729
PARASITIC CALCIFICATIONS OF SOFT PARTS IN FLIGHT PERSONNEL [LES CALCIFICATIONS PARASITAIRES DES PARTIES MOLLES ET LE PERSONNEL NAVIGANT]
R P Delahaye, P Bourniquot, and A Combes (Hôpital Militaire Dominique Larrey, Versailles, France)
(Société Française de Physiologie et de Médecine Aéronautiques et Cosmonautiques, Meeting, Paris, France, Oct 18, 1968)
Revue de Medecine Aeronautique et Spatiale, vol 7, 4th Quarter, 1968, p 251-254 In French

Discussion of indications suggested by a review of interesting X rays of parasitic calcifications found in flight personnel It is noted that the radiological finding of a parasitic calcification generally has only a retrospective significance In some afflictions, the radiological visibility of calcification images does not mean that the extension of the causative parasitoris is complete The latter can perfectly well remain active locally or at other points in the organism This may be the case with filariasis and bilharziasis Adult worms are unaffected by sclerocalcareous processes and, furthermore, ova can remain alive in reactive fibrous tissues M M

A69-22730
ADVANTAGES OF BLOODLESS METHODS OF MEASURING HEART FLOW [INTERET DES METHODES NON SANGLANTES DE MESURE DU DEBIT CARDIAQUE]
J Pernod, J Demange, R Carre, P Hardel, and J Kermarec
Revue de Médecine Aéronautique et Spatiale, vol 7, 4th Quarter, 1968, p 255-258 11 refs In French

Description of the results obtained using two bloodless methods of measuring heart flow - namely, a method of simultaneous external recording of carotid and femoral pulses, and a method of impedance plethysmography It is noted that the plethysmographic method seems to be superior to the Broemser-Ranke method and should be easy to use in aeronautical medicine, thanks to its simplicity M M

A69-23035 *
A NEW VIEW OF THE "SYNTHESIS OF LIFE "
Sidney W. Fox (Miami, University, Institute of Molecular Evolution, Coral Gables, Fla.)
(Florida Academy of Sciences, Annual Meeting, 32nd, Stetson University, DeLand, Fla , Mar. 21-23, 1968)
Florida Academy of Sciences, Quarterly Journal, vol. 31, Mar 1968, p 1-16. 21 refs
Grant No. NGR-10-007-008

Discussion of experimental research concerned with the scientific question of the origin of life Major attention has been devoted to the synthesis of precursor polymers and their self-assembly into protocells The primitive cell which could arise from reactant gases in less than a few hours had then to evolve to a contemporary cell. It is now possible to visualize how the first enzymes could have arisen in the absence of enzymes to make them. Schmitt (1956) first demonstrated self-assembly of fibrils of the protein collagen. Experiments have shown how a proteinaceous microparticle with internally ordered macromolecules, catalytic activities, and many of the properties of a contemporary cell including the ability to participate in a presumably primitive reproductive process can, and could be, spontaneously produced G R.

A69-23039 *
ABSOLUTE JUDGMENT OF MORE THAN 32 CATEGORIES (5 BITS) WITH A UNIDIMENSIONAL VISUAL STIMULUS
Herbert Friedman (College of William and Mary, Williamsburg, Va)
Psychonomic Science, vol 8, no 6, 1967, p 225, 226. 9 refs.
NIH Grant No. MH-10532-01, Contract No NAS 1-4738, Grant No NGR-47-006-028.

Investigation of the number of stimuli that a human subject can correctly identify on a unidimensional visual stimulus continuum In a series of four experiments using line length and bisected length stimuli, performance was well above the commonly accepted maximum of nine to 15 categories Channel capacity (measured by an information analysis) for the median subjects in the last two studies was 28 and 45 categories These results suggest that previous research on channel capacity should be reexamined G R.

A69-23041 *
CRITERIA FOR PHYSIOLOGICAL STRESS PRODUCED BY INCREASED CHRONIC ACCELERATION
R R Burton and A H Smith (California, University, Dept of Animal Physiology, Davis, Calif)
Society for Experimental Biology and Medicine, Proceedings, vol 128, 1968, p 608-611 23 refs
Grant No NGR-05-004-008

Comparison of hematological observations with exercise pacity, survival, and sexual development in chickens exposed to increased chronic acceleration, for the purpose of reevaluating criteria for judging physiological status in relation to stress It is found that adaptation to this hyperdynamic environment leads to an increase in the hematocrit and erythrocyte count, which has no significant effect on the exercise capacity of the animal when exercized at normal gravity, but significantly impairs these same physiological parameters during the stress period B H

A69-23045

A69-23045 *
MICROVILLAR BLEB FORMATION IN PRIMATE HEPATOCYTES IRRADIATED WITH 32-MEV PROTONS
J. J Ghidoni and H Thomas (Baylor University, College of Medicine, Dept of Pathology, Laboratory of Experimental Pathology, Houston, Tex)
Radiation Research, vol 36, Nov 1968, p 327-332 11 refs
NIH Grants No RH-00499, No CA-08803, Grant No NGR-44-003-018

Eight rhesus monkeys (Macaca mulatta) were whole-body irradiated with 6000 rads of 32-MeV protons Animals were killed at several time intervals after exposure Tissue blocks were fixed in glutaraldehyde, postosmicated, and then embedded in Maraglas-D E R 732 resin Observation of ultrathin sections by electron microscopy revealed balloon-like enlargements of distal portions of hepatocytic microvilli (blebs) which were less dense than the proximal portion of microvilli The blebs ranged widely in size, some were contained within the space of Disse, whereas many protruded into the sinusoidal lumen In a few micrographs the sinusoidal lumen was filled with bleb-like structures Such bleb formation suggests a possible mechanistic explanation for hepatic congestion following high levels of irradiation (Author)

A69-23116 *
DEPRESSED METABOLISM, PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE, WASHINGTON, D C , AUGUST 22, 23, 1968
Conference sponsored by the 24th International Congress of Physiologic Sciences, NASA, the University of Missouri, and the American Institute of Biological Sciences
Edited by X J Musacchia (Missouri, University, Columbia, Mo) and J F Saunders (NASA, Washington, D C)
New York, American Elsevier Publishing Co , Inc , 1969 648 p $16.

CONTENTS

A69-23117
CELLULAR STRUCTURAL AND ULTRASTRUCTURAL MODIFICATIONS ASSOCIATED WITH COOLING
G L Rapatz (American Foundation for Biological Research, Madison, Wis)
IN DEPRESSED METABOLISM, PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE, WASHINGTON, D C , AUGUST 22, 23, 1968 [A69-23116 10-04]
Conference sponsored by the 24th International Congress of Physiologic Sciences, NASA, the University of Missouri, and the American Institute of Biological Sciences
Edited by X J Musacchia and J F Saunders
New York, American Elsevier Publishing Co , Inc , 1969, p 3-32, Discussion, p 33-38 39 refs

Investigation of structural and functional changes in cells as a result of the freezing of muscular tissue, or the suspension of erythrocytes The changes are shown to be dependent on the cooling rate and the final exposure temperature Slow freezing to temperatures of -2 or -3°C results in severe shrinkage and distortion of cells, but they recover their structural and functional integrity after thawing In slow cooling to lower freezing temperatures, the erythrocytes hemolyze and the muscle fibers undergo irreversible shortening, accompanied by a structural disintegration of the components of the fiber Very rapid cooling to low temperatures results in the formation of intracellular ice, which is injurious to both the erythrocytes and the muscle It is suggested that the recovery of organisms whose tissues include blood and muscle is unlikely if frozen at temperatures below -3°C, unless cryoprotective agents are present to prevent freezing damage B H

A69-23118
EFFECTS OF CORPOREAL TEMPERATURE ON GLUCOSE METABOLISM IN A HOMEOTHERM, THE RAT, AND A HIBERNATOR, THE GARDEN DORMOUSE
R Agid and L Ambid (Toulouse, Université, Institut de Physiologie, Toulouse, France)

IN DEPRESSED METABOLISM, PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE, WASHINGTON, D C , AUGUST 22, 23, 1968 [A69-23116 10-04]
Conference sponsored by the 24th International Congress of Physiologic Sciences, NASA, the University of Missouri, and the American Institute of Biological Sciences
Edited by X J Musacchia and J F Saunders
New York, American Elsevier Publishing Co , Inc , 1969, p 119-157, Discussion, p 157, 158 78 refs
Research supported by the Centre National de la Recherche Scientifique

Comparative analysis of variations in glucose, lactate, free fatty acids, hepatic glycogen, and endocrine activity in a fasting, hibernating dormouse and a rat in deep hypothermia It is shown that the cellular metabolism of different tissues in the organism is affected differentially in hypothermia, and that various physiological functions cease at determined critical body temperatures Enzyme actions, like those of hormones, are shown to be affected unequally by a decrease in temperature, which explains why the hypothermic dormouse can rewarm spontaneously while the rat cannot It is noted that the differential action of temperature on organ activity and on the biochemical activity of the tissues should further an understanding of the metabolic picture found in hypothermic animals, and could lead to some practical applications B H

A69-23119 *
INTERMEDIARY METABOLISM IN HYPOTHERMIC RAT LIVERS
C Entenman, L A Hillyard (Institute for Lipid Research, Berkeley, Calif), R J Holloway, M L Albright, and G F Leong (U S Naval Material Command, Naval Radiological Defense Laboratory, San Francisco, Calif)
IN DEPRESSED METABOLISM, PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE, WASHINGTON, D C , AUGUST 22, 23, 1968 [A69-23116 10-04]
Conference sponsored by the 24th International Congress of Physiologic Sciences, NASA, the University of Missouri, and the American Institute of Biological Sciences
Edited by X J Musacchia and J F Saunders
New York, American Elsevier Publishing Co , Inc , 1969, p 159-197, Discussion, C A Privitera (New York, State University, Buffalo, N Y) and R J Hock (Northrop Corp , Hawthorne, Calif), p 197, 198 26 refs
Grants No NGR-05-035-003, No NGR-05-035-005

Systematic investigation of the alterations in biochemical processes induced by hyperthermia, using an isolated rat liver perfused at low temperatures The data reported are primarily on alterations in lipid metabolism, and on lipinogenesis by liver slices and adipose tissue during incubation at low temperatures It is concluded that liver and adipose tissue from the rat, a nonhibernator, cannot synthesize fat from acetate or glucose at a temperature of 7°C In addition, the effects of epinephrine on fat mobilization from adipose tissue are lost between 17 and 7°C It is noted that it would be valuable to compare these findings with those on tissues from a hibernator that can apparently exist on its fat stores at temperatures lower than 7°C B H

A69-23120
SEASONAL HORMONAL EFFECT OF STATES OF DEPRESSED METABOLISM
F Lachiver (Muséum National d'Histoire Naturelle, Laboratoire de Physiologie Générale et Comparée, Paris, France)
IN DEPRESSED METABOLISM, PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE, WASHINGTON, D C , AUGUST 22, 23, 1968 [A69-23116 10-04]
Conference sponsored by the 24th International Congress of Physiologic Sciences, NASA, the University of Missouri, and the American Institute of Biological Sciences
Edited by X J Musacchia and J F Saunders
New York, American Elsevier Publishing Co , Inc , 1969, p 199-226, Discussion, p 226-230 70 refs

Description of experiments to determine whether hibernation is strictly seasonal or inducible at any time, and to examine whether such a state of poikilothermia is specific to hibernators or can be induced in true homeotherms It is noted that in hibernating animals biosynthesis of thyroglobulin is very low, and that protein synthesis takes place physiologically during the periodic awakenings when body temperature is increased The role of these awakenings, whose importance in the biosynthesis of thyroid hormones is established, is considered of prime importance to the maintenance and evolution of thyroid activity during hybernation B H

A69-23121
COMPARATIVE EFFECTS OF DEPRESSED METABOLISM IN HOMEOTHERMS
Jack W Hudson (Cornell University, Div of Biological Sciences, Ecology and Systematics Section, Ithaca, N Y)
IN DEPRESSED METABOLISM, PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE, WASHINGTON, D C , AUGUST 22, 23, 1968 [A69-23116 10-04]
Conference sponsored by the 24th International Congress of Physiologic Sciences, NASA, the University of Missouri, and the American Institute of Biological Sciences
Edited by X J Musacchia and J F Saunders
New York, American Elsevier Publishing Co , Inc , 1969, p 231-259, Discussion, p 260-263 59 refs
PHS Grant No GM-15889-01

Study of metabolic depression in homeotherms under conditions of (1) acclimation to high-temperatures, (2) metabolic adaptation to climates in which heat dissipation is a particular problem, and (3) hibernation or torpor It is not known whether the first state is significant as a means of seasonal adaptation to heat The second state is shown to be widely distributed among various taxonomic groups which have species or populations forced to contend with severe problems of heat dissipation In the absence of detailed information on the physiological changes accompanying entrance into torpor it is suggested that some metabolic suppression may be involved It is noted that the metabolism of torpid animals is apparently depressed with respect to the normothermic state, which is held to be due to the passive cooling brought about as a consequence of a low ambient temperature and the absence of sufficient thermogenic activity to avoid a low body temperature B H

A69-23122 *
SLEEP, HIBERNATION AND HYPOTHERMIA IN THE YELLOW-BELLIED MARMOT (M FLAVIVENTRIS)
F E South (Missouri, University, Dept of Physiology, Columbia, Mo), J E Breazile (Missouri, University, Dept of Veterinary Anatomy, Columbia, Mo), H D Dellmann (Missouri, University, Computer Research Center, Columbia, Mo), and A D Epperly (Missouri, University, Space Sciences Research Center, Columbia, Mo)
IN DEPRESSED METABOLISM, PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE, WASHINGTON, D C , AUGUST 22, 23, 1968 [A69-23116 10-04]
Conference sponsored by the 24th International Congress of Physiologic Sciences, NASA, the University of Missouri, and the American Institute of Biological Sciences
Edited by X J. Musacchia and J F Saunders
New York, American Elsevier Publishing Co , Inc , 1969, p 277-310, Discussion, J A Panuska (Georgetown University, Washington, D C), R W Brauer (Duke University, Wilmington, N C), Peter Vash (Maryland, University, College Park, Md), and X J Musacchia (Missouri, University, Columbia, Mo), p 311, 312 40 refs
Grant No. NGR-26-004-025

Study to determine whether observable similarities exist between the phenomena of sleep and hibernation, and to differentiate these phenomena from simple hypothermia A computer analysis of cortical and subcortical activity in the yellow-bellied marmot during the various stages of arousal, sleep, natural hibernation, and artificial hypothermia is discussed It is concluded that entry into hibernation seems to be controlled by the brain temperature, rather than the activity of a thermoregulatory controller The data indicate that at least the initial entry process is not only initiated from an apparent condition of normal sleep, but may well be a physiological extension of it B H

A69-23123
ELECTROCARDIOGRAPHIC CHANGES IN DEPRESSED METABOLISM
Bengt W Johansson (General Hospital, Dept of Medicine, Heart Laboratory, Malmo, Sweden)
IN DEPRESSED METABOLISM, PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE, WASHINGTON, D C , AUGUST 22, 23, 1968 [A69-23116 10-04]
Conference sponsored by the 24th International Congress of Physiologic Sciences, NASA, the University of Missouri, and the American Institute of Biological Sciences
Edited by X J Musacchia and J F Saunders
New York, American Elsevier Publishing Co , Inc , 1969, p 313-370, Discussion, p 370-374 113 refs

Comparison of electrocardiograms from a homeothermic animal (dog), a hibernator (hedgehog), a poikilothermic animal adapted to a comparatively warm climate (South African frog), and a poikilothermic animal from the cooler Scandinavian climate (flounderfish) at decreasing temperatures The causes of EKG changes in hypothermia are discussed, and the differences in resistance to low temperatures between adult hibernators and nonhibernators are examined Metabolic changes which may contribute to EKG changes found in hypothermia are considered, and the possible existence in hibernators of metabolic pathways not found in nonhibernators is suggested B H

A69-23124
THE PERSISTENCE AND ACUTE LOSS OF PREVIOUSLY LEARNED BEHAVIOR DURING PROGRESSIVE HYPOTHERMIA
J A Panuska (Georgetown University, Dept of Biology, Washington, D C)
IN DEPRESSED METABOLISM, PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE, WASHINGTON, D C , AUGUST 22, 23, 1968 [A69-23116 10-04]
Conference sponsored by the 24th International Congress of Physiologic Sciences, NASA, the University of Missouri, and the American Institute of Biological Sciences
Edited by X J Musacchia and J F Saunders
New York, American Elsevier Publishing Co , Inc , 1969, p 375-422, Discussion, p 422-426 38 refs
Contract No DA-49-193-MD-2668

Detailed analysis of experiments involving the occurrence of performance failure in hypothermia as a temperature dependent phenomenon Six species of mammals were tested the rat, guinea pig, chinchilla, mouse, gerbil, and hamster The average body temperature for performance suppression was 24 6°C Repeated hypothermias did not significantly affect this temperature The performance suppression temperature of the hamster was higher and more variable than was noted in nonhibernating species It is concluded that while trained performance persists through a large depression in body temperature, it is nevertheless a temperature dependent phenomenon, with suppressions occurring in a nonlinear fashion Trained performance stopped within narrow body temperature ranges for members of the same species performing the same task, and within a wider, but still narrow range for the six species studied B H

A69-23125
PHYSIOLOGIC AND METABOLIC EFFECTS OF HYPOTHERMIA IN MAN
Emil Blair (Vermont, University, College of Medicine, Dept of Surgery, Div of Surgical Research, Burlington, Vt)
IN DEPRESSED METABOLISM, PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE, WASHINGTON, D C , AUGUST 22, 23, 1968 [A69-23116 10-04]
Conference sponsored by the 24th International Congress of Physiologic Sciences, NASA, the University of Missouri, and the American Institute of Biological Sciences
Edited by X J Musacchia and J F Saunders
New York, American Elsevier Publishing Co , Inc , 1969, p 525-566, Discussion, R W Brauer (Duke University, Wilmington, N C), X J Musacchia (Missouri, University, Columbia, Mo), Albert Dawe (U S Navy, Office of Naval Research, Chicago, Ill), and Olivier Heroux (National Research Council, Ottawa, Canada), p 566-568 25 refs
PHS Grant No HE-11493

Discussion of some aspects of physiological and metabolic effects in humans cooled under elective controlled conditions as a form of therapy It is noted that functional alterations in humans as compared to animals are not as consistent or as depressed at any given hypothermic level, due in part to the depressant effect of deeper anesthesia in animals Cooling is characterized by an increase in gradients between the three thermal zones, being inverse in intravascular as compared to surface cooling Hyperglycemia appeared only in humans cooled below 30°C Plasma electrolytes were unchanged, except in profound hypothermia (below 20°C) Plasma proteins were unaffected, and in hypothermic patients with metabolic deficits, correction was achieved by conventional requirements Below 30°C, acidosis developed unless ventilation was supported The studies indicate 28°C to be a critical physiological level B H

A69-23126 *
COMPARATIVE ASPECTS OF RADIO-RESISTANCE WITH DEPRESSED METABOLISM
X J Musacchia (Missouri, University, Dept of Physiology and Space Sciences Research Center, Columbia, Mo.) and R E Barr (Missouri, University, Dept of Radiology and Space Sciences Research Center, Columbia, Mo)
IN DEPRESSED METABOLISM, PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE, WASHINGTON, D C , AUGUST 22, 23, 1968 [A69-23116 10-04]
Conference sponsored by the 24th International Congress of Physiologic Sciences, NASA, the University of Missouri, and the American Institute of Biological Sciences.
Edited by X J. Musacchia and J. F. Saunders.
New York, American Elsevier Publishing Co., Inc., 1969, p. 569-604, Discussion, p. 604-607 31 refs
Research supported by the University of Missouri, Grant No. NGR-26-004-021.

Investigation of the radiation response of animals in depressed metabolic states (DMS). The discussion is restricted to two forms of DMS, hibernation and hypothermia, which are characterized by marked reductions in body temperatures along with a reduction of other physiological parameters indicative of metabolic rate. It is shown that hibernating ground squirrels do not respond to irradiation as do active normothermic squirrels. The protective effect exhibited after arousal from hibernation is studied, and it is suggested that radio-resistance in hibernation may be temperature dependent, with the posthibernation state playing a less important role than the actual state of the animal during irradiation. Changes in the influence of catecholamines relevant to hibernation and hypothermia are noted, and it is suggested that their recognition as radioprotective drugs and as physiological modifiers of circulatory functions be considered in the interpretation of current and future results. B H.

A69-23158 *
PLASMA ENZYME RESPONSES TO BLOOD WITHDRAWAL IN CHICKENS.
C. M. Winget, G. H. Bond, and L. S. Rosenblatt (NASA, Ames Research Center, Environmental Biology Div., Moffett Field, Calif.).
Comparative Biochemistry and Physiology, vol. 27, 1968, p. 827-833. 17 refs.

Description of the effect of repeated sampling (blood withdrawal) on the plasma cholinesterase, acid phosphatase, and alkaline phosphatase over an 8-hr period in the domestic chicken (Gallus domesticus). Hematocrit ratios were affected by the volume of blood removed as well as the sequence of the sample taken. (Author)

A69-23180 #
EFFECT OF GLOVES ON CONTROL OPERATION TIME
James V Bradley (Antioch College, Aerospace Medical Research Laboratories and the Behavior Research Laboratory, Yellow Springs, Ohio).
Human Factors, vol 11, Feb. 1969, p 13-20. 7 refs

Five types of control (push buttons, toggle switches, knobs, horizontally operable levers, and vertically operable levers) were

operated at room temperature with the hand clothed as follows: no glove, wool glove, and double glove (leather glove over wool glove). Operation time was measured. It was concluded that the effect of gloves on control operation time depends on the type of glove worn, the physical characteristics of control, and the type of control operation required. (Author)

A69-23181 #
GLOVE CHARACTERISTICS INFLUENCING CONTROL MANIPULABILITY
James V Bradley (Antioch College, Aerospace Medical Research Laboratories and the Behavior Research Laboratory, Yellow Springs, Ohio).
Human Factors, vol. 11, Feb. 1969, p. 21-35.

Both objective measurements and subjective ratings were made of the degree to which each of 18 widely differing gloves possessed each of the following characteristics. tenacity (resistance to sliding over a grasped surface), snugness of fit, suppleness, and protection against injury to the enclosed hand Twenty-two subjects performed each of five different control operations while wearing each of the 18 gloves and while barehanded. For both objective and subjective measurements of the characteristics, it was found that the degree of tenacity is correlated with speed of gloved operation of on-off controls, that the amount of suppleness is correlated with rapidity of gloved operation of adjustable controls, and that increasing snugness of fit improves operation time for both types of control. The difference between operation times, gloved and barehanded, was found to depend strongly on the type of control operation required. (Author)

A69-23184
GAS VACUOLE DEVELOPMENT IN A BLUE-GREEN ALGA.
J. Robert Waaland and Daniel Branton (California, University, Dept. of Botany, Berkeley, Calif.).
Science, vol. 163, Mar. 21, 1969, p. 1339-1341. 16 refs.
NSF Grant No. GB-6263.

De novo production of gas vacuoles can be induced in the blue-green alga Nostoc muscorum by transferring the cells from a defined medium to distilled water. The unusual ultrastructure of the gas vacuole membranes permits their easy recognition when specimens are prepared for electron microscopy by freeze-etching. The youngest gas vacuoles are biconical organelles, 48 hr after induction, the gas vacuoles reach their maximum observed length when they are cylinders (1.5 by 0.1 μ) with conical ends. (Author)

A69-23185
EFFECT OF MICROWAVES ON THE EYE.
Leo Birenbaum, Saul W Rosenthal (Brooklyn, Polytechnic Institute, Graduate Center, Dept of Electrophysics, Farmingdale, N Y), Gerard M Grosof (Venture Services, Inc , New York, N Y), and Milton M Zaret (Zaret Foundation, Scarsdale, N.Y.).
(International Federation for Medical and Biological Engineering and Swedish Society for Medical Physics and Engineering, International Conference on Medical and Biological Engineering, 7th, Stockholm, Sweden, Aug 14-19, 1967)
IEEE Transactions on Bio-Medical Engineering, vol BME-16, Jan 1969, p 7-14 22 refs
Grant No DA-DA-17-68-G-9249

Investigation of the effect of CW and pulsed microwave power (5 5 GHz) on the eyes of rabbits Lens opacities (when produced) were developed within four days after exposures of sufficient intensity and duration, 3-min at the 1-W level were found to exceed cataractogenic threshold, while at the 1/2-W level no acute effect was observed following a 2-hr exposure The method consisted of placing the anesthetized animals so that the exposed eye served as the termination of a length of waveguide, permitting conventional microwave instrumentation to be used for measurement of power entering the eye. G R

A69-23186 *
EEG ELECTRODE SENSITIVITY - AN APPLICATION OF RECIPROCITY
Stanley Rush and Daniel A Driscoll (Vermont, University, Dept of Electrical Engineering, Burlington, Vt)
IEEE Transactions on Bio-Medical Engineering, vol BME-16, Jan 1969, p. 15-22 12 refs
NASA-supported research.

Investigation of the sensitivity of EEG leads to the location and orientation of sources in the brain by means of the reciprocity theorem Quantitative information used in determining the sensitivity is derived from constant potential plots of a three-concentric-sphere mathematical model of the head with current applied through surface leads (the reciprocal problem), and from an electrolytic tank employing a human skull. Advantages of the reciprocal of lead field approach are outlined, and several conclusions are drawn G R.

A69-23297 #
CHEMICAL AND BIOLOGICAL PROTECTION OF THE ORGANISM AGAINST HARMFUL EFFECTS OF RADIATION AND VIBRATION [CHEMICZNE I BIOLOGICZNE ZABEZPIECZENIE USTROJU PRZED SZKODLIWYM DZIAŁANIEM PROMIENIOWANIA I WIBRACJI]
Tadeusz E. Wróblewski.
Postępy Astronautyki, no. 3, 1968, p 77-85 16 refs In Polish.

Review of the results of studies concerning chemical and biological means of safeguarding an astronaut's body against ionizing radiation and vibration The prophylactic and therapeutic chemical drugs mitigating the radiation effects are discussed. It is stated that the most efficient are biological drugs, but immunological reaction of the patient seriously limits their use The effect of vibration on the organism is briefly described, and modern protection means enhancing the body's immunity to vibration are discussed. Z W.

A69-23298 #
EFFECT OF LOW TEMPERATURE ON THE ORGANISM IN HIGH-ALTITUDE FLIGHTS AND ASTRONAUTICS [WPŁYW NISKIEJ TEMPERATURY NA ORGANIZM W LOTACH WYSOKOŚCIOWYCH I KOSMONAUTYCE].
Lucjan Golec (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland).
Postępy Astronautyki, no. 3, 1968, p. 87-100. 41 refs. In Polish.

Examination of the factors regulating the temperature of the human body in a low-temperature environment. Special attention is given to the metabolism in a cold environment, lung ventilation, and the onset of shuddering. The results obtained by examination of people acclimatized to the Arctic conditions are discussed. The prospects of using hypothermy in interplanetary flights are examined. Z. W.

A69-23303 *
ENZYMATIC CONVERSION OF NOREPINEPHRINE TO EPINEPHRINE BY THE BRAIN.
Michael Zigmond, Harvey Karten, Richard J. Wurtman (Massachusetts Institute of Technology, Dept. of Nutrition and Food Science and Dept. of Psychology, Cambridge, Mass.), and Larissa A. Pohorecky.
Journal of Pharmacology and Experimental Therapeutics, vol. 165, no. 2, 1969, p. 190-195. 27 refs.
NIH Grants No. AM-11237, No. AM-11709, Grant No. NGR-22-009-272.

Demonstration of the epinephrine-forming enzyme phenylethanolamine-N-methyl transferase (PNMT) in various brain regions of the rat, cat, hen, and turtle. The activity of the enzyme is greatest when either norepinephrine or phenylethanolamine is used as its substrate in the olfactory tubercle and olfactory bulb. PNMT activity is elevated in the olfactory tubercle among rats treated with dexamethasone for seven days. After the injection of H^3-norepinephrine into the lateral cerebral ventricle, a large fraction of the amine is converted to H^3-epinephrine and stored in the olfactory bulb. F.R.L.

A69-23304 *

PERIODIC SHOCK WITH ADDED CLOCK.

Derek P. Hendry, Matthew Yarczower, and Richard C. Switalski (Illinois, University, Chicago, Ill., Maryland, University, College Park, Md.).

Journal of the Experimental Analysis of Behavior, vol. 12, Jan. 1969, p. 159-166. 26 refs.

NIH Grants No. MH-08819, No. GM-14221, Grant No. NsG-189-61.

Rats were shocked every 6 min while responding was maintained on a variable-interval schedule of reinforcement. With some rats, shocks were interspersed with a sequence of three different stimulus conditions (S3 → S2 → S1), or clock cues, each lasting 2 min. For other rats, a single stimulus condition prevailed between shocks at the beginning of the experiment, and clock cues were introduced later. Response rate decreased from S3 to S1. Response rate in S3, S2, and S1 was inversely related to shock intensity. When clock cues were added, response rate increased in all 2-min intershock periods. During clock cues, an index of curvature, indicating the degree of negative acceleration of response rate, was greatest for S1 and least for S3, and was directly related to shock intensity. The response-facilitating effect of shock and its relation to a possible discriminative function of shock and to behavioral contrast are discussed. (Author)

A69-23306 *

PROTEIN QUALITY OF THE BACTERIUM HYDROGENOMONAS EUTROPHA.

Doris H. Calloway and Adarsh M. Kumar (California, University, Dept. of Nutritional Sciences, Berkeley, Calif.).

Applied Microbiology, vol. 17, Jan. 1969, p. 176-178. 8 refs.
Grant No. NGR-05-003-089.

Study of hydrogenomonas eutropha, a hydrogen-fixing bacterium, as a means of providing new food sources more independent of conventional agriculture. H. eutropha cells harvested from semicontinuous autotrophic culture and washed free of substrate contain about 13% nitrogen on a dry-solids basis. The biological value and digestibility of the bacterial nitrogen were determined in the rat by use of an abbreviated Mitchell-Thomas nitrogen balance technique, with casein as the standard protein. Casein nitrogen was 99% digestible, and that of both whole boiled and sonically ruptured bacterial cells was 93%. The biological value of casein and the bacterial preparations was uniformly 77%. The amino acid composition of the bacteria, as in the case of casein, indicates a first limitation of sulfur-containing amino acids. These compositional features suggest that H. eutropha may be potentially valuable as a protein supplement in animal feeds. F.R.L.

A69-23314 *

REGIONAL AND TOTAL BODY SWEAT COMPOSITION OF MEN FED CONTROLLED DIETS.

Francoise Costa, Doris Howes Calloway, and Sheldon Margen (California, University, Dept. of Nutritional Sciences, Berkeley, Calif.).

American Journal of Clinical Nutrition, vol. 22, Jan. 1969, p. 52-58. 13 refs.

PHS Grant No. AM-10202, Contract No. NAS 9-3966.

Comparison of a variety of psychological, physiological, and biochemical responses to two developed diets, both thought to be nutritionally adequate. Sweat was collected from acclimatized young men during work on a cycle ergometer in a temperate environment. The men were divided into two matched groups of six each and fed for six weeks either a diet of the type used for Project Gemini or a purified formula. There was considerable variation in the concentrations of the various constituents between the regional sites and the total body sweat. With the single exception of sodium, arm-bag sweat was the most concentrated; for all constituents measured, total body sweat was the least concentrated. The following factors were related: sweat sodium and chloride were directly related to dietary intake, osmolality of arm-bag sweat varied directly with sodium concentration within and between dietary groups, and nitrogen concentration of total body sweat varied inversely with the volume of sweat lost in the constant 40-min work test. Although the concentrations were dissimilar, sodium contents of arm-bag and total body sweat were closely related. This was not true of nitrogen and potassium levels. Thus, arm-bag sweat cannot be used to predict body losses of these components. The results suggest that variation among published total body sweat nitrogen data may be rationalized by consideration of sweat rate. M.M.

A69-23376 #

DETERMINATION OF HEAT SUSCEPTIBILITY AND HEAT TOLERANCE - A NEW INDEX.

C. A. Verghese (Institute of Aviation Medicine, Dept. of Physics, Bangalore, India), K. C. Sinha (Institute of Aviation Medicine, Dept. of Physiology, Bangalore, India), and Shri C. S. Nair (Defence Institute of Physiology and Allied Sciences, Bangalore, India).

Aero Medical Society of India, Journal, vol. 11, Oct. 1968, p. 5-14. 10 refs.

Experimental investigation of individual heat susceptibility and tolerance in astronauts. The plot of progressive changes in mean skin temperatures and oral temperatures when a subject was exposed to acute thermal stress converged after an initial phase of divergence. The progressive changes in skin and oral temperature, T_s and T_0, were found to be given by $T_s = a + b \log t$ and $T_0 = A + B t$, where a, b, A, and B are constants and t is the time. Convergence points can be obtained from these equations. The predicted time for this convergence can be used as an index of susceptibility and tolerance. There is very good correlation between the new index and tolerance time as measured by the subjective feeling of intolerance and the onset of symptoms of heat collapse. It is suggested that acute thermal stress be defined as a state where the mean skin temperature increases to a level above the oral temperature. M.M.

A69-23377 #

A NOMOGRAM FOR AIRCRAFT RUDDER PEDAL DESIGN.

S. P. Verma (Institute of Aviation Medicine, Dept. of Human Engineering, Bangalore, India) and C. A. Verghese (Institute of Aviation Medicine, Dept. of Physics, Bangalore, India).

Aero Medical Society of India, Journal, vol. 11, Oct. 1968, p. 15-21.

Description of a nomogram for designing aircraft rudder pedals. The nomogram consists of four parts and takes into consideration the following principal dimensions: seat reference point, buttock-knee length, foreleg length, rudder reference point, seat pan angle to the horizontal, thigh angle to horizontal, angle between the thigh and foreleg, and the angle made by the seat reference line with the horizontal. M.M.

A69-23378 #

EVALUATION OF CASES OF HEAD INJURIES IN AIRCREW.

H. Lakshminarayan (Institute of Aviation Medicine, Dept. of Psychiatry, Bangalore, India).

Aero Medical Society of India, Journal, vol. 11, Oct. 1968, p. 22-29. 5 refs.

Summary of analyzed data on head injuries in the Indian Air Force collected over a period of six years. The statistics show that young aircrew officers in the age group from 20 to 25 yr and with service experience of about 3 to 5 yr are the principal victims of head injuries in the Indian Air Force. The principal cause of these head injuries is found to be accidents on motor scooters or motor cycles. M.M.

A69-23379 #

BLOOD PRESSURE FLUCTUATION IN A CASE OF MULTIPLE EXTRA-SYSTOLES AS OBSERVED IN TILT TABLE STUDIES (A CASE REPORT).

K. C. Sinha (Institute of Aviation Medicine, Dept. of Physiology, Bangalore, India), C. A. Verghese (Institute of Aviation Medicine, Dept. of Physics, Bangalore, India), and Shri C. S. Nair (Defence Institute of Physiology and Allied Sciences, Bangalore, India).

Aero Medical Society of India, Journal, vol. 11, Oct. 1968, p. 30-36.

Discussion of the results of an assessment of the flying fitness of a pilot afflicted with multifocal extra systoles. The findings are as follows: (1) the extra systoles appeared as a result of induction due to postural changes, (2) the frequency of extra systoles increased with an increase in the degree of tilt, (3) the extra systoles appeared in quick succession immediately after a vertical 90° tilt; and (4) there were stages when a significant drop in systolic pressure was noted, particularly after the appearance of extra systoles in quick succession. M.M.

A69-23380 #
OCULAR INJURIES SUSTAINED DURING BAILOUT FROM A VAMPIRE AIRCRAFT (A CASE REPORT).
J. N. Singha (Institute of Aviation Medicine, Dept. of Ophthalmology, Bangalore, India).
Aero Medical Society of India, Journal, vol. 11, Oct. 1968, p. 37-47. 20 refs.

Description of two bailout cases resulting in subconjunctival hemorrhages. In the first case, ocular hemorrhages resulted from exposure to negative g effect during an inverted spin. Unilateral retinal changes with diminished intraocular pressure on the right side were probably due to the sudden degree of uneven tightening of shoulder straps and compression of neck vessels by the shoulder harness on the same side, thereby causing sudden and severe changes in retinal circulation. In the second case, petechial hemorrhages over face skin and subconjunctival hemorrhages in both eyes were attributed to wind blast mainly by virtue of its direct effects rather than from "squeeze force." A thorough eye examination after bailout accidents is recommended. M.M.

