NASA SP-7011 (16)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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A CONTINUING BIBLIOGRAPHY WITH INDEXES

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA Information System during September, 1965.

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

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INTRODUCTION

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

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

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

a. NASA entries identified by their *STAR* accession numbers (N65-10000 series),
b. AIAA entries identified by their *IAA* accession numbers (A65-10000 series); and
c. LC entries identified by a number in the A65-80000 series.

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(continued)

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

LC 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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Other organizations can purchase copies of the bibliography from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

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a continuing bibliography OCTOBER 1965

STAR ENTRIES

N65-28094# Joint Publications Research Service, Washington, D. C.
TRANSLATIONS FROM BIOFIZIKA, VOLUME 10, NO. 1, 1965
11 Jun. 1965 42 p refs Transl. into ENGLISH from Biofizika (Moscow), v. 10, no. 1, 1965 42 p
(JPRS-30575; TT-65-31249) CFSTI: $2.00

CONTENTS:

1. EVALUATION OF THE LIGHT STIMULATOR POSITION AND MOVEMENTS OF THE EYES L. I. Leushina p 1–12 refs (See N65-28095 17-05)
2. SOME INFORMATION ON THE EYE TRACKING SYSTEM A. I. Lauringson and L. P. Shchedrovitskiy p 13–18 refs (See N65-28096 17-05)

N65-28095 Joint Publications Research Service, Washington, D. C.
EVALUATION OF THE LIGHT STIMULATOR POSITION AND MOVEMENTS OF THE EYES
L. I. Leushina *In its* Transl. from Biofizika, Vol. 10, No. 1, 1965 11 Jun. 1965 p 1–12 refs (See N65-28094 17-05) CFSTI: $2.00

The participation of eye movements in evaluating the spatial position of a light stimulus was investigated based on the concept of reaction time dependency on the amount of information known. An increase in the accuracy of evaluating the position of the light stimulus resulted in a reaction time increase and also an increase in the evaluation accuracy which was equivalent to a more complicated selection. With the increase in estimation accuracy, the latent period of eye-jump to a new fixation point regularly increased in all tested individuals, while the time interval between the eye-jump and the individual's signal concerning evaluation did not change. A comparison of the moment of signal evaluation with the eye-jump showed that in 25% of the cases the evaluation signal was given prior to the end of eye movements. An increase in the accuracy of evaluating the light stimulus position resulted in a decrease in the variability of the eye-jump amplitude. Eye movements do not determine the perceptions of visual spatial correlations but are its result. R.N.A.

N65-28096 Joint Publications Research Service, Washington, D. C.
SOME INFORMATION ON THE EYE TRACKING SYSTEM
A. I. Lauringson and L. P. Shchedrovitskiy *In its* Transl. from Biofizika, Vol. 10, No. 1, 1965 11 Jun. 1965 p 13–18 refs (See N65-28094 17-05) CFSTI: $2.00

Eye tracking was investigated to establish whether or not smooth eye movement is determined only by the speed of the moving object, and that in tracking an accelerating object, the eye movement consists of individual segments of smooth motion and correcting eye jumps. Test results show that tracking does not consist of segments of movements at constant speed and of jumps, but corresponds to the law of object movements. The tracking is composed of a transitional process and an established movement. At a parabolic entry of an object the transitional process uses smooth eye movement. Smooth movement is used more at the start of tracking an accelerating object than during steady tracking. At greater accelerations the transitional process uses an eye jump along with the initial smooth movement. At an exponential entry, the transitional process always includes an initial smooth tracking and an eye jump. Steady tracking is either accomplished without rectifying jumps or jumps with intervals of one second or longer. The results refute the assumption that a smooth eye movement is determined only be the speed of the object. R.N.A.

N65-28097*# California Univ., Los Angeles. Biochemical Correlates Lab.
MOOD, MOTILITY AND 17-HYDROXYCORTICOID EXCRETION—A POLYVARIABLE CASE STUDY
Melvin Schwartz, Arnold J. Mandell, Richard Green, and Richard Ferman [1965] 19 p refs
(Grant NsG-237-62)
(NASA-CR-63785) CFSTI: HC $1.00/MF $0.50 CSCL 06E

A classic cyclic manic depressive patient was studied longitudinally over a 44 day period during one complete cycle in an attempt to correlate daily objective and subjective mood measures with objective measures of motility and to serial 24 hour urinary 17-hydroxycorticoid levels. The study added evidence in favor of the previously reported relationship between depression and increased urinary excretion of 17-hydroxycorticoid. However, this relationship may not be as specific as previously reported because the manic state is also associated with periodic elevations in corticoid excretion. This suggests that nonspecific discomfort and motility parameters warrant attention and control in such studies. R.N.A.

N65-28101# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

PROBLEMS IN BIOLOGY AND BORDERLINE MEDICINE Selected Articles

15 Feb. 1965 13 p refs Transl. into ENGLISH from Vopr. Biol. Krayevoy Med., Akad. Nauk Uzbek. SSR, no. 4, 1963 p 123-130

(FTD-TT-64-636/1+2; AD-611522)

CONTENTS:

1. PHOTOSYNTHESIS OF CHLORELLA VULGARIS BEYER AT MASS CULTIVATION IN OPEN BASINS OF UZBEKISTAN Kh. Berdykulov p 1-6 refs (See N65-28102 17-04)

2. SOME DATA ON THE CHEMICAL COMPOSITION OF CHLORELLA VULGARIS BEYER GROWN IN OPEN TANKS V. P. Kostina p 7-10 refs (See N65-28103 17-04)

N65-28102# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

PHOTOSYNTHESIS OF CHLORELLA VULGARIS BEYER AT MASS CULTIVATION IN OPEN BASINS OF UZBEKISTAN

Kh. Berdykulov *In its* Probl. in Biol. and Borderline Med. 15 Feb. 1965 p 1-6 refs (See N65-28101 17-04)

Experiments were conducted with *Chlorella vulgaris* to explain the following problems: (1) diurnal process of photosynthesis of *Chl. vulgaris* suspension; (2) intensiveness of photosynthesis in dependence upon density of suspension and layer thickness; and (3) effect of carbon dioxide concentrations in blow-through air on photosynthesis. It was shown that with an increase in density and layer thickness of *Chlorella* suspension, the photosynthesis intensity decreases; at a layer thickness of *Chlorella* suspension of 5 to 15 cm the photosynthesis intensity drops from 20 to 92% in comparison with the intensity on the surface; at a depth of 20 cm no photosynthesis is revealed. The flow through of air containing carbon dioxide in *Chlorella* suspension increases the intensity of photosynthesis by three to four times. A much higher content of carbon dioxide in the flow through air does not offer noticeable activation of the photosynthesis. The diurnal photosynthesis process in *Chlorella* suspension has a single peak curve with a peak at 13 hours. N.E.A.

N65-28103# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

SOME DATA ON THE CHEMICAL COMPOSITION OF CHLORELLA VULGARIS BEYER GROWN IN OPEN TANKS

V. P. Kostina *In its* Probl. in Biol. and Borderline Med. 15 Feb. 1965 p 7-10 refs (See N65-28101 17-04)

The value of a biomass of *Chlorella vulgaris* is determined by its protein, fat, and vitamin content. For the experimental mass cultivation of *Chlorella*, a Myer's culture of formula 04 of the Wuhan Hydrobiologic Institute and a garden mixture supplement by ferric chloride and soil extraction were used. The chemical composition of *Chlorella vulgaris* changed when cultivating it on these cultures in open tanks and large bottles. The following indexes were determined in the biomass of *Chlorella*: total nitrogen, by Kjeldahl's method; protein nitrogen, by precipitation by Barnstein's method with subsequent determination by Kjeldahl's method; cholorphyll by Godneb's method, carotin by Tautsin's method, ascorbic acid, by titration with respect to Tilman's reaction, and fat, by the method of non fat residue. The ash and moisture were determined by the generally accepted method when analyzing plant substances. The results of the analyses are presented. N.E.A.

N65-28118# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

SOME RESULTS AND PROBLEMS OF OBSERVATION UNDER SPACEFLIGHT CONDITIONS

M. M. Kosenkov and A. P. Kuz'minov 14 Jan. 1965 9 p Transl. into ENGLISH from a paper presented at the Third Intern. Symp. on Bioastronautics, San Antonio, Tex., 16-18 Nov. 1964 p 3-7

(FTD-TT-65-1/1; AD-610378)

Soviet scientist and engineers, a specialist in engineering psychology and an ophthalmologist have carried out experimental studies to determine the state of the visual analyzer during space flight under the influence of various types of adverse factors. The experiments were carried out during the Vostok and Voskhod launches. The following objectives were carried out during the experiments: (1) a check of the spectral sensitivity of the eyes under conditions of weightlessness; (2) a check of the visual acuity of cosmonauts both as the vehicle approaches orbit and under conditions of orbital flights; (3) a determination of the possibility of identifying various natural formations on the earth; and (4) a determination of optimum illuminating conditions inside the ship's cabin. Results of the experimental studies are presented. N.E.A.

N65-28123# Library of Congress, Washington, D. C. Aerospace Technology Div.

INFLUENCE OF MICROWAVES ON THE FUNCTIONAL CONDITION OF THE NERVE [DEYSTVIYE MIKROVOLN NA FUNKTSIONAL'NOYE SOSTOYANIYE NERVA Surveys of Soviet-Bloc Scientific and Technical Literature

Yu. I. Kamenskiy 18 Jun. 1965 13 p refs Transl. into ENGLISH from Biofizika (Moscow), v. 9, no. 6, 1964 p 695-700 (ATD-T-65-39; AD-465383)

The nonthermal influence of microwaves, as reflected in functional changes in the nervous and cardiovascular systems, has been observed in a number of clinical investigations and experiments with animals. Analysis of the data from these experiments and the results of specialized investigations by Presman led to the hypothesis that microwaves basically alter the functional condition of excitatory structures. This hypothesis made it desirable to study the functional state of the frog nerve during microwave irradiation. The few reports which have been published on the influence of microwaves on the frog nerve lack data on the irradiation parameters. The present paper describes the results of investigations of the functional state of the frog nerve (N. ischiadicus) including considerations of excitability thresholds, excitation conduction rates, absolute and relative refractory phases, and amplitudes of action currents during irradiation with microwaves of nonthermal intensity in pulsed and nonpulsed systems. Author

N65-28133# Joint Publications Research Service, Washington, D. C.

AUTOMATION OF THE UNIT FOR THE STUDY OF CONDITIONED REFLEX ACTIVITY IN SMALL LABORATORY ANIMALS

B. D. Bartenev and M. Ye. Kovarskiy 7 Jul. 1965 6 p refs Transl. into ENGLISH from Gigiena Truda i Prof. Zabolevaniya (Moscow), no. 8, Aug. 1964 p 57-58

(JPRS-30962; TT-65-31460) CFSTI: $1.00

An automated unit for the study of conditioned reflex in small laboratory animals is described. The automation of the unit makes it possible: (1) to regulate by remote control the work of the unit's experimental chamber and place it inside the gas chamber; (2) to eliminate certain subjective moments

while conducting the investigation; (3) to keep an objective record of the time of stimulus connection, food supply, and the animal's response reaction; and (4) to lower considerably the labor consumption of the investigation, especially in conducting chronic experiments. The basic electrical diagram of the automated unit fed from ac supply system with a voltage of 127 volts for the investigation of the conditioned reflex in small laboratory animals is presented. Programming of the unit and the procedures for operating the unit are described. N.E.A.

N65-28134# Joint Publications Research Service, Washington, D. C.