A69-23381 #
AEROMEDICAL EVALUATION OF AIRCREW FOLLOWING PARTIAL GASTRECTOMY (A CASE REPORT).
S. Krishnamurti (Institute of Aviation Medicine, Dept. of Medicine, Bangalore, India) and P. C. Chatterjee (Institute of Aviation Medicine, Dept. of High Altitude Physiology, Bangalore, India).
Aero Medical Society of India, Journal, vol. 11, Oct. 1968, p. 48-55. 5 refs.

Description of a case of incapacitation of a navigator during high-altitude flying following partial gastrectomy. The natural history of the disease and the disability are evaluated within the framework of the flying environment. Results of investigations are reviewed, and points for aeromedical evaluation are discussed with a view to conserving trained manpower without sacrificing flight safety. M.M.

A69-23382 #
SPATIAL DISORIENTATION IN A JET FIGHTER PILOT (A CASE REPORT).
V. S. N. Murty.
Aero Medical Society of India, Journal, vol. 11, Oct. 1968, p. 56-62. 5 refs.

Discussion of the case of an air force pilot who suffered from episodes of disorientation while flying as well as on the ground. The diagnostic difficulties encountered in this case are described. The most probable diagnosis was considered to be vestibular neuronitis with permanently decreased caloric response. It is pointed out that, if the pilot had met with a fatal accident, it could easily have been attributed to spatial disorientation, but not of pathological origin. M.M.

A69-23385 *
AN AXIOMATIC EXPLANATION OF COMPLETE SELF-REPRODUCTION.
Lars Löfgren (Illinois, University, Urbana, Ill.).
Bulletin of Mathematical Biophysics, vol. 30, Sept. 1968, p. 415-425. 14 refs.
Grants No. AF AFOSR 7-67, No. NGR 14-005-111, Contract No. AF 33(615)-3890.

A similarity between the concepts of reproduction and explanation is observed which implies a similarity between the less well understood concepts of complete self-reproduction and complete self-explanation. These latter concepts are shown to be independent from ordinary logical-mathematical-biological reasoning, and a special form of complete self-reproduction is shown to be axiomatizable. Involved is the question of whether there exists a function that belongs to its own domain or range. Previously, Wittgenstein (1921) has argued, on intuitive grounds, that no function can be its own argument. Similarly, Rosen (1959, 1962) has argued that a paradox is implied by the notion of a function which is a member of its own range. Our result shows that such functions indeed are independent from ordinary logical-mathematical reasoning, but that they need not imply any inconsistencies. Instead such functions can be axiomatized, and in this sense they really do exist. Finally, the introduced notion of complete self-reproduction is compared with "self-reproduction" of ordinary biological language. It is pointed out that complete self-reproduction is primarily of interest in connection with formal theories of evolution. (Author)

A69-23404 *
DIRECT EPOXY EMBEDDING FOR VERTICAL SECTIONING OF CELLS GROWN AS A MONOLAYER ON MILLIPORE FILTER.
Helge Dalen and Timo J. Nevalainen (Pennsylvania State University, Dept. of Biophysics, University Park, Pa.).
(American Society for Cell Biology, Annual Meeting, 7th, Denver, Colo., Nov. 13-15, 1967.)
Stain Technology, vol. 43, no. 4, 1968, p. 217-220. 24 refs.
NIH Contract No. DE-01764; AEC Contract No. AT (30-1)-3834, Grants No. NsG-324; No. NGR-39-009-008.

Study of cells cultured as a monolayer on a MF-Millpore GSWP, 0.22-μ pore size, filter, which were fixed, dehydrated, and examined by phase-contrast microscopy with the filter immersed in a 1:1 mixture of xylene and the embedding medium. The membrane was cut into 2 x 20 mm strips, and each strip selected for desired cells was embedded vertically in a BEEM capsule. Thus direct embedding which allowed edgewise sectioning of cells was obtained without removing them from the culturing support. P.v.T.

A69-23494
MAN'S THERMAL TOLERANCE - A REVIEW OF THE LITERATURE.
E. I. Kuznets, V. I. Chadov, G. S. Zharikova, L. V. Sadovnikova, B. S. Perepletchikova, V. M. Inshakova, and L. G. Mordovskaia.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, July-Aug. 1968, p. 11-17.)
Environmental Space Sciences, vol. 2, July-Aug. 1968, p. 258-263. 31 refs. Translation.
[For abstract see issue 23, page 4347, Accession no. A68-43878]

A69-23495
CHANGES IN CONTENT OF DRY MATERIAL, SUGARS, AND ASCORBIC ACID IN PLANTS AFTER ACTION OF COSMIC FLIGHT FACTORS ON THE SEEDS OF THESE PLANTS.
I. V. Nikitina, D. F. Gertsuskii, and L. M. Petrenko.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, July-Aug. 1968, p. 18-20.)
Environmental Space Sciences, vol. 2, July-Aug. 1968, p. 264-266. 13 refs. Translation.
[For abstract see issue 23, page 4347, Accession no. A68-43879]

A69-23496
CHANGES IN THE ENZYMATIC ACTIVITY OF CELLULAR AND SUBCELLULAR STRUCTURES IN RESPONSE TO ACCELERATIONS.
A. S. Barer, I. D. Ertanov, K. I. Murakhovskii, L. A. Rubashkina, and E. M. Semina.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, July-Aug. 1968, p. 21-25.)
Environmental Space Sciences, vol. 2, July-Aug. 1968, p. 267-271. 26 refs. Translation.
[For abstract see issue 23, page 4347, Accession no. A68-43880]

A69-23497
ON THE SIGNIFICANCE OF TYPOLOGICAL FEATURES OF THE CENTRAL NERVOUS SYSTEM FOR THE SENSITIVITY OF ANIMALS TO ACCELERATION.
N. N. Uglova.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, July-Aug. 1968, p. 26-28.)
Environmental Space Sciences, vol. 2, July-Aug. 1968, p. 272-274. 18 refs. Translation.
[For abstract see issue 23, page 4348, Accession no. A68-43881]

A69-23498
INFLUENCE OF TRANSVERSE ACCELERATION ON THE SECRETORY ACTIVITY OF THE CANINE GASTROINTESTINAL TRACT.
K. V. Smirnov, L. S. Potemkina, L. G. Goland, and A. G. Barakov.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, July-Aug. 1968, p. 29-33.)
Environmental Space Sciences, vol. 2, July-Aug. 1968, p. 275-278. 14 refs. Translation.
[For abstract see issue 23, page 4348, Accession no. A68-43882]

A69-23499
EFFECTS OF IMMOBILIZATION OF DOGS FOR TWO WEEKS ON THEIR CARDIOVASCULAR REACTIONS TO ORTHOSTATIC TESTS AND LATERAL ACCELERATION.
B. F. Asiamolov and A. D. Voskresenskii.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, July-Aug. 1968, p. 33-37.)
Environmental Space Sciences, vol. 2, July-Aug. 1968, p. 279-282. Translation.
[For abstract see issue 23 page 4348, Accession no. A68-43883]

A69-23500
EVALUATION OF ANIMAL TOLERANCE FOR IMPACT ACCELERATIONS BY BLOOD ENZYME TESTS.
E. E. Simonov and V. A. Korzhen'iants.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, July-Aug. 1968, p. 38-41.)
Environmental Space Sciences, vol. 2, July-Aug. 1968, p. 283-286. 9 refs. Translation.
[For abstract see issue 23, page 4348, Accession no. A68-43884]

A69-23501
GLYCOLYSIS RATE AND LACTIC ACID CONTENT IN THE RAT MYOCARDIUM DURING DIFFERENT PERIODS OF ADAPTATION TO HYPOXIA.
I. V. Khavkina.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, July-Aug. 1968, p. 41-43.)
Environmental Space Sciences, vol. 2, July-Aug. 1968, p. 287, 288 8 refs. Translation.
[For abstract see issue 23, page 4348, Accession no. A68-43885]

A69-23502
COMPARATIVE TOXICOLOGICAL CHARACTERISTICS OF SOME REGENERABLE ABSORBERS OF CARBON DIOXIDE
K. K Sidorov, G. M. Gorban', and G P Tikhonova.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, July-Aug 1968, p. 44-49.)
Environmental Space Sciences, vol. 2, July-Aug. 1968, p. 289-292 17 refs Translation
[For abstract see issue 23, page 4348, Accession no. A68-43886]

A69-23504
SOME CHARACTERISTICS OF THE THERMAL MINERALIZATION OF BIOCOMPLEX WASTES IN A CLOSED SYSTEM.
B. G. Gusarov, L. B. Zarudnyi, O. R. Ivanov, and S. N. Shorin.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, July-Aug. 1968, p. 51-56.)
Environmental Space Sciences, vol. 2, July-Aug. 1968, p. 295-298. Translation.
[For abstract see issue 23, page 4357, Accession no. A68-43888]

A69-23505
PRINCIPLES OF MEDICAL SUPERVISION ON LONG SPACE FLIGHTS.
V. V. Parin, R. M. Baevskii, and Iu. G. Nefedov.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, July-Aug. 1968, p. 57, 58.)
Environmental Space Sciences, vol. 2, July-Aug. 1968, p. 299, 300. Translation.
[For abstract see issue 23, page 4348, Accession no. A68-43889]

A69-23506
SOME NEUROLOGICAL PROBLEMS OF AEROSPACE MEDICINE
A G. Panov and V S Lobzin
(Kosmicheskaia Biologiia i Meditsina, vol 2, July-Aug 1968, p. 59-67)
Environmental Space Sciences, vol 2, July-Aug 1968, p. 301-307 15 refs Translation
[For abstract see issue 23, page 4349, Accession no. A68-43890]

A69-23507
SIMILAR CHANGES OF THE OXYGEN BALANCE IN MAN DURING BED REST AND STAY IN SEALED CHAMBER
L R Iseev and B. S Katkovskii
(Kosmicheskaia Biologiia i Meditsina, vol 2, July-Aug 1968, p. 67-72)
Environmental Space Sciences, vol 2, July-Aug 1968, p. 308-312 Translation
[For abstract see issue 23, page 4349, Accession no A68-43891]

A69-23508
DYNAMICS OF THE ELIMINATION OF CERTAIN PRODUCTS OF METABOLISM IN HUMANS KEPT IN ISOLATION
S M Gorodinskii, A. D Seriapin, A N Mazin, A. V Sedov, G A. Gaziev, A P Kleptsova, and L I Zhukova
(Kosmicheskaia Biologiia i Meditsina, vol 2, July-Aug 1968, p 72-76.)
Environmental Space Sciences, vol. 2, July-Aug 1968, p 313-316 13 refs. Translation
[For abstract see issue 23, page 4349, Accession no A68-43892]

A69-23509
A SYSTEM FOR THE PROCESSING OF PHYSIOLOGICAL INFORMATION IN THE COURSE OF COSMIC FLIGHTS.
A. P. Kalinovskii.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, July-Aug. 1968, p. 76-82.)
Environmental Space Sciences, vol. 2, July-Aug. 1968, p. 317-322. 7 refs. Translation.
[For abstract see issue 23, page 4357, Accession no. A68-43893]

A69-23510
DIURNAL CHANGES IN SOME PHYSIOLOGICAL FUNCTIONS AND IN THE WORK-CAPACITY OF MAN IN ISOLATION
A. N Litsov.
(Kosmicheskaia Biologiia i Meditsina, vol 2, July-Aug 1968, p 83-86.)
Environmental Space Sciences, vol. 2, July-Aug 1968, p. 323-325 15 refs Translation.
[For abstract see issue 23, page 4349, Accession no. A68-43894]

A69-23564 *

RESPONSES OF HAMSTERS TO He-O_2 AT LOW AND HIGH TEMPERATURES - INDUCTION OF HYPOTHERMIA

B A Fischer (St Louis University, Dept of Biology, St Louis, Mo) and X J Musacchia (Missouri, University, Dept of Physiology and Space Sciences Research Center, Columbia, Mo)

American Journal of Physiology, vol 215, Nov 1968, p 1130-1136 14 refs

Grant No NGR-26-004-021

Experimental investigation in which hamsters were exposed to 80% helium-20% oxygen (He-O_2) and 80% nitrogen-20% oxygen (N_2-O_2) at various ambient temperatures At room temperature hamsters in He-O_2 showed higher respiration rates, greater decrease in body weights, and lower body temperatures than those in N_2O_2 At 1, 5 5, and 10°C, He-O_2-exposed animals became hypothermic with body temperatures near ambient At 12 5°C about 50% of the experimental animals became hypothermic in He-O_2 Hypothermia induced by exposure to 80% He-20% O_2 and cold is characterized by a complete atonia, The body is limp and relaxed In addition, these animals readily rewarm and reanimate, in 2 to 3 hr, when taken from the cold and placed at room temperature N_2-O_2-exposed hamsters remained normothermic at low ambient temperatures It was suggested that in the cold the greater thermal conductivity of helium brought about a heat loss greater than heat production, thus causing a fall in body temperature At ambient temperatures of 30, 35, and 38 5°C, He-O_2-exposed animals were better able to maintain normal body temperatures than N_2-O_2-exposed hamsters M M

A69-23575

PSYCHOMOTOR REACTIONS OF MONKEYS IN FLIGHTS ALONG A BALLISTIC CURVE

R. Grandpierre

(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p. 3-7.)

Environmental Space Sciences, vol 2, May-June 1968, p 167-170 Translation

[For abstract see issue 21, page 3914, Accession no A68-40128]

A69-23576

THE EFFECT OF SODIUM AMYTAL AND SOMATOTROPIC HORMONE ON MICE SUBJECTED TO PROLONGED HYPOKINESIA

L A. Kravchuk and V G. Ovechkin.

(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p. 7-12.)

Environmental Space Sciences, vol 2, May-June 1968, p. 171-175. 18 refs Translation.

[For abstract see issue 21, page 3914, Accession no A68-40129]

A69-23577

EFFECT OF HYPEROXIA ON THE THORACIC ORGANS OF ALBINO RATS.

A R. Mansurov, F. V. Babchinskii, I G Krasnykh, and L A. Tiutin.

(Kosmicheskaia Biologiia i Meditsina, vol 2, May-June 1968, p 12-15)

Environmental Space Sciences, vol 2, May-June 1968, p 176-178 10 refs. Translation

[For abstract see issue 21, page 3914, Accession no A68-40130]

A69-23578

STABILIZATION OF THE CONCENTRATION OF MINERAL NUTRIENTS IN THE MEDIUM DURING PROLONGED CHLORELLA CULTIVATION WITH RECOVERY OF THE MEDIUM

E K. Lebedeva, G. I Meleshko, T. B. Galkina, and N. N Egorova

(Kosmicheskaia Biologiia i Meditsina, vol 2, May-June 1968, p 16-23.)

Environmental Space Sciences, vol 2, May-June 1968, p 179-184 5 refs Translation.

[For abstract see issue 21, page 3914, Accession no. A68-40131]

A69-23579

INVESTIGATION OF THE OXIDATIVE-CATALYTIC METHOD OF MINERALIZATION OF WASTES IN A CLOSED ECOLOGICAL SYSTEM.

S. V. Chizhov, Iu. E. Siniak, V. V. Krasnoshchekov, B. G. Gusarov, S. O. Kuznetsov, I. V. Aleksandrova, and G. V. Ilgach.

(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p. 23-28.)

Environmental Space Sciences, vol. 2, May-June 1968, p. 185-189. Translation.

[For abstract see issue 21, page 3914, Accession no. A68-40132]

A69-23580

MATHEMATICAL MODEL OF A LIFE SUPPORT SYSTEM.

V. A. Darg and B. G. Kovrov.

(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p. 28-33.)

Environmental Space Sciences, vol. 2, May-June 1968, p. 190-194. 8 refs. Translation.

[For abstract see issue 21, page 3917, Accession no. A68-40133]

A69-23581

CHANGE OF ORTHOSTATIC STABILITY IN ATHLETES AFTER 40-DAY HYPOKINESIA.

A V. Korobkov, L A. Ioffe, M A Abrikosova, and Iu. M Stoida

(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p. 33-40)

Environmental Space Sciences, vol. 2, May-June 1968, p 195-200. 16 refs. Translation

[For abstract see issue 21, page 3914, Accession no. A68-40134]

A69-23582

CHANGES IN URINARY OUTPUT, CREATININE EXCRETION, AND THICKNESS OF SKIN-SUBCUTANEOUS FAT LAYER IN ATHLETES DURING PROLONGED PERIODS OF HYPOKINESIA

A. A Korobova and Iu B Vinichenko.

(Kosmicheskaia Biologiia i Meditsina, vol 2, May-June 1968, p. 40-43)

Environmental Space Sciences, vol 2, May-June 1968, p 201-203 8 refs. Translation.

[For abstract see issue 21, page 3914, Accession no A68-40135]

A69-23583

EFFECTS OF PROLONGED BED REST ON MUSCLE TONE AND PROPRIOCEPTIVE REFLEXES IN HEALTHY MAN

M A Cherepakhin.

(Kosmicheskaia Biologiia i Meditsina, vol 2, May-June 1968, p. 43-47)

Environmental Space Sciences, vol 2, May-June 1968, p 204-207. 11 refs. Translation.

[For abstract see issue 21, page 3915, Accession no A68-40136]

A69-23584

THE EFFECT OF HYPOKINESIS ON THE HUMAN BLOOD CIRCULATION

V S Georgievskii and V M Mikhailov

(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p 48-51.)

Environmental Space Sciences, vol 2, May-June 1968, p 208-210 11 refs. Translation.

[For abstract see issue 21, page 3915, Accession no. A68-40137]

A69-23585

NEUROLOGICAL CHANGES IN HEALTHY HUMANS SUBJECTED TO TWO MONTHS OF HYPOKINESIA

A69-23586

Iu. N. Purakhin and B. N. Petukhov.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p. 51-56.)
Environmental Space Sciences, vol. 2, May-June 1968, p. 211-214. 10 refs. Translation.
[For abstract see issue 21, page 3915, Accession no. A68-40138]

A69-23586

ARTERIAL TONUS IN RELATION TO RESTRICTION OF MUSCULAR ACTIVITY IN MAN.
N E. Panferova and V. A. Tishler.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p. 56-62)
Environmental Space Sciences, vol 2, May-June 1968, p. 215-219 18 refs. Translation.
[For abstract see issue 21, page 3915, Accession no. A68-40139]

A69-23587

THE CONCEPT OF THE PERSONALITY AND ENVIRONMENT IN EXPERIMENTAL SPACE PSYCHONEUROLOGY.
O. N. Kuznetsov.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p. 62-70.)
Environmental Space Sciences, vol. 2, May-June 1968, p. 220-226. 29 refs. Translation.
[For abstract see issue 21, page 3915, Accession no. A68-40140]

A69-23588

MECHANISMS OF THE ACTION OF STRONG PHOTOSTIMULI ON THE VISUAL ANALYZER.
V I. Shostak.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p. 70-73.)
Environmental Space Sciences, vol 2, May-June 1968, p 227-229 10 refs. Translation.
[For abstract see issue 21, page 3915, Accession no. A68-40141]

A69-23589

HUMAN TOLERANCE TO LOCAL INFRARED IRRADIATION
I. I. Dedenko, N. K. Gnoevaia, and V. S. Ivanov.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p. 73-77.)
Environmental Space Sciences, vol. 2, May-June 1968, p. 230-233. 5 refs. Translation.
[For abstract see issue 21, page 3915, Accession no A68-40142]

A69-23590

EFFECT OF A PLANT DIET WHICH INCLUDES A BIOMASS OF UNICELLULAR ALGAE ON EXCRETION AND BALANCE OF MINERAL ELEMENTS
E. I Pokrovskaia, A. P. Tereshchenko, and V M Volynets
(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p. 78-81)
Environmental Space Sciences, vol. 2, May-June 1968, p 234-237. 10 refs. Translation.
[For abstract see issue 21, page 3917, Accession no. A68-40143]

A69-23591

EVAPORATION UNDER LOW ATMOSPHERIC PRESSURE CONDITIONS
I. N Chernıakov, I. V. Maksimov, and P. Ia Azhevskii.
(Kosmicheskaia Biologiia i Meditsina, vol. 2, May-June 1968, p 81-86.)
Environmental Space Sciences, vol 2, May-June 1968, p 238-242 12 refs. Translation.
[For abstract see issue 21, page 3916, Accession no. A68-40144]

A69-23592

VARIATION PULSOGRAMS AND INDICES OF RESPIRATORY FUNCTION IN ACUTE HYPOXIA.
I. R. Kalinichenko and G. A Nikulina
(Kosmicheskaia Biologiia i Meditsina, vol 2, May-June 1968, p. 87-90.)
Environmental Space Sciences, vol. 2, May-June 1968, p. 243-245. 7 refs. Translation.
[For abstract see issue 21, page 3916, Accession no. A68-40145]

A69-23872

ATMOSPHERIC AND PSYCHOPHYSIOLOGICAL EFFECTS ON THE OBSERVATION OF AEROSPACECRAFT.
Bernard F. Kiem (EG & G, Inc., Santa Monica Div., West Los Angeles, Calif.).
Optical Society of America, Spring Meeting, San Diego, Calif., Mar. 11-14, 1969, Paper. 14 p.

Although the eye possesses a high degree of contrast sensitivity, there are conditions under which an object will not be visible to an observer, even when the luminance of the object is not equal to that of the background space. An expression has been obtained for the luminance which an object must possess for it to be undetectable by an unaided observer, the object's luminance must match the background luminance to within the factor $(1 \pm \epsilon/U)$, where ϵ is the threshold contrast of the observer, dependent upon the size of the object and an observer performance factor. U is the atmospheric contrast transmission function, and for many realistic situations depends solely upon the optical path thickness. Examples are presented to illustrate the variability in precision with which the luminance of a large jet transport and a small single-engine aircraft must match the luminance of the sky background so that the aircraft are not visible to unaided observers. The observers are assumed to be situated within a haze layer, viewing the aircraft along an upward path of sight, at the same altitude as the aircraft, and with the horizon sky as the background. In each case, the intrinsic luminance profiles required for threshold visibility are compared with the amount of luminance provided by natural illumination on simple geometrical surfaces. (Author)

A69-23877

A MANUAL CONTROL-DISPLAY THEORY APPLIED TO INSTRUMENT LANDINGS OF A JET TRANSPORT
Warren F Clement, Henry R Jex, and Dunstan Graham (Systems Technology, Inc , Princeton, N J)
(Institute of Electrical and Electronics Engineers, Symposium on Human Factors in Electronics, 9th, Washington, D C , May 6, 7, 1968)
IEEE Transactions on Man-Machine Systems, vol MMS-9, Dec 1968, p 93-110 27 refs
Contract No N 00014-66-C-0072

Description of an illustrative application of a theory for manual control displays to the instrument landing approach of a large subsonic jet transport A methodical procedure is disclosed for formulation of compensatory display-control systems Manual approach height and lateral position control are treated in multiloop dynamic analyses so as to select preferred variables for measurement and display Closed-loop system performance and pilot scanning and workload measures are also evaluated The example concludes with the "prediction" of a preferred display arrangement Comparison with an FAA Category II instrument panel arrangement selected by an airline operating the example aircraft shows the predictions to be remarkably accurate (Author)

A69-23878

AN ANALYSIS OF PILOT ADAPTATION IN A SIMULATED MULTILOOP VTOL HOVERING TASK
Edward W Vinje (United Aircraft Corp , United Aircraft Research Laboratories, East Hartford, Conn)
IEEE Transactions on Man-Machine Systems, vol MMS-9, Dec 1968, p 110-120 5 refs

Investigation of human pilot adaptation in a simulated multiloop VTOL hovering task with a series-loop-closure model Using the model equations, the pilot-model adaptable parameters were computed from rms hovering performance data measured in flight simulator experiments for a variety of VTOL aircraft configurations *Variations in the aircraft configurations affected* both the aircraft's dynamic characteristics and its response to simulated turbulence The pilot's pitch-loop adaptation generally correlated with the frequency-domain characteristics of the pitch response to turbulence and to control inputs The results of the study show no specific low-frequency attitude gain requirements that must be satisfied by the pilot for the attitude disturbance and dynamic characteristics considered P v T

A69-23879 *

MOTION CUES IN MAN-VEHICLE CONTROL

Richard S Shirley (NASA, Electronics Research Center, Office of Control Theory and Application, Cambridge, Mass) and Laurence R. Young (Massachusetts Institute of Technology, Dept. of Aeronautics and Astronautics, Cambridge, Mass.)

IEEE Transactions on Man-Machine Systems, vol. MMS-9, Dec 1968, p 121-128 5 refs.
Grant No NsG-577.

Investigation of the human operator's use of roll-motion cues for man-vehicle control in a compensatory tracking task with a disturbance input Extensive data for the human operator's describing function are taken for a wide range of vehicle dynamics under conditions of visual cues only, roll-motion cues only, and simultaneous visual and roll-motion cues Addition of roll-motion cues to visual cues permits the human operator to increase his phase lead at frequencies above 3 rad/sec This makes it possible for him to increase the system open-loop gain without a loss of system stability, and thus to reduce the system tracking error Experimental results indicate that in a compensatory system with a disturbance input, any condition in which additional human operator lead at frequencies above 3 rad/sec would be useful is a condition in which roll-motion cues would aid. P.v.T.

A69-23880 *

HUMAN INFORMATION PROCESSING RATES DURING CERTAIN MULTIAXIS TRACKING TASKS WITH A CONCURRENT AUDITORY TASK

Thomas E Wempe and Daniel L. Baty (NASA, Ames Research Center, Moffett Field, Calif)

IEEE Transactions on Man-Machine Systems, vol MMS-9, Dec 1968, p 129-138 7 refs.

Description of experiments conducted to determine the information processing rates of several subjects performing one- and two-axis compensatory tracking tasks with a secondary auditory task The experimental variables were the order of controlled element dynamics, the forcing function, and the addition of a secondary task Human information processing rates decreased slightly on each tracking channel with the addition of the second tracking channel or the secondary auditory task. Other than this effect, the information processing rates were additive until a limit in the total information processing rate was reached This limit was related to the order of the controlled element (Author)

A69-23881 *

IDENTIFICATION OF SAMPLING INTERVALS IN SAMPLED-DATA MODELS OF HUMAN OPERATORS

George A Bekey and Caswell B Neal (Southern California, University, Dept. of Electrical Engineering, Los Angeles, Calif).

IEEE Transactions on Man-Machine Systems, vol. MMS-9, Dec 1968, p 138-142. 9 refs
Grant No NGR-05-018-022

The synthesis of sampled-data models of human controllers has been hampered by the lack of systematic procedures for estimating the sampling frequency to be used in the model This work presents two methods (programmed search and gradient search) for the determination of an unknown sampling frequency in closed-loop sampled-data systems Both methods are based on a priori knowledge of the structure of the system to be identified and require only measurements of the continuous input and output of the system Several theorems concerning the identification problem are presented The application of both the gradient search and programmed search techniques is illustrated by several examples (Author)

A69-23898 #

APPROACHES TO THE OPTIMIZATION OF AN ARTIFICIAL ATMOSPHERE WHEN P_{O_2} IN THE GASEOUS MEDIUM DECREASES IRREVERSIBLY [O PUTIAKH OPTIMIZATSII ISKUSTVENNOI ATMOSFERY PRI NEOBRATIMOM SNIZHENII P_{O_2} V GAZOVOI SREDE]

V B Malkin and O G Gazenko

Akademiia Nauk SSSR, Doklady, vol 184, Feb 1, 1969, p 995-998 5 refs In Russian

Study of the antihypoxic effect of CO_2 additions to the inspired air on the tolerance of a group of ten male subjects exposed in a sealed chamber to hypoxic conditions at a normal atmospheric pressure with oxygen partial pressures reduced to 100, 85, and 65 mm Hg EEGs, EKGs, respiratory motions, and pulmonary ventilation were recorded during the experiment, and the blood composition of the subjects was determined after it CO_2 partial pressures of 10 to 25 mm Hg at O_2 partial pressures of 120 to 65 mm Hg are tentatively recommended as enhancing the hypoxia resistance of men exposed *to media with reduced oxygen contents* V Z

A69-23966 #

ANALYSIS OF EARLY DISTURBANCES IN ION MIGRATION IN *IRRADIATED ERYTHROCYTES* [K ANALIZU RANNIKH NARUSHENII TRANSPORTA IONOV V OBLUCHENNYKH ERITROTSITAKH]

G K Gerasimova and Z N Nakhil'nitskaia (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR)

Akademiia Nauk SSSR, Doklady, vol 184, Jan. 21, 1969, p. 709-712. 9 refs In Russian

Study of the changes in the behavior of K^{42} ions introduced into irradiated *erythrocytes as indices of disturbances* in the active migration of potassium ions Special attention is given to the early stages of the postradiation period featuring an intensified influx of potassium ions into the cells The experiments were conducted on rat erythrocytes irradiated by Co^{60} gamma radiation. A relation between this intensified influx of potassium ions and the energy exchange in the cells is demonstrated. Z W

A69-24021

SIMULATED WEIGHTLESSNESS FOR THE ONTOGENESIS OF THE OTOLITH ORGAN

W Briegleb (Deutsche Versuchsanstalt fur Luft- und Raumfahrt, Bad Godesberg, *West Germany*)

Naturwissenschaften, vol 55, no 8, 1968, p 397 5 refs (DVL-855)

Experimental investigation of simulated weightlessness for the ontogenesis of the otolith organ in tadpoles and eggs When tadpoles grown in a rotating tube (160 rpm) were placed in still water, they tried to move so as to produce a sensation of rest in their otolith organs It can be assumed that simulation would reveal any dependence of the functional development of the statolith apparatus upon acceleration forces near 1 g or at zero gravity M M

A69-24157 #

ACTIVE VIBRATION ISOLATION OF HUMAN SUBJECTS FROM SEVERE DYNAMIC ENVIRONMENTS

P C Calcaterra and D W Schubert (Barry Wright Corp , Barry Controls Div., Watertown, Mass)

American Society of Mechanical Engineers, Vibrations Conference, Philadelphia, Pa , Mar 30-Apr 2, 1969, Paper 69-Vibr-65
16 p 47 refs
Members, $0 75, nonmembers, $1 50
USAF-sponsored research

A69-24185

Results of an investigation conducted to evaluate the feasibility of protecting pilots from the vertical dynamic excitations experienced during low-level high-speed flight by means of active broadband isolation techniques The required degree of vibration isolation and maximum relative displacement values are postulated based on definition of the environment, human tolerance levels, and cockpit clearance The design of an active hydraulic system is described, which employs acceleration and displacement feedback mechanisms Analyses are presented to indicate the type of compensation and loop gains required to provide the desired degree of isolation and displacement control while maintaining system stability, for conditions of combined vibratory and sustained-acceleration excitation Results of tests using a laboratory model show that the developed active hydraulic isolation technique provides the vertical isolation and displacement control postulated to be required for pilot protection during low-level, high-speed flight In addition, the system exhibits zero static deflection, and is essentially insensitive to forces applied at the isolated payload, human body resonance coupling effects, external forces applied to the payload, and vibratory excitation levels (Author)

A69-24185 *

AZOTOBACTER VINELANDII RIBONUCLEIC ACID POLYMERASE V - UNPRIMED SYNTHESIS OF POLY A POLY U

Joseph S Krakow (California, University, Space Sciences Laboratory, Berkeley, Calif)

Biochimica et Biophysica Acta, vol 166, 1968, p 459-465 23 refs
NIH Grant No GM-12326, Grants No NsG-479, No NGR-05-003-020

Experimental investigation in which, following a short lag period, poly A poly U is synthesized by the Azotobacter vinelandii RNA polymerase in an unprimed reaction containing ATP and UTP The synthesis of the polymers is accompanied by formation of aggregates which are retained at pH 8 0 on glass fiber filters No polymers are formed in the presence of 0 1 mM ATP and UTP At 0 6 mM ATP, 0 1 mM UTP, or 0 1 mM ATP, 0 6 mM UTP, synthesis of poly A poly U occurs with a lag period longer than that seen in the standard reaction M M

A69-24186 *

UNBALANCED RESPIRATORY GROWTH OF EUGLENA

J R Cook and B Heinrich (Maine, University, Dept of Zoology, Orono, Me)

Journal of General Microbiology, vol 53, 1968, p 237-251. 28 refs
NIH Grant No GN-12179, Grants No NsG-338, No NGL-20-006-001

Investigation of the respiratory physiology of Euglena gracilis grown heterotrophically on a defined medium, as a function of culture age when growth was supported by glucose, acetate, or ethanol as sole carbon source The endogenous rate of oxygen consumption in general paralleled that of total protein content, usually showing a steady decline through logarithmic and stationary phases of growth. The rate of oxygen consumption stimulated by ethanol or acetate remained fairly constant during the logarithmic phase but decreased sharply in the early stationary phase The specific activities of representative respiratory enzymes remained essentially proportional to one another and to total oxygen consumption In general, respiratory growth was out of balance with the rate of cell division but in essential balance with the rate of biosynthesis G R

A69-24188 *

DNA REPLICATION IN VIVO BY A TEMPERATURE-SENSITIVE POLYNUCLEOTIDE LIGASE MUTANT OF T4

Junko Hosoda and Elaine Mathews (California, University, Space Sciences Laboratory, Berkeley, Calif)

National Academy of Sciences, Proceedings, vol 61, Nov 1968, p 997-1004 22 refs
Grants No NsG-479, No NGR-05-003-020

Discussion of an investigation which confirms the theory that polynucleotide ligase plays an essential role in DNA replication It was found that a temperature-sensitive mutant of T4, tsA80, could initiate but could not continue DNA replication at 42°C DNA strands synthesized by tsA80 at 42°C were accumulated as short fragments when analyzed after denaturation These fragments of DNA synthesized at 42°C served as precursors of long strands when the temperature of the culture was subsequently lowered to 25°C The fragments of DNA synthesized at 42°C were not covalently connected to the bulk DNA previously synthesized at 25°C The presence of a second mutation in gene 46 prevented the joining of the short DNA fragments accumulated at 42°C by tsA80 after subsequently lowering the temperature to 25°C G R

A69-24189 *

IMPAIRED ORTHOSTATIC TOLERANCE AFTER BED REST IN PATIENTS WITH MYOCARDIAL INFARCTION

Khaja Farreduddin and Walter H. Abelmann (Boston City Hospital, Thorndike Memorial Laboratory, Harvard University, Harvard Medical School, Dept. of Medicine, Boston, Mass)

New England Journal of Medicine, vol. 280, Feb. 13, 1969, p. 345-350. 20 refs.
NIH Grants No. HE-10539, No. HE-5244, No. FR-76, Grants No. NsG-595, No. NGR-22-007-019.

In the presence of coronary atherosclerosis, systemic hypotension may result in acute ischemic damage to the myocardium. In 22 patients convalescing from acute myocardial infarction, orthostatic tolerance was studied by means of measurements of heart rate and blood pressure after bed rest. Tests were repeated after full mobilization in 16 patients. In five of 10 patients treated with strict bed rest for nine to 24 days, systemic blood pressure transiently fell by more than 38 mm Hg during 15 min of passive, upright tilt to 70°, a response abolished after full ambulation. This response was also seen in three of eight patients assuming a passive, sitting posture after strict bed rest. It was usually asymptomatic. The response was not observed in eight patients treated with modified bed rest. Strict bed rest in the treatment of acute myocardial infarction may result in cardiovascular deconditioning. Initial mobilization of such patients should be gradual and under careful supervision. (Author)

A69-24190 *

ENZYMATIC DIGESTION OF C-TERMINAL ^{3}H-LABELED PEPTIDES - POSSIBLE USEFULNESS FOR THE STRUCTURAL STUDY OF PROTEINS.

Hisayuki Matsuo and Hiroshi Matsubara (California, University, Dept of Entomology and Space Sciences Laboratory, Berkeley, Calif).

Society for Experimental Biology and Medicine, Proceedings, vol 129, 1968, p 564-566. 9 refs
NIH Grant No. HE-11553-01, Grants No. NsG-479, No NGR-05-003-020.

Study of the usefulness of tryptic and chrymotryptic digestion of the tritiated peptides in identifying C-termini. Investigations were carried out with Scenedesmus ferredoxin and peptides derived from it It was found that the tritiated peptide underwent tryptic digestion smoothly and that the C-terminal fragment was easy to detect by its radioactivity G R.

LC ENTRIES

A69-80752
MEDICAL CARE OF AIRCREWMEN IN AN INDUSTRIAL ENVIRONMENT
William E Evans and Charles I Barron (Lockheed–Calif Co Burbank Calif)
Journal of Occupational Medicine vol 10, Dec 1968 p 688–691 *Ind Med Assn , 53rd Ann Meeting, San Francisco, Apr 22–25, 1968*

The care of aircrewmen under company occupational health programs was discussed due to the increased usage of corporate aircraft as a medium for business travel A description was provided of an Aircrew Effectiveness Program typical of the airframe industry This program emphasizes the unique environment and recognizes the critical performance of the aircrew The role of industrial medicine in support of business aviation was discussed The industrial physician is already well qualified for the study of interactions between man and his environment Minor expansion of his existing occupational health program will provide for an efficient Aircrew Effectiveness Program

A69-80753
CIRCULATION AND BREATHING DURING WORK USING A PROTECTIVE OXYGEN MASK [KREISLAUF UND ATMUNG BEI ARBEIT UNTER ATEMSCHUTZMASKE]
H -J Woitowitz D Szadkowski and K Muller (Erlangen–Nurnberg, U Inst fur Arbeits- und Sozialmed West Germany)
Arbeitsmedizin Sozialmedizin Arbeitshygiene vol 3 Mar 1968, p 65–71 11 refs In German

The scope of the protective oxygen mask has been found to be important today in industry and emergency operations both in civilian and military populations The technical investigations of the performance limiting characteristics of masks such as visibility interference dead-space increment and respiration resistance elevation are known however only few medical publications have examined the effects on circulation, respiration and capacity in working humans Therefore 97 healthy young men were subjected to either increasing or constant severe ergometer loads up to maximum capacity both with and without two-value controlled complete masks Pulse blood pressure and electrocardiograms indicated cardio-circulatory behavior under load Details of the ergospirographic results were tabulated The magnitude of the mask effect was proved to be dependent on (1) the maximal oxygen consumption (2) the work-respiration minute volume, and (3) the endurance capacity The respiration protective apparatus resulted in a statistically significant curtailing of the endurance capacity oxygen consumption (2) the work-respiration minute volume, and (3) the endurance capacity The respiration protective apparatus resulted in a statistically significant curtailing of the endurance capacity during constant severe work and in steady state there was a statistically significant reduction of the maximum oxygen consumption and work-respiration time volumes in the last minute of work

A69-80754
CHANGE IN THE RATE OF THE BASAL METABOLISM AND OXIDATIVE PHOSPHORYLATION IN THE LIVER MITOCHONDRIA UNDER THE EFFECT OF GLUTAMIC ACID IN HYPOXIA AND THYROIDECTOMY [IZMENENIE INTENSIVNOSTI OSNOVNOGO OBMENA I OKISLITEL'NOGO FOSFORILIROVANIIA V MITOKHONDRIIAKH PECHENI POD VLIIANIEM GLUTAMINOVOI KISLOTY PRI GIPOKSII I TIREOIDEKTOMII]
M S Volkov and N A Glotov (Sverdlovsk Med Inst Dept of Biochem USSR)
Ukrains kyi Biokhimichnyi Zhurnal, vol 40 no 5 1968, p 431–435 20 refs In Russian

The effect of glutamic acis on basal metabolism and the respiration and oxidative phosphorylation processes in the liver mitochondria was investigated in experiments conducted on intact and thyroidectomized rats in normal and hypoxic conditions It was shown that glutamic acid administered to intact rats in normal conditions decreased the basal metabolism and in hypoxic conditions prevented its decrease In thyroidectomized rats the glutamic acid had no influence on the basal metabolism both in normal and hypoxic conditions A total ablation of the thyroid resulted in a drop of the levels of respiration and inorganic phosphate absorption by the liver mitochondria Glutamic acid stimulated respiration and oxidative phosphorylation in the liver mitochondria in thyroidectomized animals both in normal and hypoxic conditions

A69-80755
EFFECT OF CHOLINE ON THE METABOLISM OF PHOSPHOLIPIDS IN RADIATION SICKNESS [VPLYV KHOLINU NA OBMIN FOSFOLIPIDIV PRY PROMENEVOMU URAZHENNI]
E F Sopin and V M Gaidai (Kiev State U Sci -Res Inst of Physiol T G Shevchenko Dept of Animal Biochem UkrSSR)
Ukrains'kyi Biokhimichnyi Zhurnal vol 40 no 5 1968 p 527–530 7 refs In Ukrainian

The content and the formation rate of total and single phospholipids were studied in the muscles liver and brain of healthy and irradiated guinea pigs at the terminal stage of radiation sickness induced by exposure to acute total X-ray radiation doses of 500 r It was determined that the administration of choline for ten days resulted in an increase of the lipid phosphorus level in all the tissues studied The formation rate of the phosphate group in total and single phospholipids increased sharply in all the tissues studied while it decreased markedly in irradiated animals not receiving choline

A69-80756
ACETYLCHOLINE CONTENT IN CENTRAL NERVOUS SYSTEM OF RATS WITH CHRONIC HYPERCAPNIA
Sofia Navon and Alberto Agrest (Buenos Aires U , Inst de Invest Med , Cardiorespirat Unit Argentina)
Life Sciences vol 7 part 1 Dec 1 1968 p 1271–1275 21 refs

A group of 65 rats was permanently exposed to a gas mixture of 6 to 10% CO_2 and 18 to 20% O_2 in order to determine whether long-term hypercapnia has any effect on acetylcholine content in the brain The adenosine triphosphate (ATP) concentration

was also determined A significant fall ($p < 0.001$) in acetylcholine was observed reaching a minimum value by the 15th day The ATP content of the central nervous system fell steadily to the 12th day leveled off and then increased after the 15th day although not reaching normal values

A69-80757
ADAPTIVE CHANGES IN "REACTIVITY" AND WALL/LUMEN RATIO IN CAT BLOOD VESSELS EXPOSED TO PROLONGED TRANSMURAL PRESSURE DIFFERENCE

Bjorn Folkow and Ramon Sivertsson (Goteborg U , Dept of Physiol Sweden)

Life Sciences, vol 7 part 1 Dec 1 1968, p 1283–1289 8 refs
Contract AF 61(052)-732, Grants PHS HE-05675-06 and SMRC B68-14X-16-04C Swed Natl Assn against Heart and Chest Diseases supported research

To illustrate experimentally the effects on the resistance vessels of an adaptive change in wall/lumen ratio one of the hind limbs in a series of cats was exposed for three to five wk to moderate hypotension induced by ligation of some of its major arteries In acute experiments, after establishment of identical arterial connections to both hind limbs the resistance responses to graded vasoconstrictor fiber stimulations and intra-arterial noradrenaline infusions were compared in the calf muscle regions of the normal control limb and the earlier hypotensive test limb The results indicated that there was no difference between the control limb and the test limb in terms of threshold response with respect to sensitivity to noradrenaline However to suprathreshold noradrenaline concentrations and to graded vasoconstrictor fiber stimulations the resistance vessels of the control limb exhibited throughout more pronounced responses as compared with the test limb These differences in the hemodynamic characteristics of the two limbs are in agreement with the fact that the arterial vessels in the earlier hypotensive limb showed an adaptive reduction in wall/lumen ratio The bearing of these results with respect to changes in vascular wall/lumen ratio in hypertensive disease is briefly discussed

A69-80758
PATHOLOGY OF MONKEY RETINA FOLLOWING IRRADIATION WITH AN ARGON LASER

Robert C Rosan Milton Flocks Heinrich W Rose Robert R Peabody (Stanford U School of Med Palo Alto, Calif) Arthur Vassiliadis and Arin Hammond (Stanford Res Inst Electromagnetics Tech Lab Menlo Park Calif)

Archives of Ophthalmology vol 81, Jan 1969 p 84–88 13 refs
Contract AF 33(615)-3060 and Grant PHS NB-63401-01

The argon continuous wave laser was used to inflict experimental injuries to retinas of monkeys of an order similar to that which might be achieved in clinical situations These lesions differed markedly from previously reported retinal injuries induced by ruby and neodymium lasers and by xenon photocoagulator It was found possible to fundamentally change the structural patterns of the media and adventitia of retinal arteries and to consistently thrombose choroidal vessels but not retinal arteries under the conditions employed

A69-80759
EVALUATION OF PROLIFERATIVE AND MATURATIVE ACTIVITY OF THE BONE MARROW DURING EXPERIMENTAL BENZENE INTOXICATION [VALUTAZIONE DELL'ATTIVITA PROLIFERATIVA E MATURATIVA DEL MIDOLLO OSSEO IN CORSO DI INTOSSICAZIONE BENZOLICA SPERIMENTALE]

G Castaldi R Spanedda P L Pareschi and B Dallapiccola (Ferrara U Ist di Clin Med Gen e Terapia Med Italy)

Lavoro Umano vol 20 Jul 1968, p 293–308 88 refs
Contract CNR 115-1135-04690

The results of a study on rabbits bone marrow during subacute experimental benzene intoxication were reported An increase of mitotic indices and metaphases with an arrest of the maturation in the basophil erythroblasts in myeloblasts and in promyelocytes was detected at the third and fifth day of intoxication After treatment's discontinuation mitotic indices decreased rapidly, for the proliferative inefficiency of the bone marrow At this stage the maturation curves of the white cell series appeared to be still inhibited Red cell series, on the contrary showed a variable degree of maturation

A69-80760
SOME FEATURES OF BARBITURATE INTERACTION AND INHIBITION OF NADH-CYTOCHROME C OXIDOREDUCTASE IN RESPIRING SYSTEMS

Herbert E Spiegel and W W Wainio (Rutgers–The State U Rutgers Coll , Dept of Biochem New Brunswick N J)

Journal of Pharmacology and Experimental Therapeutics vol 165 Jan 1969 p 23–29 29 refs
Grant NSF GB2649 and Schering Found supported research

The inhibitory effects of barbiturates on the NADH-cytochrome c oxidoreductase enzyme were studied in respiring mitochondrial and submitochondrial preparations These included a particulate enzyme derived from sucrose mitochondria and a 0.2% deoxycholate extractable enzyme derived from a Keilin–Hartree particle Inhibition by the barbiturates was localized between the enzyme flavoprotein and coenzyme Q-1 Blockade at this site probably involves interaction between the barbiturate the enzyme and a coenzyme Q-ferrous complex Other features of the barbiturate inhibition which were studied are the correlations of lipid solubility and of ability to lower surface tension of water with inhibition of the enzyme The correlation of inhibition by barbiturates with lipid solubility was high ($r = 0.95$) whereas the correlation with lowering surface tension was moderate ($r = 0.66$) Interaction reversibility by amobarbital with respiring particles was shown to be reversible and without effect on subsequent sensitivity to added barbiturate

A69-80761
THE DIRECT EFFECT OF NOREPINEPHRINE AND OF ANGIOTENSIN ON THE PULMONARY VEINS OF INTACT DOGS

Albert Hyman (Tulane U , School of Med Dept of Surg New Orleans La)

Journal of Pharmacology and Experimental Therapeutics vol 165, Jan 1969 p 87–96 26 refs

The direct response of the pulmonary veins to angiotensin and norepinephrine in intact dogs was studied by a technique of pump perfusion of a hemodynamically separated lobar artery at a constant flow During administration the direct effects of these pressor agents were studied in the pump-perfused lobe whereas the modulated effects were studied in the normally perfused lobes In

the pump-perfused lobe angiotensin actively constricted vessels upstream to the small pulmonary veins presumably the pulmonary arteries but had no demonstrable effect on the pulmonary veins Although lobar arterial pressure increased lobar venous pressure was unchanged In normally perfused lobes the vasoconstrictor response to angiotensin was obscured by the decrease in pulmonary veins and the upstream vessels presumably the lobar pulmonary arteries In the normally perfused lung vessels the response to norepinephrine was modified by increases in blood flow and blood volume Larger doses of norepinephrine and angiotensin increased left arterial pressure and modulated the responses of lobar veins This modulated response was compared to the passive response of the pulmonary veins to similar increases in left arterial pressure which were produced by mechanically impeding left ventricular ejection The data indicated that whereas the lobar veins were passively distended by the left arterial hypertension induced by norepinephrine, the compliance of these vessels decreased The response of the lobar vein to the left arterial hypertension induced by angiotensin, however was similar to that induced by impeding left ventricular ejection These experiments indicate that the responses of the pulmonary veins to angiotensin and norepinephrine are similar to the responses of systemic veins to these drugs

A69-80762
THE EFFECT OF D- AND L-NOREPINEPHRINE ON RAT CARDIAC PHOSPHORYLASE ACTIVATION

John H McNeill and Theodore M Brody (Mich State U Dept of Pharmacol East Lansing)

Journal of Pharmacology and Experimental Therapeutics vol 165, Jan 1969, p 97–101 13 refs

Mich Heart Assn and Merck Found supported research

Intact, anesthetized rats were infused with various doses of d- and l-norepinephrine and the activity of the enzyme glycogen phosphorylase was determined The d-isomer of norepinephrine activated the enzyme to the same extent as did the l-isomer but was 1/27 as potent Simultaneous infusions of both d- and l-norepinephrine resulted in a shift to the left of the l-norepinephrine dose-response curve Pretreatment with tripelennamine did not further shift the dose-response curves obtained when d- and l-norepinephrine were infused together or when d-norepinephrine was infused alone Reserpine pretreatment did not affect the response to d-norepinephrine but the response was blocked by propranolol It was concluded that d-norepinephrine has a direct action on the cardiac *beta* adrenergic metabolic receptor and that d-norepinephrine utilizes the same active uptake mechanism as l-norepinephrine in the rat heart

A69-80763
MUSCLE REFLEX CHANGES UNDER EMOTIONAL STRESS

Kurt Boman and Erkki Kivalo (Helsinki U Dept of Neurol Finland)

Annales Academiae Scientiarum Fennicae, Ser A V Medica, 135 1968, 19 p 30 refs

Signe och Ane Gyllenbergs Stiftelse supported research

The effect of emotional stress on myotatic reflexes of 33 healthy students was investigated The subjects were seated in a convenient chair and under identical quiet circumstances knee jerks were elicited by the same supramaximal mechanical stimulus with a frequency of two per minute during a period of two to three hr The angular reflex movements were recorded by an electric goniometer Fifteen subjects were examined in this way twice or more often In the first series the basis reflex activity was recorded only but in the second series the subjects had to perform hard mental arithmetics during a period of 30 to 45 min after a relaxation time of about 40 to 60 min Eighteen subjects were examined only once similarly to the subjects in the second series described above The values of the jerk amplitudes obtained under relaxed pre-stress circumstances were compared with those obtained under emotional stress During the emotional stress a marked increase in the jerk amplitudes varying between 4 5° and 13 3° was observed in 16 subjects and a slight to moderate increase varying between 0 1° and 3 6° in 10 subjects A marked decrease in jerk amplitude values varying between 4 5° and 8 5° was seen in four cases and a slight to moderate decrease varying between 0 3° and 2 3° in three cases It was concluded that emotional factors can exert a marked influence on the fusimotor system which regulates principally the excitability of the myotatic reflexes During emotional stress also clonic reflexes an increased number of leg oscillations and an increased angular velocity of the free swinging leg were observed The results were discussed

A69-80764
THE ENDOGENOUS RESPIRATION AND UREA PRODUCTION OF LIVER TISSUE SLICES FROM HIBERNATING AND NON-HIBERNATING HEDGEHOGS AND FROM COMMON FROGS ACCLIMATED TO DIFFERENT AMBIENT TEMPERATURES

Rolf Kristoffersson (Helsinki U Dept of Physiol Zool Finland)

Annales Academiae Scientiarum Fennicae Ser A IV Biologica 129 1968, 14 p 23 refs

Natl Res Council for Sci supporter research

The present study concerned the endogenous respiration and urea production of liver tissue from hibernating and non-hibernating hedgehogs and from common frogs acclimated to different ambient temperatures The results indicated that the oxygen consumption of liver tissue was significantly decreased in deeply hypothermic hedgehogs as compared with awake animals at all incubation temperatures tested between 5° and 35° C No corresponding difference could be demonstrated between cold- and warm-acclimated frogs Liver tissue of frogs was found to have a lower respiration rate than that of hedgehogs The urea production of liver tissue from deeply hypothermic hedgehogs was significantly retarded as compared with that of awake animals during *in vitro* incubation In this respect no difference was found between frogs acclimated to 5° or to 15° C However the group of frogs acclimated to 25° C exhibited a somewhat retarded rate of urea production

A69-80765
SPATIAL AND LUMINANCE FACTORS DETERMINING VISUAL EXCITABILITY

Thomas E Frumkes (N Y City U Queens Coll Flushing) and Joseph F Sturr (Syracuse U N Y)

Journal of the Optical Society of America vol 58, Dec 1968 p 1657–1662 18 refs

Opt Soc of Am , Meetings Columbus, Mar 1967

Grants PHS 1-F2-MH-32 850-01 and PHS NB06618-01

Excitability functions were determined by measuring the threshold luminance of a circular test flash (43 five msec) at various temporal intervals before and after the onset of a larger concentric 25-msec conditioning flash (CF) The paired stimuli were presented in maxwellian view to the right eye either centrally, or 7° or 15° in the nasal field The CF was either 57 1°50 , 2°43 or 3°30 in diameter and was either scotopic, or one of two photopic luminances The results showed that (1) luminance was the most powerful nontemporal determinant of the increment

threshold and (2) as the conditioning diameter increased test threshold decreased with central or 7° photopic stimuli but with scotopic peripheral stimuli the test threshold increased and then decreased For photopic stimuli at 15° increasing the CF diameter generally raised the increment threshold In general the diameter for maximal increment threshold became progressively larger as luminance was decreased or as stimulation occurred farther in the periphery These results were discussed in terms of the neural organization under different conditions of luminance and retinal position

A69-80766
PERFORMANCE CHARACTERISTICS OF FIELD DEPENDENT AND INDEPENDENT INDIVIDUALS ON AN AUDITORY SIGNAL DETECTION TASK

Victor J DeFazio and William F Moroney (St John s U Dept of Psychol Jamaica N Y)

Journal of Psychology vol 71 Jan 1969 p 77–82 12 refs

A previous investigator reported that the field-analytic approach was erroneously generalized to include all sense modalities The Embedded Figures Test (EFT) which requires subjects to detect a figure in a background was used to differentiate the field-dependent group (N = 10) from the field-independent group (N = 10) In an analogous task the theory of signal detection procedures (TSD) was used and subjects were required to detect a tone in a white-noise background No significant field-independent group (N = 10) In an analogous task the theory of signal detection procedures (TSD) was used and subjects were required to detect a tone in a white-noise background No significant differences were noted between groups with respect to response time criterion values or sensitivity nor was any relationship noted between EFT score and performance on the auditory detection task

A69-80767
THE EFFECT OF LEADING CONTOUR ON THE RELATIVE LENGTHS OF MOVING LIGHT AND DARK ARCS

Gordon Stanley and Robert Jackson (New England U Dept of Psychol Armidale New South Wales Australia)

Journal of Psychology vol 71 Jan 1969 p 83–88 8 refs
New England U supported research

Twenty subjects were required to estimate the relative lengths of the white and black teeth on a Sherrington disc rotating at 90 r p m Judgments were obtained with a standard black tooth of 12 cm in length and a white tooth varying from eight to 16 cm in length When the disc-center which subtended a visual angle of seven degree 10 min to the teeth was fixated under conditions of a leading but no trailing contour there were significantly fewer white longer judgments than under conditions of a trailing but no leading contour Apparent shrinkage was occurring in the former condition but not in the latter As the peripheral angle of viewing was increased the presence or absence of Friedman leading contour produced little difference in the relative judgments of the arc lengths

A69-80768
EFFECT OF DURATION OF ENVIRONMENTAL STRESS ON STOMACH ULCERATION AND ADRENAL ASCORBIC ACID

William P Pare (Veterans Admin Hosp Perry Point, Md)

Psychological Reports, vol 23, part 1 Dec 1968, p 683–688 15 refs
Grant PHS MH 06920-01

Four groups of rats were exposed to unavoidable tone-shock presentations for either one hr 24 hr five days or 24 days Upon termination of each stress-duration period adrenal ascorbic acid (AAA) determinations were made and stomachs were inspected for ulcers The AAA response manifested the typical adaptation function Ulcers were not observed in any of the four stress–duration groups Previous similar research was re-evaluated in the light of the present research findings

A69-80769
AROUSAL LEVEL AND INVESTIGATIVE RESPONSE

Robert L Hilgendorf (Aerospace Med Div Aerospace Med Res Labs Wright-Patterson AFB Ohio)

Psychological Reports vol 23 part 1 Dec 1968, p 715–721 11 refs

This study was concerned with the relationship between investigative response and arousal level including change in arousal level Data were from 18 subjects placed in both a task situation and an investigative situation Subjects were divided into two groups based on whether their skin resistance level (SRL) increased or decreased during the investigative period when compared with the SRL during the task period It was found that the group whose members had shown an increased level (as measured by SRL) investigated significantly less during the investigation period and had significantly higher general test anxiety (as measured by the Test Anxiety Questionnaire) than the group whose members had shown a decrease in resistance level

A69-80770
HUMAN METABOLIC RESPONSES TO HYPERTHERMIA DURING MILD TO MAXIMAL EXERCISE

L B Rowell G L Brengelmann J A Murray, K K Kraning II and F Kusumi (Wash U School of Med School of Nursing and

Journal of Applied Physiology, vol 26 Apr 1969, p 395–402 32 refs
Grants PHS HE 09773 and PHS FR 37 Wash State Heart Assn supported research

The purpose was to determine whether oxygen consumption (V_{O_2}) is increased or decreased in hyperthermic exercising men Arguments for both possibilities have been advanced In 54 men studied in three different experimental protocols increased temperature of skin (T_s) blood and rectum had no effect on submaximal V_{O_2} V_{O_2} at 25 6° C was compared with V_{O_2} under the following conditions (a) prolonged work requiring 41–54% of maximal V_{O_2} at 48 9° C (seven men) (b) prolonged requiring requiring 26–64% maximal V_{O_2} during which T_s was rapidly changed (via a water-perfused suit) at 30-min intervals from approximately 33° C to 38° C 26° C and 39° C (16 men) (c) four 15-min periods of graded exercise requiring 25–85% of maximal V_{O_2} at 43 3° C (27 men) In these 27 men at 43 3° C and four other subjects at 48 9° C maximal V_{O_2} was reduced 3% of graded exercise requiring 25–85% of maximal V_{O_2} at 43 3° C (27 men) In these 27 men at 43 3° C and four other subjects at 48 9° C maximal V_{O_2} was reduced 3% ($P < 0.01$) Results indicate negligible extra costs of increased cardiac output V_E and sweating and an increase in muscle efficiency at least offsetting Q_{10} effects

A69-80771
HEAT TOLERANCE OF EXERCISING OBESE AND LEAN WOMEN

O Bar-or, H M Lundegren and E R Buskirk (Pa State U , Inst for Sci and Eng Lab for Human Performance Res University Park)
Journal of Applied Physiology vol 26 Apr 1969 p 403–409 23 refs
Grant PHS AM 08311

Five obese and four lean women were each exposed to six different walks in controlled environments ranging from warm to hot Walking conditions were 4 8 km /hr and the environmental range was 21 1–35 0° C effective temperature with a relative humidity of 13–20% Environmental conditions were kept constant during a given session With either the critical effective temperature in which rectal temperature becomes dependent on the heat-stress level or the heat stress at which rectal temperature reaches 39 2° C as criteria for heat tolerance the women showed tolerance similar to that reported for comparably acclimatized men who performed similar work loads The obese women were under higher heat strain than were the lean a difference which diminished with increasing heat stress The latter finding may be explained by a larger surface area per kg in the lean which at high ambient temperatures results in the imposition of a greater relative heat load via radiation and convection in the lean as compared to the obese

A69-80772
MODIFICATION OF SKIN MECHANICAL PROPERTIES BY ECCRINE SWEAT GLAND ACTIVITY

Thomas Adams and William S Hunter (Mich State U Dept of Physiol East Lansing)
Journal of Applied Physiology vol 26 Apr 1969 p 417–419 15 refs

Skin friction at footpad surface was measured in anesthetized (Na pentobarbital 36 mg /kg , ip) cats at 12 different steady-state levels of sweating with 19 separate footpads Sweat secretion was controlled by electrical stimulation of the peripheral segment of the severed medial plantar nerve Skin friction was measured as a function of the horizontal force (F_H) required to move a small (2 5 cm^2 3 mm thick) deglazed, plastic plate over skin surface at a rate of 5 mm /min In separate experiments amounts of water evaporated from skin surface were also measured as a function of controlled sweat secretion Compared to nonsweating skin low rates of sweat gland activity produced progressive increase in skin frictional contact, resulting in an average maximum increase in F_H of 51%, higher steady-state rates of sweating progressively decreased skin friction During maximum sweating, F_H was lowered to an average of 6% below that recorded for dry skin These observations are interpreted as indicating that at low sweating rates *eccrine sweat gland activity can modify water content of outer* skin presumably because of movement of sweat from lumen of the distal sweat gland tubule directly into the adjacent relatively drier peritubular skin changes in skin hydration so produced are accompanied by changes in frictional contact at skin surface

A69-80773
VENTILATION-PERFUSION RELATIONSHIPS IN THE OBESE PATIENT

Frank Barrera, Marcus M Reidenberg William L Winters and Suwana Hungspreugs (Temple U School of Med , Depts of Physiol Pharmacol and Med Philadelphia Pa)
Journal of Applied Physiology, vol 26, Apr 1969 p 420–426 28 refs
Grants PHS HE-06313-06 and PHS FR-00349

In a group of eight obese patients and six controls analysis of the washin-washout curves by the method of Briscoe and Cournand demonstrates that the distribution of ventilation to the various lung compartments in the obese patient is not significantly different from the normal subject The distribution of blood flow throughout the lung was studied in two different but related ways (a) Predicted alveolar-arterial oxygen tension difference ($(A\text{-}a)D_{O_2}$) The predicted $(A\text{-}a)D_{O_2}$ was calculated assuming that perfusion is distributed in proportion to lung volume In three obese patients the measured $(A\text{-}a)D_{O_2}$ was larger than the predicted $(A\text{-}a)D_{O_2}$, suggesting that in these cases the less ventilated alveoli were relatively overperfused (b) Actual distribution of perfusion By the use of Briscoe s logarithmic grid the fractional perfusion to the less ventilated lung compartment is obtained A ratio between fractional *perfusion and fractional lung volume in the less ventilated group* of alveoli higher than 1 0 was found in four obese patients, suggesting that the less ventilated alveolar group was overperfused In three obese patients a large anatomical shunt was found The anoxemia without hypercapnia found in some obese patients is related to overperfusion of underventilated areas or to perfusion of completely unventilated areas

A69-80774
CONTINUOUS POSITIVE-PRESSURE BREATHING IN ACUTE HEMORRHAGIC PULMONARY EDEMA

Takeshi Uzawa and David G Ashbaugh (Colo U Med Center Dept of Surg Denver)
Journal of Applied Physiology, vol 26 Apr 1969 p 427–432 16 refs
Contract DADA-17-68-C-8078 and Grant VRA-RT-10

After the injection of small amounts of oleic acid into the right ventricle of dogs a syndrome of tachypnea loss of lung compliance and hypoxemia occurred Without respiratory support all animals died within five hr (mean two hr) Both intermittent positive-pressure breathing (IPPB) and continuous positive-pressure breathing (CPPB) prolonged life but animals treated with CPPB maintained higher Pa_{O_2} levels better lung compliance lower minute ventilation and lower oxygen consumption than the animals treated with IPPB Cardiac output and oxygen transport were decreased to a greater extent with CPPB than IPPB but no adverse effects were noted as a result of this decrease

A69-80775
EFFECT OF INSPIRATORY FLOW RATE ON REGIONAL DISTRIBUTION OF INSPIRED GAS

P C Robertson N R Anthonisen and D Ross (McGill U Roy Victoria Hosp Joint Cardio-Respirat Serv Montreal Canada)
Journal of Applied Physiology vol 26 Apr 1969, p 438–443 10 refs
John A Hartford Found and Med Res Council supported research

Boli of ^{133}Xe were inspired at different flow rates from residual volume (RV) or higher lung volumes in seven erect subjects ^{133}Xe concentrations were measured in various lung regions at total lung capacity (TLC) During the subsequent slow expiration to RV the ^{133}Xe concentration at the mouth was measured Boli inhaled at RV were distributed preferentially to apical regions by slow inspiratory flow rates (0 2–0 3 l /sec) but fast inspiration (3–5 l /sec) produced a more even regional distribution the apex-to-base concentration gradient was 10 1 after slow inspirations and 2 1 after fast inspirations Fast inspiration produced conspicuous flattening of the expiratory ^{133}Xe alveolar plateau when compared to that obtained after slow inspiration These results are compatible with closure of basal airways at RV and their earlier opening by the greater transpulmonary pressures required for fast inspiration Boli inhaled above 40% of vital capacity (VC) were distributed mainly *to basal regions but fast inspiration produced a slightly more even*

distribution than slow inspiration, implying that sequential distribution of ventilation was potentially present at these lung volumes

A69-80776
COMPARISON OF THERMOREGULATORY FUNCTION IN MEN AND WOMEN

R H Fox, B E Lofstedt, Patricia M Woodward E Eriksson and B Werkstrom (Hampstead Labs Natl Inst for Med Res London, Great Britain and Lund U Dept of Hyg Sweden)

Journal of Applied Physiology vol 26, Apr 1969 p 444–453 33 refs

Thermoregulation in 21 young men and 21 young women was studied by a mobile standard function test at Lund in Sweden the results are analyzed together with comparable measurements on a control group of British male subjects before and after heat acclimatization The principal differences between the two sexes at Lund concerned the sweating mechanism, the women had a much higher sweat onset threshold, lower sweating capacity and no significant rate of sweat suppression In addition a difference was found in the relationship of ear-to-rectal temperatures in the two sexes The comparisons with the control group show that most of the differences between the sexes are similar to those that exist between acclimatized and unacclimatized men The results are discussed in relation to previous studies and the hypothesis is put forward that many of the differences between the sexes previously reported can be simply explained in the same way, also there are logical reasons for expecting women to be less heat-acclimatized than men when both sexes are living in identical climatic conditions

A69-80777
CARDIAC OUTPUT DETERMINATION FROM PRECORDIAL ISOTOPE-DILUTION CURVES DURING EXERCISE

Frank E Kloster, J David Bristow, and Herbert E Griswold (Ore U Med School Dept of Med Div of Cardiol Portland)

Journal of Applied Physiology, vol 26 Apr 1969 p 465–468 15 refs
Grant PHS HE 06336-06

Duplicate cardiac output studies during exercise were performed by the Fick and radioisotope-dilution (albumin-^{131}I) methods in 30 patients with heart disease Ten were studied by the conventional albumin-^{131}I technique with precordial detection of isotope Twenty were studied by a modified technique which allowed collection of all data for cardiac output calculation during a 1-min period after 5 min of exercise Mean cardiac output value for the modified radioisotope method was identical with the Fick, and correlation between the two was high ($r = 0.86$ $P < 0.001$) Results of the conventional technique were lower than Fick values ($0.02 < P < 0.01$) although correlation was again high ($r = 0.93$ $P < 0.01$) Cardiac output determination by the modified radioisotope-dilution technique during exercise agrees closely with simultaneous Fick studies and offers advantages over the conventional method in permitting data collection during a short time period and in avoiding prolonged exercise Both techniques provide the features unique to the albumin-^{131}I method minimal vascular cannulation and ready adaptation to bedside or outpatient studies without risk

A69-80778
PORTABLE, MULTIUNIT LOW-PRESSURE CHAMBER WITH LOCKS

John L Steele and David A Vaughan (USAF School of Aerospace Med , Biosci Div Pharmacol -Biochem Brooks AFB Tex)

Journal of Applied Physiology vol 26 Apr 1969 p 492–493 Pharmacol -Biochem Brooks AFB Tex)

A portable multiunit low-pressure chamber with locks is described It is designed to be used in small-animal experiments and permits the investigator to introduce and remove food dishes and replenish drinking water while the animal is continuously exposed to low pressures and experimental gas mixtures

A69-80779
THEORY OF SHEET FLOW IN LUNG ALVEOLI

Y C Fung and S S Sobin (Calif , U San Diego and Southern Calif , U Los Angeles)

Journal of Applied Physiology vol 26 Apr 1969 p 472–488 19 refs
Grants AFOSR 1186-67 NSF GK-1415 and PHS HE-1152

The capillary blood vessels in the pulmonary alveoli are so short and so closely knit that a new term sheet flor is desirable to avoid the usual notion of a blood vessel as a tube From the viewpoint of fluid mechanics the new terminology is particularly pertinent In this article the flow pattern of the blood in such a sheet is considered A theoretical approach as well as a large-scale model study has been undertaken to determine the streamlines the velocity distribution and the pressure gradient in the pulmonary alveolar septa The role of the elasticity of the system is considered It is shown that in the range of linear elasticity, the fourth power of the thickness of the sheet satisfies the Laplace equation The thickness distribution as a function of pulmonary arterial pressure venous pressure and alveolar air pressure is illustrated by several examples

A69-80780
A BALANCED FIELD-TYPE ELECTROMAGNETIC FLOWMETER

A Westersten, E Rice C R Brinkman and N S Assali (Calif U , School of Med Depts of Obstet and Gynecol and Physiol , Los Angeles)

Journal of Applied Physiology vol 26 Apr 1969, p 497–500 9 refs
Grants PHS HE 01755 PHS HD 2729 and PHS HD 38

A new design of an electromagnetic flowmeter is presented This flowmeter eliminates interference between simultaneously energized transducers This feature permits measurements of several blood flows simultaneously without any base-line shift or signal distortion This flowmeter does not require mechanical occlusion of the blood vessel to obtain zero base line A newly designed device for *in vitro* calibration of cuff-type transducers is also presented

A69-80781
A CONTINUOUS AUTOMATED SAMPLING TECHNIQUE

Michel G Nasser Maria Wachter and Robert B Case (St Luke s Hosp Center Lab of Exptl Cardiol New York City, N Y)

Journal of Applied Physiology vol 26 Apr 1969, p 501–503 9 refs
Grant PHS HEO-2621

A method is described for continuously monitoring the metabolic state of the left ventricle The method employs a continuous automated sampling technique which offers a number

of advantages over traditional sampling methods and results in a precise measurement of alterations in myocardial balance The method is applicable to organs other than the heart or simply to venous sampling

A69-80782
A TECHNIQUE FOR MAPPING INTRAMUSCULAR INNERVATION

Margaret H Gladden and G L Kidd (Liverpool, U Physiol Lab Great Britain)

Journal of Applied Physiology vol 26, Apr 1969, p 507–509
Med Res Council supported research

A preparation of the caudal muscle is described that is ideal for physiological and pharmacological studies of muscle A thin sheet of muscle with its circulation undisturbed is almost completely transparent and the intramuscular distribution of its nerve supply can be traced with the aid of a dissecting microscope The innervation is accessible to recording and stimulating electrodes and structures studied electrophysiologically may be identified histologically by means of a described in situ staining procedure

A69-80783
CLIMATIC CHAMBER ERGOMETER

A R Atkins (South Africa, Chamber of Mines Phys Sci Lab Johannesburg)

Journal of Applied Physiology vol 26 Apr 1969, p 510–512

An ergometer for exercising subjects during calorimetric studies in a climatic chamber is described The ergometer is built into the climatic chamber and forms an integral part of the whole instrumentation system for the chamber The ergometer pedal wheel has an unusual single spoke on which strain gauges are attached for the purpose of measuring the input torque so that errors due to frictional losses in the long chain drive to the load are eliminated The ergometer load which is controlled automatically to maintain a constant work rate is situated beneath the climatic chamber floor Work-rate measurement is accurate to within 1% of full scale

A69-80784
VALIDATION OF A METHOD FOR BLOOD FLOW IN ADIPOSE TISSUE OF RATS BY CLEARANCE OF Rb 86

Joan A Mayerle and Richard J Havel (Calif U, Med Center Cardiovascular Res Inst and Depts of Physiol and Med San Francisco)

Journal of Applied Physiology, vol 26, Apr 1969 p 513–516
18 refs
Grants PHS HE-06285 PHS GM-00927, and PHS HE-5251