ASTEROMONAS GRACILIS ARTARI AS AN OBJECT OF MASS CULTIVATION

K. A. Voskresenskiy and Ye. V. Yurina 9 Jul. 1965 16 p refs Transl. into ENGLISH from Vestn. Mosk. Univ., Ser. VI: Biol. Pochvoved. (Moscow), no. 2, Mar.-Apr. 1965 p 29-35 (JPRS-30995; TT-65-31493) CFSTI: $1.00

The conditions for the successful cultivation of the algae, *Asteromonas gracilis Artari* were investigated. It was found that good growth of this algae occurs at 20° to 25° C. At a higher temperature the speed of growth is retarded, and at 36° C the cells discolor and die on the fourth day. At temperatures below 20° C the rate of cell division slows down markedly. The viability of the algae is retained down to a temperature of 0° C; however, no cell division takes place at this temperature, but upon their return to normal conditions they quickly begin multiplying. The most favorable growth takes place in the presence of urea. Also, no seasonality was observed in the growth of the algae. The intensity of growth of the algae was found to depend to a great extent on the availability of CO_2 which was fed to the algae by a jet of air containing 5% CO_2. E.E.B.

N65-28135*# National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

EFFECTS OF SIMULATED ROCKET-JET EXHAUST ON STABILITY AND CONTROL OF A RESEARCH-TYPE AIRPLANE CONFIGURATION AT A MACH NUMBER OF 6.86

David E. Fetterman, Jr. Washington, NASA, Oct. 1959 36 p refs

(NASA-TM-X-127) CFSTI: HC $2.00/MF $0.50 CSCL 01A (Declassified)

An investigation has been undertaken in the Langley 11-inch hypersonic tunnel at a free-stream Mach number of 6.86 to determine the jet-interference effects at high jet-static-pressure ratios on the stability and control of a research-type airplane configuration. Compressed-air tests with a jet exhausting from the base of the fuselage were conducted. The results of these tests indicated that the operation of the jet induced a sizable separated-flow region over the vertical- and horizontal-tail surfaces which could be approximately duplicated at low angles of attack by use of metal jet-boundary simulators. The results of force tests, during which these metal jet-boundary simulators were used, indicated that this separated-flow region caused a large reduction in the longitudinal stability and control and a smaller reduction in the lateral and directional stability and control. By extending the divergent section of the nozzle and thus reducing the jet-static-pressure ratio, these losses were diminished. Author

N65-28140# Joint Publications Research Service, Washington, D. C.

ELIMINATION OF HYPOTHERMIA IN DOGS BY MEANS OF HIGH FREQUENCY CURRENTS

N. V. Semenov 9 Jul. 1965 5 p refs Transl. into ENGLISH from Byull. Eksptl. Biol. i Med. (Moscow), no. 4, Apr. 1965 p 17-19

(JPRS-30998; TT-65-31496) CFSTI: $1.00

Investigations were conducted to examine the possibility of using high frequency currents for warming large animals in a state of hypothermia. A diathermy apparatus with an operating current near 165 kilohertz and a LUCh-58 apparatus with an operating current of 2375 ± 50 were used. The methods were extremely effective and caused no burning. The short wave diathermy increased the body temperatures of dogs from range of 24.8° to 26.4° C to 30.8° to 33.6° C within 40 to 45 minutes. The LUCh-58 increased the body temperatures of dogs to a range of 32° to 32.8° C within half an hour. The dogs needed no further treatment and reached a normal body temperature unaided. R.N.A.

N65-28142# Joint Publications Research Service, Washington, D. C.

EFFECT OF OXYGEN, CARBON DIOXIDE, AND NITROGEN ON THE ELECTRIC PROPERTIES OF THE SMOOTH MUSCLE

M. F. Shuba 9 Jul. 1965 10 p refs Transl. into ENGLISH from Fiziol. Zh., Akad. Nauk Ukr. RSR (Kiev), v. 10, no. 2, Mar.-Apr. 1964 p 156-162

(JPRS-31013; TT-65-31511) CFSTI: $1.00

Experiments on the effect of oxygen, carbon dioxide, and nitrogen on physical electrotonus and action currents of the smooth annular stomach muscles of the frog indicate that the aerobic stage of metabolism plays an important role in changing the electrical properties of smooth muscles. Under the effect of oxygen, physical electrotonus is slightly decreased, spontaneous activity is increased, and the latent period of action currents is shortened. A gaseous mixture of 95% oxygen and 5% carbon dioxide decreases physical electrotonus, lengthens the latent period of the action current, and suppresses spontaneous activity. Changes in the electrical properties of muscles, particularly physical electrotonus, caused by oxygen, carbon dioxide, and nitrogen are easily reversible. Tests were made by excising a 2 × 20 mm strip from the interior portion of the stomach. The strip, with the polarizing and leadout electrodes (Ag-AgCl) attached, was placed in a dampening chamber which was hermetically sealed. M.W.R.

N65-28173# Kansas State Univ., Manhattan. Dept. of Psychology.

THE EVOLUTION OF PERCEPTUAL FRAMES OF REFERENCE

William Bevan Jan. 1965 37 p refs

(Contract Nonr-3634(01))

(TR-21; TR-22; TR-23; TR-24; AD-610438)

Several problems in physiological psychology are presented along with a discussion of the methods used and results. Included are the perception of auditory patterns as a function of incidental visual stimulation, vigilance performance with a qualitative shift in verbal reinforcers, and the potency of a lightness anchor as a function of the reflectance of its background. Also presented are the history and the intellectual trends leading to the present state of psychophysics. R.N.A.

N65-28174# Joint Publications Research Service, Washington, D. C.

EFFECT OF CORIOLIS ACCELERATION ON THE HUMAN ORGANISM

V. S. Nesterenko 2 Jul. 1965 19 p refs Transl. into ENGLISH from Usp. Sovrem. Biol. (Moscow), v. 59, no. 2, Mar.–Apr. 1965 p 246–256
(JPRS-30927; TT-65-31426) CFSTI: $1.00

The scientific literature on the effects of Coriolis acceleration on the human vestibular apparatus is reviewed. Coriolis acceleration is of particular interest in aviation medicine since it is the result of the combined motion of the pilot's head and the angular motion of his aircraft. Studies have associated it with various disturbances of the semicircular canals. Threshold magnitudes of Coriolis accleration have been studied in connection with manifestations of nystagmus, the sensation of simulated incline, banking illusions, and body deflection. Of particular interest in space research is the effect of Coriolis acceleration extended at relatively low levels over long periods of time. Considerable experimentation with animals and human subjects has been done in rotation chambers to investigate chronic effects, adaptation processes, and recovery after simulated flight. J.M.D

N65-28194# Tracor, Inc., Austin, Tex.
[BINAURAL INTERACTION INVESTIGATIONS] Summary Report, 1 Apr. 1964–1 Apr. 1965
29 Apr. 1965 53 p refs
(Contract Nonr-4193(00))
(TRACOR-65-181-U; AD-614613)

The two experiments reported here are concerned with detectability as a function of interaural intensity differences. The experiments investigate masking in the N_o,S_m and N_u,S_m conditions and are concerned with a model of binaural interaction recently proposed by Jeffress. Other models are also suggested and are considered in order to account for the processes of binaural interaction. The second investigation reported here represents the first set of data collected in the newly-expanded psychophysical laboratories at TRACOR, Inc., and demonstrates the facility with which large amounts of data may be collected in a relatively short period of time. With this capability, detectability as a function of interaural intensity differences is being examined at other interaural noise correlations in the testing of models of binaural interaction.
Author

N65-28205# London Univ., England. Inst. of Laryngology and Otology.
ENERGY TRANSFORMATION WITHIN THE INNER EAR Final Technical Report
D. F. N. Harrison Jul. 1964 9 p refs
(Grant AF-EOAR-63-30)
(AFOSR-65-0040; AD-610567)

At present the main emphasis has been applied to the cochlea of the Chiroptera and Rodentia but the more difficult problem of interpreting the considerable amount of laryngeal sections is now underway. Analysis of the many tape recordings made of the sounds emitted by these mammals has enabled the workers to postulate, and in some cases, verify theories of echolocation and voice production. This work naturally stimulates thought into the more pertinent problems of human auditory perception and voice production. New apparatus and techniques have, of necessity, had to be developed to meet the specialized nature of these investigations. A reference collection is now available of both preserved specimens and serially sectioned slides of many species of both the bats, rodents and other mammals. Author

N65-28223# Joint Publications Research Service, Washington, D. C.
MULTIPERIODIC CHANGES IN CONCENTRATION OF VARIOUS BLOOD COMPONENTS
S. E. Shnol' and V. I. Grishina 9 Jul. 1965 12 p refs Transl. into ENGLISH from Biofizika (Moscow), v. 9, no. 3, 1964 p 376–381
(JPRS-31007; TT-65-31505) CFSTI: $1.00

Changes in radioactivity of blood samples taken from peripheral vessels of rabbits following intravenous administration of substances labeled with radioactive isotopes are characterized by multiperiodic fluctuations. The isotopes used included P^{32}-phosphate, S^{35}-sulfate, and I^{131}-labeled human plasma proteins. Fluctuations in the amount of radioactivity in the blood were probably related to the radioactive irradiation of the isotopes used as indicators, and these fluctuations changed markedly under the influence of pharmacologically active agents, particularly medinal. For medinal the range fluctuations increase markedly, probably caused by increase in sluggishness and slowing of the regulatory system reaction time. The opposite effect is obtained with caffeine. Great similarity was observed in curves reflecting changes in radioactivity of blood (P^{32}) in different animals. M.W.R.

N65-28236# Harry Diamond Labs., Washington, D. C.
NONLINEAR DIFFERENTIAL EQUATIONS IN CIRCULATORY SYSTEM MODELLING
Walter J. Brinks 10 Feb. 1965 24 p refs
(HDL-TR-1244; AD-614702)

Nonlinear differential equations are suggested as models in the large of the circulatory system. The response of a particular second-order differential equation is examined with respect to changes in external resistance and system mass; approximate analogues are suggested between this response and that of the heart-blood network complex. Author

N65-28286# Joint Publications Research Service, Washington, D. C.
MISCELLANEOUS ARTICLES IN *PRIRODA* (NATURE, NO. 4, 1965) ON SPACE FLIGHT AND PHYSIOLOGICAL AND MEDICAL DEVELOPMENTS
3 Jul. 1965 38 p refs Transl. into ENGLISH from Priroda (Moscow), no. 4, 1965 p 9-16, 46-53, 78-81, 108-110
(JPRS-30944; TT-65-31443) CFSTI: $2.00

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N65-28287 Joint Publications Research Service, Washington, D. C.
UNPARALLELED SCIENTIFIC EXPERIMENT IN OUTER SPACE: A SOVIET MAN EXITS SPACE SHIP IN OUTER SPACE

M. V. Kel'dysh et al. *In its* Misc. Articles in Priroda (Nature, No. 4, 1965) on Space Flight and Physiol. and Med. Develop. p 1-12 (See N65-28286 17-04) CFSTI: $2.00

Presented is an edited transcript of a press conference at which cosmonauts reviewed their experiences in preparation for, and during, the flight of Voskhod-2. Particular emphasis is on the extravehicular experiments by cosmonaut A. A. Leonov. S.C.W.

N65-28288 Joint Publications Research Service, Washington, D. C.