^{86}Rb was measured in tissues obtained 60 sec after intravenous pulse injection and cardiac output was estimated from dilution of isotope in blood collected from an aortic catheter The following observations indicate that flows estimated from product of fractional clearance of ^{86}Rb in epididymal mesenteric, retroperitoneal and intrascapular fat was stable 30–60 sec after injection but lower after 90 sec Flow measured from the spermatic vein of large castrated rats agreed closely with values obtained simultaneously by the clearance method Mean values and standard errors for 10 rats (ml /min x g wet weight) were 0 057 ± 0 014 from clearance of ^{86}Rb and 0 053 ± 0 013 for directly measured flow Fractional extraction during constant infusion of ^{86}Rb was 0 79 for epididymal fat and 0 80 for the region drained by inferior vena cava

A69-80785
EFFECTS OF DURATION OF SERIES AND ANCHOR-STIMULI ON JUDGEMENTS OF PERCEIVED SIZE

Harry Helson and Takashi Kozaki

American Journal of Psychology, vol 81, Sep 1968 p 291–302
10 refs
Kan State U York U and Natl Res Council supported research

Two experiments dealing with the effects of duration of series and anchor-stimuli on estimates of perceived size were reported In Experiment I, different estimates of the same series stimuli were obtained by varying duration Longer exposure-times of the larger members of the series resulted in higher adaptation levels (AL) with lower estimates while longer exposure of the smaller members of the series resulted in lower AL with higher estimates of size of all series stimuli In Experiment II the duration of the series stimuli was kept constant while that of a large anchor and a small anchor was varied Longer duration of the large anchor resulted in higher AL and lower estimates while longer duration of the small anchor resulted in lower AL with higher estimates of size of series stimuli A simple weighted log mean of series and anchor-sizes by time showed AL that were in excellent agreement with least-squares AL for five conditions The results of the two experiments showed that duration and size pool in formation of AL with resultant effects on judgments of size The method of absolute judgment reliably differentiated between independent groups observing under different conditions of stimulation Predictions based on the effects of temporal integration on prevailing AL were confirmed by estimates of size under eight different conditions of stimulation

A69-80786
EGOCENTRIC VISUAL LOCALIZATION IN NORMALS AND PARTIALLY BLIND DURING EXPOSURE TO CENTRIPETAL FORCE

Brant Clark (San Jose State Coll, Calif) and Ashton Graybiel (Naval Aerospace Med Inst, Pensacola Fla)

American Journal of Psychology, vol 81 Sep 1968 p 314–318
8 refs
NASA supported research

The purpose of this experiment was to compare the interaction of visual and nonvisual information during the perception of the visual horizontal in 12 normal and seven partially blind subjects during exposure to centripetal force Both the normal and the partially blind subjects had normal vestibular functions The subjects set a collimated luminous line to the horizon in darkness while they sat in a cockpit 20 ft from the center of rotation Settings were made with the device stationary and during rotation at three velocities The results showed negligible differences between the normals and the partially blind for all conditions Both groups showed minimal errors during the static series both before and after rotation and during rotation their settings were very close to the resultant horizontal It was concluded that interaction between visual and nonvisual information is possible with extremely limited central vision

A69-80787
PERCEPTUAL SERIAL-POSITION CURVES WITH A FREQUENTLY ISOLATED ELEMENT

E Rae Harcum (William and Mary Coll Williamsburg Va)

American Journal of Psychology, vol 81 Sep 1968 p 334–346
28 refs
Grant PHS HD-00207-08

A69-80788

This experiment supplemented an earlier one in which an isolation effect was obtained in perceptual serial-position curves only when subjects had advance knowledge of the isolation Ten-element binary patterns were exposed tachistoscopically to subjects in three groups For the Isolated (I) group all patterns contained vertical lines above and below the seventh element from the left for the Unisolated (U) group there were no such lines I and U patterns were mixed randomly for the Mixed (M) group which was not informed before exposure whether the lines would appear For Group M reproductions of U and I patterns were not significantly different supporting the earlier results, although an isolation effect appeared for both conditions contrary to previous findings The results support the conclusion that different distributions of errors are caused by different perceptual strategies which are generally established by the subject prior to stimulus-exposure and for which the physical presence of an isolating stimulus is not critical

A69-80788
ENHANCED VISIBILITY BY REGULAR MOTION OF RETINAL IMAGES

Floris L Van Nes (Utrecht U Dept of Med and Physiol Physics The Netherlands)

American Journal of Psychology, vol 81 Sep 1968 p 367–374 18 refs

N V Philips Gloeilampenfabrieken and Netherlands Organ for Advan of Pure Res (Z W O) supported research

The results of an investigation of spatiotemporal modulation-transfer in the human eye showed that the contrast-sensitivity for slowly moving sine-wave gratings of low spatial frequency at retinal illuminances over 10 td was higher than for stationary gratings under the same conditions This effect was conveniently and quantitatively expressible as a visibility-improvement factor Previous research on the visibility of moving objects was discussed in view of this data

A69-80789
THRESHOLD AND RESPONSE-LATENCY AS A FUNCTION OF THE RISE-TIME OF A C ELECTRICAL STIMULI

Thomas G Sticht (The George Washington U Human Resources Res Office Washington D C)

American Journal of Psychology, vol 81 Sep 1968 p 384–390 13 refs

Threshold (RL) and reaction-time (RT) measurements were obtained from two groups of subjects using electrocutaneous stimuli having rise-times of < one to 750 msec The results indicate that increasing the rise-time to 50 msec produces a slight increase in RL but that the RL is constant for stimuli with longer rise-times RT increases by an amount equal to the rise-time when the latter is greater than 50 msec

A69-80790
EFFECTS OF D-AMPHETAMINE ON TASK-ALTERNATION AND UTILITY OF DELAYED REWARD

Paul M Hurst Robert Radlow and Marianna F Weidner (Inst for Res State College, Pa)

American Journal of Psychology, vol 81 Sep 1968 p 391–397 5 refs

Grant PHS MH-11294

Ninety college-student volunteers served as their own controls to test selected behavioral dimensions of d-amphetamine at two dosage-levels Two hypotheses advanced to explain the drug's apparent effect on industriousness were tested according to overt behavioral criteria The first hypothesis was that an anti-inhibition mechanism is involved From this hypothesis was derived the prediction that the drug would produce less frequent alternation between two different repetitive tasks than the placebo This was confirmed at $p < 02$ for the smaller dosage at $p < 001$ for the larger dosage The second hypothesis was that d-amphetamine reduces the disutility of delay in reward and thus flattens the goal-gradient This was tested by offering subjects various delayed-payment options concerning their remuneration for the experiment It was predicted that the drug would increase the acceptance of lower-interest options The second hypothesis was not confirmed although measurement-precision was too low for a conclusive test

A69-80791
STIMULUS-RANGE, NUMBER OF CATEGORIES, AND FORM OF THE CATEGORY-SCALE

Lawrence E Marks (John B Pierce Found Lab and Yale U New Haven Conn)

American Journal of Psychology vol 81 Dec 1968 p 467–479 31 refs

Contract AFOSR F44620-67-C-0017

Nine category-scales were measured for brightness as a function of luminance Their form varied with the stimulus-range and with the number of available categories When adjusted by means of an additive constant the category-scales can be described as power functions of stimulus-intensity Their exponents are smaller than the exponent obtained by ratio-scaling procedures The size of the exponent of the power function can serve as an index of how the stimulus-range and the number of categories affect the form of the category-scale The power function is also able to describe other category-scales that have been reported for a variety of perceptual continua

A69-80792
DISCRIMINATION OF REPEATED AUDITORY PATTERNS OF PULSED DOPPLER SEQUENCES

Irwin Pollack (Mich U Mental Health Res Inst Ann Arbor)

American Journal of Psychology, vol 81, Dec 1968 p 480–487 11 refs

Grant NSF GB-6148

Auditory Doppler pulse-trains were constructed so that successive interpulse intervals within a nonrepeated pattern either increased or decreased in duration Doppler thresholds for the departure from uniform interpulse intervals were obtained as a function of the average interpulse interval the temporal uncertainty or jitter the number of intervals in a nonrepeated pattern of intervals and the number of repeated presentations of the pattern For a fixed total number of intervals or for a fixed pattern-length Doppler thresholds increased i e discrimination became poorer as the number of successive repetitions of the pattern was increased This unexpected result is consistent with the demonstration of a previous investigator that introduction of symmetry to random-dot visual patterns hinders their recall

A69-80793
VISUAL HORIZONTAL-PERCEPTION IN RELATION TO OTOLITH-FUNCTION

Earl F Miller II Alfred R Fregly, and Ashton Graybiel (Naval Aerospace Med Inst Pensacola Fla)
American Journal of Psychology vol 81 Dec 1968 p 488–496
17 refs
NASA supported research

To determine the influence of the otolith-organs on visually perceived direction of space the constant and variable errors of normal persons and of deaf persons with bilateral labyrinthine defects were compared for 19 positions of body-tilt within ± 90° of graviational vertical The general perceptual pattern was similar for the two groups although that of the labyrinthine-defective group was found to be more variable and to reveal greater E and A effects in several of the tilt-positions The significantly larger E effect occurred even though these labyrinth-defective subjects manifested little or no ocular counterroll

A69-80794
AUTOKINESIS AND FELT EYE-POSITION

Stephen Jordan (Naval Training Device Center Port Washington, N Y)
American Journal of Psychology, vol 81, Dec 1968 p 497–512
10 refs

The relationship between perceived eye-position and autokinesis was investigated in a series of experiments Systematic changes in what was called the registered or more simply, the felt position of the eyes were found to accompany autokinesis Specifically it was found that a subject asked to look straight ahead tended to look in a direction opposite to the direction of autokinetic movement Since this shift in felt eye-position was found not only during and after but prior to autokinesis it was concluded that a shift in felt eye-position was a sufficient condition for the perception of autokinetic movement A theory was proposed to account for the shift in felt eye-position The basic assumption was that the eye-position felt to be straight ahead coincides with the center of incoming or afferent stimulation impinging on the eye In the darkness internal sources of asymmetrical stimulation, such as those due to eye-dominance were assumed sufficient to shift the egocentric coordinates of visual space resulting in the apparent displacement of a geographically fixed light

A69-80795
SYMMETRY OF LETTERS AS A FACTOR IN TACHISTOSCOPIC RECOGNITION

M P Bryden (Waterloo U , Ontario Canada)
American Journal of Psychology, vol 81 Dec 1968 p 513–524
17 refs
Grant NRC APA-95

Three experiments are reported in two rows of six letters were exposed tachistoscopically in the other, letters were presented singly The results show that asymmetric letters are more readily identified than bilaterally symmetric ones when presented in groups but not when presented singly This effect decreased when the spacing between the letters increased The results indicate that asymmetric letters are less subject to spatial masking than symmetric letters, perhaps because they contain more information about spatial location

A69-80796
CEREBRAL DYSFUNCTION AND FLICKER-DETECTION THE ROLE OF LOCAL ADAPTATION

Oscar A Parsons, Julian Burn, and Peter J Chandler (Okla , U Med Center Norman)
American Journal of Psychology, vol 81 Dec 1968 p 525–534
21 refs
Grant PHS B-2507

Recent evidence on central efferent control of receptor-activity raises the question whether altered retinal functioning is a determinant of nonspecific deficits in flicker-detection throughout the visual fields of brain-damaged subjects To investigate this and other questions thresholds for flicker before and after stimulation by a coarsely flickering light were obtained at the 30° temporal point for both eyes in 16 brain-damaged subjects and 16 controls Through a comparison of ipsilateral and homonymous stimulation, it was possible to assess central and peripheral components of the local adaptation response to stimulation Despite highly significant differences in flicker-thresholds between brain-damaged and control groups and despite a significant effect of the adapting stimulation none of the interactions involving groups was significant Nor were the curves for recovery from adaptation from three to nine sec significantly different for the two groups It was concluded that altered retinal states cannot account for nonspecific deficits in flicker in the brain-damaged and that local adaptation is largely a retinal, as opposed to central phenomena

A69-80797
SELECTIVITY IN PROBLEM-SOLVING

Alison C Campbell (Manchester U , Dept of Social and Prevent Med Great Britain)
American Journal of Psychology, vol 81 Dec 1968, p 543–550
8 refs

Eight students were presented with code-items incorporating supraminimal data both relevant and not relevant to item-solution The subjects tested were not particularly adept at separating data relevant to the solution of a problem from data not relevant to solution Nor were the subjects particularly adept at separating data relevant and necessary to problem-solution from data relevant but superfluous Hence supraminimal data other things being equal were found significantly to impede solution of the items This was equally true both for supraminimal data relevant to solution and for supraminimal data not relevant to solution The more data present whether relevant or not the more complex the item as a perceptual display The subjects then took longer to select an appropriate starting point The absolute amount of data however was crucial only when the probability of starting out on a wrong path was held constant An item with supraminimal data but without false leads was in fact less difficult on the whole (i e took less time to solve) than an item without supraminimal data but with numerous false leads The greater the number of false leads (initially plausible starting points) the greater the probability of starting out on a wrong path and hence the more difficult the item This was true however only in group terms The items were such that a fortuitous factor of initial choice could lead to rapid success Hence an individual even on an item with an inordinate number of initially plausible starting points could by chance choose the correct starting point straight off The present research dealt with only one type of problem-situation albeit in some detail It may be concluded that the findings of the present study in relation to amount and kind of data and the presence of false leads threw at least some light on some general aspects of problem-situations that pose difficulties to the problem-solver

A69-80798
SPATIAL MODELS AND MULTIDIMENSIONAL SCALING OF RANDOM SHAPES

Hoben Thomas (Pa State U , University Park)
American Journal of Psychology, vol 81, Dec 1968 p 551–558 19 refs

Eighth-grade children (N = 232) and college adults (N = 218) made similarity judgments to 20 random shapes varying in complexity The judgments were scaled using Kruskal's nonmetric scaling procedure For both groups the data fit a Euclidean solution as well as or better than various Minkowski metrics, for varying numbers of dimensions In particular the data most poorly fit the city-block metric Results indicated the data can be accounted for in either a one- or two-dimensional space The first dimension was labeled complexity, the second dimension was tentatively labeled symmetry

A69-80799
MINIMAL AVERSION-THRESHOLDS FOR BRIGHTNESS AFTER LIGHT- AND DARK-ADAPTATION

Richard Sullivan (N Y U , Med Center New York)
American Journal of Psychology, vol 81 Dec 1968 p 581–585 7 refs

A minimal aversion-threshold (MAT) was obtained for high levels of brightness under differing conditions of adaptation A large bright target was presented continuously in both ascending and descending trials, and subjects judged when the white light was minimally aversive annoying or bothersome The range of brightness in both conditions was 93 9 to 110 db re 10^{-7} m Lam MAT differed for the dark- and light-adapted conditions The MAT following light-adaptation was below the bleaching light's intensity for 16 of the 20 subjects which suggests that there is a limit to the effect of adaptation on the MAT as the adapting stimulus increases in intensity The findings suggest that the MAT concept may be useful for dividing intensive sensory continua into aversive and nonaversive ranges of stimulation

A69-80800
DIRECTION OF THE SIGHTING LINE FOR DIFFERENT ACCOMMODATIVE RESPONSES

Sidney Wittenberg and William M Ludlam (N Y Optometric Center New York)
American Journal of Optometry and Archives of American Academy of Optometry, vol 46 Jan 1969 p 15–24 6 refs
Am Acad of Optometry, Ann Meeting, Denver, Dec 12, 1966
Grant PHS NB04806-03-04

The sighting line is the only reference axis of the eye that can be experimentally assessed simultaneously with respect to the visual system and its orientation in space It is different from other axes such as visual axis line of sight and fixation axis which are defined for reference points which cannot be readily measured This experiment was designed to determine if the direction of the sightling line is invariant in the presence of accomodative changes In the apparatus used two objects could be placed along the subject s sighting line providing an approximately 2 00 D difference in accomodative stimulus The mean change in the direction of the sighting line for six subjects was found to be of the order of 2 in the horizontal meridian and 1 in the vertical meridian and the maximum deviation observed was approximately 4-1/2' In this sample taken as a whole no systematic shift in direction of the sighting line was observed

A69-80801
PATHOGENESIS AND REVERSIBILITY OF THE PULMONARY LESIONS OF OXYGEN TOXICITY IN MONKEYS 1 CLINICAL AND LIGHT MICROSCOPIC STUDIES

H P Kaplan, F R Robinson (Aerospace Med Res Labs , Wright-Patterson AFB Ohio), Y Kapanci (Geneva, U Inst of Pathol Switzerland) and E R Weibel (Berne, U , Inst of Anat Switzerland)
Laboratory Investigation, vol 20 Jan 1969 p 94–100 18 refs
Contract AF 61(052)-941

Eighteen monkeys (Macaca mulatta) were used in studying the effects of continuous exposure to pure oxygen at 750 mm of Hg total pressure for 2 4 7, and 12 days Many appeared seriously ill between the third and eighth days of exposure with dyspnea, cyanosis lethargy and almost total abstentation from food and drink Nearly one-half of the monkeys died during this time Some monkeys tolerated the exposure much better with milder clinical symptoms Survivors showed marked clinical improvement with continued exposure and appeared overtly normal by the 12th day unless suddenly removed from the hyperoxic environment to ambient air Pathologic examination of lungs from these animals revealed acute exudative changes associated with the interval of severe debility and resolution of exudate and progression to hypertrophic and proliferative changes during the period of improvement Examination of the lungs from two monkeys removed from exposure and allowed to recover from the hyperoxic environment one after eight days of exposure and the other after 13 days revealed that after a two- to three-month return to ambient air, there was complete clinical and overt functional recovery Examination of lungs from these animals revealed that interruption of exposure after the onset of proliferative changes left residual scarring The relative significance of these data to reports of respriator-lung syndrome in human patients is cited

A69-80802
PATHOGENESIS AND REVERSIBILITY OF THE PULMONARY LESIONS OF OXYGEN TOXICITY IN MONKEYS 2 ULTRASTRUCTURAL AND MORPHOMETRIC STUDIES

Y Kapanci (Geneva, U Inst of Pathol Switzerland) E R Weibel (Berne U Inst of Anat Switzerland) H P Kaplan, and F R Robinson (Aerospace Med Res Labs , Wright-Patterson AFB, Ohio)
Laboratory Investigation vol 20, Jan 1969 p 101–118 65 refs
Contract AF 61(052)-941 and Schweiz Nationalfonds supported research

Breathing pure oxygen at one atmosphere pressure causes significant damage to respiratory tissue of monkeys Alveolar lining epithelium is almost completely destroyed after four days The air-blood tissue barrier becomes progressively thickened, particularly in the phase of proliferative reaction which appears after seven days of exposure to pure oxygen The endothelium seems to constitute the target tissue in the early reaction to oxygen toxicity The mechanism of endothelial involvement is not clearly understood but appears to start with inconspicous changes at the intercellular junctions after two days of exposure After seven days of exposure the destruction of endothelial cells produces a 50% decrease in their total volume on the 12th day this volume is one-third that of the control values The finding of interstitial hemorrhage and other morphologic manifestations indicates a capillary destruction which has been clearly demonstrated in rat lungs exposed to pure oxygen Recovery in room air for 56 and 84 days preceded by 8 and 13 days of exposure respectively, allows substantial structural recuperation Because of the increase of interstitial tissue associated with the formation of septal scars, the air-blood tissue barrier remains thickened after 13 days of exposure followed by 84 days of recovery However the concurrent increase in capillary surface area assures satisfactory conditions for gas exchange and thus allows total functional recuperation At this time the

diffusing capacity of the air-blood barrier as calculated from the morphometric data is practically normal

A69-80803
CONTINUOUS MEASUREMENTS OF ARTERIAL FLOW IN MAN DURING ATRIAL AND VENTRICULAR ARRHYTHMIAS

A Benchimol Peter Maroko Jack Gartland (Good Samaritan Hosp Inst of Cardiovascular Diseases Phoenix Ariz), and Dean Franklin (Scripps Clin and Res Found La Jolla Calif)

American Journal of Medicine, vol 46 Jan 1969 p 52–63 20 refs

NASA Grant NGR-05042 and Grant NIH HE 11131-01, Ariz Heart Assn and Southwest Found for Med Res and Educ supported research

Measurements of arterial flow using the transcutaneous or implanted technic with the Doppler shift ultrasonic telemetry system was studied in 190 patients Fifty were normal subjects and 140 had diseased hearts All had some form of arterial or ventricular arrhythmia during the study The phenomenon of post-extrasystolic augmentation occurred with both arterial and ventricular extrasystoles (greater for ventricular extrasystoles) and was dependent chiefly on the timing of the extrasystole Atrial and ventricular tachycardia resulted in a decrease in peripheral arterial flow which occurred only at rapid rates above 140 to 160 per minute The contribution of atrial contraction to the peripheral arterial flow was not as great as expected In patients in whom restoration of regular sinus rhythm resulted in greater peak flow velocity this was of the *magnitude of 10 percent or less*

A69-80804
INFLUENCE OF ACCOMMODATION ON THE VIEWING OF AN OPTICAL ILLUSION

Michel Millodot (Brown U Hunter Lab of Psychol Providence R I)

Quarterly Journal of Experimental Psychology vol 20, Nov 1968 p 329–335 15 refs

This study demonstrates the role of microfluctuations of accomodation in the viewing of the concentric ring illusion Four experiments were carried out Experiment I consisted of changing the distance between the illusion and the eyes but retaining visual angle luminance and pupil size constant In Experiment II, the accommodation of the eyes is paralysed by a cycloplegic In Experiment III the illusion is shown to a monocular aphakic and in Experiment IV the exposure time is varied between 1/100 and five sec Furthermore, a series of observations compared the concentric ring illusion seen with both eyes simultaneously The evidence provided by the results of these experiments plus others discussed provide evidence that the concentric ring illusion is caused by the *microfluctuations of accommodation*

A69-80805
DISTRACTION AND TIME ESTIMATION

Guy von Sturmer, Tong Wong, and Max Coltheart (Monash U Dept of Psychol Victoria Australia)

Quarterly Journal of Experimental Psychology, vol 20 Nov 1968, p 380–384 13 refs

It is argued that events which occur during an interval of time which is being judged may be classified in terms of their effects on the alertness of the subject, and in terms of the degree to which they distract him from the task of detecting and processing time-relevant cues A distracting task, defined by the number of arithmetical operations a subject was required to perform was presented while reproductions of an interval were being made The data support the prediction that the higher the level of distraction, the less time a subject will judge to have elapsed during an objective period

A69-80806
THE EFFECT OF ACUTE HYPOXIA AND HYPERCAPNIA ON THE ULTRASTRUCTURE OF THE CENTRAL NERVOUS SYSTEM

L Bakay and J C Lee (N Y, State U Div of Neurosurg, Buffalo)

Brain vol 91 part 4 Dec 1968 p 697–706 27 refs
Grant PHS NB 03754-06

The effect of acute hypoventilation hypoxia with normal CO_2 elimination and hypercapnia produced by the inhalation of 25 *per cent* CO_2 *on the fine structure of the central nervous* system of cats was studied by electron microscopy Significant increase in tissue water occurred in hypercapnic hypoxia and to a lesser degree in hypercapnia In both instances the edema was mostly limited to the white matter The ultrastructural changes were most pronounced in hypercapnic hypoxia in direct proportion to the degree of O_2 deprivation and acidosis They consisted of a marked swelling of the astrocytic processes and relatively mild expansion of the extercellular space in the white matter The changes were much less severe in hypercapnia There was no measurable edema in brains under hypoxia with normal CO_2 elimination except for a minimal swelling in the pericapillary astrocytic processes However there was evidence of increased secretory activity in the choroid plexus under all three conditions Swelling of mitochondria with dissolution of the cristae occurred in hypoxia more frequently than in hypercapnic hypoxia or hypercapnia Mitochondrial damage was limited to oligodendrocytes and some neurons and did not involve astrocytes indicating a difference in enzyme systems and vulnerability of mitochondria to anoxia among various cell types The axons and nyelin sheaths remained normal in all conditions

A69-80807
STIMULUS GENERALIZATION OF GRAVITY

D F McCoy and K O Lange (Ky U , Lexington)

Journal of the Experimental Analysis of Behavior, vol 12, Jan 1969, p 111–118 11 refs
NASA Grant NsG-456

In two experiments squirrel monkeys were exposed to centrifugally generated artificial gravity and trained to respond for food reinforcement at selected gravity (g) levels Experiment I involved a single g value, in Exp II subjects were trained to discriminate among two or three g values After training, generalization tests were administered over a 1 1-g to 2 1-g range The major findings were as follows (a) single-stimulus training yielded a linear relationship between percentage of responding and magnitude of gravity (b) Two-valued discrimination training produced gradient peaks which were shifted from S^D in a direction away from S^Δ This effect was cancelled when S^D was located equidistant between two S^Δ stimuli (c) Gradient form was independent of the S^D-S^Δ difference, but related to continuum location and/or intensity of discriminative stimuli

A69-80808
PERIODIC SHOCK WITH ADDED CLOCK

A69-80809

Derek P Hendry Matthew Yarczower and Richard C Switalski (Md U College Park and Ill U Chicago Circle)
Journal of the Experimental Analysis of Behavior vol 12 Jan 1969 p 159–166 26 refs
Eastern Psychol Assn Conf New York 1966
NASA Grant NsG 189-61 Grants NIH MH 08819 and NIH GM 14221

Rats were shocked every six min while responding was maintained on a variable-interval schedule of reinforcement With some rats shocks were interspersed with a sequence of three different stimulus conditions (S3→S2→S1) or clock cues each lasting two min For other rats a single stimulus condition prevailed between shocks at the beginning of the experiment and clock cues were introduced later Response rate decreased from S3 to S1 Response rate in S3 S2 and S1 was inversely related to shock intensity When clock cues were added response rate increased in all two-min intershock periods During clock cues, an index of curvature, indicating the degree of negative acceleration of response rate was greatest for S1 and least for S3 and was directly related to shock intensity The response-facilitating effect of shock and its relation to a possible discriminative function of shock and to behavioral contrast is discussed

A69-80809
CONDITIONED CARDIAC REFLEXES AND THE FUNCTIONAL AND MORPHOLOGICAL STATE OF THE CORTICAL NEURONS UNDER THE ACTION OF ELECTROMAGNETIC FIELDS OF SUPERHIGH FREQUENCIES [K VOPROSU OB USLOVNYKH SERDECHNYKH REFLEKSAKH, FUNKTSIONAL'NOM I MORFOLOGICHESKOM SOSTOIANII KORKOVYKH NEIRONOV PRI DEISTVII ELEKTROMAGNITINYKH POLEI SVERKHVYSOKIKH CHASTOT]

M I IAkovleva T P Shliafer and I P Tsvetkova (USSR Acad of Med Sci Inst of Exptl Med Leningrad)
Zhurnal Vysshei Nervnoi Deiatel nosti vol 18 Nov–Dec 1968, p 973–978 19 refs In Russian

A study was made of cardiac conditioned reflexes in rats and of bioelectrical activity and histological structure of their cortical cells after the action of superhigh-frequency electromagnetic fields Single and repeated actions of superhigh-frequency fields with PPM equal to 5–15 mw /cm ^{2} lead to a reduction of excitability and functional mobility of the cortical cells Histologically edemic changes were observed in the nerve cells throughout the cross-section of the cortex The greatest number of changed cells were recorded after repeated actions of superhigh-frequency fields The changes in the functions and structure of the cerebral cortex units precede distrubances of conditioned control of heart activity

A69-80810
EVOKED RESPONSES TO SOUNDS OF DIFFERENT DIRECTION IN THE AUDITORY CORTEX OF THE CAT 2 QUANTITATIVE CHARACTERISTICS [VYZANNIE OTVETY V SLUKHOVOI KORE KOSHKI NA ZVUKI RAZNOGO NAPRAVLENIIA SOOBSHCHENIE 2 KOLICHESTVENNYE KHARAKTERISTIKI]

N IU Alekseenko and I P Levshina (USSR Acad of Sci , Inst of Higher Nervous Activity and Neurophysiol Lab of Analytic Physiol Moscow)
Zhurnal Vysshei Nervnoi Deiatel nosti, vol 18 Nov -Dec 1968 p 1001–1008 15 refs In Russian

The dependency of the parameters of evoked potentials (EP) upon the side of the monaural acoustic stimulation (clicks) was studied in the primary auditory area AI and in the associative zone (the middle suprasylvian gyrus) of the anesthetized cats Along with differences in the form of responses previously described quantitative differences between EP to contra- and ipsilateral stimuli were found in both areas of the cortex In responses to the stimulation of the contralateral ear latencies of different EP phases and the duration of their positive phase are shorter the amplitude greater and the thresholds of emergence of their individual components lower than in the responses to ipsilateral stimuli of the same suprathreshold intensity Such differences in EP parameters testify in the case of contralateral stimulation to a higher excitability of the elements taking part in its formation, to the participation of a greater number of them in the reaction and to their earlier and more synchronous involvement It may be assumed that such differences being superimposed on the binaural effect enhance it and may thus contribute to sound localization

A69-80811
DEPENDENCE OF THE PARAMETERS OF EVOKED POTENTIALS IN HUMAN BRAIN ON THE STATE OF ATTENTION [O ZAVISIMOSTI PARAMETROV VYZVANNOGO POTENTSIALA MOZGA CHELOVEKA OT SOSTOIANIIA VNIMANIIA]

M P Kudinova and M S Myslobodskii (USSR Acad of Sci Inst of Higher Nervous Activity and Neurophysiol Moscow)
Zhurnal Vysshei Nervnoi Deiatel nosti, vol 18 Nov–Dec 1968 p 1027–1034 38 refs In Russian

A description is given of changes in the average human evoked potential to light (recorded from inion with reference electrode placed on the mamilliform process) during sleep and a change state of attention Sleep increases the amplitude and duration of mainly the second and fourth positive wave of response and the sensory after-discharge is replaced by a slow negative wave Attraction and distraction of attention changes the amplitude of individual waves of the response to light in a different direction The nature of such changes and indicational possibilities of the method are discussed

A69-80812
DYNAMICS OF ELECTRORETINOGRAM B-WAVE IN CATS UNDER RHYTHMIC PHOTIC STIMULATION [DINAMIKA IZMENENIIA B-VOLNY ELEKTRORETINOGRAMMY KOSHKI PRI RITMICHESKOM SVETOVOM RAZDRAZHENII]

V F Fokin (USSR Acad of Med Sci , Brain Inst Lab of Neurocybernetics Moscow)
Zhurnal Vysshei Nervnoi Deiatel nosti, vol 18 Nov–Dec 1968 p 1035–1043 21 refs In Russian

In experiments on cats anesthetized with nembutal a study was made of the dynamics of the (IERG) intraelectroretinogram b-wave to a rhythmic photic stimulation of the central and peripheral areas of the retina under conditions of dark and light adaptations as well as the connection of the b-wave with slow changes in the steady potential of the retina observed during stimulation The amplitude of the rhythmic IERG b-wave during dark adaptation exponentially diminished as the flashes frequency increases The difference between the central and peripheral areas were slight and manifested itself mainly in the range of from one to six c p s In this range the significance of the difference between the mean b-wave amplitude in the center and the periphery was not lower than 0 95 During light adaption the b-waves of the rhythmic IERG in the center and the periphery of the retina increased at a flash frequency of two to 10 c p s as compared with the response to a single stimulus at higher frequencies there was a subsequent

exponential dimunition of amplitude The differences found between the mean b-wave amplitudes in the center and the periphery of the retina were statistically non-significant

A69-80813
FUNCTIONAL CHANGES IN THE CARDIOVASCULAR SYSTEM OF YOUNG ATHLETES DURING TRAINING IN DRY HOT ENVIRONMENTS [FUNKTSIONAL'NYE IZMENENIIA SERDECHNO-SOSUDISTOI SISTEMY U IUNYKH LEGKOATLETOV V PROTSESSE TRENIROVKI V USLOVIIAKH SUKHOGO ZHARKOGO KLIMATA]
M K Kurbanmamedov
Teoriia i Praktika Fizicheskoi Kul'tury no 3 Mar 1968, p 41–42 In Russian

The response of the cardiovascular system to hot, dry environments was studied in two groups of young (17 to 18 yr old) native inhabitants of Ashkhabad Turmenia USSR, during the summer (June–Aug) One group was composed of 60 well-trained athletes the other of 25 beginners Electrocardiograms were made while the peripheral blood circulation was recorded by oscillography and the skin temperature by electrothermometry The measurements were recorded at rest and in the postexercise period The findings showed a lower heart rate arterial pressure and skin temperature, a relatively decreased vascular tonus and higher pulse pressure in the trained subjects in comparison with the untrained The favorable adaptation of the well-trained young athletes to physical exertion in high temperature environments would encourage the systematic practice of moderate athletics for a better cardiovascular stability and higher levels of adaptation in the thermoregulatory processes

A69-80814
EFFECT OF PHYSICAL WORK LOAD ON THE ACTIVITY OF BLOOD CHOLINESTERASE IN SKIERS [VLIIANIE FIZICHESKOI NAGRUZKI NA AKTIVNOST' KHOLINESTERAZY KROVI U LYZHNIKOV]
I D Kostiunin
Teoriia i Praktika Fizicheskoi Kul tury, no 3, Mar 1968 p 42–44 In Russian

The content of true and pseudocholinesterase in the blood was studied in 23 trained skiers and 27 beginners who exercised on a bicycle ergometer for 15 min at a work rate of 4,000 kgm /min Blood samples were taken before and after exercise It was concluded from the findings that the variation of the cholinesterase activity in the skiers blood in relation to the workload followed an undulating pathway The initial increase of the pseudocholinesterase and the decrease in the true cholinesterase changed to a decrease of the pseudocholinesterase and increase of the true Later with the development of fatigue both the true and pseudocholinesterase increased The variations of the cholinesterase activity were related to the amount of physical work performed and the degree of fitness of the athlete The magnitude of the variations in the activity and the correlation between true and pseudocholinesterase and the workload were clearly correlated with the athletic achievements of the subjects investigated, and could be as a reliable criterion of the physical fitness

A69-80815
DURATION OF THE SPINAL COMPONENT AND MOTOR REACTION TIME IN MAN [DLITEL'NOST' SPINAL'NOI KOMPONENTY I VREMIA DVIGATEL'NOI REAKTSII Y CHELOVEKA]
V A Martianov
Teoriia i Praktika Fizicheskoi Kul tury, no 3 Mar 1968 p 45–50 12 refs In Russian

With the help of the monosynaptic N-reflex, the duration of the latent period of the motor reaction was determined in man with various changes in the reaction time such as natural variability in the repeated execution of the movement, individual differences in different subjects reduction during the training process, decrease with the change from the light signal to the skin electric stimulation, and enhancement to the signal by selection The time of the spinal component of the motor reaction was found to be 55–60 msec , and to remain constant irrespective of the changes in the motor reaction latent period The invariability of the motor reaction spinal time component indicated that the main role in the changes of speed of the motor reaction was played by the higher part of the central nervous system

A69-80816
CONDITIONING OF INSPIRED AIR IN THE UPPER RESPIRATORY WAYS [UPRAVA TEPLOTY A VLHKOSTI VDECHOVANEHO VZDUCHU V HORNICH DYCHACICH CESTACH]
I Pavlík
Ceskoslovenská Otolaryngologie, vol 17 Oct 1968 p 288–296 9 refs In Czech

The energy required for warming up and moistening air in the upper respiratory tract was calculated It was concluded that under optimal conditions at 20°C and 60% relative humidity, the consumption of thermal energy amounted to about 20% basal metabolism There are possibilities of thermotherapy of the mucosa of the upper respiratory tract by only warm and sufficiently moist air The theoretical curve according to which the air should be heated was calculated and compared to experimentally obtained curves Theoretical calculations were verified in a small group of subjects, and a method was submitted which would enable determination of the numeric characteristics of the functional efficiency of the nasal cavity A new conception of the genesis of tracheobronchitis was also suggested

A69-80817
EXCITATION OF THE ELLIPSE PHENOMENON BY THE HARMONICS OF A RECTANGULAR STIMULATING CURRENT [ANREGUNG DES ELLIPSENPHANOMENS DURCH DIE HARMONISCHEN EINES RECHTECKFORMIGEN REIZSTROMES]
E Welpe (Munich, Tech Hochschule Inst fur Tech Elektronik West Germany)
Pflugers Archiv European Journal of Physiology, vol 305, Dec 12 1968 p 9–20 18 refs In German

The paper deals with the ellipse phenomenon It is percepted as a dark elliptic ring (seldom as a dark elliptic area) during periodical electrical stimulation of the eye and simultaneous watching of a bright surface It is proved that the ellipse phenomenon at stimulation with rectangular (and other nonsinusodial) currents is released by the harmonics of the stimulating current The frequency range, where the ellipse phenomenon is excitated by sinusoidal currents (at amplitudes of the stimulating current, which do not lie over the threshold for more than a factor of six to nine) is 81 to 104 c p s

A69-80818
THE HEMODYNAMIC EFFECTS OF CHANGES IN BLOOD VOLUME DURING INTERMITTENT POSITIVE-PRESSURE VENTILATION

Beverly C Morgan Edward W Crawford and Warren G Guntheroth (Wash U School of Med , Seattle)
Anesthesiology, vol 30, Mar 1969, p 297–305 18 refs
Grant PHS HE 7945 and Life Insurance Med Res Fund supported research

The hemodynamic effects of changes in blood volume during intermittent positive-pressure ventilation (IPPV) were studied in lightly anesthetized dogs following recovery from implantation of pulsed ultrasonic flow transducers on vena cava and aorta Alveolar ventilation was maintained in excess of normal and arterial carbon dioxide tension (Pa_{CO_2}) was varied by alteration of concentration of inspired CO_2 Blood volume was altered by the bleeding of 20% of estimated blood volume, following this by reinfusion of the shed blood plus an equal amount of dextran During each of these periods low (peak airway pressure 10 cm H_2O inspiratory-to-expiratory ratio 1 2) and high (peak airway pressure 30 cm H_2O inspiratory-to-expiratory ratio 2 1) levels of ventilation were employed The three variables, blood volume Pa_{CO_2} and intrathoracic pressure exerted separate effects on stroke volume (S V) and cardiac output (C O) C O and S V increased with increasing blood volume and with rising Pa_{CO_2} but decreased with increasing intrathoracic pressure These findings suggest that the deleterious effects of high levels of intrathoracic pressure on cardiac output may be compensated by expanding blood volume

A69-80819
PROTECTION AGAINST IONIZING RADIATION AT THE CELLULAR LEVEL, ASSESSED BY VARIOUS PARAMETERS

O Vos and M C A C Kaalen (Natl Defence Res Organ TNO, Med Biol Lab Rijswijk (Z H) The Netherlands)
International Journal of Radiation Biology, vol 14, no 2, 1968, p 107–118 21 refs

The radioprotective effects of cysteamine glycerol and dimethyl sulphoxide were investigated at the cellular level The incidence of anaphase bridges occurring at one hr after irradiation and the length of mitotic delay served as criteria for radiation damage The data were compared with those on protection against radiation-induced loss of reproductive integrity obtained in previously published experiments It was shown that the protection assessed by any of the three parameters was of the same magnitude This similarity in response to protection suggests a similarity in the nature of the lesions involved Damage to the cell membrane as shown by leakage of hemoglobin and potassium from rat erythrocytes indicated a different protective capacity of the three compounds This was most evident with dimethyl sulphoxide which protected as judged by the three criteria mentioned in the first paragraph but sensitized with regard to membrane permeability Since radiation-induced mortality of animals is mostly due to a loss of the reproductive integrity of certain stem cells the value of chemicals with regard to the protection of whole animals cannot be assessed on account of their effectiveness in protecting cell membrane

A69-80820
RADIATION SENSITIVITY OF DROSOPHILA EMBRYOS IN RELATION TO AGE, IN AIR AND IN NITROGEN

Edel Havin and Per Oftedal (Norweg Radium Hosp Norsk Hydros Inst for Cancer Res Oslo Norway)
International Journal of Radiation Biology, vol 14, no 2 1968 p 149–160 21 refs
Norweg Cancer Soc and Norweg Res Council for Sci and Humanities supported research

The sensitivity of *Drosophila* embryos to X-rays was investigated for ages between one hr and three and one-half hr The highest sensitivity was found in embryos about one and one-half hr old (LD_{50} about 180 r) the lowest in embryos two and three-fourths hr old (LD_{50} about 1 700 r) The oxygen enhancement ratio was found to be the same for these two ages, about two

A69-80821
SLEEP AND WAKEFULNESS IN A GROUP OF SHIFT WORKERS

G S Tune (MRC Liverpool U , Unit for Res on Occupational Aspects of Ageing Great Britain)
British Journal of Industrial Medicine, vol 26, Jan 1969 p 54–58 15 refs

Fifty-two shift workers recorded their hours of sleep and wakefulness for a period of 10 wk Compared with matched non-shift-working control subjects it was found that they took a higher average duration of sleep per 24 hr and more and longer naps outside the major sleep period A comparison of the on and off duty records from the shift workers showed that a sleep debt was incurred during the former which was largely paid off by taking long naps in the latter It is suggested that the longer sleep taken by shift workers may be necessary in order to pay off specific kinds of sleep debt

A69-80822
PLASMA CORTICOSTERONE RESPONSE TO ENVIRONMENTAL STIMULATION EFFECTS OF DURATION OF STIMULATION AND THE 24-HOUR ADRENOCORTICAL RHYTHM

R Ader and S B Friedman (Rochester U School of Med and Dentistry, Depts of Psychiat and Pediat N Y)
Neuroendocrinology, vol 3 no 6 1968 p 378–386 11 refs
Grants PHS MH-03655, PHS K3-MH-6318, PHS MH-06352 and PHS K3-MG-18,542

Three experiments were conducted to determine the effects of the known 24 hr adrenocortical rhythm on the rat s plasma corticosterone response to different durations of environmental stimulation In Experiment 1 plasma corticosterone was sampled from rats housed 10 per cage and sacrificed sequentially at the crest or trough in the adrenocortical cycle Animals sacrificed at the crest in the daily cycle showed a rise of approximately 50% whereas there was a five-fold increase in corticosterone levels between the first and last animals sacrificed at the trough in the adrenocortical cycle In Experiment 2, rats were sacrificed 15 min after five to 240 sec of stimulation that consisted in transferring an animal from its home cage to a different cage Five sec of stimulation was sufficient to cause a significant elevation in corticosterone levels in animals sampled at the crest at the trough in the adrenocortical cycle As in previous studies the relative increase in corticosterone levels was greater when the stimulation was superimposed upon the trough in the daily cycle In Experiment 3, rats were sacrificed at the crest or trough in the adrenocortical cycle either 5 15 30 or 60 min following five sec or three min of stimulation Significant interactive effects indicated that the time course of the plasma corticosterone response to environmental stimulation depends upon the duration of stimulation and the point in the 24 hr adrenocortical rhythm upon which the stimulation is superimposed The results raised several questions concerning the definition of adrenocortical reactivity and the adaptive significance of the several parameters of the plasma corticosterone response to environmental stimulation

A69-80823
LUMINANCE REQUIREMENTS FOR HUE IDENTIFICATION IN SMALL TARGETS

Mary M Connors (NASA Ames Res Center Moffett Field, Calif)
Journal of the Optical Society of America, vol 59, Jan 1969 p 91–97 19 refs

Foveal luminance thresholds for identification of red (642 nm) yellow (584 nm) green (521 nm) and blue (468 nm) were determined by the method of constant stimuli for a range of small stimulus sizes and for two exposure durations The luminances necessary for chromatic and absolute thresholds were also specified The luminances necessary for chromatic and absolute thresholds were also specified The luminance required for chromatic threshold was found to be lowest for the 642-nm stimulus and highest for the 468-nm stimulus the threshold for correct hue identification was found to be inversely related to wavelength The ratios of the luminance necessary for hue perception to the absolute threshold range from 1 14 for the 642-nm stimulus to 1 51 for the 584-nm stimulus The ratio of the luminance required for correct hue identification to the absolute threshold ranged from 1 32 for the 642-nm stimulus to 3 33 for the 521-nm stimulus More reliable responses and fewer confusion in the hue identification were associated with the 642-nm stimulus than with the other wavelengths The identification thresholds of this study are compared with the detection thresholds for similar targets

A69-80824
LATENCY VARIATION IN HUMAN PUPIL CONTRACTION DUE TO STIMULUS LUMINANCE AND/OR ADAPTATION LEVEL

Robert E Lee Gerald H Cohen and Robert M Boynton (Rochester, U N Y)
Journal of the Optical Society of America vol 59 Jan 1969 p 97–103 15 refs
Grants PHS NB-00624 and PHS 2G-540

The purpose of the experiment was to measure the latency to onset of the contraction of the pupil as a function of the size of positive steps in luminance starting at various luminance levels to which the eye has been adapted prior to the stimulus steps In the past latency of the pupil response has been inaccurately measured owing to the difficulty of separating the end of the latent period from the slow beginning of contraction To overcome this a digital curve-fitting technique involving a time delay followed by a modified second-order step response was developed Latency was defined as the time delay given the most accurate fit Because the curve-fitting procedure needed a response with less random variation than is normally present, an average was used Such averaging was first justified by using the standard deviation to show that there is probably no significant variation of latency for responses for a given subject under identical stimulus conditions This analysis also showed that 20 responses is an efficient number of average for the pupil-contraction system The excellent agreement between each average experimental response and the computed fit verified the value of delay used in the computation Latency thus defined for each stimulus condition was found to be primarily a function of luminance during the step and only secondarily of the ratio of the step change of luminance to the adaptation luminance

A69-80825
EXCRETION OF 17-HYDROXYCORTICOSTEROIDS AND VANILLYLMANDELIC ACID DURING 205 HOURS OF SLEEP DEPRIVATION IN MAN

Robert T Rubin Edward J Kollar Grant G Slater and Brian R Clark (Navy Med Neuropsychiat Res Unit San Diego Calif and Calif U, School of Med Dept of Psychiat Los Angeles)
Psychosomatic Medicine, vol 31 Jan–Feb 1969 p 68–79 31 refs
Am Psychosomat Soc, Ann Meeting Boston, Mar 29–31, 1968
Grant CDMH 66-2-40 4 and Navy Dept supported research

Previous studies of adrenocortical activity during sleep deprivation revealed unchanged or lowered plasma 17-hydroxycorticosteroid (17-OHCS) levels and either unchanged lowered or elevated urine 17-OHCS values, depending on the subject and the length of the deprivation period In the present study plasma 17-OHCS urine 17-OHCS and urine vanillymandelic acid (VMA) were measured during 205 hr of wakefulness the rationale being that an extended period of sleep deprivation might result in more definitive physiological responses Plasma 17-OHCS in all four subjects decreased to a low point at about 90 hr then increased to peak values at about 170 hr Urine 17-OHCS values tended to reflect changes in plasma 17-OHCS levels Urine VMA excretion varied considerably among the four subjects The results suggest that prolonged sleep deprivation *per se* results in only mild, if any specific activation of the pituitary-adrenocortical axis and in variable increases of catecholamine biosynthesis Differing patterns of physiological activity may occur among sleep-deprived subjects

A69-80826
LASER-INDUCED ACOUSTIC BREAKAGE OF TOBACCO MOSAIC VIRUS

E F Carome (John Carroll U Dept of Physics Cleveland Ohio)
Nature, vol 221 Feb 15, 1969 p 660–661

A previous investigation was reviewed which reported alterations in biological systems produced by the intense acoustic transients that are generated when a Q-spoiled laser impulse is used to irradiate an optically absorbing material The intention was to clear up confusion which may occur from the conclusion that the breakage of particles was found to depend on the surface boundary conditions of the irradiated medium Only in one case was the sample subjected solely to positive pressure transients whereas in two other cases there would be reversal of phase on reflexion It was reported that cavitation was not a contributing factor however that conclusion needs further study The investigators pointed out that laser-induced acoustic transients may produce a wide spectrum of possible effects The phenomenon is complicated and identification of the specific causes of some of the observed effects may be difficult

A69-80827
ACUTE RESPIRATORY INFECTIONS IN AIRCREW UNDER TRAINING WITH SPECIAL REFERENCE TO INFLUENZA AND ADENOVIRUS INFECTIONS

A W McCracken (Tex, U, Med School, Dept of Pathol San Antonio) and J A Hopson (Min of Defense (Air), London Great Britain)
Military Medicine vol 134, Feb 1969 p 111–115 16 refs

Aircrews under training and their instructors who had respiratory infections during the periods November, 1965 to May 1966 and October 1966 to April 1967 were examined clinically and specimens cultured for evidence of influenza or adenovirus infection Two instances of adenovirus type 2 were found during the 1965 to 1966 phase and no isolations of influenze viruses were obtained in either period These largely negative findings, together with the clinical data, suggest that these two groups of viruses are not normally a major cause of respiratory disease in servicemen who have progressed recently beyond the recruit stage

A69-80828
PROTECTION AGAINST IONIZING RADIATION 2 PROBLEMATIC AND RESPONSIBILITY [BESCHERMING

TEGEN IONISERENDE STRALING (II) PROBLEMATIEK EN VERANTWOORDELIJKHEID]
H Galjaard and J W Thiessen
Nederlands Militair Geneeskundig Tijdschrift vol 21, May–Jun 1968 p 147–152 In Dutch

In this article on the problematics of the use of ionizing radiations in the armed forces the authors go into two other meaures which could assist the commander in executing his responsibilities viz the drafting of guidelines concerning the protection against ionizing radiation and the establishment of an interservice radiological assistance team which could carry out inspections and give practical advice when this is needed

A69-80829
MILITARY-MEDICAL EXAMINATION AND DISABILITY EVALUATIONS IN RELATION TO THE FUNCTION OF HEARING, PARTICULARLY CONCERNING NOISE INJURY OF THE AUDITORY ORGAN [MILITAIR-GENEESKUNDIGE KEURINGEN EN INVALIDITEITSSCHATTNGEN MET BETREKKING TOT LAWAAIBESCHADIGING VAN HET GEHOORORGAAN]
H C Bodegraven
Nederlands Militair Geneeskundig Tijdschrift vol 21 May–Jun 1968 p 158–177 In Dutch

A description is given of some aspects of military-medical examination and disability evaluations in relation to the function of hearing particularly concerning noise injury In this respect the author goes further into the activities of a medical board examination of the military which makes use of the World Pension Committee (WPC) scale for the determination of the degree of disability due to military service, as a result of the reduction of the acuity of hearing Because of the slight differentiation given in the WPC scale more differentiated tables were developed by using graphic methods allowing determination of the disability rates from 0 to 90% in numbers of five according to law

A69-80830
EXPERIMENTAL STUDIES ON THE EFFECT OF TRAINING ON HEAT TOLERANCE
Kuhee Hirooka (Kobe U School of Med , Dept of Hyg Japan)
Kobe Journal of Medical Sciences, vol 14 Sep 1968 p 195–218 19 refs

After acclimatization determinations of heat tolerance in mice were made by measuring the lethal time of tested mice exposed to an environment with a temperature of 41° C The effect of heat acclimatization became greater with the rise of acclimatization temperature and exposure to 41° C for 30 min every day increased heat tolerance prominently The following tendencies were observed the effect of heat training is increased according to the duration of acclimatization, the acclimatization effect is already recognized after one hr , and it increases remarkably by 24 hr On the other hand heat acclimatization alone lowers cold tolerance and this tendency becomes greater with time

A69-80831
DIFFERENTIAL OPERANT CONDITIONING OF HEART RATE
Howard I Levene, Bernard T Engel and John A Pearson (Calif U San Francisco Med Center, Langley Porter Neuropsychiat Inst and Cardiovascular Res Inst San Francisco)
Psychosomatic Medicine vol 30 Nov–Dec 1968 p 837–845 8 refs
Grants PHS FR-00122 PHS 5TI-MH-7082 and PHS HE-06285

Five normal female subjects were taught to increase and decrease cyclically their heart rate (HR) by means of a differential operant conditioning technique Discrimination between slowing and speeding was easily demonstrated however the ability significantly to increase and decrease HR relative to resting rate was less apparent Although each subject could do this on at least one occasion only two subjects did so with consistency Breathing or musculoskeletal responses did not seem to mediate the learned responses

A69-80832
CORTICAL SLOW POTENTIAL CHANGES IN MAN RELATED TO INTERSTIMULUS INTERVAL AND TO PRE-TRIAL PREDICTION OF INTERSTIMULUS INTERVAL
Dale W McAdam John R Knott and Charles S Rebert (Iowa U , Dept of Psychiat Iowa City)
Psychophysiology vol 5 Jan 1969 p 349–358 13 refs

Two experiments were performed to explore further the relationship between the cortical slow potential change known as the contingent negative variation (CNV) and the concept of expectancy In Experiment I 24 male subjects were presented click pairs with inter-click intervals of 800 1600 and 4800 msec (two blocks of 10 trials each, counter-balanced between subjects for order) and instructed to press a key after the second click Interval by order by trials analysis of variance showed interval to be the only significant factor CNV were lower and reaction times (RT) *longer as interval increased In Experiment II eight female subjects* given 60 pairs of clicks 30 each with separations of 1200 and 2400 msec were instructed to respond as in Experiment I and were asked to make a pretrial prediction of the interval they would next receive Analysis of variance of RT showed that subjects responded slower when the interval was other than that predicted Prediction by reception by subjects analysis of variance of CNV amplitude at the 1200 msec point gave a significant F only for prediction mean amplitude for short being higher than for long A similar design applied to CNV amplitudes at both the 1200 and 2400 msec points when subjects received the long interval yielded a significant measurement point by interval prediction interaction at the 1200 msec point short predictions were followed by higher CNV than were long predictions at 2400 msec the opposite was found These data combine with those already in the literature to indicate that the relationship between expectancy and the CNV is far from simple and that cognitive and motivational factors play a significant role in determining CNV amplitude

A69-80833
HEART RATE RESPONSE TO SOUND AND LIGHT
Robert Roessler Forrest Collins and Neil R Burch (Baylor U Coll of Med , Dept of Psychiat Psychophysiol Lab and Tex Res Inst of Mental Sci Psychophysiol Div Houston)
Psychophysiology, vol 5 Jan 1969 p 359–369 26 refs
NASA Grant NGR 44-003-031 Grants AFOSR-727-65 PHS MH 13630, and PHS FR 00254

The heart rate (HR) response to five intensities of sound was examined in 18 subjects and to five intensities of light in 12 subjects Each subject was tested on four occasions at monthly intervals After covariance adjustment significant acceleration to sound was found within the first five beats after stimulus onset but no significant deceleration occurred There was no differences between testings Individuals HR acceleration was reliable over testings and differing experimental contexts No habituation occurred and no consistent relationship between HR response and ego strength was found There was no significant HR response to light stimulation The results were discussed in relation to Graham and

Clifton s hypotheses concerning the relationship of the HR response to the orienting reflex

A69-80834
EFFECTS OF ATTENTION AND ACTIVATION ON THE VISUAL EVOKED CORTICAL POTENTIAL AND REACTION TIME
Philip M Groves (Calif , U Irvine) and Robert G Eason (N C , U Greensboro)
Psychophysiology vol 5 Jan 1969 p 394–398 8 refs
Grant NSF GB-4067

An attempt was made to assess the relative contributions of arousal and attentional factors affecting the amplitude of the visual evoked cortical potential and reaction time latency Subjects were studied under the following four conditions (1) passively watching a small dim intermittent flash (2) reacting to each flash by releasing a lever, thereby giving a reaction time, (3) reacting to each flash within a specified period of time in order to avoid an uncomfortable shock to the fingers, and (4) reacting to each flash while receiving occasional unavoidable shock Statistical analyses revealed that the evoked potentials recorded during the avoidable shock condition (3) were significantly larger than during the other three conditions Reaction times were routinely shorter during condition (3) followed by the no-shock (2) and then unavoidable shock (4) conditions

A69-80835
THE LOCALIZATION OF NON-TACTILE THERMAL SENSATIONS
Marianne L Simmel and Alan Shapiro (Brandeis U Dept of Psychol Waltham Mass)
Psychophysiology vol 5 Jan 1969 p 415–425 15 refs

An experiment by previous investigators on the localization of thermal sensations was replicated The present somewhat more detailed results essentially confirm the findings of the earlier authors Thermal sensations evoked by nontactile thermal stimuli can be localized their localization is less accurate than that of tactile stimuli and the accuracy of localization increases with increasing intensity of stimulation and sensation To account for these findings several alternative hypotheses concerning the interaction between thermal and tactile modalities and large and small fiber sensory systems were suggested

A69-80836
THE INFLUENCE OF EVENING ACTIVITY ON THE ONSET OF SLEEP
Peter Hauri (Va U Charlottesville)
Psychophysiology, vol 5 Jan 1968 p 426–430
Grant PHS MH-04151

Sleep onset following three kinds of evening activities was investigated These activities were six hr of strenuous physical work six hr of intensive studying and mental work and six hr of relaxation i e , watching TV listening to records and reading magazines Subjects were 15 young men, each of whom participated in one activity per night for three non-consecutive nights Results showed that studying delayed sleep onset by an average of about six min but subjects took similar times to fall asleep after exercise and after relaxation At the moment of sleep onset heart rate respiratory rate rectal temperature and peripheral pulse volume all were significantly elevated after exercise when compared to studying and relaxation Both of these results combined were interpreted as indicating that the level of physiological, systemic activity is relatively unimportant for sleep onset while the level of mental stimulation seems to play a more important role

A69-80837
STIMULUS DETECTION DURING PERIODS OF HIGH AND LOW HEART RATE
David C Edwards and Jonathan E Alsip (Iowa State U Dept of Psychol , Ames)
Psychophysiology vol 5 Jan 1969, p 431–434 9 refs

The study was designed to test the suggestion of a previous investigation that elevated heart rate (HR) and blood pressure could lead to decreased sensory sensitivity and that a reduction in HR and blood pressure may facilitate sensory sensitivity A tone of five intensities encompassing the subject s intensity threshold was presented randomly 25 times under high and 25 times under low transient HR The results indicated no differences in the number of correct detections under high and low HR and no interaction between HR level and tone intensity It was concluded that low HR may well be a necessary condition for increased sensory sensitivity but that it is not a sufficient condition Discussion was directed to the range of possible HR changes and the possible requirements of the sensitivity mechanism

A69-80838
HABITUATION OF THE ORIENTING RESPONSE TO MULTIPLE STIMULUS SEQUENCES
S H Lovibond (Adelaide, U Dept of Psychol Australia)
Psychophysiology vol 5 Jan 1969 p 435–439 9 refs
Grant ARGC 65/15863

The purpose of the study was to test the hypothesis that rate of habituation of the orienting response (OR) to multiple stimulus sequences is a negative function of the uncertainty (H) in the stimulus series Seven groups of 30 subjects received 10 presentations of a 10 sec light stimulus (S_1) followed immediately by a one sec 70 db auditory stimulus (S_2) on 0 10 20 50 80, 90 or 100% of trials The response measure was change of skin conductance to S_1 Mean conductance change scores of the various groups were closely related to the degree of uncertainty (H) in the stimulus series The results were interpreted as offering support for Sokolov s OR theory and the view that, in human information processing information concerning stimulus probabilities is integrated continuously to form the basis of predictive extrapolation

A69-80839
SOME CURRENT PROBLEMS OF HIGH ALTITUDE PHYSIOLOGY [NIEKTORE AKTUALNE ZAGADNIENIA FIZJOLOGII WYSOKOGORSKIEJ]
Jerzy Kaulbersz
Folia Medica Cracoviensia vol 10 no 3, 1968 p 377–396 51 refs In Polish

The main reactions of humans at high altitude were revealed in laboratories on mountain passes at summits in the Alps in the Andes of South America at other elevations and during some scientific and mountaineering expeditions A sudden decrease in atmospheric pressure to a half or more may evoke disturbances similar to Caisson s disease Hypoxia occurs during the first hours Previous investigations revealed that young animals nursed by mothers exposed to a simulated high altitude for several hours each day show a considerable increase of erythropoetic activity and a hemoglobin concentration The mediation of a humoral acting erythropoetic factor is obvious The oxygen blood saturation is greater in newcomers than in high altitude natives The oxygen saturation does not seem to be the decisive factor in acclimatization Individuals whose blood is saturated with oxygen are less physically efficient than persons with a low oxygen saturation The iron

turnover rate and absorption of iron is increased at altitude Beside a greater oxygen capacity of blood a rise of pulmonary ventilation is the second most important compensatory factor in high altitude environment At an altitude of 7,000 m the pulmonary ventilation increases two-fold Also a greater response of the respiratory center to CO_2 is noted Maximal oxygen consumption is less in high altitude than at sea level, whereas the submaximal work expressed in liters of oxygen per min remains unchanged Physical endurance at an altitude of 4,540 m declines significantly the magnitude of work performed drops as compared to sea level values During work of the same intensity mountain dwellers produce less lactic acid Taking into consideration the fact that the blood pressure of the high altitude natives is usually low, a previous investigator found that hypoxia diminishes experimentally dwellers produce less lactic acid Taking into consideration the fact that the blood pressure of the high altitude natives is usually low a previous investigator found the hypoxia diminishes experimentally elevated blood pressure Heart weight of rats born at high altitude exceeds at the end of the eighth mo the heart weight of animals born at sea level by 90% When the body weight drops the life chances diminish Growing in the mountains the rats show a deficiency of the hypophysis and a disturbance in the function of the hypothalmus Anhydrase carbonate is more active in rats at high altitude whereas the activity of its inhibitor-acetazolamid-diminishes The neuron inhibitor, gamma amino butyric acid is less effective at altitude Limitation of physical work at high altitude is mainly the consequence of the diminished oxygen diffusing capacity of newcomers as compared with the natives In altitude residents cardiovascular limitations seem to occur first before dyspnea The role of cerebrospinal fluid in high altitude acclimatization is noted Above 3 800 m the fecundity of the lowlanders is significantly reduced The acclimatization of a lowland inhabitant at high altitude even after a longer stay seems not to be perfect The best index of acclimatization is doubtless a great tolerance to exercise of maximal type Only few specially qualified lowland residents may equal the altitude natives

A69-80840
EFFECTS OF PREVIOUS CALCIUM INTAKES ON ADAPTATION TO LOW AND HIGH CALCIUM DIETS IN RATS

J D Benson R S Emery and J W Thomas (Mich State U Dept of Dairy East Lansing)

Journal of Nutrition vol 97, Jan 1969 p 53–60 31 refs

To study adaptation to low and high calcium diets female weanling rats were fed for two periods in one of four ways (1) a low calcium diet (0 2%) throughout both periods (LL) (2) a low calcium diet followed by a high calcium diet (0 9%) (LH) (3) a high calcium diet followed by a low calcium diet (HL) or (4) a high calcium diet throughout both periods (HH) Rats (LL and LH) accustomed to low intakes of calcium retained a larger percentage of the dietary calcium than rats (HL and HH) accustomed to higher amounts of the element regardless of whether the present calcium intake was low or high Up to 133 days of age the bones of the LL and LH groups contained less calcium and phosphorus per unit of bone weight than did the bones of the HL and HH groups At 156 days of age (end of experiment), however, the bones of all groups contained equal concentrations of calcium and phosphorus These data were interpreted to mean that body calcium stores control calcium retention Parathyroid activity as estimated by parathyroid gland weight and urinary phosphate values was greater in the LL group than in the HL group These data demonstrated that the adaptation to both high and low calcium diets was affected by previous dietary calcium levels and confirmed the idea that body stores of calcium control its retention

A69-80841
INFLUENCE OF MICROORGANISMS ON INTESTINAL ABSORPTION OLEIC ACID I-131 AND TRIOLEIN I-131 ABSORPTION BY GERMFREE AND CONVENTIONALIZED RATS

Bud Tennant Mario Reina-Guerra Doris Harrold and Marvin Goldman (Calif U , School of Vet Med , Dept of Clin Sci and Radiobiol Lab Davis)

Journal of Nutrition, vol 97, Jan 1969 p 65–69 18 refs
Assn for Gnotobiotics, Inc , Ann Meeting Buffalo, Jun 9–10, 1968

Several differences in lipid metabolism have been demonstrated between germfree and conventional rats To evaluate the role which intestinal absorption might play in determining these differences the *absorption of oleic acid* ^{131}I *and triolein* ^{131}I *was compared* in germfree and conventionalized rats Gastric emptying of both compounds appeared to be delayed in germfree rats and correspondingly less radioactivity reached the cecum during the six-hr period following intragastric administration When corrections were made for differences in gastric emptying germfree and conventionalized rats absorbed oleic acid and triolein at similar rates Under the conditions of the studies, intestinal microorganisms did not appear to influence the rate of either lipolysis or fatty acid absorption directly but significantly influenced the rate at which fat was transported along the gastrointestinal tract

A69-80842
PERFORMANCE OF RATS ALTERNATELY FED DIETS HIGHER AND LOWER IN ENERGY OR PROTEIN

Karl M Barth and James C McConnell (Tenn U Knoxville)

Journal of Nutrition vol 97 Jan 1969 p 85–89 14 refs

Effects of alternating higher and lower energy or protein diets on carcass composition growth, voluntary feed intake and feed conversion were determined with male albino rats The five dietary regimens each fed to six singly caged rats for 32 days were as follows a 10% corn oil diet alternated with a 5% corn oil diet (1) every two days and (2) every four days a 20% casein diet alternated with a 10% casein diet (3) every two days (4) every four days and (5) the control diet containing 7 5% corn oil and 15% casein fed throughout the trial When rats were fed by the two fluctuating energy regimens they consumed less feed, gained less and were less efficient in feed conversion than control rats and none of these differences was statistically significant There were no significant differences in body moisture protein or ether extract content of the carcasses However alternating dietary protein levels significantly decreased feed consumption and body weight grains ($P < 0.05$) and significantly increased carcass moisture content in the two-day regimen as compared with control rats Rats on the four-day fluctuating protein regimen has a 10% increase in carcass fat

A69-80843
EFFECT OF LEVEL AND PATTERN OF ESSENTIAL AMINO ACIDS ON NITROGEN RETENTION OF ADULT MAN

Gladys S Romo and Hellen Linkswiler (Wis , U Dept of Nutr Sci Madison)

Journal of Nutrition, vol 97 Jan 1969 p 147–153 12 refs

Two studies were conducted to determine the effect on nitrogen retention of increasing the dietary intake of essential and semiessential amino acids patterned as in the poorly balanced protein of corn when total nitrogen was held constant Men were fed diets containing approximately 6 00 g nitrogen daily of which crystalline amino acids and diammonium citrate provided 5 50 g

and ordinary foods the remainder During five experimental periods of study one the eight essential and four semiessential amino acids patterned as in corn protein provided 1 10 2 20 3 30 4 40 and 5 50 g nitrogen daily During the sixth experimental period 2 20 g nitrogen was also provided by the essential and semiessential amino acids but the level of isoleucine was increased to that in the FAO provisional pattern Each increase in the intake of essential and semiessential amino acids was accompanied by an increase in nitrogen retention Increasing the level of isoleucine to that in the FAO pattern had no effect on nitrogen retention In the second study nitrogen balance responses of men fed the corn and egg pattern were compared, equivalent amounts of nitrogen 2 20 3 30 or 5 50 g were supplied by the essential and semiessential amino acids of the two patterns When the essential nitrogen provided 3 30 or 5 50 g more higly positive nitrogen balances were obtained when subjects were fed the egg pattern than when they were fed the corn pattern of amino acids

A69-80844
MOVEMENT CONTROL IN SKILLED MOTOR PERFORMANCE
Steven W Keele (Ore U , Eugene and Portland)
Psychological Bulletin, vol 70 part 1 Dec 1968, p 387–403 94 refs
Contract AFOSR F44620-67-C-0099 and Grant NSF GB-3939, NIMH supported research

The speed and accuracy of single movements depend on several factors such as direction of movement, distance to the target and accompaniment by simultaneous movements The relation between speed accuracy and distance appears to be determined by the time required to process feedback and to make corrective alterations in the movement For a repetitive series of movements there is some evidence suggesting that control is shifted from feedback to a motor program This view receives further support from demonstrations that the reproduction of single movements may be under programmed control How the study of movements may be relevant to understanding perceptual and memory skills as well as motor skills is briefly mentioned

A69-80845
METHOD, FINDINGS, AND THEORY IN STUDIES OF VISUAL MASKING
Daniel Kahneman (Harvard U Center for Cognitive Studies Cambridge Mass)
Psychological Bulletin vol 70, part 1 Dec 1968 p 404–425 113 refs
Grant PHS 1 PO1-MH 12623 and Contract NSF GS-1153

The various paradigms in the study of visual masking are classified and related to cases of interference among contemporaneous stimuli The dependent variables in masking studies are described A distinction between criterion content and criterion level is introduced in the discussion of detection under masking and metacontrast Various conceptions of identification of forms under masking and the contributions of masking effects to the study of psychological time are reviewed

A69-80846
EXPLANATIONS OF GEOMETRICAL ILLUSIONS
Ray Over (Dalhousie U Halifax Nova Scotia Canada)
Psychological Bulletin, vol 70 part 1 Dec 1968, p 545–562 90 refs

The present review demonstrates that explanations of geometrical illusions in terms of deformation of the field of retinal induction cortical satiation directional eye movements and inappropriate constancy scaling generate incorrect predictions about the viewing conditions under which perceptual error occurs None of these accounts is likely to be satisfactory without major revision of its basic propositions Several other theories of illusions have an uncertain status at the present time e g the lateral inhibition explanation the centration theory and the contextual learning theory Information is particularly needed on whether similar perceptual error occurs with visual haptic and tactual judgment of an illusion figure and whether illusions are products of the subject s learning history The relationship between illusions and figural aftereffects requires further examination, as does the issue of whether geometrical illusions constitute a single class of perceptual effects

A69-80847
ANTICIPATION AND TIMING IN HUMAN MOTOR PERFORMANCE
Richard A Schmidt (Md U Dept of Phys Educ College Park)
Psychological Bulletin, vol 70, part 1 Dec 1968 p 631–646 77 refs

Recent evidence concerning the role of anticipation and timing in human motor performance is reviewed Evidence generally indicates that anticipation and timing can be learned, and that there is substantial forgetting over retention intervals of up to five mo The spatial and temporal predictability of the stimuli appear to be the most potent determiners of anticipation but response-produced proprioceptive stimulus traces may also provide a basis for more accurate timing Changes in the nature of the stimulus predictability produce widely different response strategies and after considerable practice anticipated responses become automatic freeing the subject to perform other tasks simultaneously There has been a general lack of interest concerning both intraresponse timing and the motor variables determining anticipation

A69-80848
REVERSAL OF SIMULTANEOUS LIGHTNESS-CONTRAST
Joseph A Steger (N Y , State U Albany)
Psychological Bulletin, vol 70 part 1 Dec 1968 p 774–781 40 refs

The theoretical and experimental research on the reversal of simultaneous lightness-contrast (assimilation) is reviewed Helson s differential stimulation hypothesis of contrast and assimilation is examined in view of recent research The conclusion is reached that before a quantitative formulation incorporating both simultaneous lightness-contrast and assimilation can be complete, research is needed to assess the contribution of (a) area-luminance functions (b) mode of viewing, (c) contours and divisions (d) perceptual set (e) absolute levels of luminance in the viewing situation (f) adaptation of the eye and (g) the nature of the experimental stimuli used

A69-80849
HUMAN ADJUSTMENT TO AN EXOTIC ENVIRONMENT
Jim H Earls (Okla U Med Center Oklahoma City)
Archives of General Psychiatry, vol 20, Jan 1969 p 117–123 5 refs

The polaris submariner is a highly screened individual placed into a chronically stressful and frustrating environment When the individual begins to develop feelings of anger in response to the frustrations he is faced by a cultural structure which does not readily permit the expression of anger He is then forced to turn the

anger inward and then experiences a depressive phenomenon in reaction to operative stresses The course of this depressive phenomenon is believed to be a ubiquitous phenomenon among the polaris submarine crews A similar adjustment pattern has been reported from other isolated environments It is believed that the polaris submarine represents an ideal laboratory in which to study the dynamics of group adjustment to unusual environments

A69-80850
MENTAL HEALTH PROBLEMS IN ANTARCTICA
E K Eric Gunderson (Navy Dept Med Neuropsychiat Res Unit San Diego, Calif)
Archives of Environmental Health vol 17 Oct 1968 p 558–564
Symp on Circumpolar Health Related Problems College, Alaska Jul 25, 1967
Navy Dept supported research

Mental health problems are of special concern at small Antarctic stations because of the extreme environmental conditions and because of the complete isolation from the outside world during the winter months Emotional symptoms such as insomnia anxiety depression and irritability were common and tended to increase during the winter months Such changes in emotional adjustment were predictable to some degree from psychiatric screening information gathered prior to deployment to the Antarctic stations Emotional adjustment depends importantly upon the man s specific job at the station and upon the appropriateness of his psychological needs personality traits and recreational interests for his particular role