ALONG THE ROUTE FROM THE EARTH TO THE MOON—A BIOLOGICAL EVALUATION OF DANGER FROM RADIATION DURING SPACE FLIGHTS

V. V. Antipov, M. D. Nikitin, and P. P. Saksonov. *In its* Misc. Articles in Priroda (Nature, No. 4, 1965) on Space Flight and Physiol. and Med. Develop. p 13-24 ref. (See N65-28286 17-04) CFSTI: $2.00

An evaluation of the biological effects of cosmic radiation is presented, which was designed to determine the magnitude of danger to be expected during manned lunar flights. Analyzed were primary cosmic radiation (PCR), ionizing radiation of the radiation belts surrounding the earth, and radiation from solar flares. Presented are data on the composition of each type of radiation, the energy spectrum, the interaction of the charged particles with matter, and the biological dosage created by each type of radiation. It is concluded that the integral dosage of radiation from PCR and the radiation of natural and artificial belts near the earth with a shielding of 1 to 2 g/cm^2 must not exceed 10 rem for a two-week flight on a lunar trajectory. To avoid the deleterious effects of solar flare radiation, the physical shielding should be increased to 3 g/cm^2. Medicinal shielding of cosmonauts from ionizing radiation is also proposed. S.C.W.

N65-28289 Joint Publications Research Service, Washington, D. C.

THERMAL MOTION IN LIVING PROTOPLASM

N. A. Mal'tsev. *In its* Misc. Articles in Priroda (Nature, No. 4, 1965) on Space Flight and Physiol. and Med. Develop. p 25-30 ref. (See N65-28286 17-04) CFSTI: $2.00

A study on the role of thermal molecular motion (diffusion) in living protoplasm is reported. Cited are results of a quantitative evaluation of thermal motion in which nuclear spinal echo determinations were employed. It was found that a relatively high level of internal thermal motion occurred in living protoplasm, which supported the hypothesis that protoplasm is a liquid. Also discussed is the importance of the diffusional homostat to the adaptation of organisms to changing external environmental conditions, its role in the regulation of thermal motion with the aid of absorbent barriers, and the significance of thermal molecular mechanisms to the process of aging. S.C.W.

N65-28290 Joint Publications Research Service, Washington, D. C.

GENETICS AT A NEW STAGE OF DEVELOPMENT

L. M. Kryukova. *In its* Misc. Articles in Priroda (Nature, No. 4, 1965) on Space Flight and Physiol. and Med. Develop. p 31-33 (See N65-28286 17-04) CFSTI: $2.00

A synopsis of research reported at the Moscow State University All-Union Symposium on *Experimental Mutagenesis in Animals, Plants, and Microorganisms* is presented. Among the research cited were included studies on the practical use of mutagens; conditions under which mutations occur; the evolution and genetic adaptation of organisms to radiation and radiational diseases; and studies which indicated that mutational changes are associated with molecular realignments occurring in chromosomes of a cell nucleus. S.C.W.

N65-28291# Joint Publications Research Service, Washington, D. C.

STUDIES IN PHYSIOLOGICAL EFFECTS CAUSED BY ORGANOPHOSPHORUS INSECTICIDES, CARBON MONOXIDE AND METHANE EXPOSURE, AND INHALATION OF FIBERGLASS PLASTICS FUMES

8 Jul. 1965. 18 p. refs. Transl. into ENGLISH from Farmakol. i Toksikol. (Moscow), no. 2, 1965 p 245-250 (JPRS-30976; TT-65-31474) CFSTI: $1.00

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1. THE EFFECTS OF SOME ORGANOPHOSPHORUS INSECTICIDES THROUGH THE SKIN. Yu. I. Kundiyev. p. 5 refs.

2. MORPHOLOGICAL CHANGES IN THE LIVER FOLLOWING EXPOSURE OF THE ORGANISM TO CARBON MONOXIDE, METHANE, AND THEIR COMBINATIONS. L. I. Morozova. p 6-9 (See N65-28292 17-04)

3. PATHOLOGICAL CHANGES IN THE ANIMAL ORGANISM DURING INHALATION OF FUMES EMANATING FROM SOME SPECIMENS OF FIBERGLASS REINFORCED PLASTIC. V. N. Russkikh and O. A. Naumova. p 10-15 refs. (See N65-28293 17-04)

N65-28292 Joint Publications Research Service, Washington, D. C.

MORPHOLOGICAL CHANGES IN THE LIVER FOLLOWING EXPOSURE OF THE ORGANISM TO CARBON MONOXIDE, METHANE, AND THEIR COMBINATIONS

L. I. Morozova. *In its* Studies in Physiol. Effects caused by Organophosphorus Insecticides, Carbon Monoxide and Methane Exposure, and Inhalation of Fiberglass Plastics Fumes. 8 Jul. 1965. p 6-9 (See N65-28291 17-04) CFSTI: $1.00

As part of a program on mining safety, the morphological condition of the liver under the combined influence of carbon monoxide and methane was studied. The necessity of this combination was dictated by the fact that in some areas of the mine the atmosphere of the shafts is saturated with a high content of carbon monoxide and methane. Experiments on white mice led to the following conclusions: 1) Carbon monoxide causes a pronounced disorder in blood circulation, dystrophic changes in parenchymatic elements, disruption of fatty and albumen exchanges, and total increase in size of nuclei of liver cells. 2) In the combined action on an organism of carbon monoxide and high-percent methane less pronounced changes are observed in the liver, than under the influence of carbon monoxide along. 3) High-percent methane with a normal content of oxygen in a gaseous mixture does not cause any structural or functional changes in the liver. J.L.D.

N65-28293 Joint Publications Research Service, Washington, D. C.

PATHOLOGICAL CHANGES IN THE ANIMAL ORGANISM DURING INHALATION OF FUMES EMANATING FROM SOME SPECIMENS OF FIBER GLASS REINFORCED PLASTIC

V. N. Russkikh and O. A. Naumova *In its* Studies in Physiol. Effects caused by Organophosphorus Insecticides, Carbon Monoxide and Methane Exposure, and Inhalation of Fiberglass Plastics Fumes 8 Jul. 1965 p 10-15 refs (See N65-28291 17-04) CFSTI: $1.00

Histological tests were performed on the heart, lungs, liver, spleen and nervous system to determine pathological changes resulting from the inhalation of fumes from fiber glass reinforced plastics. The most toxic plastics were found to be styrolene and hyperes, which may in certain concentrations cause extremely drastic alterations in the nervous system and the parenchymatose organs. J.L.D.

N65-28294# Joint Publications Research Service, Washington, D. C.

STUDIES IN HYGIENE AND SANITATION

9 Jul. 1965 47 p refs Transl. into ENGLISH from Gigiena i Sanit. (Moscow), no. 4, Apr. 1965 p 3-6, 12-16, 28-32, 44-51 (JPRS-30993; TT-6531491) CFSTI: $2.00

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1. SUBSTANTIATING THE MAXIMUM PERMISSIBLE DAILY AVERAGE CONCENTRATION OF CARBON MONOXIDE IN THE ATMOSPHERIC AIR T. M. Shul'ga p 1-7 refs (See N65-28295 17-04)

2. PURIFICATION OF WATER CONTAMINATED WITH BOTULINUS TOXIN BY MEANS OF ION-EXCHANGE POLYMERS Ye. V. Shtannikov and V. A. Zhuravlev p 8-16 refs (See N65-28296 17-04)

3. THE EFFECT OF NOISE LEVEL ON WORKING EFFICIENCY S. D. Kovrigin and A. P. Mikheyev p 17-23 refs (See N65-28297 17-05)

4. THE IMMEDIATE PROBLEMS OF INDUSTRIAL TOXICOLOGY I. V. Sanotskiy p 24-28 refs (See N65-28298 17-04)

5. THE EFFECT OF LONG-TERM ADMINISTRATION OF SMALL DOSES OF CALCIUM-45 ON CERTAIN INDICES OF NATURAL IMMUNITY V. I. Ternov p 29-38 refs (See N65-28299 17-04)

6. REVIEW OF THE BOOK "TEKHNICHESKIYE USLOVIYA NA METODY OPREDELENIYA VREDNYKH VESHCHESTV v VOZDUKHE" [TECHNICAL SPECIFICATIONS FOR METHODS OF DETERMINING HARMFUL SUBSTANCES IN THE AIR] p 39-44

N65-28295 Joint Publications Research Service, Washington, D. C.

SUBSTANTIATING THE MAXIMUM PERMISSIBLE DAILY AVERAGE CONCENTRATION OF CARBON MONOXIDE IN THE ATMOSPHERIC AIR

T. M. Shul'ga *In its* Studies in Hyg. and Sanit. 9 Jul. 1965 p 1-7 refs (See N65-28294 17-04) CFSTI: $2.00

Two white rats were subjected to chronic CO poisoning of about one and two mg/cu m around the clock for two and a half months. It was found that CO in an average concentration of 2.65 mg/cu m under conditions of round-the-clock chronic poisoning for a period of two and a half months caused a certain change in porphyrin metabolism. CO in average concentration of 1.3 mg/cu m under the same conditions causes no change in the motor chronaxie or porphyrin metabolism of experimental animals and has no effect on the function of the hemopoietic system. The average daily maximum permissible concentration of CO in the atmospheric air at a level of 1 mg/cu m as now adopted, may be recognized as experimentally substantiated at the current stage. N.E.A.

N65-28296 Joint Publications Research Service, Washington, D. C.

PURIFICATION OF WATER CONTAMINATED WITH BOTULINUS TOXIN BY MEANS OF ION-EXCHANGE POLYMERS

Ye. V. Shtannikov and V. A. Zhuravlev *In its* Studies in Hyg. and Sanit. 9 Jul. 1965 p 8-16 refs (See N65-28294 17-04) CFSTI: $2.00

This work presents data from experimental investigations on the use of ion-exchange polymers for the purification of water contaminated with botulinus toxin. From the experimental data, it was shown that ion-exchange polymers are effective means for purifying water not only of bacteria, but also of highly pathogenic agents—biological poisons (botulinus toxin). The toxin-inactivation mechanism is explained by the combined effect of sorption as well as by the denaturing effect of aggressive media which form as a result of ion exchange. The treatment of water with ionites according to the OH-anion + H-cation scheme, which causes the formation of an alkali filtrate, makes it possible to inactivate the toxin with particular effectiveness and speed. N.E.A.

N65-28297 Joint Publications Research Service, Washington, D. C.

THE EFFECT OF NOISE LEVEL ON WORKING EFFICIENCY

S. D. Kovrigin and A. P. Mikheyev *In its* Studies in Hyg. and Sanit. 9 Jul. 1965 p 17-23 refs (See N65-28294 17-04) CFSTI: $2.00

The effect of noise level on the working efficiency in letter-sorting rooms of post offices is investigated. The results of the investigation indicate that the letter sorter's productivity, apart from other factors, depends to a significant degree on the operative noise levels. The investigation results agree with the data in Soviet and foreign literature regarding the effect of noise on efficiency. The research results also indicate the advisability of setting standards for maximum permissible sound-pressure levels for communications enterprises. N.E.A.

N65-28298 Joint Publications Research Service, Washington, D. C.

THE IMMEDIATE PROBLEMS OF INDUSTRIAL TOXICOLOGY

I. V. Sanotskiy *In its* Studies in Hyg. and Sanit. 9 Jul. 1965 p 24-28 refs (See N65-28294 17-04) CFSTI: $2.00

Problems of industrial toxicology can be solved by combining the theoretical and practical trends in laboratory toxicological experiment with the hygienic evaluation of new technology employed in chemical production, as well as with the appropriate clinical research. Some of the problems considered in industrial toxicology are: maximum permissible concentrations of the new chemicals that the air may contain, and comprehensive measures of prophylaxis; efficient technology which rules out the use of highly toxic and dangerous compounds; appropriate condition of work and rest; individual means of protestion; therapeutic and prophylactic diet, and methods of early diagnosis. Methods by which the solutions of some of these problems are discussed. N.E.A.