A69-80851
ADAPTATIONS OF NATIVE POPULATIONS TO COLD
Laurence Irving (Alaska U Inst of Arctic Biol College)
Archives of Environmental Health, vol 17 Oct 1968 p 592–594
Symp on Circumpolar Health Related Problems, College, Alaska Jul 25 1967
Grant PHS GM-10402

A brief discussion is presented on the adaptations of men and animals to life in the arctic environment Knowledge of this should help in adjusting newcomers and settlers to the northland

A69-80852
PATHOPHYSIOLOGICAL ASPECTS OF HUMAN ADJUSTMENT TO COLD
Jack H Petajan (Alaska, U Inst of Arctic Biol Arctic Health Res Lab College)
Archives of Environmental Health, vol 17 Oct 1968 p 595–598
Symp on Circumpolar Health Related Problems, College Alaska, Jul 25 1967

A discussion is presented of the pathological effects in humans of severe cold exposures Clinical data on mountaineers Eskimos and other inhabitants of cold regions are discussed Injuries of the limbs frostbite and neuropathic effects are included Methods of therapeutic management of frostbite are suggested Better methods of preventive medicine are needed to guard against cold injuries

A69-80853
RESPONSES OF MOUNTAINEERS TO MULTIPLE STRESSORS
Peter Morrison (Alaska U Inst of Arctic Biol College)
Archives of Environmental Health, vol 17 Oct 1968 p 599–602
Symp on Circumpolar Health Related Problems, College Alaska, Jul 25, 1967
Grant NIH GM-10402

With only partial and incomplete evaluation of the data at hand extensive and widespread physiological alteration was detected which involved physical fitness mental function and peripheral neuromuscular function in climbers on Mt McKinley in 1967 Performance in preliminary tests did correlate with actual performance on the mountain Thus important differences in subjects motivation may be of less significance in predicting their behavior than are the very rigorous conditions that they must undergo in this environment Despite the difficulty of approach and the sometimes fragmentary nature of the data we feel that this program which is made possible by the contiguity of laboratory facilities and research specialists concerning mountains and mountaineers in Alaska shows much promise Particularly beneficial is its emphasis on interference factors in the neural control systems which are particularly sensitive to oxygen deficiency rather than in the effector organ system The direct returns will include better knowledge of the physiological influences of a variety of factors applied synergistually and better knowledge for management of man at high altitude with some predictive criteria for his performance at altitude For example in chamber tests on eight mountaineers currently on Mt McKinley cardiac responses to steady state work (10 in /4 sec) simulated at 16 000 ft ranged from a low of 96 to a high to 176 beats per min to provide an attractive response spectrum against which we hope to correlate actual performance on the mountain Safer mountaineering practice and tests which can anticipate an incipient weakness breakdown or malfunction in man can also be expected from these studies In broader terms we hope that these studies may describe model systems which perhaps parallel the responses of primative man in his encounters with environment, beast or warring fellow and point to attributes which condition him for survival

A69-80854
ENVIRONMENTAL OXYGEN TENSION AND ELECTRICAL BRAIN ACTIVITY IN HYPOTHERMIA [NAPRIAZHENIE KISLORODA V OKRUZHAIUSHCHEI SREDE I ELEKTRICHESKAIA AKTIVNOST' MOZGA PRI GIPOTERMII]
IU S Aliukhin (USSR, Acad of Sci I P Pavlov Inst of Physiol Lab of Thermoregulation Leningrad)
Fiziologicheskii Zhurnal SSSR vol 54 Sep 1968, p 998–1005 17 refs In Russian

Rarefaction of the inspired air to 360 and 220 mm Hg resulted in a relative reduction of the integral area (with brain temperatures from 30 to 22°C) and frequency (with brain temperatures from 32 to 18°C) of the rat cerebral cortex biopotentials in hypothermia Over the whole range of the hypothermic temperatures, up to the discontinuation of the cerebral electrical activity the brain of the rats to judge by its electrical activity was more resistant to the decrease of oxygen content in the inspired air than under normal body temperature (which was in accordance with the all known facts of the increased body resistance to hypoxic conditions in hypothermia) With increased cooling of the rats the temperature at which the electrical cerebral activity vanished had little or no relation with the environmental oxygen tension Oxygen deficiency did not seem to play a significant role in the hypothermic depression of the electrical cerebral activity in rats

A69-80855
THE EFFECT OF HYPOTHERMIA ON THE SUMMATION AND THE DIFFERENT INDICES OF UNCONDITIONED REFLEXES [VLIIANIE GIPOTERMII NA SUMMATSIIU I DRUGIE POKAZATELI BEZUSLOVNYKH REFLEKSOV]
V A Smotrov (Med Inst Dept of Normal Physiol Donetsk USSR)
Fiziologicheskii Zhurnal SSSR, vol 54 Sep 1968, p 1018–1024 12 refs In Russian

A two-phase change in the excitability of the central apparatus of the flexor reflex was observed in the process of cooling the excitability was increased in moderate (32°C) hypothermia and lowered in cooling to 25°C or below A decrease in the summational time and summational constant shifts of the optimal frequencies to higher rhythms and an increase in pessimal frequencies of the stimulation with a temperature of 32°C were indicative of the increased lability of the flexor reflex center under these conditions An increase in the summational time and summational constant a decrease in the optimal and pessimal frequencies of the stimulation with a temperature of 25°C demonstrated a lowered lability of the center mentioned The results suggested that there was a possibility to control by summation analysis the alteration of excitability in experimental hypothermia

A69-80856
IN COORDINATION OF PHYSIOLOGICAL FUNCTIONS AS AN INDEX OF FATIGUE [DISKOORDINATSIIA FIZIOLOGICHESKIKH FUNKTSII KAK POKAZATEL' UTOMLENIIA]
R A Shabunin (Med Inst Central Sci-Res Lab Sverdlovsk USSR)
Fiziologicheskii Zhurnal SSSR vol 54 Sep 1968 p 1034–1038 15 refs In Russian

A transitional period was found when the steady state was impaired during the performance of static exercises by a group of 30 subjects It was evidenced by the simultaneous appearance of spasmodic changes in some of the physiological indices, starting before the decrease in work capacity of the muscular activity During this period the shifts in the neuromuscular cardiovascular and respiratory systems pointed to an impairment in the regulatory functions, as expressed by loss of coordination and fall in the efficiency of the physiological expenditure of the organism This transition period, determined with polygraphical recordings of physiological parameters presented signs indicating an initial stage of fatigue The basic practical criterion to diagnose the first stage of fatigue should be the functional incoordination instead of the decrease of the work capacity parameter The diagnosis of fatigue should be based on a battery of tests

A69-80857
EFFECT OF POSTURE ON THE FUNCTIONAL STATE OF THE ARTERIAL VESSELS [IZMENENIIA FUNKTSIONAL'NOGO SOSTOIANIIA ARTERIAL'NYKH SOSUDOV PRI POSTURAL'NYKH VOZDEISTVIIAKH]
M A Abrikosova (All-Union Sci-Res Inst of Phys Cult, Dept of Physiol, Moscow USSR)
Fiziologicheskii Zhurnal SSSR, vol 54 Sep 1968 p 1039–1044 17 refs In Russian

The velocity of the pulse wave in the elastic and muscular type large arteries varied with changes in bodily postures the vascular wall tension decreased in the head downward position and increased in the head upward position The vascular tone alterations in orthostatic tests varied with different vascular regions being most marked in the descending aorta and in the lower extremities vessels These alterations were determined by the activity of different reflex and biophysical mechanisms Regional peculiarities of the vascular tone depended mostly on local hydrostatic influences on the vascular wall The vascular tone responses to orthostatic compensations were closely related with the degree of physical fitness Alterations in vascular tone were less marked in athletes trained to postural changes as compared to those untrained

A69-80858
EFFECT OF MUSCULAR ACTIVITY ON THE REDISTRIBUTION OF THE BLOOD FLOW IN THE MAIN ARTERIES [ROL' MAGISTRAL'NYKH ARTERII V PERERASPREDELENII KROVOTOKA POD VLIIANIEM MYSHECHNOI DEIATEL'NOSTI]
V V Vasil eva and N A Stepochkina (P F Lesgaft Inst of Phys Cult Dept of Physiol, Leningrad, USSR)
Fiziologicheskii Zhurnal SSSR, vol 54 Sep 1968 p 1051–1056 21 refs In Russian

Four series of experiments were conducted to study the effect of physical exercise on the functional state of the arteries in athletes practicing various sports The last series were repeated in a pressure chamber at simulated altitudes of 2 500 and 4,000 m Sphygmographic recordings of the carotid femoral, radial and tibial arteries were made before and 20 to 60 sec after exercise to determine the propagation velocity of the pulse wave in the upper and lower limbs The results showed different changes in the main arteries viscoelasticity On a background increase of rigidity in the arteries in the inactive regions of the body a decrease in the rigidity of the vessels supplying blood to the working muscles was observed and which allowed an estimation of the blood supply to working and non-working muscles Physical work caused a significant increase in the arterial blood pressure in non-working regions of the body but in working regions the arterial pressure increased insignificantly or even decreased This was apparently related with the dilatation of the arterioles in the working muscles With decreased barometric pressure, the vascular reactions observed at sea level changed, and deprived the active muscles of an adequate blood supply It could be assumed that during training at high altitudes the general vascular reactions were different and trained subjects were able to perform prolonged and intensive work under these conditions

A69-80859
OXYGEN CONSUMPTION AND BODY TEMPERATURE CHANGES IN COOLING OF FURLESS RABBITS [IZMENENIE POTREBLENIIA KISLORODA I TEMPERATURY TELA PRI OKHLAZHDENII KROLIKOV, LISHENNYKH SHERSTNOGO POKROVA]
G I Medvedeva (USSR Acad of Med Sci, Inst of Exptl Med, Div of Gen Pathol, Leningrad)
Fiziologicheskii Zhurnal SSSR, vol 54 Sep 1968, p 1077–1081 6 refs In Russian

The experimental study of the effect of cold exposure (+1°C) on normal and furless rabbits for periods ranging from 10 to 13 days showed furcutting resulted in a transitory fall of the body temperature of 1 3 to 1 8°C with significant increase in the oxygen consumption The gas exchange alterations in cooled furless rabbits appeared to be fairly stable and did not return to the initial level for several days after their return to the environmental temperature of +17 to +20°C Long term increase of the thermogenesis in cooling was much more essential for the rabbits with lowered natural thermo-insulation resulting from furcutting than for normal ones The temperature homeostasis however, was affected but for

several minutes after the furcutting with subsequent restoration and prolonged retention, even though the environmental temperature was about 0°C

A69-80860
ADAPTATION TO HYPOXIA AND ENDURANCE OF HIGH ENVIRONMENTAL TEMPERATURE BY HUMAN SUBJECTS [ADAPTATSIIA K GIPOKSII I PERENOSIMOST' CHELOVEKOM VYSOKOI TEMPERATURY OKRUZHAIUSHCHEI SREDY]
A N Azhaev
Fiziologicheskii Zhurnal SSSR, vol 54 Sep 1968, p 1073–1076 10 refs In Russian

Regular exposure to hypoxia combined with physical exercise under simulated altitude conditions in a pressure chamber produced an increased endurance to both altitude and high environmental temperature An increased endurance to high temperatures by human subjects was achieved only with varying the levels of hypoxia and physical loads which was in accordance with the fundamentals of training elaborated for sport medicine

A69-80861
THE EFFECT OF PHYSICAL STRESS ON THE DYNAMICS OF AMINO ACID EXCRETION DURING URINATION IN DOGS [VLIIANIE FIZICHESKIKH NAGRUZOK NA DINAMIKU VYVEDENIIA AMINOKISLOT S MOCHOI U SOBAK]
V A Pegel' S M Ksents and IU V Shcherbakov (State U , Dept of Human and Animal Physiol Tomsk USSR)
Fiziologicheskii Zhurnal SSSR, vol 54, Sep 1968 p 1102–1106 16 refs In Russian

Significant static and dynamic stresses sharply decreased the urinal excretion of amino acids in dogs, the degree of the decrease being different for various amino acids in dogs, the degree of the decrease being different for various amino acids Temporary increase in the content of glutamic acid cystine aspartic acid glycine, lysine and arginine in the urine occurred in the first minutes of dynamic stress During the recovery period after both dynamic and static stresses the excretion of amino acids quickly reached the initial level

A69-80862
THE STUDY OF THE REACTION OF HYDROGEN LIBERATION BASED ON A NITROGEN-FIXING SYSTEM MODEL [IZUCHENIE REAKTSII VYDELENIIA VODORODA MODEL'NOI AZOTFIKSIRUIUSHCHEI SISTEMOI]
E IA Alfimova, R I Gvozdev and V R Linde
Izvestiia Akademii Nauk SSSR Seriia Biologicheskaia, no 6 Nov–Dec 1968, p 915–917 7 refs In Russian

Hydrogen was liberated in vacuum in a system composed of a cell-free *Azotobacter vinelandii* preparation in the presence of ATP $MgCl_2$ and $Na_2S_2O_4$ prepared on a buffer (tris-HCl, pH 7) It was shown that hydrogen liberation was closely connected with nitrogen fixation For the purpose of estimating the effect of protein concentration on the release of hydrogen the reaction rate of hydrogen liberation at 30° and the protein concentration in the reaction mixture 1 86 to 18 6 mg /ml was measured The average value of the energy of the activation process amounted to 21 4 Cal /mol

A69-80863
THE EFFECT OF MEDULLARY AUTOTRANSPLANTATION ON THE SURVIVAL RATE IN MICE SUFFERING FROM ACUTE RADIATION SICKNESS [VLIIANIE AUTOTRANSPLANTATSII KOSTNOGO MOZGA NA PRODOLZHITEL'NOST' ZHIZNI MYSHEI, PEREZHIVSHIKH OSTRUIU LUCHEVUIU BOLEZN']
S N Aleksandrov and K F Galkovskaia (USSR Min of Health, Central Sci -Res Roentgen-Radiol Inst , Leningrad)
Voprosy Onkologii, vol 14 no 4, 1968 p 79–82 6 refs In Russian

Transplantation of autologous myelkaryocytes was found to be ineffective in mice irradiated with gamma-rays in doses of 600 r and increased the life terms of mice irradiated in doses of 900 r This effect in combination with streptomycin injections resulted in longer survival of animals exposed to 1100 r

A69-80864
BLOOD SERUM LIPIDS OF YOUNG MEN IN RELATION TO STRESS AND PHYSICAL ACTIVITY [LIPIDY KRVNEHO SERA U MLADYCH MUZOV V ZAVISLOSTI OD STRESU A FYZICKEJ AKTIVITY]
A Cagáňová S Cagáň V Simko and P Glesk
Bratislavske Lekarske Listy vol 50 Sep 1968 p 321–337 124 refs In Czech

The values of blood serum lipids in young men 18 to 26 yr of age, were studied in relation to acute mental stress and regular sports activities Under stress on the day of an examination statistically significantly raised values of the beta-lipoproteins iodine number beta to alpha lipoprotein ratio and a decrease in the alpha-lipoproteins were found in comparison with the values obtained in the course of the university term Between the group of athletes and non-athletes no significantly pronounced differences were found in the levels of blood serum lipids as reported by several authors in literature A single physical load exerted no substantial influence on the blood serum lipids in any of the investigated groups Likewise no substantial differences were found between the group of athletes and non-athletes when serum lipids were studied in the course of the term in the period of a relative mental relaxation Only in the period of pronounced stress immediately before an examination did the level of cholesterol and beta-lipoproteins rise in the non-athletes to the border-line of statistical significance and that of phospholipids to statistically significantly raised values, whereas in the athletes the cholesterol level fell insignificantly and the rest of the fractions did not undergo any substantial changes Attention was drawn to the fact that the main importance of physical education and sport consisted in modifying the functional state of the organism, in the training of the main systems and in the preparation of the organism for the control of adequate especially mental reactions

A69-80865
BONE MARROW, GRAVITATION AND WEIGHTLESSNESS [KOSTNYI MOZG, GRAVITATSIIA I NEVESOMOST']
P A Korzhuev (USSR Acad of Sci Inst of Evolutionary Morphol and Animal Ecol , Moscow)
Zhurnal Obshchei Biologii, vol 29 Sep–Oct 1968 p 587–593 18 refs In Russian

The skeleton of animals dwelling in different gravitational fields presented differences which played a very important role in the adaptation to gravitation In this respect aquatic animals differed from terrestrial ones by a lighter skeleton and a smaller amount of bone marrow The exposure of animals to prolonged weightlessness should lead to a sharp depression of the bone marrow function and consequently, could not be without effect on the organism and should be regarded as a dangerous factor

A69-80866
THE FUNCTIONAL STATE OF THE KIDNEYS IN WORKERS EXPOSED TO THE PROLONGED ACTION OF CHLORORGANIC CHEMICAL POISONS [FUNKTSIONAL'NOE SOSTOIANIE POCHEK U RABOTAIUSHCHIKH V USLOVIIAKH DLITEL'NOGO VOZDEISTVIIA KHLORORGANICHESKIKH IADOKHIMIKATOV]

N G Loganovskii (Kiev Inst of Labor Hyg and Occupational Diseases, UkrSSR)

Vrachebnoe Delo, no 10, Oct 1968, p 82–86 In Russian

A study of 106 persons suspected of chronic intoxication with chlororganic chemical poisons, DDT, benzene hexachoride ethersulfonate (ovotran) revealed that prolonged contact with the mentioned substances led to more or less distinct disorders of the renal functional capacity, the renal plasma flow being disturbed first These renal disorders may be caused by direct effect of chlororganic substances on the kidneys and through their toxic effect on other organs and systems (central nervous system, cardio-vascular and endocrine systems liver etc)

A69-80867
EFFECT OF BASIC MILITARY TRAINING ON THE CARDIOVASCULAR CAPACITY OF DRAFTEES [WPLYW SZKOLENIA UNITARNEGO NA ZACHOWANIE SIE WYDOLNOSCI SERCOWO-NACZYNIOWEJ U NOWO WCIELONYCH ZOLNIERZY]

Edward Sibiga

Lekarz Wojskowy vol 44, no 4 1968 p 255–258 *In Polish*

The Crampton test was used to study the effect of basic physical training in 28 new army recruits The subjects were tested before and at the end of the training period Then findings showed an increase of 11% in the Crampton s test index value in all the soldiers at the end of the training period this increase was statistically characteristic (t = 3 147 with P = 0 05) which proved that the adaptation of the cardiovascular apparatus to the physical stress produced by the training was beneficial to the physical fitness of the recruits The use of the Crampton test was recommended for the evaluation of the physical fitness of the soldiers during their military service

A69-80868
RESULTS OF THE EXAMINATION OF A GROUP OF SUBJECTS WORKING WITH FUEL AND EXPOSED TO TETRAETHYL LEAD CHRONIC POISONING [WYNIKI BADAN PRACOWNIKOW SLUZBY MPS, NARAZONYCH NA PRZEWLEKLE ZATRUCIA CZTEROETYLKIEM OLOWIU]

Longin Klichowski

Lekarz Wojskowy, vol 44 no 4 1968, p 259–264 17 refs In Polish

The examination of 100 subjects working in a military gasoline station disclosed no symptoms of tetraethyl lead poisoning Investigations carried out on persons working in normal conditions with exposure to ethylbenzene showed similar results

A69-80869
MECHANISMS INVOLVED IN VISUAL ORIENTATION CONSTANCY

R H Day and N J Wade (Monash U Victoria Australia)

Psychological Bulletin, vol 71 Jan 1969, p 33–42 44 refs

Visual orientation judgments made during body tilt (E- and A-effects) during centrifugation (oculogravic effect) and following prolonged tilt (aftereffect) are interpreted in terms of visual orientation constancy Data from two classes of experiments, those using labyrinthine-defective subjects and those involving different combinations of posture indicate that three systems are involved in orientation constancy These are the vestibular otolith system and the proprioceptive systems of the neck and trunk Although the three systems are involved in the E- A-, and oculogravic effects adaptation of only the neck and trunk systems generates the aftereffect

A69-80870
EFFECTS OF HYPNOSIS AND MOTIVATION ON RESISTANCE TO HEAT STRESS

Perry London (Southern Calif U , Los Angeles), Michael E Ogle (Washington U , St Louis, Mo) and Irving P Unikel (Ga U , Athens)

Journal of Abnormal Psychology, vol 73, Dec 1968, p 532–541 34 refs

Grants NIMH 1-K01-MH-12853 and NIMH 1-K3-MH-31,209

This paper reports an experiment which examined the relative effects of hypnosis exhortative instructions, and routine task-performance instructions on the performance which individuals who differed in their degree of hypnotic susceptibility rendered on a continuous performance task both under normal conditions and under conditions of induced stress High-susceptible (T) and low-susceptible (UT) subjects operated a pursuit rotor at room temperature and then under extreme heat Performance of all subjects under stress improved after they were either hypotized or exhorted to perform better exhortation had a slightly but nonsignificantly greater effect The initial performance of UTs was not significantly superior to that of Ts Though the performance of Ts appeared more strongly affected by both hypnosis and exhortation than performance of UTs, this difference proved nonsignificant when subjected to conservative statistical test

A69-80871
MAXIMUM QUANTUM YIELD AND ACTION SPECTRUM OF PHOTOSYNTHESIS AND FLUORESCENCE IN CHLORELLA

Rajni Govindjee E Radinowitch and Govindjee (Ill , U Dept of Botany Urbana)

Biochimica et Biophysica Acta vol 162 Nov 26 1968, p 539–544 27 refs

Grants NSF GB-3305 NSF GB-4040 PHS GM-12877, and PHS GM-13913

The maximum quantum yield of oxygen production in *Chlorella pyrenoidosa* was found, in new systematic experiments not to exceed 0 12, under a great variety of conditions Measurements were made on autospores and other synchronous cultures, at different CO_2 concentrations at very low light intensities, and in the *presence of catalytic amounts of blue light* The action spectra (quantum yield as a function of wavelength) of photosynthesis and of chlorophyll *a* fluorescence *in vivo* were measured on the same *Chlorella* cell suspensions In both cases a decline in the yield was observed in the red beginning at about 675 to 680 nm The yield declines to 50% of the maximum, on both curves at 690 to 695 nm A strong dip was observed in the action spectra of both fluorescence and photosynthesis at 660 to 665 nm

A69-80872
EFFECTS OF TWO KINDS OF DISTANCE INFORMATION ON VISUAL JUDGMENTS OF ABSOLUTE SIZE

Max Coltheart (Monash U Dept of Psychol Victoria Australia)

Nature, vol 221 Jan 25 1969, p 388 7 refs

Subjects viewed a bright triangle (eight in sides) of light against a black background five ft away The subjects estimated

the size of the stimulus with and without distance information Results showed that knowing the distance before estimating the absolute size enabled the subject to combine this information with information contributed by the retinal subtense of the stimulus to judge the size of the stimulus

A69-80873
MODIFICATIONS OF RECEPTIVE FIELDS OF CELLS IN THE VISUAL CORTEX OCCURRING SPONTANEOUSLY AND ASSOCIATED WITH BODILY TILT

Gabriel Horn (Cambridge U Dept of Anat Great Britain) and Richard M Hill (Ohio State U Coll of Optometry Columbus)

Nature vol 221 Jan 11, 1969 p 186–188 8 refs
PHS supported research

Cats were used to measure field changes in 57 units of the visual cortex occurring spontaneously or in response to tilting the body When rotating the animal about its horizontal axis the relationship between the head axis and the field axis remained constant but in some units the angle between the field axis and the head axis changed after tilting the body The change almost always was in the direction of the original meridional axis It appeared that some compensation for bodily rotation was present These results and others showed that neither the axis nor the threshold of the receptive fields is unchangeable Changes occurred after rotation about the longitudinal axis of the body and may give a basis for the psychophysical occurrences in humans estimating gravitational vertical after head tilt

A69-80874
INFLUENCE OF COLD EXPOSURE ON SKELETAL METABOLISM IN RATS

S H Cohn D G Baker A Jahn and C S Dombrowski (Brookhaven Natl Lab Med Res Center and Biol Dept Upton, N Y)

Journal of Applied Physiology, vol 26 May 1969 p 524–529 20 refs
AEC supported research

The effect of prolonged exposure of rats to a cold environment (2°C) was measured in terms of a number of parameters of skeletal metabolism in rats Kinetic tracer techniques providing the data for compartmental analysis were supplemented with Ca balance measurements to obtain the rates of Ca absorption, endogenous fecal excretion exchangeable space as well as accretion rates It was found that the prolonged cold exposure (30 and 300 days) resulted in a loss of weight but had no effect on the size of the compartments in the model used Further although the accretion rate of Ca into bone was not affected by the cold exposure in the 30-day cold-adapted group the accretion rate in the 300-day cold-adapted group was reduced compared to its control Both cold-adapted groups showed an appreciable increase in the resorption rate of Ca from bone and a very low rate of apposition of Ca into bone compared to the controls Possible mechanisms for these effects are presented in terms of the thyroid-adrenal medullary hormonal response of the animals to this cold stress The use of a mathematical model provided to be a useful framework against which the effects of cold exposure could be measured quantitatively

A69-80875
RELATIONS BETWEEN PHYSICAL TRAINING, ACCLIMATIZATION, AND HEAT TOLERANCE

Carl Gisolfi and Sid Robinson (Ind U Dept of Anat and Physiol, Bloomington)

Journal of Applied Physiology vol 26 May 1969, p 530–534 13 refs
Contract DA-49-193-MD 2449

This study was designed to determine effects of strenuous physical training on men s tolerance for work in heat Five healthy, untrained young men wearing only shorts shoes and socks attempted a 90 min walk on a treadmill (MR 4–5 met) in heat (50°C db 27°C wb) After this heat tolerance test the men performed six wk of intensive interval training in T-shirt shorts shoes and socks on an indoor track alternating with strenuous handball or basketball games one hr daily five times/wk in a cool environment (21°C) The workouts raised the men s rectal temperatures markedly and elicited pronounced sweating The training period was followed by a second work-heat exposure, in which all men completed the 90 min and had none of the symptoms of syncope shown by the majority in the initial exposure Rectal and mean skin temperatures averaged 39 6 and 37 8°C, and heart rates averaged 168 beats/min at the end of the initial exposure, corresponding mean values for the post-training heat tests were 38 7°C 36 8°C and 144 beats/min Mean sweat rate per degree increase in rectal temperature above 37°C increased 50% Interval training indoors improved the heat tolerance of the men significantly but did not fully acclimatize them for work in the heat

A69-80876
EFFECTS OF ALTITUDE ACCLIMATIZATION ON BLOOD COMPOSITION OF WOMEN

John P Hannon, J L Shields, and Charles W Harris (Fitzsimons Gen Hosp, U S Army Med Res and Nutr Lab Physiol Div, Denver Colo)

Journal of Applied Physiology, vol 26, May 1969 p 540–547 33 refs

The effects of altitude acclimatization on blood composition were studied in eight coeds who lived on the summit of Pikes Peak (14 000 ft) for 10 wk During the period of altitude exposure the following changes were observed a transient increase in heart rate the maximum being reached on the first day of exposure an early rapid increase in hematocrit and hemoglobin which later became more gradual, an early and sustained reduction in plasma volume a rapid initial increase and a more gradual later increase in plasma protein concentration which was attributable to elevations in both the albumin and globulin fractions, a sustained decrease in the albumin-to-globulin ratio, a slight but sustained increase in serum oncotic pressure a slight but sustained decrease in blood water content and serum osmolarity, and finally, an unaltered total leukocyte count but a significant increase in lymphocytes and significant decrease in monocytes It is concluded that the hematopoietic response to altitude is markedly less in women than that usually observed in men In women at least dietary iron supplementation enhances the rate of hematocrit increase at altitude And finally the loss of plasma volume is felt to be real and not due to simple dehydration

A69-80877
MECHANICAL COMPONENTS OF HUMAN EYE MOVEMENTS

D A Robinson D M O Meara A B Scott and C C Collins (Pacific Med Center Smith-Kettlewell Inst of Visual Sci, San Francisco Calif and Johns Hopkins U School of Med, Dept of Med Baltimore, Md)

Journal of Applied Physiology, vol 26 May 1969 p 548–553 26 refs

Grants NONR-3009(00) PHS AM-05524, PHS NB-06038 and PHS 5 SOL FR-05566

The isometric tensions of three lateral rectus muscles of three patients were measured while detached from the globe during strabismus surgery together with the force required to rotate the globe horizontally with both horizontal recti detached The length-tension relationship was measured for several levels of innervation by requesting the patient to make known eye movements with the unoperated eye Muscle tone in the primary position of gaze ranged from 12 to 17 g The slope of the length-tension curve near the primary position was about 0 45 g /deg The spring constant of the passive muscle components was about 0 25 and 0 33 g /deg for the globe suspensory tissues This makes it possible to estimate the division of forces between agonist, antagonist and suspensory tissues for any angle of gaze The time course of isometric tension associated with saccades clearly reveals the pulsatile nature of net active state tension that accounts for the rapidity of saccadic eye movements

A69-80878
CIRCADIAN VARIATIONS IN HUMAN THERMOREGULATORY RESPONSES

Robert El Smith (Ky , U Dept of Physiol and Biophysics, Lexington)

Journal of Applied Physiology, vol 26, May 1969 p 554–560 25 refs

NASA Grant NGR 18-001-008 and Contract AF 41 (609)-2684

To investigate circadian variations in human temperature regulation, peripheral and rectal temperatures and peripheral heat and arterial blood flows were measured in clothed resting males in a neutral environment at different times throughout the day Core-periphery heat conductance was considered a measure of thermoregulatory function and was used, together with peripheral heat and blood flows, in evaluating changes in this function Circadian thermoregulatory changes were isolated from responses to environmental stresses variously by bed-rest procedures by use of conventional statistics, and by periodicity analysis following Halberg s Cosinor method The results so obtained indicate that circadian changes do occur in all thermoregulatory functions measured and that a possible mechanism for these variations may be a circadian change in circulatory pathways, and so in countercurrent heat exchange as well as a circadian variation in peripheral blood supply

A69-80879
MAMMALIAN VENTRICULAR FUNCTION DURING SUBMERSION ASPHYXIA

Frank L Ferrante and David F Opdyke (N J Coll of Med and Dentistry Dept of Physiol Jersey City)

Journal of Applied Physiology, vol 26 May 1969 p 561–570 44 refs

Grant PHS HE 10332

The objectives of this investigation were to assess changes in ventribular contractility during submersion, and to determine the efferent mechanisms of such alterations Nutria (four to six kg) were completely submerged for one to five min Left ventricular force (VF) left ventricular end-diastolic length (LVEDL) left ventricular pressure (LVP), and rate of rise of left ventricular pressure (LV dp/dt) were measured During submersion both LVF and LV dp/dt decreased although left ventricular end-diastolic pressure and LVEDL increased These data indicated a 25 to 50% decrease in left ventricular contractility during a dive After vagotomy or atropinization (0 5 to 1 mg /kg iv) LV dp/dt increased at least 25% above control during submergence, indicating an increased left ventricular contractility in the absence of parasympathetic (vagal) cardiac innervation The β-adrenolytic agent, propranolol (0 4 to 0 6 mg /kg iv) administered to vagotomized or atropinized nutria greatly reduced or prevented the increased LV dp/dt, indicating increased adrenergic influences Thus it appears that during a dive, both cholinergic and adrenergic influences increase the former more than the latter the net effect being a decrease in left ventricular contractility

A69-80880
RESTING HEART RATE INVESTIGATIONS WITH TRAINED AND NONTRAINED HYPOPHYSECTOMIZED RATS

Charles M Tipton R James Barnard, and Tse-Kia Tcheng (Iowa, U , Exercise Physiol Lab Iowa City)

Journal of Applied Physiology, vol 26 May 1969, p 585–588 20 refs

Iowa Heart Assn supported research

Cholinergic mechanisms have been cited to explain the bradycardia of training This aspect was reinvestigated with male hypophysectomized rats who were trained to run in motor-driven treadmills The experimental period was 80 days Resting heart rates were measured before, during and near the termination of the experiment After 30 to 40 days and thereafter the trained animals had significantly lower heart rates than the nontrained animals Atropine sulfate (1 mg /kg) was injected (ip) into both groups at the cessation of the training period It was observed that the trained group had less cardiac acceleration than the nontrained group a trend previously reported for normal trained rats When neostigmine methylsulfate was injected in the same manner (300 μg /kg), the trained group had significantly lower resting heart rates This difference could not be explained by myocardial cholinesterase levels as there were no group findings that had statistical meaning From these results it was concluded that the bradycardia association with training can occur in animals devoid of pituitary hormones and that trained and nontrained animals are different in their responses to cholinergic agents

A69-80881
EFFECT OF URINE FLOW RATE ON UREA REABSORPTION IN MAN UREA AS A "TUBULAR MARKER"

Marvin H Goldstein Paul R Lenz, and Marvin F Levitt (Mt Sinai School of Med , Dept of Med New York City, N Y)

Journal of Applied Physiology vol 26 May 1969 p 594–599 23 refs

Grant PHS 5 TI HE 5505

Studies were performed in man to determine the magnitude of distal tubular area reabsorption at different urine flow rates Of filtered area 60% was reabsorbed during hydropenia and 35% during hydration Diuretics inhibiting proximal or distal tubular sodium and water reabsorption were administered after achieving high urine flows by hydration or by modest osmotic loads with added antidiuretic hormone The percent of filtered urea excreted increased with proximal but not with distal agents suggesting that urea was not reabsorbed in the distal segments The findings that urea reabsorption was confined to the proximal tubule with high urine flows and that only 25% was reabsorbed distally during hydropenia indicates the relative impermeability of the distal tubule to urea Since sodium and water reabsorption was associated with parallel changes in urea reabsorption in the proximal but not in the distal tubule it appears that analysis of changes in the percent of filtered urea excreted may be useful in localizing alterations in sodium and water reabsorption to specific tubular segments within the human nephron

A69-80882
INSTANTANEOUS PERIPHERAL VASCULAR RESISTANCE CHANGES RENDERED BY CRITICAL CLOSING PHENOMENON

Robert M Olson (USAF School of Aerospace Med , Aerospace Med Div (AFSC) Biodyn Branch Brooks AFB, Tex)

Journal of Applied Physiology, vol 26 May 1969, p 600–605 6 refs

The gracilis muscle of five anesthetized dogs was used to study the critical closing phenomenon Pressure-flow (i e , resistance) measurements and tissue-staining techniques were used to detect the sudden closure of vessels in the microcirculation as the pressure driving blood through them was gradually decreased Sudden rises in resistance occurred as the pressure fell through several discrete levels, one of which was near diastolic pressure The tissue-staining technique suggested that sudden resistance rises are probably associated with sudden decreases in the number of functioning microcirculatory beds in the muscle tissue Other investigators have reported a sudden rise in resistance (to infinity) associated with a shutdown of flow through all microcirculatory beds as pressure falls to a level near 10 to 20 cm H_2O due to the critical chosing phenomenon The findings of this paper suggest that the critical closing phenomenon occurs not just at low pressures, but also at pressures near the normal physiologic range

A69-80883
PHYSIOLOGICAL RESPONSES DURING EXERCISE AND RECOVERY IN A FOOTBALL UNIFORM

Donald K Mathews, Edward L Fox and David Tanzi (Ohio State U , School of Phys Educ Exercise Physiol Res Lab Columbus)

Journal of Applied Physiology vol 26 May 1969, p 611–615 11 refs

Nine men ran on a treadmill (9 6 km /hr) in (1) shorts (MR = 397 kcal /m ^{2} per hr) (2) a football uniform (MR = 422 kcal /m ^{2} per hr) and (3) shorts plus a backpack weighing the same as the uniform (6 2 kg MR = 439 kcal /m ^{2} per hr) Environmental temperatures were 25 6° ± 1 2°C db and 1 0° ± 16 0°C wb Exercise rectal temperature (T_r) increased 1 7°C (to 39 0°C) in the uniform compared to 1 1 C (38 4°C) in shorts and 1 4°C (38 7°C) with the pack Skin temperatures (T_s) in uniforms were at times 4 50°C higher than controls and less than 1 0°C lower than T_r End-exercise heart rate (HR) in uniforms averaged 186 beats/min compared with 168 in shorts and 179 with the pack Peripheral blood flow and heat conductance were twofold greater in uniforms than in controls Exercise evaporative cooling was 20 and 55 kcal /m ^{3} per hr less and sweating 128 and 83% more in uniforms than in shorts and pack respectively During recovery uniform T_r T_s and HR differences were as large as during exercise These differences are due to added heat production caused by the weight and the insulation and limitation of evaporation by clothing and pads

A69-80884
EXTERNAL ILIAC VEIN FLOW ITS RESPONSE TO EXERCISE AND RELATION TO LACTATE PRODUCTION

Leonard A Cobb Patrick H Smith San Lwai, and Floyd A Short (Wash U , Dept of Med and King County Harborview Hosp Seattle)

Journal of Applied Physiology, vol 26 May 1969 p 606–610 23 refs
Grants NIH HE-07478 and NIH 5-K3-HE-4570

The relationships between external iliac vein blood flow and lactate production were studied in 19 normal male volunteers standardized quadriceps exercise elicited a prompt rise in leg blood flow averaging five times the resting level In about two-thirds of the subjects blood flow began to fall immediately after exercise, in the other third a brief rebound in excess of the exercising level was observed There was a significant correlation between blood flow during and after exercise so that the magnitude of postexercise flow was proportional to the level during exercise These observations are further evidence against the concept of postexercise repayment of a blood flow debt Both arterial lactate levels and lactate efflux during exercise were directly correlated with the magnitude of exercise blood flow The subjects who produced high levels of lactate during exercise had correspondingly high levels of leg blood flow both during and after exercise In this study neither blood lactate concentration nor lactate production reflected inadequate oxygen delivery to the exercising limb

A69-80885
COMPARSION OF WEIGHTING FORMULAS FOR CALCULATING MEAN SKIN TEMPERATURE

Duncan Mitchell and C H Wyndham (South Africa Chamber of Mines Human Sci Lab Johannesburg)

Journal of Applied Physiology vol 26 May 1969 p 616–622 18 refs

Different weighting formulas for calculating the mean skin temperature of men have been compared with mean of 15 temperature measurements weighted according to the regional distribution of body surface area The skin temperatures used for the comparison were obtained during a study in which two nude resting men were studied in dry environments with air temperatures between 12 8°C and 49 1°C and windspeeds between 0 67 and 4 94 m /sec Analysis revealed that the unweighted mean of the temperatures at 15 selected sites can be recommended for accurate work This method of calculating mean skin temperature provides as a reliable a mean as any of the weighting formulas considered and is simpler to apply Where the large number of measuring sites presents a problem and in field studies where simplicity of technique becomes important a four-point mean is recommended

A69-80886
IN VIVO HUMAN SURAL NERVE ACTION POTENTIALS

Ryoichi Shiozawa and Huntington Mavor (Utah U Coll of Med Dept of Neurol and Veterans Admin Hosp Neurol Serv Salt Lake City)

Journal of Applied Physiology, vol 26, May 1969, p 623–629 14 refs
Grants PHS 5 T1 NB 5309 and PHS I-GS-128

In vivo measurement of the conduction velocity of the fastest conducting fibers of the sural nerve was performed by the *electronic summation of orthodromic nerve action potentials* in 40 normal subjects The conduction velocity of fibers in a proximal segment (high ankle to popliteal fossa) was found to be greater than in a distal segment (foot to high ankle) confirming previous findings for the posterior tibial nerve Technical details concerning this method of measuring sensory function in the leg are discussed The technique was used in 11 patients In all patients with clinical evidence of distal sensory neuropathy in the lower extremities sural nerve action potentials were absent In two patients with severe motoneuronal disease one of whom had markedly slowed motor conduction sural nerve conduction was normal Similar findings were present in a severe cased of idiopathic polyneuritis

A69-80887
AN UNDERWATER WEIGHING SYSTEM UTILIZING "FORCE CUBE" TRANDUCERS

R Akers and E R Buskirk (Pa State U, Inst for Sci and Eng Lab for Human Performance Res University Park)
Journal of Applied Physiology, vol 26 May 1969 p 649–652 6 refs
Grant PHS AM-08311

An underwater weighing system is described in which four electronic force cubes are used for the measurement of underwater weight and an open-circuit procedure for nitrogen washout from the lungs is used for the measurements of residual volume The system is relatively compact, easy to use and could be fabricated in most laboratory shops An important advantage of the system is that the subject retains control of the submersion procedure which reduces his apprehension and promotes cooperation Valid *and reliable underwater weights can be obtained with the system* The average standard deviation among replicate determinations of body density in four subjects was 0 0015 The intraindividual range in density for these four subjects was 0 005 Subsequent routine utilization of the underwater weighing system has proven its reliability and practicality

A69-80888
DETERMINATION OF MEAN TISSUE OXYGEN TENSIONS BY IMPLANTED PERFORATED CAPSULES
Carl E Jones, Jack W Crowell and Elvin E Smith (Miss U School of Med Dept of Physiol and Biophysics, Jackson)
Journal of Applied Physiology, vol 26, May 1969 p 630–633 15 refs
Grant NIH HE-02494 and Miss Heart Assn supported research

Using a miniaturized Clark electrode oxygen tensions within the fluid-filled space of perforated plastic capsules implanted in various tissues were determined The intracapsular oxygen tension of subcutaneous tissue skeletal muscle liver and cerebral cortex was 33 3 (± 2 1 SEM) 21 7 (± 1 5 SEM) 18 3 (± 1 1 SEM), and 15 8 (± 1 0 SEM) mm Hg respectively During hemmorhagic hypotension decreases in intracapsular oxygen tensions were obtained During respiration with 100% oxygen, increases in oxygen tension were obtained Since the oxygen tension of the fluid-filled space of the capsule will equilibrate with the mean oxygen tension of the tissue surrounding the space it is believed that the *intracapsular oxygen tension is indicative of the mean tissue oxygen* tension

A69-80889
BLOOD OXYGEN CONTENT MEASURED BY OXYGEN TENSION AFTER RELEASE BY CARBON MONOXIDE
C Herman Klingenmaier, Marjam G Behar and Theodore C Smith (Pa U School of Med Dept of Anesthesia, Philadelphia)
Journal of Applied Physiology, vol 26, May 1969 p 653–655 7 refs
Grants PHS GM-09070-06 PHS GM-15430-02, PHS 5-T10-GM-215-11, and PHS 5-K03-GM-34902-03

Whole-blood oxyten content can be measured by the increase in dissolved oxygen tension when an accurately known volume of blood is diluted to another accurately known volume with *deoxygenated carbon monoxide-saturated physiologic saline The* CO displaces O_2 from hemoglobin without lysing the cells raising the partial pressure of oxygen in the mixture by an amount proportional to the content of oxygen CO-saline is stable and hence superior to other oxygen-releasing solutions A five-port two-bore stopcock and a volume-limited syringe facilitate the sample preparation The results are very reproducible and directly related to Van Slyke analyses, although a small systematic difference exists

A69-80890
RESEARCH IN SPACE BIOLOGY IN MARCH 1967 [LES EXPERIENCES DE BIOLOGIE SPATIALE DE MARS 1967]
R Grandpierre
Revue de Médecine Aeronautique et Spatiale vol 7 no 28, 1968, p 217–219 9 refs In French

Presented was a short analysis on the current state of research in 1967 in bioastronautics, based on current literature and the author s experimental data The physiological and psychological effects of weightlessness and acceleration on men and animals were *reviewed briefly in reference to the sensorimotor neuromuscular* and visual responses vigilance motivations, and adaptation Further research for a better understanding of both physiological and psychological aspects of the gravity-free environment was deemed necessary

A69-80891
BIOLOGICAL NOSE CONE FOR THE MONKEY [POINTE BIOLOGIQUE SINGE]
C de Lisle
Revue de Medecine Aéronautique et Spatiale, vol 7 no 28 1968 p 220–223 In French

A short survey was given of some of the French problems encountered during the planning and development of the scientific payload of nose cones to be used in the study of monkey performance under weightlessness and high altitude environments *The problems that had to be solved were related both with the* biological subject and instrumentation The instrumentation and telemetry provided continuous data on such aspects as heartbeat respiration temperature humidity oxygen pressure, and task performance during flight The difficulties in the programming system of the scientific experiments, the protection of the equipment against vibrations and the test carried out to check reliability and flight qualifications of the nose cone were mentioned

A69-80892
USE OF PRIMATES IN SPACE RESEARCH [UTILISATION DES PRIMATES DANS LES RECHERCHES SPATIALES]
F Gallouin, J L Belugou and Fondanesche
Revue de Médecine Aéronautique et Spatiale, vol 7, no 28 1968 p 224–226 In French

A discussion was presented on the advantages offered by the utilization of primates, particularly monkeys in space research Their anatomy and physiology bore the closest resemblance to that of man and made them very good subjects for space experiments The species most suited for the space research were reviewed briefly as well as methods of purchase cost and necessary care to keep the animals healthy Primates were destined because of their level of intelligence (the order being characterized by a developed neopallium with numerous circonvolutions and a progressive *operculization of the central region) to participate in the space* adventure

A69-80893
RESULTS OF EXPERIMENTS CARRIED OUT ON PRIMATES SUBJECTED TO WEIGHTLESSNESS [RESULTATS DES EXPERIENCES EFFECTUEES SUR DES PRIMATES PLACES EN ETAT DE NON-PESANTEUR]
Chastelier
Revue de Médecine Aéronautique et Spatiale vol 7 no 28, 1968 p 227–235 In French

A discussion was presented on the data gathered during two experimental ballistic flights of Vesta rockets lasting seven min

and containing a macaque monkey The animals electrocorticograms neck and arms myograms cardiac and respiratory rhythms and core temperature were recorded by telemetry as well as the animal performance of a manipulative task consisting of pressing a lever in response to a luminous signal The animals were also filmed during the flight The findings seemed to confirm the result of previous experiments conducted on rats and cats where synchronized patterns with slow waves and especially numerous hypersynchronous spindles appeared in weightless conditions Transient or marked decrease in vigilance were usually observed in the state of weightlessness These results tended to demonstrate that the lack of acceleration induced a marked decrease in the vigilance level more similar to a state of inhibition than drowsiness It would seem that an acceleration of even a tenth of a g would be sufficient to maintain a normal level of vigilance

A69-80894
ALTITUDE ACCLIMATIZATION AND STRENUOUS PHYSICAL WORK [ACCLIMATEMENT A L'ALTITUDE ET TRAVAIL MUSCULAIRE EPUISANT]
M V Strumza (Paris U Fac de Méd Lab de Biol Aeron , France)
Revue de Médecine Aéronautique et Spatiale vol 7 no 28 1968 p 236–238 In French

The effect of altitude acclimatization on the performance and work capacity was studied in white rats The animals were trained under normal and hypoxic conditions on the treadmill until they became proficient then they were exercised for two successive periods of three wk each, under normal and hypoxic conditions alternatively The rats were then put into a pressure chamber and exposed to progressively decreasing oxygen tensions for eight hr per day Acclimatization to a simulated altitude of 7 500 m was reached in three wk The animals continued their exercises for nine more wk under normal and hypoxic conditions then in normal conditions until their acclimatization disappeared The physiological data studied included electrocardiography basal metabolic rate and blood composition It was found that altitude acclimatization markedly increased the animals endurance in physical work in hypoxia however the acclimatized rats showed no improvement in their performance in normal conditions Among the major factors susceptible to improve physical performance were the increase of the amount of circulating hemoglobin combined with polycythemic neoformation and the drop in the basal metabolic rate

A69-80895
IMPORTANCE OF EXTERNAL MECHANOGRAMS IN THE INTERPRETATION OF SYSTOLIC MURMURS IN FLYING PERSONNEL EXAMINATION [INTERET DES MECANOGRAMMES EXTERNES DANS L'INTERPRETATION DES SOUFFLES SYSTOLIQUES LORS DE L'EXPERTISE DU PERSONNEL NAVIGANT]
R Carre J Kermarec J-C Canicave and J Pernod (C P E M P N and Hop d'Instruction, Serv de Cardiol , Percy France)
Revue de Médecine Aéronautique et Spatiale, vol 7, no 28, 1968 p 239–243 In French

To increase the precision of the cardiac examination in the flying personnel undergoing aeromedical evaluation the use of phonocardiography was recommended in addition to cardiac auscultation, electrocardiography and cardiac radiography The techniques used and the difference in phonocardiographic definitions of normal and abnormal systolic murmurs were described in detail

A69-80896
EXPERIMENTAL STUDY OF THE METABOLIC RELATIONSHIP BETWEEN HYPOXIA AND HYPOGLYCEMIA [ETUDE EXPERIMENTALE DES RELATIONS METABOLIQUES ENTRE L'HYPOXIE ET L'HYPOGLYCEMIE]
P M Pingannaud and R Didkovski
Revue de Médecine Aéronautique et Spatiale, vol 7 no 28, 1968, p 244–245 8 refs In French

The effect of hypoxia on the glucide metabolism was particularly important in aerospace physiology as hypoxia could enhance the danger presented by anomalies in the glycoregulation of the aviator To investigate the increased oxygen consumption cuased by hypoglycemia an experimental study was carried out on white rats to analyze the variations in energy expenditure observed after administration of insulin in hypoxia With the fall of the partial oxygen pressure a decrease in the variations of the energy expenditure was noted It was postulated that hypoxia did not present an aggravating factor in hypoglycemia with regard to oxygen consumption on the contrary by reducing certain secondary hypoglycemic effects it represented an economy factor for the available oxygen

A69-80897
CLINICAL CASE ACQUIRED EPILEPSY IN A FIGHTER PILOT [CAS CLINIQUE EPILEPSIE ACQUISE CHEZ UN PILOTE DE CHASSE]
R Pannier and P Francoz (Méd Aéron Hop d Instruction des Armées Versailles France)
Revue de Médecine Aéronautique et Spatiale, vol 7 no 28 1968 p 247–250 In French

A detailed case study of the occurrence of acquired epilepsy in a young fighter pilot was reported The disease was caused by a large temporal angioma which was discovered after repeated clinical observations and systematic review of various etiologies The pilot was subsequently taken off flight status as efficient therapy was considered impossible in view of the extent and site of the angioma

A69-80898
PARASITIC CALCIFICATIONS OF THE SOFT PARTS AND THE FLYING PERSONNEL [LES CALCIFICATIONS PARASITAIRES DES PARTIES MOLLES ET LE PERSONNEL NAVIGANT]
R P Delahaye P Bourniquot and A Combes (Hop Mil Dominique-Larrey Versailles France)
Revue de Medecine Aéronautique et Spatiale, vol 7, no 28 1968 p 251–254 In French

The discovery of parasitic calcifications among flying personnel is not a rare occurrence Radiographical detection of parasitic calcifications presented generally only a retrospective interest nevertheless it was not an absolute rule and in certain affections the radiological finding of such occurrences did not signify that the growth of the parasitosis causing them was completed It could be active topically or in other parts of the organism, as in the case of filariasis or s schistosomiasis Adult worms remained untouched by the sclero-calcareous processes, and the eggs could remain active in the reactive fibrous tissues The hytatid cyst could also stay active for a long period in its calcareous shell In toxoplasmosis active infectious focuses could be similar to calcified ones The radiological identification of certain cases of the parasitic calcifications was important to establish a correct diagnosis that could be followed by an appropriate and effective therapy

A69-80899
ADVANTAGE OF ATRAUMATIC TECHNIQUE FOR THE DETERMINATION OF CARDIAC OUTPUT [INTERET DES METHODES NON SANGLANTES DE MESURE DU DEBIT CARDIAQUE]
J Pernod J Demange R Carre P Hardel, and J Kermarec
Revue de Médecine Aéronautique et Spatiale, vol 7 no 28 1968 p 255–258 11 refs In French

Two atraumatic methods of estimating cardiac output in man one by simultaneous recording of the carotid and femoral pulse (Broemser–Ranke method) and the other by electrical impedance plethysmography were reported Each method was used in turn to study the cardiac output in healthy and cardiopathic subjects The results of the investigation were presented and discussed The impedance plethysmographic method was found superior to that of Broemser–Ranke and should be easily applicable in aerospace medicine because of its simplicity

A69-80900
WHAT DOES AN ASTRONAUT EAT [COMMENT S'ALIMENTE UN COSMONAUTE]?
Revue de Médecine Aéronautique et Spatiale, vol 7 no 28 1968, p 259–260 In French

An interview with the Russian scientist A Ushakov of the Institute of Medico-Biological Problems published by the Press Agency Novosti was presented The astronauts nutritional requirements, food preservation and food supplies during short and extended space flights were discussed

A69-80901
REDUCTION OF ENDURANCE CAPACITY DURING ACUTE ALTITUDE EXPOSURE AT 2,320 M AND 3,457 M [UBER DIE VERMINDERUNG DER AUSDAUERLEISTUNGSFAHIGKEIT BEI AKUTER HOHENEXPOSITION IN 2320 M UND 3457 m u M]
H Weidemann, H Roskamm W Zwecker P Hummel and H Reindell (Freiburg im Breisgau, U Med Klin Lehrstuhl fur Kreislaufforschung und Leistungsmed and Med Universitatsklin , West Germany)
Schweizerische Zeitschrift fur Sportmedizin, vol 16, no 1 1968 p 1–15 15 refs In German
Bundesausschusses zur Forderung des Leistungssports supported research

Seven female and seven male normal persons of 23 to 33 yr were submitted in lying position to ergometer work according to the steady-state principle Thirteen normal male persons were submitted to spiroergometry load according to the vita-maxima principle The tests took place in Freiburg i e at an altitude of 260 m at the station of Eigergletscher 2,320 m and at the high alpine research station of Jungfraujoch 3,457 m On an average the decrease of maximal Watt pulse between 260 m and 2 320 m amounted to 4 5%, oxygen between 260 m and 3 457 m to 8 5% The decrease of the maximal oxygen consumption on vita-maxima load amounted on an average between 260 m and 2 320 m to 5%, and between 260 m and 3 457 m to 17 4%

A69-80902
BLOOD PRESSURE BEHAVIOR DURING ACUTE ALTITUDE EXPOSURE AT 2,320 M AND 3,457 M [UEBER DAS BLUTDRUCKVERHALTEN BEI AKUTER HOHENEXPOSITION IN 2320 M UND 3457 m u M]
H Weidemann H Roskamm P Hummel W Grewe, and H Reindell (Freiburg im Breisgau U , Med Klin Lehrstuhl fur Kreislaufforschung und Leistungsmed and Med Universitatsklin , West Germany)
Schweizerische Zeitschrift fur Sportmedizin vol 16 no 1, 1968 p 16–22 10 refs In German
Bundesausschusses zur Forderung des Leistungssports supported research

With the automatic hemodynamometer of Boucke and Brecht the blood pressures of 49 subjects (male and female normal persons and high performance sportsmen) were measured at rest submaximal, and maximal ergometer work at altitudes of 272 m 2,320 m and 3 457 m Neither the systolic nor the diastolic pressure showed a regular modification at rest or at load in relation to altitude

A69-80903
THE EFFECT OF INSTRUCTIONS ON VISUAL AND HAPTIC JUDGMENT OF THE MULLER–LYER ILLUSION
Ray Over (Otago, U Dunedin New Zealand)
Australian Journal of Psychology vol 20 Dec 1968 p 161–164 8 refs
New Zealand U Grants Res Comm supported research

In an experiment with the Muller–Lyer figure instructions to judge apparent size-equality resulted in a larger visual illusion than instructions to judge objective size-equality The two sets of instructions did not, however have a differential effect on the amount of haptic illusion One reason for this difference may be that visual inspection permitted the subject to perceive the illusion figure in relation to its background while haptic inspection did not The data may also reflect differences in the way spatial information is sampled within the two modalities Haptic inspection entails widespread sampling from the figure under both instruction conditions With visual inspection it is possible that widespread sampling occurs with one set of instructions but not the other

A69-80904
THE ROLE OF VISUAL AND KINAESTHETIC CUES IN LEARNING A NOVEL SKILL
Judith I Laszlo (Western Australia U , Nedlands)
Australian Journal of Psychology, vol 20 Dec 1968 p 191–196 12 refs

Subjects were trained in a serial discriminative task under normal sensory feedback with visual (+K-V) information loss with kinaesthetic (−K+V) information loss The performance curves over the 10 training sessions showed initial high decrement for −K+V, and somewhat less decrement for +K−V groups All groups improved significantly the information loss groups reaching the same final performance level In Test 1 (normal feedback) the groups performed at equal levels Thus it was proposed that sensory information during the practice of a new skill influences performance rather than learning The results in Test 2 where feedback channels available to subjects differed from those utilized during training lent some support to the hypothesis of the dependence of skilled task on the modality utilized during training

A69-80905
AUDITORY VIGILANCE THE EFFECTS OF COSTS AND VALUES ON SIGNALS
W G Davenport (Newcastle U New South Wales Australia)
Australian Journal of Psychology vol 20, Dec 1968, p 213–218 11 refs

A69-80906

The effects on signal detection performance of the value of correctly detecting a signal and the costs of a miss and false detection were examined for auditory vigilance behavior Results suggested that poorer detection performance was obtained with increased costs for misses and false detections while the value placed on the correct detection of a signal had little effect The d' statistic of signal detection theory was invariant with both signal costs and time while β varied with both factors These results were interpreted to mean that the performance decrement during the vigil was due to an increased strictness in the criterion (β) which the subject used for deciding whether or not a signal was present The cost factors were effective in manipulating performance during the watch by causing changes in the subject s decision criteria Findings from this study unanimously support those predicted by a previous investigator This is suggested as perhaps being the best available basis for a theory of vigilance

A69-80906
BRAIN 5-HYDROXYTRYPTAMINE AND ANTERIOR PITUITARY ACTIVATION BY STRESS

B N Dixit and J P Buckley (Pittsburgh U , School of Pharm Dept of Pharmacol Pa)
Neuroendocrinology vol 4 no 1 1969 p 32–41 22 refs
Grant NIMH MH-04511

In the present study, it was found that 10 to 12 hr pretreatment with tranylcypromine a monoamine oxidase inhibitor 5 0 mg /kg i p , increased the whole brain 5-hydroxytryptamine (5-HT) levels by more than 200% while 16 to 17 hr pretreatment of rats with 4-chloramphetamine, 20 0 mg /kg i p or feeding a tryptophan deficient diet decreased the whole brain 5-HT levels by approximately 74% and 63%, respectively In spite of these great differences in the whole brain 5-HT levels the basal levels of plasma corticosterone in these groups were not significantly different when compared with the respective controls Exposure to either cold or shaker stress activated the anterior pituitary of these rats to the same degree as in controls These results are interpreted to suggest that the changes in the whole brain 5-HT level *per se* does not affect the degree of anterior pituitary activation due to stress stimuli This however does not rule out the possibility that other parameters such as turnover rate may be of importance in determining the role of brain 5-HT in the activation of the pituitary by stress

A69-80907
VENTILATORY MECHANICS AND EXPIRATORY FLOW LIMITATION DURING EXERCISE IN NORMAL SUBJECTS

Snorri Olafsson and Robert E Hyatt (Mayo Clin and Mayo Found and Mayo Graduate School of Med Rochester Minn)
Journal of Clinical Investigation, vol 48 Mar 1969 p 564–573 25 refs
Grant NIH OH-146

The interrelationships among transpulmonary pressure flow and volume during exhausting exercise in 10 normal adult males were examined Expiratory transpulmonary pressures during exercise were compared with flow-limiting pressures measured at rest by two techniques In no case did pressures developed during exercise exceed to an appreciable extent the flow-limiting pressures This indicates that, during near-maximal exercise ventilation remains efficient as judged in terms of the pressure-volume relationships of the lung The mechanical properties of the lung do not appear to limit ventilation during exhausting exercise in normal subjects No relationship could be found between the magnitude of transpulmonary pressure and exercise limitation There was no evidence that lung mechanics changed during exhausting exercise in normal subjects The two methods for estimating expiratory flow-limiting pressures the orifice technique and the iso-volume pressure-flow method gave similar results

A69-80908
LIVER AND KIDNEY METABOLISM DURING PROLONGED STARVATION

Oliver E Owen, Philip Felig, Alfred P Morgan John Wahren and George F Cahill, Jr (Elliott P Joslin Res Lab , Harvard Med School, Depts of Med and Surg Peter Bent Brigham Hosp and Joslin Diabetes Found Inc , Boston Mass)
Journal of Clinical Investigation vol 48 Mar 1969 p 574–583 40 refs
Grants DA-49-193-MO-2337 PHS AM-05077 PHS AM-09584 PHS AM-09748 PHS AM-02657 PHS HE-05679 PHS HE-08591 PHS HE-11306 and PHS FR-31 Adler Found Inc supported research

This study quantifies the concentrations of circulating insulin growth hormone glucose free fatty acids glycerol β-hydroxybutyrate acetoacetate and alpha amino nitrogen in 11 obese subjects during prolonged starvation The sites and estimated rates of gluconeogenesis and ketogenesis after five to six wk of fasting were investigated in five of the subjects Blood glucose and insulin concentrations fell acutely during the first three days of fasting, and alpha amino nitrogen after 17 days The concentration of free fatty acids, β-hydroxybutyrate and acetoacetate did not reach a plateau until after 17 days Estimated glucose production at five to six wk of starvation is reduced to approximately 86 g /24 hr Of this amount the liver contributes about one-half and the kidney the remainder Approximately all of the lactate pyruvate glycerol and amino acid carbons which are removed by liver and kidney are converted into glucose as evidenced by substrate balances across these organs

A69-80909
AMINO ACID METABOLISM DURING PROLONGED STARVATION

Philip Felig Oliver E Owen John Wahren and George F Cahill, Jr (Elliott P Joslin Res Lab Harvard Med School Depts of Med and Surg Cardiovascular Unit Peter Bent Brigham Hosp and Diabetes Found Inc Boston Mass)
Journal of Clinical Investigation, vol 48 Mar 1969 p 584–594 42 refs
Grant PHS 5-F3-AM-36-069 PHS AM-05077 PHS AM-09584 PHS AM-09748, PHS HE-05679, PHS HE-08591 PHS HE-11306, and PHS FR-31 John H Hartford Found Inc supported research

Plasma concentration, splanchnic and renal exchange and urinary excretion of 20 amino acids were studied in obese subjects during prolonged (five to six wk) starvation Splanchnic amino acid uptake was also investigated in postabsorptive and briefly (36 to 48 hr) fasted subjects A transient increase in plasma valine leucine isoleucine methionine and α-aminobutyrate was noted during the first wk of starvation A delayed progressive increase in glycine threonine and serine occurred after the first five days Thirteen of the amino acids ultimately decreased in starvation but the magnitude of this diminution was greatest for alanine which decreased most rapidly during the first wk of fasting In all subjects alanine was extracted by the splanchnic circulation to a greater extent than all other amino acids combined Brief fasting resulted in an increased arterio-hepatic venous difference for alanine due to increased fractional extraction After five to six wk of starvation a marked falloff in splanchnic alanine uptake was

attributable to the decreased arterial concentration Prolonged fasting resulted in increased glycine utilization by the kidney and in net renal uptake of alanine It is concluded that the marked decrease in plasma alanine is due to augmented and preferential splanchnic utilization of this amino acid in early starvation resulting in substrate depletion Maintenance of the hypoalaninemia ultimately serves to diminish splanchnic uptake of this key glycogenic amino acid and is thus an important component of the regulatory mechanism whereby hepatic gluconeogenesis is diminished and protein catabolism is minimized in prolonged fasting The altered renal extraction of glycine and alanine is not due to increased urinary excretion but may be secondary to the increased rate of renal gluconeogenesis observed in prolonged starvation

A69-80910

THE EFFECT OF CHICKEN AND HOG CALCITONIN ON SOME PARAMETERS OF Ca, P, AND Mg METABOLISM IN DOGS

C F Cramer C O Parkes and D H Copp (Brit Columbia, U Dept of Physiol Vancouver Canada)

Canadian Journal of Physiology and Pharmacology, vol 47 Feb 1969, p 181–184 17 refs
Grant MRC MT-774

Partially purified calcitonin extracted from both chickens and hogs was injected intravenously into young dogs The effects of each extract were essentially similar in causing immediate depression of both plasma Ca and P but not Mg The preparations caused hyperphosphaturia and decreased urinary excretion of magnesium Gut transport of Ca P, or Mg in either direction was unaffected by the extracts

A69-80911

LIGHT-INDUCED CHANGES IN THE FLUORESCENCE YIELD OF CHLOROPHYLL A IN VIVO 3 THE DIP AND THE PEAK IN THE FLUORESCENCE TRANSIENT OF CHLORELLA PYRENOIDOSA

John C Munday Jr and Rajni Govindjee (Ill U , Dept of Physiol and Biophysics and Dept of Botany, Urbana)

Biophysical Journal vol 9 Jan 1969 p 1–21 61 refs
Biophys Soc of Am , 12th Ann Meeting Pittsburgh, Feb 1968
Grants NSF GB-4040 NSF GB-7331, and NIH PH-GM-13913

The fluorescence transient of *Chlorella pyrenoidosa* excited by saturating light absorbed mainly by system II has a dip D between the peak I at 75 msec and the large peak P at 400 msec (the times depend on light intensity) This dip is observed in aerobic cells and in anaerobic cells where it is prominent In anaerobic cells, the I-D decline is hastened almost equally by absorption of either 705 or 650 nm background light In aerobic cells, supplementary 700 and 710 nm light given during the transient slightly hastens and heightens P Methyl viologen an exogenous system I electron acceptor eliminates P Results suggest that system I action causes D and that P is due to reduction of Q (fluorescence quencher) and intersystem intermediates caused by development of a block in oxidation of XH (X being the primary electron acceptor of light reaction I) Mathematical analysis suggests that if only two forms of Q participate beyond I then system I action is required for D If three forms participate then the system $Q \rightarrow QH \rightarrow Q$ may explain D The Malkin model in its present form, does not allow D

A69-80912

LIGHT-INDUCED CHANGES IN THE FLUORESCENCE YIELD OF CHLOROPHYL A IN VIVO 4 THE EFFECT OF PREILLUMINATION ON THE FLUORESCENCE TRANSIENT OF CHLORELLA PYRENOIDOSA

John C Munday Jr and Rajni Govindjee (Ill U Dept of Physiol and Biophysics and Dept of Botany Urbana)

Biophysical Journal vol 9 Jan 1969 p 22–35 31 refs
Biophys Soc of Am , 12th Ann Meeting Pittsburgh, Feb 1968
Grants NSF GB-4040 NSF GB-7331 and NIH PH-GM-13913

The fluorescence transient of *Chlorella pyrenoidosa*, excited by saturating blue light, has a base level O hump I dip D peak P and at 1 5 sec a quasisteady level S With two sec exciting exposures and four min dark periods preillumination-I ($\lambda \geq 690$ nm intensities 1 to 750 erg /sec -cm ^{2} incident) replacing the dark periods lowers I more effectively than preillumination-2 (650 nm $\leq \lambda \leq$ 680 nm) in both aerobic and anaerobic cells Results indicate that the intersystem electron transport pool A as well as the primary electron acceptor of pigment system II Q (fluorescence quencher) is normally being reduced at I Preillumination-I lowers and delays P Preillumination-2 (absorbed by both pigment systems) also lowers P but delays P only at low intensity at high intensity it hastens P Preillumination-1 raises S while preillumination-2 lowers S With 30 instead of two sec exciting light exposures, preillumination-1 causes a large S increase, and at low intensity a P increase The S effect seems to be of a long-term nature (26 to 29) rather than rapid changes in the redox state of Q As exciting light intensity increases fluorescence yield at P increases three-fold maximally The ratio of P (anaerobic) to O (aerobic) is 5 5 These high ratios restrict the Franck–Rosenberg model of photosynthesis which is based on fluorescence yield doubling

A69-80913

NORMAL SERUM CALCIUM LEVELS IN ALBINO MICE 3 DIURNAL VARIATIONS

Carlos A Bonilla and Reed M Stringham, Jr (Midwestern U Dept of Biol Wichita Falls, Tex and Utah U Dept of Biol Sci Salt Lake City)

Life Sciences, vol 7 part 2, Nov 15 1968, p 1193–1196 7 refs

Diurnal variations in the serum calcium level in 30 male Swiss albino mice were investigated When blood was sampled four times from each animal during a 24-hr period and analyzed for calcium the values obtained at 6 p m , midnight 6 a m , and noon were 9 13 ± 0 22, 9 60 ± 0 27 8 89 ± 0 40, and 9 95 ± 0 34 mg% respectively These differences were not statistically significant

A69-80914

A SEMI-QUANTITATIVE TOTAL BODY SKIN CULTURE TECHNIQUE FOR PATIENTS IN A PROTECTED ENVIRONMENT

G P Bodey Z Kim and E Bowen (Tex U , M D Anderson Hosp and Tumor Inst Houston)

American Journal of the Medical Sciences, vol 257, Feb 1969, p 100–115 13 refs
Grants NIH CA 10041 and NIH FR 05511

A semi-quantitative method for culturing the entire skin surface has been developed for assessing skin contamination of patients occupying a patient isolator unit Seven patients with acute leukemia were studied Seventy-nine percent of 89 strains of aerobic bacteria, 80% of 15 strains of anaerobic bacteria, and 73% of 15 strains of fungi were eliminated with the germicidal soaps, alcohol rinses and topical antibiotics used The face groin and perianal areas were most frequent sites of persistent contamination Occasionally gram-negative bacteria persist in the groin and perianal areas long after they were eliminated from the stool This method

of culturing the skin surface has proven very useful as a means of monitoring microbial contamination of patients in a protected environment

A69-80915
HIGH CALCIUM DIET AND THE PARAMETERS OF CALCIUM METABOLISM IN OSTEOPOROSIS

S H Cohn C S Dombrowski W Hauser and H L Atkins (Brookhaven Natl Lab Med Res Center Upton, Long Island N Y)

American Journal of Clinical Nutrition vol 21, Nov 1968 p 1246–1253 20 refs
AEC supported research

Kinetic tracer techniques providing the data for a compartmental analysis were supplemented with calcium-balance measurements to obtain the rates of Ca resorption, endogenous fecal excretion size of exchangeable Ca pools and accretion rates in seven osteoporotic patients Using each patient as his own control the effect of a high Ca diet (2 5 g /day) was then measured in terms of the above parameters of skeletal metabolism in these seven patients The high Ca diet resulted in a slightly increased accretion rate but the primary effect was a decrease in the resorption rate, which resulted in an increased apposition of Ca to the skeleton Insofar as the high Ca diet produced a positive Ca balance and acted to inhibit bone resorption it can be considered to be beneficial to osteoporotic patients The use of a mathematical model proved to be a useful framework to objectively measure small changes in the values of the parameters of Ca metabolism of an individual patient not readily discernible by previous techniques

A69-80916
THE EFFECT OF INCREASED BAROMETRIC PRESSURE ON INTRA-OCULAR PRESSURE AND AQUEOUS DYNAMICS A PRELIMINARY REPORT

G H M Pretorius (Witwatersrand U Dept of Ophthalmol and Baragwanath Hosp , Johannesburg, South Africa)

South African Medical Journal vol 42 Dec 7 1968 p 1254–1256 15 refs
Witwatersrand, U and Council for Sci and Ind Res supported research

The intra-ocular pressure was demonstrated to remain unaltered in rabbits on single Schiotz tonometry readings under increased barometric pressure but the facility of outflow of aqueous humour is decreased under hyperbaric conditions The application of this principle to persons subjected to high pressures, e g deep-sea divers and caisson workers is significant and may put more emphasis on the aqueous dynamics rather than on the intraocular pressure whenever hyper- or hypobaric conditions prevail

A69-80917
EFFECT OF GLOVES ON CONTROL OPERATION TIME

James V Bradley (Antioch Coll Aerospace Med Res Labs and Behavior Res Lab , Yellow Springs Ohio)

Human Factors, vol 11, Feb 1969 p 13–20 7 refs

Five types of control (push buttons, toggle switches, knobs horizontally operable levers, and vertically operable levers) were operated at room temperature with the hand clothed as follows no glove wool glove double glove i e , leather glove over wool glove Operation time was measured It was concluded that the effect of gloves on control operation time depends on the type of glove worn the physical characteristics of the control and the type of control operation required

A69-80918
GLOVE CHARACTERISTICS INFLUENCING CONTROL MANIPULABILITY

James V Bradley (Antioch Coll Aerospace Med Res Labs and Behavior Res Lab , Yellow Springs, Ohio)