N65-28299 Joint Publications Research Service, Washington, D. C.

THE EFFECT OF LONG-TERM ADMINISTRATION OF SMALL DOSES OF CALCIUM-45 ON CERTAIN INDICES OF NATURAL IMMUNITY

V. I. Ternov *In its* Studies in Hyg. and Sanit. 9 Jul. 1965 p 29-38 refs (See N65-28294 17-04) CFSTI: $2.00

The daily introduction of Ca-45 into white rats in a dose one thousand times in excess of the maximum permissible concentration (MPC) of this isotope for water (0.09 microcurie/kg) causes clear signs of chronic radiation injury in animals from as early as the third month on. Ca-45 in a dose one hundred times in excess MPC induces the first signs of radiation injury in ten and a half months of introducing it into the white rats. The daily introduction of Ca-45 into white rats in a dose of 0.0009 microcurie/kg (ten times excess MPC) over the space of nine months induces only negligible functional changes involving certain immunity factors. This dose of the isotope can be regarded as the threshold dose. N.E.A.

N65-28325# Rochester Univ., N. Y. Atomic Energy Project
PLUTONIUM UPTAKE BY ANIMALS EXPOSED TO A NON-NUCLEAR DETONATION OF A PLUTONIUM-BEARING WEAPON SIMULANT. PART I: FIELD OPERATIONS
R. H. Wilson and J. L. Terry 28 Jun. 1965 49 p refs
(Contract W-7401-ENG-49)
(UR-665) CFSTI: $3.00

Operation Roller Coaster was a joint United States–United Kingdom field exercise undertaken to aid in the evaluation of criteria for the storage and transport of Plutonium-bearing weapons. The biological studies performed as a part of this Operation consisted of exposing 300 dogs, sheep and burros on a highly mobile array to the cloud generated by the chemical detonation procedures employed in the biological studies. Subsequent reports will present results, interpretations, etc. Author

N65-28334# HRB-Singer, Inc., State College, Pa.
UTILITY OF INFORMATION AS A PREDICTOR OF DECISION ADEQUACY
James M. Mc Kendry and Paul M. Hurst Sep. 1964 38 p refs
(Contract Nonr-4441(00))
(Rept.-567-R-2)

Information used to predict decisions is applied to a simple analog of antisubmarine and anti-aircraft situations, with specific applications to the former discussed. In this way, it is possible to express information requirements quantitatively by use of an information-indexing approach, and to provide a commander with a single score which reflects the total utility of all the known information. Information provided to subjects is categorized into types commonly provided by intelligence and surveillance systems. Using expectancy equations, the true value of any item can be computed. Questions relating to the state of nature, judgment accuracy, information index performance values, and the invariance of these performance scores are converted into experimental predictions subjected to traditional hypothesis testing. Apparatus used in the test, and how the examinee's subjective estimates are converted to scores along the utility scale are also described. The appendices deal with theoretical problems and the equations required for their solutions. M.W.R.

N65-28341# Federal Radiation Council, Washington, D. C.
IMPLICATIONS TO MAN OF IRRADIATION BY INTERNALLY DEPOSITED STRONTIUM-89, STRONTIUM-90, AND CESIUM-137
Arthur C. Upton et al 31 Dec. 1964 38 p refs Report of an Advisory Comm. from the Div. of Med. Sci. NAS-NRC

In reviewing the possible biological effects of irradiation, particular consideration was given to hazards that might result from uptake of any of these isotopes under conditions leading to cumulative dose levels of 25 rads or less within about one year after contamination. The effects of these nuclides in man, in view of their particular metabolic properties and in relation to known irradiation results from other internally deposited radioelements and from external sources, were surveyed. Risks of chief concern from internally deposited cesium-137, strontium-89, and strontium-90 are considered to be the carcinogenic effects on the exposed embryo, fetus, child, and adult. Also considered as risks are the genetic effects, and the effects on the development of the exposed embryo and fetus due to cesium-137; and disturbances of skeletal growth and development in the exposed embryo and fetus as a result of strontium-89 and strontium-90 dosages. M.G.J.

N65-28346*# Oklahoma City Univ., Okla.
[INTERDISCIPLINARY STUDIES OF THE EFFECTS OF THE SPACE ENVIRONMENT ON BIOLOGICAL SYSTEMS] Semiannual Status Report
30 Apr. 1965 50 p refs
(Grant NsG-300-63)
(NASA-CR-63790) CFSTI: HC $2.00/MF $0.50 CSCL 06S

The effects of the experimental environment on the turnover rates of metabolic pools after 4 and 12 weeks of exposure and evidence of the oxidative state of the tissues in another experiment for 4, 8, or 12 weeks are reported. It was found that exposure of rats for four weeks to a high oxygen–low pressure environment produced symptoms of marginal oxygen toxicity. After prolonged exposure, many of the parameters which were observed earlier to be abnormal tend to return to the levels found in the control animals, although some did not. The response of coenzyme A was as expected. In the early stages of the experiment, it was destroyed by a high cellular level of oxygen. On longer exposure, the oxygen tension at the cellular level was decreased and the coenzyme concentration was allowed to return to normal. The hematocrit values of the experimental animals decreased while hemoglobin suffered parallel decreases. Small increases in methemoglobin were observed in the blood of these animals though glucose-6-phosphate dehydrogenase activity roughly paralleled the changes in numbers of red cells. E.E.B.

N65-28350*# Naval School of Aviation Medicine, Pensacola, Fla.
COMPARATIVE EFFECTS OF PROLONGED ROTATION AT 10 RPM ON POSTURAL EQUILIBRIUM IN VESTIBULAR NORMAL AND VESTIBULAR DEFECTIVE HUMAN SUBJECTS
Alfred R. Fregly and Robert S. Kennedy 23 Mar. 1965 25 p refs Joint rept. with NASA
(NASA Order R-93)
(NASA-CR-63799; NSAM-920) CFSTI: HC $1.00/MF $0.50 CSCL 06S

As a means of better understanding the role of the vestibular organs in relation to ataxic responses to prolonged rotation, two contrasting groups of subjects were studied to: 1) determine quantitatively to what extent two visually-enhanced postural equilibrium test performances of labyrinthine defective subjects (L-D's) on a single rail of optimum difficulty become disturbed along the time axis of rotation (Experiment A), and 2) compare the performances of L-D's with normals in terms of postrotation effects as studied with a new standardized ataxia test battery (Experiment B). Rotation-induced ataxia was superimposed to an appreciable extent upon the previously present and characteristic vestibular ataxia in the L-D's

point is emphasized that man is the key to operations which require judgment, decision, creative intelligence, and flexibility which characterize military situations. E.E.B.

N65-28455 Bundesamt fuer Wehrtechnik und Beschaffung, Koblenz (West Germany).
MAN–MACHINE PROBLEMS IN VTOL AIRCRAFT
Theodor Benecke *In* AGARD Proc. of the 14th AGARD Gen. Assembly [1964] p 91–98 refs (See N65-28450 17-34)

With conventional aircraft the pilot's all important quality has been his flying proficiency. All other activity within the aircraft was limited to watching engine performance parameters, assimilating target optical tracking information and operating the weapons system. With VTOL configurations another category of proficiency is added. Take-off demands careful evaluation of atmospheric conditions prevailing at the time and of aircraft gross weight, and take-off must be accomplished very speedily when it is extremely difficult to check through all systems. Furthermore, the pilot must be capable of hovering, maneuvering the aircraft above ground from one point to another, carefully controlling altitude, transitioning from hover to aerodynamic flight, and vice versa. Control aids for the VTOL pilot, the merits of simulation in VTOL aircraft engineering and pilot training, and experience gained in flying the VJ-101 VTOL aircraft are discussed. Also, the particular problems in training pilots for the VTOL type aircraft are considered. E.E.B.

N65-28456 Sud-Aviation, Paris (France).
'CONCORDE': CONSIDERATION OF THE POINT OF VIEW OF THE RELATIONSHIP BETWEEN MAN AND MACHINE ['CONCORDE': ENVISAGE DU POINT DE VUE DES RELATIONS DE L'HOMME ET DE LA MACHINE]
M. R. Blanchet *In* AGARD Proc. of the 14th AGARD Gen. Assembly [1964] p 99–118 In FRENCH (See N65-28450 17-34)

Problems in passenger transport design associated with transonic and supersonic travel are discussed. The limits imposed on velocity, acceleration, altitude, trajectory, and on the structure and material of the aircraft, by the requirements for passenger safety and comfort are quite different from those involved in subsonic air transportation. Completely automatic function of the aircraft is not possible, and human supervision will continue to be necessary for many control and decision making operations. The problems are considered in the framework of the French supersonic transport, Concorde, expected to be completed in 1967. Trans. by J.M.D.

N65-28531# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
PHYSICOCHEMICAL ASPECTS OF THE CONDITIONING OF PHYTOPHARMACEUTICAL PREPARATIONS
S. Petrascu, Margareta Baltac, and Maria Ilie 31 Mar. 1965 39 p refs Transl. into ENGLISH from Rev. Chim. (Rumania), v. 15, no. 2, 1964 p 91–100
(FTD-TT-64-1121/1+2+3+4; AD-463478)

The phenomenon of wetting is considered in the use of phytopharmaceutical substances for plant protection. Also considered are the surface phenomenon; the formation and stability of the emulsions; and the granular structure of the preparations, such as powders, pastes, suspensions, emulsions, and sprays. A literature survey showed that the degree of dispersion of emulsions and suspensions influenced their biological effectiveness, and that optimal dispersion depended on the active substance and on the species of the organism to be combatted. Various methods for determining common quality norms were studied, and the numerical data obtained were compared with values indicated in the literature. As a result, some 300 preparations were examined, and criteria established for such main categories as powders for dusting, wettable powders, and emulsifiable preparations. For powders, these norms include specifications for moisture content; percentages of coarse, large, and fine granules; bulk weight; adhesion; and suspensibility. Specifications for emulsifiable preparations cover water content, density, stability of the preparation and emulsion, and wetting power. The methods of analyses are described. M.G.J.

N65-28538*# North Carolina State Coll., Raleigh. Dept. of Genetics.
UTILIZATION OF HABROBRACON AND ARTEMIA AS EXPERIMENTAL MATERIALS IN BIOASTRONAUTIC STUDIES Status Report, Jan.–Jun. 1965
D. S. Grosch [1965] 7 p
(Grant NsG-678)
(NASA-CR-63829) CFSTI: HC $1.00/MF $0.50 CSCL 06F

The combined effects of radiation and gravity forces in excess of 1-g were investigated using the wasp, Habrobracon. A motor designed for long continuous operation fitted with a head machined to hold capsules of wasps was used in this investigation. Centrifugation for a few minutes at a speed providing a force of 1000 g was found too severe for all stages of the braconid life cycle; however, the majority of adults survived 500 g for as long as 24 hours. The radiation exposure was conducted with Co^{60} at a dose rate of 30 R/hr to give 720 R for a 24-hour exposure. Experiments were made with centrifuged, irradiated, centrifuged and irradiated, and the control. Egg production and hatchability were decreased for the combination exposure of increased gravity and radiation below the records for either radiation or centrifugation alone. Experiments were also made to test the radiation and prototype packages under simulated space flight conditions. These conditions were: simulated flight profile, irradiation, combined effects of profile and radiation, and control. Wasp survival was good except in the 1000 R position where wasps were pulverized during the simulated reentry vibration testing. E.E.B.

N65-28539*# Naval School of Aviation Medicine, Pensacola, Fla.
EVALUATION OF SOME ANTIMOTION SICKNESS DRUGS ON THE SLOW ROTATION ROOM (NO. 1)
Charles D. Wood, Ashton Graybiel, Robert G. Mc Donough, and Robert S. Kennedy 29 Mar. 1965 10 p refs *Joint report with* NASA *Its* Rept.-110
(NASA Order R-93)
(NASA-CR-63800; NSAM-922) CFSTI: HC $1.00/MF $0.50 CSCL 06O

A series of antimotion sickness drugs was evaluated on the human centrifuge. The procedures used enabled the same stimulus to be applied to the individual subjects through the series of drug tests. A combination of hyoscine and d-amphetamine was found to be the most effective preparation. Hyoscine alone was the most effective single drug followed by d-amphetamine and meclizine. Prochlorperazine was slightly effective but chlorpromazine, thiethylperazine, and trimethobenzamide were ineffective. Hyoscine alone produced pronounced drowsiness. The combination with d-amphetamine relieved this side effect but not the vertigo and dry mouth. The advantages of the human centrifuge in the testing of antimotion sickness drugs are pointed out. Author

(Exp. A), and (in Exp. B), upon cessation, there were significant decrements on all Test Battery performances of the normal group, whereas in the L-D group significant decrements were observed only on the two visually-enhanced tests. Other findings, which were considered tentative, are discussed in terms of several unresolved methodological problems in such experiments. Author

N65-28352# Technology, Inc., Dayton, Ohio.
STUDIES ON VERTEBRAL INJURIES SUSTAINED DURING AIRCREW EJECTION Final Report
Lawrence S. Higgins, Stuart A. Enfield, and Robert J. Marshall May 1965 151 p refs
(Contract Nonr-4675(00))
(TI-65-041; AD-615442)

Available world literature on ejection-related vertebral injuries in aviators was thoroughly surveyed and is presented as an annotated bibliography. Basic findings of some of the principal investigators into vertebral injury are summarized. Parameters associated with the pilot, aircraft, and ejection-seat system are evaluated in the light of their trends and relative significance in contributing to ejection-caused vertebral injury. These studies led to the development of a proposed research design to determine the dynamic strength of isolated vertebrae. Preliminary research objectives are outlined. The experimental procedure and analysis techniques are set forth. A plan for sequencing and integrating the research operations is diagramed. Author

N65-28357# Joint Publications Research Service, Washington, D. C.
THE EFFECT OF MICROWAVES OF VARYING INTENSITY ON THE BLOOD AND HEMOPOIETIC ORGANS OF WHITE RATS
I. A. Kitsovskaya 18 Jul. 1965 10 p refs Transl. into ENGLISH from Gigiena Truda i Prof. Zabolevaniya (Moscow), no. 6, Jun. 1964 p 14-19
(JPRS-31047; TT-65-31545) CFSTI: $1.00

Reported are the effects of the administration of a dose of radiation with 10-centimeter wave pulses upon the blood and hemopoietic organs (bone marrow and spleen) in white rats. After establishing each rat's background level for hemoglobin content, the number of erythrocytes, reticulocytes, and leukocytes and their differential, radiation of the animals was begun with the microwave intensity and exposure periods varied for each group. Periodic blood studies were performed, and changes in the number of formed blood elements in each animal were compared and the results recorded. M.R.W.

N65-28451 Royal Aircraft Establishment, Farnborough (England).
MAN-MACHINE SYNERGY
T. C. D. Whiteside *In* AGARD Proc. of the 14th AGARD Gen. Assembly [1964] p 39-46 (See N65-28450 17-34)

The question of human response and the modification of this response by anatomical, physiological, or psychological origin are examined. The man-machine synergy depends fundamentally upon communication-communication in this sense referring to the exchange of information from man to machine and from machine to man. In presenting information, maximum use should be made of transfer of training. An instrument which makes use of an aspect of perception which was learned in childhood will have a considerable advantage over one without this association. The plea is made for better communication between man and machine on the basis that more use should be made of man in his ability to make a decision rather than as a complicated sensor responding in a binary system. The time and effort which a highly trained pilot and crew have to put into an extensive preflight check list would seem to be more usefully employed in performing some function making use of judgment and skill at that critical stage of the flight. E.E.B.

N65-28452 Aerospace Medical Div. Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, Ohio.
ADAPTATION OF MAN TO THE MACHINE
Joseph M. Quashnock *In* AGARD Proc. of the 14th AGARD Gen. Assembly [1964] p 47-63 (See N65-28450 17-34)

Protective devices to extend the tolerance limits of crews to aerospace hazards and the simulators to reproduce such hazards at or near ground level for training and research purposes are discussed. Also, certain philosophies which are frequently overlooked in the initial planning stages of research and development are considered. The protection afforded by the pressure suit to low atmospheric pressure, heat, acceleration, and noise is reviewed. Also, the environmental chambers for the evaluation of these devices are included. To prepare man for his future roles in space, the interactions of man's equipment and his environment must be of primary concern. Man's primary piece of space equipment is his pressure suit. Most of this presentation concerns the protection given by this garment. E.E.B.

N65-28453 Aerospace Corp., El Segundo, Calif.
THE ROLE OF THE PILOT IN THE MERCURY AND X-15 FLIGHTS
Walter C. Williams *In* AGARD Proc. of the 14th AGARD Gen. Assembly [1964] p 65-81 refs (See N65-28450 17-34)

The objectives of X-15 were verifications of the predicted hypersonic aerodynamics; the study of aircraft structures in a high heating and loading environment; the investigation of stability and control problems encountered while leaving and entering the earth's atmosphere; and the investigations of problems associated with brief periods of weightlessness. Project Mercury had as a basic objective orbital flight and recovery and the examination of man's capabilities in the space environment. In both programs, one of the important roles of the pilot was systems management. In this area, man's contribution to the success of space flight and the effectiveness of employing redundant systems are emphasized. In the case of the X-15, the contribution of the pilot and redundant systems to the success of the flight program are shown. The control and reference systems used in Mercury; the sequence of the major events for Mercury-Atlas manned orbital missions; the pilot ability to control the attitude of the Mercury spacecraft; and the ability of the pilot to control the X-15 during the boost phase are shown. E.E.B.

N65-28454 Air Force Dept., Washington, D. C.
SOME ASPECTS OF HIGH-SPEED MANNED FLIGHT AT LOW ALTITUDES
James Ferguson *In* AGARD Proc. of the 14th AGARD Gen. Assembly [1964] p 83-89 (See N65-28450 17-34)

The limitations and capabilities for high-speed manned flight at low-altitudes are discussed. Some of the limitations are nature controlled; others are operational. Technology in materials, structures, aerodynamics, and engines generally establish basic speed limitations. Ceiling, visibility, and turbulence can be called nature controlled limitations. Operationally, the defenses, terrain, detection capabilities, crew proficiency, weapon delivery, and mission urgency must be considered. With high speed-low altitude flight, everything possible should be preplanned. Distraction requiring head down in cockpit must be reduced or eliminated. Reaction time is critical. Also, the

N65-28540*# Naval School of Aviation Medicine, Pensacola, Fla.

A NEW QUANTITATIVE ATAXIA TEST BATTERY

Ashton Graybiel and Alfred R. Fregly 19 Mar. 1965 43 p refs Joint Report with NASA *Its* Rept.-107

NASA Order R-93)

(NASA-CR-63803; NSAM-919) CFSTI: HC $2.00/MF $0.50 CSCL 05J

A new multi-dimensional quantitative ataxia test battery employing the "rail method" of testing was developed to assess more precisely than heretofore postural equilibrium-disequilibrium under unusual conditions and stresses such as rotating environments. High reliability, including test-retest reliability, was demonstrated for each of two versions: a Long Version employing six rails of varying widths, and a Short Version employing two of these rails. Normative standards covering a wide age range, and age, height, and weight influences upon performance, tentative sex differences in performance, practice effects, and Test Battery relationships with several clinical-type ataxia tests were determined. Validity of the standardized test procedures in the laboratory, in the field, and in clinical situations was demonstrated, and present and future uses of the Test Battery in normals and auricular involved individuals in vestibular research as well as in related research-clinical areas were outlined, and several methodological limitations were indicated. Author

N65-28590# National Research Council of Canada, Ottawa (Ontario).

***EXPERIMENTS ON THE PERCEPTION OF ULTRA-SHORT-WAVES BY BIRDS [VERSUCHE ZUR WAHRNEHMUNG VON ULTRAKURZWELLEN DURCH VOGEL]* Technical Translation**

G. Kramer 1964 8 p refs Transl. into ENGLISH from Vogelwarte (Stuttgart), v. 16, no. 2, 1951 p 55-59

(NRC-TT-1162)

Night migrating song birds, specifically red-backed shrikes, were conditioned by means of the condition reflex method to the decimeter waves emitted continuously by a weak transmitter to determine the methods by which night migratory birds orient themselves. The transmission frequency was 520 mc. The antenna emission power was approximately three to six watts. In the various conditioning methods employed, the birds were conditioned not only to the radiation, but also to an accompanying stimulus which the birds could be assumed to perceive. In all tests the transmitter was set up so that the observer could be certain that the emission was taking place by observing the deflection of a meter. Tests were performed on perching birds and also birds in flight. A discussion of the tests is given with a conclusion of negative results. N.E.A.

N65-28642# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

PHYSIOLOGIC REACTIONS OF ANIMALS DURING FLIGHTS ON THE THIRD, FOURTH, AND FIFTH SATELLITE SPACESHIPS

O. G. Gazenko, I. I. Kas'yan, A. R. Kotovskaya, Ye. M. Yuganov, and V. I. Yazdovskiy 26 Jan. 1965 23 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Ser. Biol. (Moscow), no. 4, 1964 p 497-511

(FTD-TT-64-360, AD-615525)

Flights of experimental animals in near-earth space on satellite spaceships showed an absence, during and after flight, of pathological changes in system of blood circulation and breathing. Functional shifts of basic physiologic functions of animals turned out to be the most expressed during entry of ship into orbit and descent of it to earth. In period of weightlessness, the indices of cardiovascular system for majority of dogs already in the 2-3rd turns were lowered to initial magnitudes. In state of weightlessness, both curtailing and quickening of breathing was noted. Author

N65-28700# Joint Publications Research Service, Washington, D. C.

BIOLOGICAL ACTION OF ULTRASOUND AND SUPER-HIGH FREQUENCY ELECTROMAGNETIC OSCILLATIONS

A. A. Gorodetskiy, ed. 30 Jun. 1965 143 p refs Transl. into ENGLISH of the booklet "Biologicheskoye Deystviye Ultrazvuka i Sverkhvysokochastotnykh Elektromagnitnykh Kolebaniy" Kiev, Akad. Nauk Ukr. SSR, 1964 p 3-120 (JPRS-30860; TT-65-31380) CFSTI: $4.00

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N65-28701 Joint Publications Research Service, Washington, D. C.