Human Factors, vol 11 Feb 1969, p 21–35

Both objective measurements and subjective ratings were made of the degree to which each of 18 widely differing gloves possessed each of the following characteristics tenacity (i e , resistance to sliding over a grasped surface), snugness of fit suppleness and protection against injury to the enclosed hand Twenty-two subjects performed each of five different control operations while wearing each of the 18 gloves and while barehanded For both objective and subjective measurement of the characteristics, it was found that degree of tenacity is correlated with speed of gloved operation of on-off controls that amount of suppleness is correlated with rapidity of gloved operation of adjustable controls and that increasing snugness of fit improves operation time for both types of control The difference between operation times, gloved and barehanded was found to depend strongly on the type of control operation required

A69-80919
THE MEASUREMENT OF TRACKING PROFICIENCY

Charles R Kelley (Dunlap and Associates Inc Santa Monica, Calif)

Human Factors, vol 11 Feb 1969 p 43–64 25 refs
Contract Nonr-4986(00)

The problem of measuring tracking proficiency is reviewed and analyzed The five classes of measurements discussed are (1) single-axis error amplitude scores (2) multi-axis error amplitude scores, (3) simple frequency scores control effort (4) special engineering measurement techniques and (5) adaptive tracking measurements The most widely used score in psychological investigations time on target is shown not to be an interval measurement of tracking error amplitude and in addition is shown to be unreliable Seventeen equations for the measurement of tracking skill are described Adaptive tracking measurement techniques are shown to be more effective than are techniques employing fixed-difficulty tasks

A69-80920
OXYGEN AND CARBON MONOXIDE EQUILIBRIA OF HUMAN ADULT HEMOGLOBIN AT ATMOSPHERIC AND ELEVATED PRESSURE

F Lee Rodkey John D O Neal, and Harold A Collison (Natl Naval Med Center, U S Naval Med Res Inst , Lab of Anal Biochem , Bethesda Md)

Blood, vol 33 Jan 1969 p 57–65 19 refs
Navy Dept supported research

Adult human hemoglobin has been shown to have an affinity for carbon monoxide 218 times that for oxygen at 37° C There is no change in the relative affinity between pH 6 8 and 8 8 The same value was obtained with whole blood and with concentrated undialyzed hemoglobin solutions Measurements made at atmospheric pressure were identical with those at increased total pressure up to 21 4 atm Substitution of helium for nitrogen as inert gas did not alter the value The relative affinity constant K is increased by 2% by a decrease in temperature of 1° C

A69-80921
AN EXPERIMENTAL STUDY OF THE RETENTION OF RADIOACTIVE AEROSOL PARTICLES IN THE HUMAN RESPIRATORY TRACT [BEITRAG ZUR FRAGE NACH DER RETENTION RADIOAKTIVER AEROSOLPARTIKEL IM ATEMTRAKT]
R Reiter
Atomkernenergie, vol 13, Nov–Dec 1968 p 437–443 24 refs
In German

The retention characteristics of natural radioactive aerosols are studied by observations carried out with a human subject in a mine and the size-distribution spectrum of the aerosol and the amount of radon decay products absorbed on the particles are determined simultaneously The results obtained thereby are compared with data from a four-stage retention simulator used to ascertain the distribution of inspired aerosol particles with reference to the anatomy of the respiratory tract and the percentage of expired material The agreement between the two sets of data is found to be quite good, there is moreover, a conspicuously low retention rate for aerosols with diameters less than 0 2 μm The results are checked by independent experiments on animal lungs, in which the percentage of total retention for particles with diameters ranging from 0 07 to 2 0 μm is measured

A69-80922
STRUCTURE AND FUNCTION OF CHLOROPLAST PROTEINS 7 RIBULOSE-1,5-DIPHOSPHATE CARBOXYLASE OF CHLORELLA ELLIPSOIDEA.
T Sugiyama C Matsumoto T Akazawa (Nagoya U , School of Agr Seikagaku Seigyo Kenkyu Shisetsu Chikusa, Japan), and Shigetoh Miyachi (Tokyo U Inst of Appl Microbiol Bunkyo-ku Japan)
Archives of Biochemistry and Biophysics, vol 129 Feb 1969 p 597–602 32 refs
Grant PHS AM-10792-02

Ribulose-1,5-diphosphate (RuDP) carboxylase isolated from autotrophically grown cells of the gree algae *Chlorella ellipsoidea*, was partially purified The nature of the enzyme closely resembles the spinach leaf enzyme in its elution patterns on Sephadex gel filtration and DEAE-cellulose column chromatography migration on starch gel electrophoresis and the immunological specificity *Chlorella* RuDP carboxylase exhibits essentially identical kinetic parameters of the regulatory enzyme with those of spinach enzyme (a) homotropic effect of $NaHCO_3$ (b) allosteric activating effect of Mg^{2+} with respect to $NaHCO_3$, and (c) shift of optimum pH by elevating the Mg^{2+} concentrations

A69-80923
IONIC AND pH TRANSITIONS TRIGGERING CHLOROPLAST POST-ILLUMINATION LUMINESCENCE
C D Miles and A T Jagendorf (Cornell U Div of Biol Sci Ithaca N Y)
Archives of Biochemistry and Biophysics vol 129, Feb 1969 p 711–719 19 refs
Grants NIH GM-14479 and NIH GM 32599-02

The postillumination chemiluminescence of isolated spinach chloroplasts, previously shown to be caused by an acid-base transition, is found to be caused also by a transition from a low to a high ionic strength environment The salt induction of luminescence is in competition with the acid-base luminescence, whichever comes first prevents light emmission upon going through the second process It was discovered that suddenly lowering the pH to 3 2 or below also causes light emission The acid procedure induces up to eight times as much light emission as the others and does not seem to compete with them in that raising the pH or the salt concentration causes a further amount of luminescence even after the acid-induced burst All three procedures share a sensitivity to phosphorylation inhibitors and to DCMU, and all require preillumination of the chloroplasts Chloroplasts subject to a low to high salt transition do not go into a high energy state as judged by either ATP formation or ATPase activation Evidence is presented suggesting that even in the case of acid-base transition the high energy state is not the trigger for light emission

A69-80924
SECOBARBITAL AND NOCTURNAL PHYSIOLOGICAL PATTERNS
Boyd K Lester Joe D Coulter, Lawrence C Cowden, and Harold L Williams (Okla U , Med Center, Dept of Psychiat , Neurol and Behavioral Sci Oklahoma City)
Psychopharmacologia, vol 13 Nov 4, 1968, p 275–286 27 refs

Sleep patterns of 14 male subjects were examined following a single oral dose (200 mg) of the barbiturate secobarbital Compared to baseline medication caused definite changes in the amount and distribution of the electroencephalographic (EEG) states of sleep With the drug a decrease in percent stage rapid eye movement (REM) and an increase in percent stage two were accompanied by fewer body movements and a trend toward less waking A more striking effect was the drug-induced redistribution of EEG stages with slow-wave sleep potentiated during the first half of the night but virtually eliminated during the last half Stage REM on the other hand was inhibited in the first half but returned to baseline levels in the last half of the night Recent evidence suggests that such effects could result from modulation of brain levels of the monoamines Within the stages of sleep the amount of fast EEG activity was increased by the drug, with a tendency toward desynchrony Pre-central beta activity became especially prominent in stages REM and two (low-voltage phases), and this change was associated with inhibition of such phasic events as eye movements during REM sleep sigma spindles during stage two and spontaneous electrodermal responses in slow-wave sleep Thus it appears that secobarbital potentiates tonic and suppresses phasic phenomena during sleep A possible interpretation of these results is that secobarbital enhances electrical activity in forebrain structures while inhibiting the reticular activation system causing a reduction of phasic variability in all stages of sleep

A69-80925
SOME OBSERVATIONS SUGGESTING PRESERVATION OF SKILLED MOTOR ACTS DESPITE DRUG-INDUCED STRESS
Hans Heimann (Centre de Rech Psychopathol Clin Psychiat U Prilly-Lausanne Switzerland) Charles F Reed (Temple U Dept of Psychol Philadelphia Pa) and Peter N Witt (N C Dept of Mental Health, Div of Res Raleigh)
Psychopharmacologia, vol 13 Nov 4 1968 p 287–298 11 refs
Geneva Sandoz and Geigy Pharm supported research

Measures of skilled motor performances both of a task-oriented (tests of eye-hand coordination) and incidental (control of facial and ocular muscles) nature were recorded for a sample of 20 healthy young adults before and after single administration of perphenazine, opipramol, imipramine and placebo at dose levels commonly supposed to produce mood or behavioral effects It was anticipated that such performances would be sensitive even to slight changes

in the subjects physiological and psychological state, the aim was to test the power of tests of subtle skills in providing indices of slight to moderate behavioral effects The performance measures remained suprisingly little affected by all drugs despite their sensitivity to drug-independent improvement in performance throughout the experimental day, and despite evidences of drug-related effects, especially for imipramine and opipramol, in simple objective physiological measures and for imipramine alone in subjective measures taken concurrently There may be a class of skilled sensory-motor acts particularly those related to well-leaned daily activities which rather than being vulnerable to adverse effect remain efficient even in the presence of signs of disturbance of bodily function

A69-80926
DOSAGE AND TIME EFFECTS OF CIGARETTE SMOKING

Marianne Frankenhaeuser Anna-Lisa Myrsten, Michael Waszak, Aldo Neri and Birgitta Post (Stockholm U Psychol Labs Sweden)
Psychopharmacologia, vol 13, Nov 4 1968 ,p 311–319 13 refs
Swed Med Res Council and Swed Council for Soc Sci Res supported research

Effects of cigarette smoking were examined in eight healthy habitual smokers Comparisons between effects on catecholamine excretion produced by 2, 4 and 6 cigarettes smoked within a two hr period showed a progressive increase in adrenaline excretion with number of cigarettes while noradrenaline excretion was not noticeably affected Comparisons between smoking and control conditions showed effects on hand steadiness skin temperature, heart rate and blood pressure Dose- and time-response curves indicated that the relatively largest effect was regularly produced by the first cigarette while the second to sixth cigarette produced progressively smaller changes

A69-80927
THE EFFECTS OF DEXTROAMPHETAMINE AND PHENOBARBITAL ON A SIMPLIFIED STANDARDIZED CFF MEASURE

Henryk Misiak and Edward F Rizy (Fordham U , Dept of Psychol New York, N Y)
Psychopharmacologia vol 13 Nov 4 1968 p 346–353 10 refs
Warner–Lambert Res Inst supported research

The effects of a central nervous system (CNS)-stimulant CNS-depressant, and placebo on critical flicker frequency (CFF) thresholds of 24 subjects were determined using a flicker-fusion test based on the psychophysical method of limits Four conditions 10 mg of d-amphetamine 65 mg of phenobarbital inert placebo and no-drug, were applied in a repeated measures design under double-blind conditions Each session lasted three hr Pulse was taken concurrent with CFF and an adjective checklist of subjective feeling was administered at the end of each session Both CFF and mood checklist were sensitive to phenobarbital Pulse differences appeared only under d-amphetamine Longer test sessions more frequent testing or more subjects seemed advisable for future work The method of CFF measurement used most amenable to the aforementioned extensions appeared at least as sensitive as the more complex techniques previously employed

A69-80928
CARDIAC FREQUENCY IN RELATION TO AEROBIC CAPACITY FOR WORK

C T M Davies (MRC Environ Physiol Res Unit, London School of Hyg and Trop Med London Great Britain)
Ergonomics, vol 11 Nov 1968 p 511–526 24 refs

Cardiac frequency (f_H) and oxygen consumption (V_{O2}) during the transition from rest to exercise in relation to the aerobic capacity for work were studied in an Olympic athlete and a healthy male subject The behavior of the f_H and V_{O2} during the early phase of exercise was remarkably similar in both subjects As exercise was increased in intensity a level of exercise was reached at approximately 1,700 cc /min in the non-athlete and 3 000 cc /min in the athlete beyond which the exchange ratio (R) began to show its first marked rise, the O_2 debt curve departed from its rectilinear form f_H began to exhibit a slower secondary rise to a delayed steady state value The underlying mechanisms responsible for and the implications of these observed changes are discussed It is suggested that the f_H during early exercise might be used to characterize the aerobic capacity of the individual In order to investigate this problem further an analysis of healthy subjects of different ages and sex was presented It was shown that the delayed rise in f_H only became marked at levels of exercise corresponding to 55 to 60% of predicted V_{O2} max in well trained subjects and 45 to 55% predicted $V_{O2\ max}$ in less fit individuals It was thus independent of sex, and age related only to the fitness of the individual The possible use of an index derived from the adaptation of the heart rate to exercise (PDI^{65}) as a basis for a simple rational test of capacity for aerobic work is discussed

A69-80929
EXPERIMENTAL STUDIES OF SHIFT-WORK 2 STABILIZED 8-HOUR SHIFT SYSTEMS

W P Colquhoun, M J F Blake and R S Edwards (MRC Appl Psychol Res Unit Cambridge Great Britain)
Ergonomics, vol 11 Nov 1968, p 527–546 7 refs
Roy Naval Personnel Res Comm supported research

Thirty-one subjects were employed in an experiment to determine whether the relationship between efficiency at mental tasks and the circadian rhythm of body temperature observed in an earlier study was affected by an increase in the length of the duty-spell from four to eight hr Subjects were assigned either to a control day shift (0800 to 1600), a night shift (2200 to 0600) or a morning shift (0400 to 1200) and were tested for a period of 12 consecutive days on the same shift The control shift workers showed no consistent effects of fatigue due to the increased length of the duty-spell Adaptation of temperature rhythm to work on the night shift was only partial but was relatively closely reflected in the recorded performance trends Very little adaptation to work on the morning shift was observed and performance was thought to have been affected by partial sleep deprivation It was concluded that body-temperature was as effective as a predictor of overall mental efficiency in most industrial type shifts as in the special four-hr shift system previously investigated

A69-80930
TRAINING FOR VIGILANCE REPEATED SESSIONS WITH KNOWLEDGE OF RESULTS

E L Wiener (Miami U Dept of Ind Eng Coral Gables Fla)
Ergonomics vol 11 Nov 1968 p 547–556 18 refs
Grant PHS AC00250-02 UI 00014-02

Two groups of subjects were run in a visual monitoring test, one with knowledge of results (KR) providing instant feedback of correct reponses commissive errors, and missed signals, and the other with no knowledge of results (NKR) The groups were run for five 48-min sessions on consecutive days with a follow-up

transfer session five wk later Results showed significant differences *in detection rates between the groups on all five training sessions but* not on the transfer session Detection rates increased significantly during the five training sessions for both groups and at approximately the same rate Commissive errors were significantly different only in the first two training sessions with the KR subjects showing more false alarms Commissive errors did not increase or decrease over time within sessions or over the five training sessions

A69-80931
PROPRIOCEPTION VARIABLES AS DETERMINANTS OF LAPSED TIME ESTIMATION

M J Ellis, R A Schmidt and M G Wade (Ill U , Children s Res Center Urbana)

Ergonomics, vol 11 Nov 1968, p 577–586 19 refs
Grant PHS MH-07346 and Ill , State Dept of Mental Health supported research

It was postulated that increasing positional and force cues would provide more discriminable stimuli to serve as references for the reproduction of a motor response The levels and mode of the proprioceptive feedback were varied during the coincident positioning task of moving a carriage along a trackway in 2 0 sec In a balanced design with 80 subjects, two values of positional cues moving the carriage over 2 5 or 65 0 cm , and two values of force cues minimal resistance and 18 9 kg produced four different feedback combinations Significant learning occurred during 30 trials with knowledge of results (KR) and the combinations involving movement produced the greatest accuracy Throughout 30 trials without knowledge of results (NoKR) the estimates produced by the movement only and weight only groups became longer, while the control group and the movement plus weight group did not drift It was suggested that the group differences were caused by fatigue Interpolated rest of one min between groups of five trials during the KR condition shortened the first post-rest trial whence performance was restored by the remaining four trials During NoKR the first post-rest trial was again shorter but since the remaining four were overestimated it was more accurate In view of these results apparently redundant movements might aid in timing tasks requiring temporal and spatial organization

A69-80932
EFFECT OF LOW LEVEL RED OR WHITE LIGHT ON DARK ADAPTATION

Richard H Dohrn (USAF School of Aerospace Med Aerospace Med Div (AFSC), Ophthalmol Branch, Brooks AFB Tex)

American Journal of Optometry and Archives of American Academy of Optometry vol 46 Feb 1969, p 103–108 5 refs
Am Acad of Optometry Ann Meeting Chicago, Dec 12, 1967

Eighteen subjects were pre-adapted for 20 min to a luminance of 0 1 ft –L of red or white light The peripheral (11° inferiorly) light threshold and the threshold for foveal recognition of a four-position Landolt ring were determined with a Goldman–Weekers adaptometer For foveal recognition there was no difference between red and white preadaptation Peripheral thresholds following red light pre-adaptation were significantly lower than for white light, but these differences were so small that the practical advantage of red over white light pre-adaptation may be questioned

A69-80933
A TACTILE VISION SUBSTITUTION SYSTEM

Paul Bach-y-Rita, Carter C Collins Benjamin White Frank A Saunders Lawrence Scadden, and Robert Blomberg (Pacific Med Center Smith-Kettlewell Inst of Visual Sci San Francisco, Calif)

American Journal of Optometry and Archives of American Academy of Optometry, vol 46 Feb 1969 p 109–111
Am Acad of Optometry, Ann Meeting Beverly Hills Dec 8 1968
Grants HEW RD-2444-S PHS 5 K3 NB-14 094 and PHS 5 SO1 FR 05566 Rosenberg Found and T B Walker Found supported research

A prototype of tactile television system has been developed, in which a television camera image is projected onto the skin of the back by means of vibrating electromechanical stimulators Blind subjects within a few hours of training have learned to identify geometric forms, movement in depth environmental objects, photographs of faces and block letter words

A69-80934
SURVIVAL OF T3 COLIPHAGE IN VARIED EXTRACELLULAR ENVIRONMENTS 1 VIABILITY OF THE COLIPAGE DURING STORAGE AND IN AEROSOLS

James C Warren and Melvin T Hatch (Naval Supply Center Naval Med Res Unit No 1, Oakland Calif and Calif U School of Public Health Naval Biol Lab , Berkeley)

Applied Microbiology, vol 17 Feb 1969 p 256–261 16 refs
Am Soc for Microbiol 68th Ann Meeting, Detroit, May 5–10 1968

The objective of this study was to determine the feasibility of using airborne T3 coliphage as a viral tracer in microbial aerosols Although T3 coliphage was relatively stable when stored either at temperatures ranging from 21° to 37° C or in the frozen state at –20° C there was a two-log loss in infectivity when stored for 72 days at 4° C Either agitation of stored coliphage suspensions held at 31° C or wide fluctuations in storage temperature produced an increased loss of infectivity In the airborne state freshly prepared coliphage and stored coliphage behaved similarly with survival diminishing as the relative humidity (RH) was lowered The greatest loss occurred during the first five min following aerosolization The results showed that only under certain conditions of temperature and relative humidity can T3 coliphage be used as a satisfactory aerosol tracer

A69-80935
FACTORS AFFECTING THE PERSISTENCE OF STAPHYLOCOCCUS AUREUS ON FABRICS

Lee J Wilkoff Louise Westbrook and Glen J Dixon (Southern Res Inst Chemotherapy Res Dept Virus and Cell Biol Div Birmingham, Ala)

Applied Microbiology vol 17, Feb 1969, p 268–274 21 refs
Contract USDA 12-14-100-8317(63)

The persistence of Staphylococcus aureus (Smith) on wool blanket, wool gabardine cotton sheeting cotton knit jersey cotton terry cloth and cotton wash-and-wear fabrics was studied The fabrics were exposed to bacterial populations by three methods direct contact aerosol and a lyophilized mixture of bacteria and dust having a high content of textile fibers The contaminated fabrics were held in 35 or 78% relative humidities at 25° C In general, the persistence time of *S aureus* populations on fabrics held in 35% relative humidity was substantially longer when the fabrics were contaminated by exposure to aerosolized cultures or to dust containing bacteria than when contaminated by direct contact In a 78% relative humidity bacterial populations on the fabrics persisted for substantially shorter periods of time regardless of the mode of contamination or fabric type Cotton wash-and-wear fabric

(treated with a modified triazone resin) was the material on which populations of S aureus persisted for the shortest time This organism retained its virulence for Swiss mice after being recovered from wool gabardine swatches held four wk in 35% relative humidity and six wk in 78% relative humidity

A69-80936
VACUUM-CLEANING SYSTEM FOR ISOLATION CHAMBERS

Charles E Yale (Wis U Med School Dept of Surg Madison)
Applied Microbiology, vol 17 Feb 1969, p 291–292
Grant PHS AI 06956

To encourage the utilization of the isolation chamber as a research tool, the cost of its use should be lowered Methods and devices must be developed which make more efficient use of the space within the isolator and allow the operator to work effectively in this confined area A simple vacuum-cleaning system is described it consists of a nozzle and flexible hose which connect through the isolator wall to an externally placed waste tank attached by way of its outlet filter to a source of vacuum The cylindrical waste tank [48 in (1 219 m) high and 36 in (0 914 m) in diameter] was sterilized in a large autoclave During a nine-mo test period the system was used to remove soiled corncob bedding from a large isolator containing 90 adult monocontaminated rats During this period, the microbial flora of the isolator was unchanged, and the time required to clean the cages was reduced by 50% This vacuum-cleaning is a safe convenient and economical means of increasing the efficiency of an isolation chamber

A69-80937
SPORULATION, HEAT RESISTANCE, AND BIOLOGICAL PROPERTIES OF CLOSTRIDIUM PERFRINGENS

S Nishida N Seo and M Nakagawa (Kanazawa U School of Med Dept of Bacteriol, Japan)
Applied Microbiology, vol 17, Feb 1969 p 303–309 23 refs

A sporulation medium for 134 *Clostridium perfringens* strains was devised according to Grelet s observation that sporulation occurred when cultural environment became limited in any nutritional requirement indespensable for the growth of the organism Sporulation took place most prominently when 10% cooked-meat broth (pH 7 2) containing 3% Proteose Peptone and 1% glucose was used for the preculture and 2% Poli Peptone medium (pH 7 8) was used for the subculture medium Sometimes, terminal spores could be observed A correlation between sporulation and heat resistance was examined by use of *C perfringens* strains isolated from samples heated at different temperatures Almost all strains isolated from unheated samples and from those heated at lower temperatures gave rise to spores in our sporulation medium but the spores were weakly heat resistant whereas strains isolated from samples heated at 100°C for 60 min were highly heat-resistant but sporulated poorly A majority of these heat-resistant strains were non-gelatinolytic and definitely salicin-fermenting

A69-80938
A SIMPLE TECHNIQUE OF UNDERWATER HARDWIRE ECG RECORDING

I P Unsworth, J Williams and R Tayler (Roy Naval Physiol Lab Alverstoke Hants Great Britain)
Bio-Medical Engineering vol 4 Feb 1969, p 74–76

A simple and reliable method of monitoring the heart of a working diver is described A continuous cable attached to a small electrocardiograph is used Recordings utilizing MRC silver discs were made in 100 ft of water A special technique for attaching the electrodes which is critical to reliability is given The quality of the recordings is good in comparison to those of others taken under similar conditions

A69-80939
INHIBITION OF SHIGELLA FLEXNERI BY THE NORMAL INTESTINAL FLORA 2 MECHANISMS OF INHIBITION BY COLIFORM ORGANISMS

David J Hentges (Creighton U, School of Med Dept of Microbiol Omaha Neb)
Journal of Bacteriology, vol 97, Feb 1969 p 513–517 15 refs
Contract DA DA 17-67-C-0024 and Grant PHS AI-07148

Of 15 strains of coliform bacteria, all isolated from human feces 14 inhibited the growth of *Shigella flexneri* in mixed culture In every case when inhibition occurred exponential growth of *Shigella* was interrupted in the mixed culture and the organisms entered into either a stationary or a death phase None of the test coliform strains produced colicines active against *Shigella* An analysis of mixed-culture environments at the time *Shigella* inhibition occurred revealed that the inhibition was not due to nutrient depletion nor to the development of adverse pH or oxidation-reduction potentials in themselves In mixed culture the coliform strains produced formic and acetic acids in concentrations that inhibited *Shigella* growth With one exception the coliform strains also greatly reduced the culture medium In average concentrations produced the formic and acetic acids exerted a bactericidal effect on *Shigella* under the reduced conditions found in mixed cultures The acids were only moderately toxic for the coliform strains under the same conditions Results indicate that volatile acid production and concomitant reduction of the medium are the mechanisms by which coliform bacteria inhibit *Shigella* growth in mixed cultures

A69-80940
EFFECTS OF ANTICHOLINERGIC DRUGS ON EPILEPTIC ACTIVITY FROM AMYGDALA AND FRONTAL CORTEX

C J Vas J M R Delgado and G H Glaser (Yale U School of Med Dept of Psychiat Sect of Neurol New Haven Conn)
Neurology, vol 19, Mar 1969, p 234–241 19 refs
Grants NONR 609(48) PHS 5-P02-NB-06208 PHS M 2004 and AF F/29600-67-C-0058

A comparative study of effects of the anticholinergic drugs hyosine methixene and procyclidine on epileptic activity from amygdala and frontal cortex was undertaken in five monkeys Electrodes were implanted into the amygdalae and frontal cortices for both stimulation and recording During the course of controlled experiments the intensity of current required to produce electrical after-discharges (EAD) was determined in addition to the duration of the EAD at both the amygdala and crotical sites Hyoscine (1 5 mg /kg) methixene (4 mg /kg), and procyclidine (10 mg /kg) prolonged the duration of cortical EAD to a significant extent whereas normal saline had no such effect These large doses of the anticholinergic drugs however had no effect on the threshold current required to produce cortical EAD Smaller doses of hyoscine (0 75 mg /kg), methixene (2 mg /kg) and procyclidine (5 mg /kg) had no statistically significant effect on the threshold current or duration of cortical EAD The drugs had no significant effect on either threshold or duration of amygdala EAD

A69-80941
OBJECTIVE EVALUATION OF JOINT SENSE AND TOUCH IN THE HUMAN

E Rodin S Wasson and J Porzak (Lafayette Clin Neurol Res Div Detroit Mich)
Neurology vol 19 1969 p 247–257 8 refs
Am Acad of Neurol, Ann Meeting, Chicago Apr 1968

Passive movement of the index finger at the metacarpophalangeal joint resulted in detectable cerebral-evoked responses in ten normal male volunteer subjects when averaging techniques were used The response had the following main characteristics (1) it was present ipsilaterally as well as contralaterally to the stimulated finger with the contralateral response being distinctly higher in amplitude (2) it was higher in amplitude in the connections between the anterior to posterior parietal areas than in the connections between the premotor and anterior parietal regions (3) the right hemisphere gave higher responses to stimulation of the left finger than the left hemisphere to movement of the right finger and (4) the evoked response from the premotor to anterior parietal regions showed greater complexity than the response from the anterior parietal to posterior parietal regions Touch-evoked responses were similar to joint movement-evoked responses but had lower amplitudes Median nerve stimulation at the wrist produced a similar evoked response curve as joint movement did except for the early components (between 20 and 40 msec) which were markedly higher when median nerve stimulation was used Examples of alterations of the joint movement-evoked response due to various lesions of the central nervous system were presented

A69-80942
DIRECTION OF MOVEMENT AS THE SIGNIFICANT STIMULUS PARAMETER FOR SOME LATERAL GENICULATE CELLS IN THE RAT

Vicente M Montero and John F Brugge (Wis. U Lab of Neurophysiol, Madison)
Vision Research, vol 9 Jan 1969 p 71–88 27 refs
Grants NIH NB-03640, NIH NB-03641 NIH NB-06225 and NIH NB-05326

Directional neurons in rat dorsal lateral geniculate nucleus responded maximally to images moving in one direction opposite movement evoked no spikes and often suppressed spontaneous activity Asymmetry in the directional response was independent of stimulus size, shape contrast and, within a range velocity Directional responses were obtained about 45° on either side of the preferred null axis On–off responses were evoked throughout the receptive field Inhibition acts in the null direction and facilitation in the preferred direction Receptive fields occurred throughout the visual field 52% grouped in a region just nasal to the projection of the optic disc

A69-80943
AUTOKINESIS AND THE PERCEPTION OF MOVEMENT THE PHYSIOLOGY OF ECCENTRIC FIXATION

R A Crone and H F E Verduyn Lunel (Wilhelmina Gasthuis U Eye Clin Amsterdam The Netherlands)
Vision Research, vol 9, Jan 1969, p 89–101 27 refs

An after-image method was devised by means of which the average direction of fixation could be measured to within one min of arc During autokinesis fixation was found to lag behind the apparent movement When a stationary target appeared to move during optokinetic stimulation the mean eccentricity of fixation was one and one-half min of arc Tracking a point of light which was really moving showed again that the fixation lagged behind the movement The eccentricity of fixation was dependent upon the speed of the real movement If, at very low speed, the mean eccentricity was less than one min of arc real movement could not be distinguished from autokinesis During fixation of a point of light in the dark the mean eccentric fixation is the physiological correlate of the perception of movement and also the quantitative stimulus to tracking movements of the eye

A69-80944
MONOCULAR ESTIMATES OF DISTANCE AND DIRECTION WITH STABILIZED AND NON-STABILIZED RETINAL IMAGES

David S Gilbert (Calif Inst of Technol Biol Dept, Pasadena)
Vision Research, vol 9 Jan 1969 p 103–115 29 refs
Grants NIH NB 03627 and NIH GM 01335

Using both stabilized and non-stabilized retinal images two subjects tried to match distances and angles defined by bright coplanar points about 2° apart in order to determine whether or not eye movements help the usual system determine distances Within an experimental uncertainty of ± two min arc, or 3% of the distances to be matched both subjects carried out matches as accurately with a stabilized image as with a non-stabilized image Further, with a stabilized image the distance and direction of a retinal point from the fovea were estimated with approximately the same accuracy as the point's distance and direction from another non-foveal point These results indicate that accurate spatial estimates may be obtained from extra-foveal area of the retina and that eye movements do not improve the accuracy of spatial judgments

A69-80945
OPTOKINETIC EYE MOVEMENTS IN THE RABBIT INPUT-OUTPUT RELATIONS

H Collewijn (Rotterdam Med Fac, Dept of Physiol The Netherlands)
Vision Research vol 9 Jan 1969 p 117–132 9 refs

Slow phase velocities of optokinetic eye movements due to constant rotation or sinusoidal movement of surroundings were measured under normal and open loop conditions Speeds from 0 03 to 1°/sec were followed with a closed loop gain of 0 7 to 0 9 Higher eye speeds were reached at an acceleration of no more than $1°/sec^2$ and lower gain Open loop gain was better than 10 for stimulus velocities up to 0 1°/sec Phase lag in sinusoidal movement was very small even at low gain No evidence for a genuine position servo was found

A69-80946
THE MONOCULAR EYE MOVEMENTS OF THE PIGEON

Patrick W Nye (Calif Inst of Technol Div of Appl Sci Pasadena)
Vision Research, vol 9 Jan 1969 p 133–144 17 refs
Grant PHS NB 03627

The monocular eye movements of both restrained and partially restrained pigeons were measured by means of a mirror attached to the edge of the cornea The principal observations may be summarized under the following categories (1) *Flicks* or eye movements which bring about a rapid change of fixation are found to occur only in response to sudden and unexpected motion of a visual stimulus and are rarely observed under the quiescent conditions of a darkened room (2) *Drifts* which are slower movements of the eye between fixation points, occur at velocities of about 1° to 5°/sec and are stimulated by object motion, (3) *Tremor* motion is of extremely low amplitude and is unlikely to serve any visual function and (4) *Oscillations* occur in short bursts

at frequencies of about 30 Hz and amplitudes of several degrees The evidence indicates that this eye movement is normally executed during a blink and it is probable that it performs a polishing action on the cornea in conjunction with the nictitating membrane The observations lead to the conclusion that although the range of rotational motion available to the pigeon is less than in man it nevertheless possesses a well developed and precisely controlled oculomotor system which appears in some respects to out-perform our own

A69-80947
THEORY OF STEREOSCOPIC SHADOW-CASTER AN INSTRUMENT FOR THE STUDY OF BINOCULAR KINETIC SPACE PERCEPTION
David N Lee (Harvard Med School, Boston, Mass)
Vision Research, vol 9, Jan 1969 p 145–156 6 refs
Contract Nonr-1866(52) and Boston City Hosp supported research

The stereoscopic shadow-caster is a simple and versatile instrument for the study of binocular stereopsis under kinetic viewing conditions for objects in the stereoscopic scene can be easily moved either by the experimenter or the observer and the observer can move and interact with them Thus the instrument is suitable for use with human infants and animals as well as adult subjects This paper presents the theory of the instrument necessary for its research use, discusses the application of this theory to photographic stereoscopic projection and describes the perceptual effects of the stereoscopic transformation In addition some current research applications and modifications of the instrument are described

A69-80948
A SPATIAL INTEGRATION EFFECT IN VISUAL ACUITY
J M Findlay (J J Thomson Phys Lab , Reading, Great Britain)
Vision Research, vol 9, Jan 1969, p 157–166 12 refs
Grant MRC G/964/278/B

The effect of grating size on the threshold for a 30 cycle per degree grating pattern is investigated for various colors of illumination and target orientations It is shown under certain conditions that the threshold decreases as the target size is increased and this is attributed to spatial integration of information

A69-80949
THE EFFECT OF BACKGROUND DENSITY ON THE ZOLLNER ILLUSION
G K Wallace and D J Crampin (Reading U Great Britain)
Vision Research, vol 9 Jan 1969, p 167–177 18 refs

The Zollner illusion consists in the distortion of two parallel lines when superimposed on a background of oblique intersecting lines The size of the illusion was measured for intersect angles 2 to 45° with pattern density constant The angle distortion is maximum at 20° and declines to either side of this value Different explanations for this are considered and predictions made as to how different pattern densities should affect the function The illusion was measured for two pattern densities over the range 2 to 20° The results show that increasing the pattern simply multiplies the entire illusion function by a constant These measurements are an important first step before forming any theory of the illusion

A69-80950
VISUAL SUPPRESSION DURING SMOOTH FOLLOWING AND SACCADIC EYE MOVEMENTS
A Starr R Angel and H Yeates (Stanford U , School of Med , Div of Neurol and Veterans Admin Hosp , Palo Alto Calif)
Vision Research vol 9, Jan 1969 p 195–197 13 refs
Grant NINDB NB 31242

Four young ladies with normal vision tracked a slowly moving target and pressed a button whenever a light flashed during the tracking task The intervals of flashing were three to ten sec Detection of the light flash was affected differently by the saccadic eye movement (SEM) or the smooth following movements (SFM) The probability of detection during SFM was greater than 85% If the flash occurred near a SEM, detection was greatly reduced at threshold intensity A possible explanation for this difference may be that neural mechanisms initiating SEM affect structures processing visual information and influence perception

A69-80951
VISUAL BACKWARD MASKING OF A SINGLE LINE BY A SINGLE LINE
Mary B Parlee (Mass Inst of Technol , Dept of Psychol , Cambridge)
Vision Research vol 9 Jan 1969, p 199–205 8 refs
NASA Grant NsG 496 and Natl Defense Educ Act supported research

The detectability of a single target line was determined under conditions in which control of the contour relationship between the lines was maintained This was the amount of overlapping and non-overlapping contours of the two lines In experiment I the angle of the masking line to the vertical target line was the variable In experiment II overlap affecting detectability was determined and in experiment III the effect of a non-overlapping masking line at various distance on detectability was determined In the results the masking effect seemed to decrease rapidly with an increasing angle and tapers off out to 90° As overlap decreased detectability increased which showed that as the masking line caused less excitation of the target line receptor, the target line effect became more detectable Experiment III indicated that with increasing separation between non-overlapping contours of the target and masking lines detectability increased Underlying physiological bases for these results were discussed

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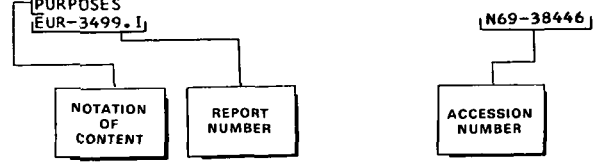

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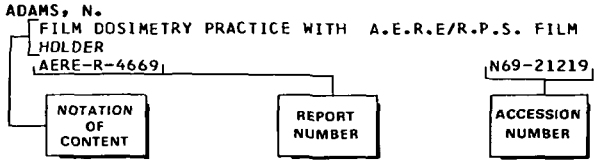

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