EFFECT OF IRRADIATION BY ULTRASONIC WAVES ON THE MORPHOLOGICAL COMPOSITION AND ON CERTAIN PHYSICO-CHEMICAL PROPERTIES OF THE BLOOD OF ANIMALS

S. A. Bershteyn *In its* Biol. Action of Ultrasound and Super-High Freq. Electromagnetic Oscillations 30 Jun. 1965 p 2-20 refs (See N65-28700 17-04) CFSTI: $4.00

Irradiation of animals with ultrasonic sound caused changes in the resistance of erythrocytes and the morphologic composition of peripheral blood with the degree of change being dependent on the intensity of the ultrasonic oscillations. Changes in the morphologic composition of peripheral blood occurred soon after irradiation and were moderately pronounced. The blood morphology was completely normalized

from 10 to 15 days after irradiation. Irradiation intensities of 3 watts per square centimeter had the most pronounced effect on blood morphology. Irradiation intensities of 1 and 3 watts per square centimeter caused distinct pathomorphologic changes in internal organs, with the most pronounced changes occurring in areas of direct contact with the emitter. Reticulocytosis, the division of red propagules in bone marrow, the change in erythrocyte geometric form, and focal changes of parenchyma in the spleen and liver indicate a connection between changes in the blood and the functional state of hemopoietic and blood destroying systems. R.N.A.

N65-28702 Joint Publications Research Service, Washington, D. C.

ACTION OF ULTRASOUND ON THE METABOLISM OF NUCLEIC ACIDS

N. Ye. Khursin *In its* Biol. Action of Ultrasound and Super-High Freq. Electromagnetic Oscillations 30 Jun. 1965 p 21-34 refs (See N65-28700 17-04) CFSTI: $4.00

A study to determine the mechanism of changes in the content of nucleic acids in the testes of white rats under the influence of ultrasonic sound and heat, and to determine the metabolism of nucleic acids in dynamics is presented. Ultrasonic sound at an intensity of 2 watts per square centimeter, with a frequency of 800 kilocycles per second and a 10 minute exposure, caused a regular decrease in the content of nucleic acids in the testes of the white rats. Cooling the testes protected the nucleic acids from the destructive action of the ultrasonic sound, while heating caused an intensified disintegration of the nucleic acids. The thermal factor was concluded to play a leading role in the mechanism of ultrasonic action on the metabolism of nucleic acids. R.N.A.

N65-28703 Joint Publications Research Service, Washington, D. C.

MORPHOLOGICAL CHANGES OF TESTES CAUSED BY THE INFLUENCE OF ULTRASOUND

V. M. Andrianov *In its* Biol. Action of Ultrasound and Super-High Freq. Electromagnetic Oscillations 30 Jun. 1965 p 35-54 refs (See N65-28700 17-04) CFSTI: $4.00

The effects of small intensities of ultrasonic wave irradiation on the morphology of white rat testes were investigated. The ultrasonic effect on morphologic changes was of a phase nature. A buildup of the pathologic process in damaged structures occurred as a result of sonication. An ultrasonic irradiation intensity of 2 and 0.2 watts per square centimeter caused fragmentation of nerve fibers in the testes. An immediate change in the structure of the testes occurred at the time of irradiation. Regeneration processes restored the morphologic changes after 14 days. R.N.A.

N65-28704 Joint Publications Research Service, Washington, D. C.

ULTRA-ACOUSTIC PARAMETERS OF THE BLOOD IN THE DYNAMICS OF ACUTE RADIATION SICKNESS

I. R. Yevdokimov *In its* Biol. Action of Ultrasound and Super-High Freq. Electromagnetic Oscillations 30 Jun. 1965 p 55-72 refs (See N65-28700 17-04) CFSTI: $4.00

Investigations were conducted on the propagation speed of ultrasonic oscillations in intact blood and in blood irradiated with X-rays in vitro, in the peripheral blood of healthy animals and animals with radiation sickness, and on the absorption of ultrasonic energy in the blood of irradiated animals. A deceleration of the propagation of ultrasonic oscillations in the blood was observed in acute radiation sickness. The speed of sound in the blood changes in phases, conforming with periods during the course of radiation sickness. The propagation velocity of ultrasonic oscillations in the blood of irradiated dogs depends on changes in the hemoglobin content, the erythrocyte quantity, and on their volume, specific gravity, and compressibility. Irradiation of whole blood and plasma with X-rays in vitro in doses of 100 and 150 kiloroentgens does not lead to changes of the speed of sound in them. The absorption coefficient of ultrasonic energy in the blood of dogs in acute radiation sickness decreases because of a decrease in hemoglobin content in the blood. R.N.A.

N65-28705 Joint Publications Research Service, Washington, D. C.

THE THERMAL EFFECT OF THE ACTION OF A SVCh [SUPER-HIGH FREQUENCY] ELECTROMAGNETIC FIELD ON ANIMALS AND CERTAIN PROBLEMS OF DOSIMETRY OF A SVCh FIELD

V. I. Mirutenko *In its* Biol. Action of Ultrasound and Super-High Freq. Electromagnetic Oscillations 30 Jun. 1965 p 73-94 refs (See N65-28700 17-04) CFSTI: $4.00

A method of waveguide dosimetry of absorbed energy of the SVCh field of a wavelength of three centimeters in a biological specimen was developed. The magnitude of thermal effect on the SVCh field in conditions of general irradiation is in direct proportional dependency on the magnitude of incident energy. The increase of thermal effect in irradiated tissues of the animal during local irradiation occurs linearly for short exposures (1 to 3 minutes) and is determined by the quantity of energy of the SVCh field absorbed. During prolonged action of an intense SVCh field (3 to 5 minutes) the magnitude of the thermal effect and the distribution of heat in all organs and tissues of the animal is determined by heat regulation and blood circulation. This method for determining the energy absorbed, serves as a basis of dosimetry for the absorbed energy of the SVCh field by the thermal effect of its action in the study of the biological action of this form of energy in experiments on animals. R.N.A.

N65-28706 Joint Publications Research Service, Washington, D. C.

EFFECT OF SVCh ELECTROMAGNETIC FIELD ON THE REPRODUCTION, COMPOSITION OF PERIPHERAL BLOOD, CONDITIONED REFLEX ACTIVITY, AND MORPHOLOGY OF THE INTERNAL ORGANS OF WHITE MICE

S. F. Gorodetskaya *In its* Biol. Action of Ultrasound and Super-High Freq. Electromagnetic Oscillations 30 Jun. 1965 p 95-107 refs (See N65-28700 17-04) CFSTI: $4.00

A study was conducted to compare the effects of a SVCh field with convectional heat on the reproduction, peripheral blood composition, conditioned reflex activity, and morphology of the internal organs of white mice. Changes in the conditioned reflex activity by the SVCh field were more clear-cut and prolonged than by convectional heat. An SVCh field at a PPM of 0.4 watts per cubic centimeter caused definite changes in the reproduction of both males and females and in the peripheral blood composition. The female sex organs were more sensitive to the SVCh field irradiations. Convectional heat exposure caused disturbances in the morphology and sex organs of the mice. Hemodynamic disorders also developed in the early periods after exposure. Changes in the peripheral blood composition by the SVCh field lead to a decrease of leukocytes, hemoglobin, and erythrocytes directly after irradiation. Normalization was restored by the 10th to 15th day after irradiation. The effects of convectional heat on the peripheral blood composition were less and recovery faster than with SVCh field. R.N.A.

N65-28707 Joint Publications Research Service, Washington, D. C.

THE PROBLEM OF MICROWAVE LESIONS OF THE SKIN

A. A. Slabospitskiy *In its* Biol. Action of Ultrasound and Super-High Freq. Electromagnetic Oscillations 30 Jun. 1965 p 108-126 refs (See N65-28700 17-04) CFSTI: $4.00

Skin lesions on white rats and rabbits caused by microwaves 3 centimeters in length were investigated. Upon exposure to microwaves, the skin temperature of the animals increased, with all layers of the skin being heated equally. During the microwave exposure at a power flux density of 0.5 watts per square centimeter for three minutes, a pathological focus appeared on the skin characterized by disinnervation, persistent stasis on the exposed area, and necrobiotic processes with an outcome of mumification. However, exposure to microwaves of the same intensity but with the skin heating eliminated, did not produce pathological changes. The skin lesions appear to be the result of the action of heat given off during the absorption of the microwave energy by the skin tissues. R.N.A.

N65-28708 Joint Publications Research Service, Washington, D. C.

THE EFFECT OF SUPER-HIGH FREQUENCIES OF AN ELECTROMAGNETIC FIELD ON THE ACTIVITY OF POLYNUCLEASES AND CONTENT OF NUCLEIC ACID

N. I. Kerova *In its* Biol. Action of Ultrasound and Super-High Freq. Electromagnetic Oscillations 30 Jun. 1965 p 127-139 refs (See N65-28700 17-04) CFSTI: $4.00

The effects of super-high frequencies from an electromagnetic field on the nucleic acid metabolism of white rats were investigated. Radio waves 3 centimeters in length at a power flux density of 0.5 and 0.1 watts per cubic centimeter and radiated for a period of six minutes, caused changes in the nuclein metabolism of the skin and internal organs of white rats. The changes were manifested in some inactivation of RNA-ase and DNA-ase, and in an increase of RNA content and a decrease in DNA content. The activation of RNA-ase and DNA-ase was observed immediately after irradiation and was caused by the stimulating effect of the radio waves. The radio waves exerted no specific effect which is shown by the analogous nature of the changes in the activity of the polynucleases and the content of nucleic acids under their effect. R.N.A.

N65-28732# Joint Publications Research Service, Washington, D. C.

CYBERNETICS AND THE PROBLEM OF PURPOSE

Ye. Kh. Gimel'shteyb 16 Jul. 1965 11 p refs Transl. into ENGLISH from Nauchn. Dokl. Vysshei Shkoly, Filosofskiye Nauki (Moscow), no. 3, 1965 p 40-47
(JPRS-31124; TT-65-31622)

Philosophical problems of cybernetics are discussed, and the concepts of purpose, purposefulness, and expediency are defined. These concepts are examined in relation to man, his behavior, and his goals, and then related to cybernetic systems devised to model the purposeful actions of man. The point is made that the machine's performance serves as the means for realizing a goal programed by man, and that the machine achieves that goal objectively. Functions of the self-adjusting systems are also discussed, wherein the capacity for adaptation to environment is exhibited. Self-adjusting systems operate expeditiously under statistical searching, governed by the principle of selection. It was concluded that further development of the categories of purpose, purposefulness, and expediency will yield greater insight of cybernetic systems. M.G.J.

N65-28750*# National Aeronautics and Space Administration, Washington, D. C.

SYMPOSIUM ON THE ANALYSIS OF CENTRAL NERVOUS SYSTEM AND CARDIOVASCULAR DATA USING COMPUTER METHODS

Lorne D. Proctor, ed. (Henry Ford Hosp.) and W. Ross Adey, ed. (Calif. Univ. Med Center) 1965 492 p refs Symp. held at Washington, D. C., 29-30 Oct. 1964
(NASA-SP-72) CFSTI: HC $4.50/MF $2.50 CSCL 06B

This article covers neurological and cardiovascular research and the acquisition and treatment of such research data by computer methods. For individual titles see N65-28751-N65-28777.

N65-28751* Aix-Marseilles Univ. (France). Neurobiology Lab.

VISUALLY-EVOKED POTENTIALS RECORDED TRANSCRANIALLY IN MAN

Henri Gastaut and Henri Regis *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data using Computer Methods 1965 p 7-34 refs (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50
(Grants PHS MH-03258; AF-AFOSR-62-74)

A brief description of an investigation to study visually-evoked potentials recorded transcranially in man is presented. The apparatus and techniques used in the study are described. Discussions are given on: (1) mean visually-evoked potential in healthy subjects under standard conditions; (2) mean visually-evoked potential in the healthy subjects when experimental conditions vary, and (3) mean visually-evoked potential of pathological subjects. It is shown that the most constant and significant wave of the mean visually-evoked potential is one designated wave V. A discussion of its significance is presented. N.E.A.

N65-28752* Massachusetts General Hospital, Boston. Stanley Cobb Labs.

ON-LINE COMPUTER TECHNIQUES FOR ANALYSIS OF THE VISUAL SYSTEM

Frank R. Ervin *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 35-51 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

An on-line computer technique for fine-grained analysis of the visual cortical neuron and the relationships of its firing to evoked potential and to the resting EEG activity is presented. The PDP-4 general-purpose digital computer used in the study is described. With the aid of a shock-display-sampling system, procedures of how the experiment is carried out are presented. Some of the data that emerge from the kind of system described is compared with classical descriptions from traditional techniques. Figures of the type of responses that were recorded from the visual cells are presented. N.E.A.

N65-28753* Loma Linda Univ., Calif. Dept. of Gynecology and Obstetrics.

COMPUTER METHODS IN THE STUDY OF FETAL DISTRESS

Edward H. Hon *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data using Computer Methods 1965 p 53-71 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

A study of the use of computer methods to elucidate problems in obstetrics concerning prenatal mortality and morbidity is presented. The study is concerned primarily with monitoring the fetus during the period of labor and delivery

The overall problem of fetal distress is outlined and the approach to the problem is discussed. The approach used in studying fetal electrocardiogram and its relation to fetal heart rate patterns, uterine contraction and umbilical compression is discussed in detail. The computer role in data acquisition and data handling in the study is described. N.E.A.

N65-28754* Salpetriére Hospital, Paris (France).
TOPOLOGICAL ASPECTS OF THE ORGANIZATION, PROCESSING AND PRESENTATION OF DATA
Antoine Rémond *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 73-93 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

The problems of automatic computer handling of topological studies of the electrical activity of the brain are discussed. Comments are made on topological resolution, on presentation of topograms through time, on amplitude resolution, and data reduction of various kinds. The sensory average evoked potential is used as the main theme of these developments. An intricate description of the practical methods used in the topographic approach to EEG studies is given under the following headings: (1) amplitude relations between derivations; (2) spatiotemperal maps; (3) instantaneous topograms; (4) alpha rhythm patterns; (5) amplitude resolution; and (6) root mean square values reduction. Physiological situations considered were: the effects of the eyelid on topographic changes; and the effect produced by the direction of gaze. N.E.A.

N65-28755* Minnesota Univ., Minneapolis. School of Physics.
ELECTROGRAPHIC FORMATS TO CONFORM WITH BIOPHYSICAL RESEARCH REQUIREMENTS
Otto H. Schmitt *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 95-109 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

This paper gives an account of the interphase between the biophysical instrumentation problem, the research worker, and the interpretation of data. Examples of electrographic formats used in examining experiments are given. N.E.A.

N65-28756* California Univ., Los Angeles. Brain Research Inst.
CONCEPTS OF CEREBRAL ORGANIZATION ARISING FROM TIME SERIES ANALYSIS OF NEUROPHYSIOLOGICAL DATA
W. Ross Adey *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 113-139 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

This paper is concerned with experiments which have been done in animals to try to elucidate some problems of the origin of the EEG wave process. Two approaches were used in this study. One has been to seek evidence of shared activity in both linear and nonlinear relations within and between brain regions that form part of a common system. The second technique has been to look at the level of single cells for evidence in intracellular recordings of EEG as recorded in the domain as a whole. Techniques of impedance measurement which are thought to relate to the frame of structure organization of brain tissue have also been used. In order to detect patterns in EEG waves, a variety of computing techniques, which range from simple averaging over quite long periods, usually two seconds, to the more complex aspects of cross-spectra and spectral contours, have been used. N.E.A.

N65-28757* Gaustad Mental Hospital, Oslo (Norway). EEG Lab.
COLLECTION OF NEUROPHYSIOLOGICAL AND CARDIOVASCULAR DATA WITH DATA REDUCTION, PATTERN AND CORRELATION ANALYSIS
Carl W. Sem-Jacobsen and Edmund Kaiser *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 141-147 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

Principles and tools have been developed for collecting from prolonged flights (simulated and actual) neurological and cardiovascular data, as well as behavioral and environmental data, and to follow biological and behavioral changes and relate these changes to environmental stress. This paper discusses an approach to advanced analysis of sequential signatures in the changes of these biological data that correlate with the subject's behavior under rest and under stress. N.E.A.

N65-28758* California Univ., Berkeley.
HEMODYNAMIC EVALUATION OF PRIMATES BEFORE, DURING AND AFTER LONG PERIODS OF WEIGHTLESSNESS
Nello Pace *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 149-163 (See N65-28750 17-40) CFSTI: HC $4.50/MF $2.50

The problem discussed in this paper is the attempt to evolve a technique for measuring hemodynamic function before, during, and after long periods of weightlessness in an earth-orbiting satellite. Specifically discussed is progress in automating hemodynamic data collection in a completely unattended primate (explicitly, the pig-tailed monkey, Macaque nemestrina). Descriptions of the configurations of the experimental environments are given and techniques and instruments used in measuring the vascular parameters are discussed. N.E.A.

N65-28759* Baylor Univ., Houston, Tex. College of Medicine
DATA PROCESSING OF PSYCHOPHYSIOLOGICAL RECORDINGS
Neil R. Burch *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 165-180 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

An attempt is made at analyzing one of the tapes from the normative library of EEGs with a developed method of period analysis of the EEG and modified period analysis of other psychophysiological signals. A psychophysiological study and data are presented concerning both the analysis of the single channel EEG on one of these tapes and the Galvanic Skin Response. Some data generated from sleep studies recently completed are also presented. A brief discussion is given on the concept of a total data reduction system and the analytical principles involved in the method of period analysis. N.E.A.

N65-28760* National Inst. of Neurological Diseases and Blindness, Bethesda, Md.
HUMAN-AIDED COMPUTER ANALYSIS OF MORPHOLOGICAL DATA

Lewis E. Lipkin *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 181-202 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

A discussion is presented on an effort to construct a general-purpose morphological analyzer and synthesizer which will have as its input either micro-photographs or actual slides for analysis of morphological data. The proposed system will have as additional inputs typewritten English (or really pseudo-English) and a light pen acting upon a very high-resolution screen. The concept of a computer linguistic procedure in the analysis of morphological data and the difficulties encountered in such a system are presented. N.E.A.

N65-28761* School of Aerospace Medicine, Brooks AFB, Tex.

AUTOMATED ANALYSIS OF HEART-RATE PATTERNS FOR BIOMEDICAL MONITORING

David G. Simons *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 205-224 refs (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

This is a progress report on heart-rate computer programing and a review of the patterns upon which the program is based. The first part of this report discusses heart-rate patterns which include base heart-rate and two major types of heart reflex activity, one due to peripheral servomechanism type responses, and the other due to Pavlovian orienting reflex. Two specific heart-rate reflex activity patterns of the peripheral servomechanism type are discussed in detail. These are respiratory heart-rate reflexes and nonrespiratory heart-rate reflexes. The last part of this report is concerned with a computer program for analysis of respiratory patterns and the line of research being followed for heart-rate programing. N.E.A.

N65-28762* California Univ., Los Angeles. Brain Research Inst.

SYSTEM APPROACH TO NEUROPHYSIOLOGICAL DATA ACQUISITION

Daniel Brown and Raymond Kado *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 225-236 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

A discussion of the evaluation of tools in neurophysiological data acquisition is presented. Emphasis is placed on the general purpose digital computer as the primary tool for data acquisition. Problems in data acquisition, particularly problems related to noise and the systematic approach used in dealing with these noise problems are discussed. N.E.A.

N65-28763* Baylor Univ., Houston, Tex. Inst. for Rehabilitation and Research

CONSIDERATIONS IN USE OF INFORMATION PROCESSING TECHNOLOGY IN CLINICAL INVESTIGATIONS

William Spencer, David Cardus, and Carlos Vallbona *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 237-257 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

Studies of the effect of bedrest recumbency upon some parameters of physiologic function are reported. A major effort in the study has been to quantitate the effect of bedrest recumbency upon cardiovascular responses to passive tilting and bicycle exercise. Analytic and interpretive problems in the analysis of cardiodynamic responses to passive tilt are described. A large part of the discussion is concerned with some examples of the use of information processing technology in these studies. N.E.A.

N65-28764* Henry Ford Hospital, Detroit, Mich. Dept. of Neurology and Psychiatry.

STATISTICAL LIMITS ON COMPUTER-DEFINED EEG PATTERNS RELATED TO BEHAVIOR

Wilbur R. Mc Crum and Lorne D. Proctor *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 259-266 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

A study of the possible relationship between the electroencephalogram and programed task performance of monkeys during a simulated 48-hour orbit is reported. A method of statistical analysis of the EEG patterns collected from the study, using a digital computer system, is described. The sequence through which the final computer system was derived to analyze the EEG data is presented. N.E.A.

N65-28765* State Univ. of Iowa, Iowa City. Coll. of Medicine.

TOPOSCOPES AS COMPUTER INTERFACES

Harold W. Shipton *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 269-279 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

A multichannel toposcope as an aid to planning computer experiments is described. A technical description of the toposcope and a review of topographic procedure are given. The technique and the topographic approach to the study of EEG are presented. An explanation of the toposcopic device, which has to be constantly watched while the EEG is being made, in preparation for designing an experiment, and in choosing among a variety of possibilities to use the larger computer with different capabilities, is given. N.E.A.

N65-28766* California Univ., Los Angeles.

DEFINITION OF PARAMETERS FOR COMPUTER ANALYSIS OF NEUROPHYSIOLOGICAL DATA

Donald O. Walter and J. M. Rhodes *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 281-292 Prepared jointly with New Mexico Univ. (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

EEG data from the normative library of EEGs were analyzed by an elaborate process of spectral analysis to indicate neurological relationships. The digital computer analysis of the EEGs is based on frequency analysis and its extension, spectral analysis. Reasons for the selection of the spectral analysis method for the analysis of the EEGs are presented. Physiological findings which came from the analysis of the normative library material through the process of spectral analysis are discussed. N.E.A.

N65-28767* Air Force Cambridge Research Labs., Bedford, Mass. Data Sciences Lab.

IMPLICATIONS FOR ELECTROPHYSIOLOGY OF A MODEL OF GLOBAL FUNCTION USING SIMPLE SIMULTANEITY

Harry Blum *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 293-304 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

Classes of brain models are outlined as an approach to brain function studies. The models are aimed at tying EEG to function and suggesting experimental direction. Attention is called to a set of implicity hypotheses which have underlain much experimental nerve physiology in the past and

which have been built from ancient models of quite simple nervous systems. A discussion of the function the models are designed to perform is given. N.E.A.

N65-28768* Baylor Univ., Houston, Tex. Coll. of Medicine.
TECHNICAL DETAILS OF DATA ACQUISITION FOR THE NORMATIVE ELECTROENCEPHALOGRAPHIC REFERENCE LIBRARY
Peter Kellaway *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 305-310 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

This paper reports a project to create a tape library which would serve as a normative or baseline for the development of automatic analysis techniques applicable to monitoring central nervous system function during space flights. The subjects used in this study are flight personnel on active duty whose ages range from 25 to 35 years. The majority are pilots. The magnetic tape recordings from each subject contain 18 channels of EEG, two channels of electro-oculogram, and one channel each of electrocardiogram, electromyogram, impedance pneumogram, digital plethysmogram, skin temperature and basal skin resistance. A description is given of the objectives set up by the committee which were thought to measure all important EEG and psychophysiological data on a large number of subjects under identical conditions in a form easily usable by other investigators. The immediate product of the project has been the determination of normative EEG data in a selected group under conditions of various states of sleep and wakefulness. N.E.A.

N65-28769* Baylor Univ., Houston, Tex. Inst. for Rehabilitation and Research.
COMPUTER ANALYSIS OF THE EFFECTS OF BEDREST ON CARDIAC DYNAMICS
Carlos Vallbona *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 311-331 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

Studies of the effect of bed rest were conducted to: (1) attempt to quantitate the degree of cardiovascular deconditioning occurring as a result of bed rest of variable duration; (2) test specific hypotheses on the mechanisms of orthostatic hypotension; (3) evaluate the information provided by direct techniques of measurement of the cardiac cycle and its phases; and (4) evaluate the possible effect of isometric exercise offsetting the deleterious effects of bed rest. A description is given of the experiment design and data processing system. Results of some of the tests performed in the study are given. N.E.A.

N65-28770* Maryland Univ., College Park. Space Research Lab.
EXPERIMENTAL ANALYSIS OF COMPLEX BEHAVIORAL REPERTOIRES UNDER CONTINUOUS ENVIRONMENTAL CONTROL
Joseph V. Brady and William Hodos *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 339-356 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

This paper briefly reviews some of the activities at the Space Research Laboratory at the University of Maryland and emphasizes the current research efforts that are related to performance analysis of potential relevance to the biosatellite program involving animal preparations. Attention is focused on the development of behavioral assessment techniques under continuous environment control so that animals could be worked with for extended periods without having to be manipulated to get some ideas of their performance capabilities in a variety of conditions. N.E.A.

N65-28771* California Univ., Los Angeles. Brain Research Inst.
BIOSATELLITE PERFORMANCE SIMULATIONS
W. Ross Adey *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 357-384 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

This paper briefly discusses those aspects of the biosatellite experiment which are performed from the viewpoint of the simulations that can be performed on earth. Anticipated problems in the development of the experiment and the areas of satisfactory consolidation in its present status are indicated. The biosatellite experiment has been designated P-1001, and was originally conceived as a primarily central nervous system experiment on the status of the animal in the brain function as measured by the EEG with associated task performance. It has been expanded to include a series of cardiovascular monitors. A discussion is given on the changes induced in the primate central nervous system and in the cardiovascular functions in space. N.E.A.

N65-28772* California Univ., Los Angeles. Brain Research Inst.
BIOSATELLITE PROGRAM
Donald O. Walter *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 385-395 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

A 12 to 15-pound Nemestrina monkey bearing sensors of cerebral, cardiovascular and behavioral functions is scheduled for an approximately 30-day mission. Placement of the sensors, training of the monkey, development and production of the signal conditioning equipment, and analysis of the data have all been assigned to the Space Biology Laboratory of UCLA. This paper is concerned primarily with the analysis of EEG and other physiological data presumably available from this monkey. The methods proposed to apply to the EEG data are spectral analysis and cross-spectral analysis frequency. A description of these methods is given. N.E.A.

N65-28773* Henry Ford Hospital, Detroit, Mich. Dept. of Neurology and Psychiatry.
THE DEVELOPMENT OF PERFORMANCE TASKS PRODUCING FATIGUE IN MAN AND OTHER PRIMATES
Mary I. Blake and Lorne D. Proctor *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 397-409 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

This paper gives results of a project designed to see if there are changes in EEG that are consistently associated with fatigue; these changes could then be used as fatigue indicators. A discussion of the development, so far, of tasks and working conditions producing such deterioration is presented. The species used in this project were monkeys, chimpanzees, and humans. This report is based on 160 orbits with five monkeys, 50 orbits with seven humans, and training data from three chimpanzees. Test conditions represent a partial simulation of space flight; that is, all subjects are confined in isolation chambers with controlled sound and constant illumination. Performance tasks and fatigue decrements observed are discussed. N.E.A.

N65-28774* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THE RELATIONSHIP BETWEEN EVOKED MYOGRAPHY AND DIFFERENT STATES OF CONSCIOUSNESS

Jorge Huertas *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 411-419 (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

This paper is concerned with determining whether or not there is any relationship among the different stages of consciousness, the electroencephalogram and the electromyogram. Experiments were performed on 30 monkeys. The results of the experiments indicate that if evoked myography is elicited by stimulation of a mixed nerve, a monosynaptic reflex is obtained in the process. This reflex can be studied very precisely if the stimulus is applied by means of permanently embedded electrodes in the ulnar nerve and recorded from the adductor. If the stimulation of the nerve resembles the technique used in obtaining strength duration curves, the classical Hoorveg-Weiss curves are obtained which are different for the anesthetized animal, for the awake animal and for the sleeping animal. The curve for sleep can be subdivided into smaller curves corresponding to the different phases of sleep. Thus, evoked myography offers a unique method for determining sleep quantitatively in time and phase, rather than qualitative as has been done so far. The application of this method to astronautics will provide a simple and reliable tool for a quick evaluation of an organism in regard to its sleep or wakefulness. N.E.A.

N65-28775* National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.

THE NORMATIVE ELECTROENCEPHALOGRAPHIC DATA REFERENCE LIBRARY

Lawrence F. Dietlein, Robert L. Maulsby, and Peter Kellaway *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 421-432 Prepared jointly with Baylor Univ. (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

This paper presents the program used in establishing the normative electroencephalographic data reference library. Two hundred volunteer flight personnel on active duty in the Air Force were used in the study. Their ages ranged from 30 to 35 years. The majority of the subjects were pilots, but a certain number of navigators and electronic warfare officers were included in the group. All subjects underwent an extensive medical and psychological evaluation before the recording session. The physiological parameters recorded from each subject include 18 derivations of EEG, two derivations of electro-oculogram, electrocardiogram, electromyogram, skin temperature, respiration, finger plethysmogram, and galvanic skin response. Descriptions are given of the manner in which the electrodes and transducers are attached to the subjects, the recording chamber, and the manner in which stimuli are applied to the subjects. A discussion is given on the spectrum of physiological and psychological situations, ranging from rest and relative boredom through reception of sensory stimuli to solving increasingly difficult discriminative mental tasks, that the subjects underwent. N.E.A.

N65-28776* National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex

TECHNICAL DETAILS OF DATA ACQUISITION FOR NORMATIVE EEG REFERENCE LIBRARY

Lawrence F. Dietlein and Martin H. Graham *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 433-440 Prepared jointly with Rice Univ. (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

The instrumentation system for collecting the normative EEG library is an attempt to meet all the objectives initially set by a committee. These objectives were to record, in form easily usable by other investigators, all the interesting measurable data on a large number of subjects under identical conditions. The objectives of all the interesting data are presented. The number of subjects was set at 200. The technical details of data acquisition and a description of the instrumentations are presented. It is concluded that the desired information has been recorded in a manner that permits it to be reproduced on standard equipment and treated as if it were generated in the investigator's own laboratory. N.E.A.

N65-28777* Stanford Univ., Calif. Div. of Neurology.

COMPUTER-AIDED ANALYSES OF BRAIN ELECTRICAL ACTIVITY

Frank Morrell and Lenore Morrell *In* NASA, Washington Symp. on the Anal. of Central Nervous System and Cardiovascular Data Using Computer Methods 1965 p 441-478 refs (See N65-28750 17-04) CFSTI: HC $4.50/MF $2.50

The studies described on computer-aided analysis of brain activity are interrelated and fall into readily definable categories. These include: (1) relation of background EEG to vigilance behavior, (2) relation of evoked potentials to reaction-time behavior; (3) period analysis of presignal background EEG; (4) sensory interactions at cortical, electrophysiological level; and (5) observations on the spatial distribution of evoked potentials: implications for models of neuronal function and for the detailed study of naturation and of certain clinical conditions. These studies are discussed separately. Some concerning the relationship between EEG potentials recorded from persons performing simple detection-response tasks and the level of performance in those tasks are outlined. N.E.A.

N65-28803# Bureau of Social Science Research, Inc., Washington, D. C.

CONCEPTS AND INDICATORS IN STUDIES OF BEHAVIOR UNDER STRESS

Samuel Z. Klausner Oct. 1964 59 p refs
(Contract AF 49(638)-992)
(AD-610808)

The reasoning between concepts and indicators, a typology of concept-indicator relations, and the occurrence of various types of inference are presented. Examples of each type of indicator-concept inference are provided. Twelve hundred and twenty-six such concepts, their referents and their associated indicators were collected from literature on human behavior in stressful situations. Each was classified as functional, set, or symbolic. The case of joint change, transformation, and the attributive case are discussed for the functional relation; the monadic, patterned, and the attributive case are considered for the attributive case. E.F.B.

N65-28808# Joint Publications Research Service, Washington, D. C.

STUDIES IN ELECTRONARCOSIS

M. G. Anan'yev, A. M. Geselevich, and Yu. Ya. Gritsman, ed. 12 Jul. 1965 28 p refs Transl. into ENGLISH from the book "Sovremennaya Tekhnika v Khirurgii: Materialy VI Nauchnoy Sessii NIIEKha i I" Moscow, 1965 p 90-99 and p 162-168 (JPRS-31018; TT-65-31516) CFSTI: $2.00

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N65-28815# National Research Council of Canada, Ottawa (Ontario).

ON THE QUESTION OF THE "PERCEPTION" OF ULTRASHORTWAVES BY MIGRATORY BIRDS [ZUR FRAGE DES "WAHRNEHMENS" VON ULTRAKURZWELLEN DURCH ZUG-VOGEL]

J. Schwartzkopff 1964 5 p refs Transl. into ENGLISH from Die Vogelwarte (Germany), v. 15, no. 3, 1950 p 194-196 (NRC-TT-1161)

Possible causes were examined for the apparent startling of migratory birds when encountering a radar beam. The release of neural or physiological sensory reactions on exposure to ultra-short electromagnetic waves is one explanation considered and discussed. M.R.W.

N65-28817# Israel Program for Scientific Translations, Ltd., Jerusalem.

PHOTOSYNTHETIC BACTERIA

E. N. Kondrat'eva 1965 247 p refs Transl. into ENGLISH of the book "Fotosinteziruyushchie Bakterii" Moscow, Izd. Akad. Nauk SSSR, 1963 Publ. for AEC and NSF (TT-AEC-tr-6203)

The distribution, role in nature, isolation, cultivation, morphology, cell chemical composition, pigmentation, physiology, initial photosynthetic stages, and taxonomy of photosynthetic bacteria are presented. R.N.A.

N65-28853*# Kansas State Univ., Manhattan.

ANALYTIC STUDIES IN THE LEARNING AND MEMORY OF SKILLED PERFORMANCE Second Semi-Annual Report, Oct. 1, 1964-Mar. 30, 1965

Merrill E. Noble and Don A. Trumbo 20 Apr. 1965 22 p (Grant NsG-606)

(NASA-CR-63837) CFSTI: HC $1.00/MF $0.50 CSCL 05J

A study was performed to evaluate the role of sequential length on the acquisition and retention of skill when the task involves coherent and partially coherent sequences. Methods and procedures used in the study are presented. Results are given for the first analyses for error scores on the training since the retention phase of the study is not completed. It is suggested that the information provided from this study will aid in the description of the information processing capacities and limitations of the human operator, and his ability to retrieve and use such information after extended periods of disuse. N.E.A.

N65-28868*# Maryland Univ., College Park. Computer Science Center.

AN EMPIRICAL EVALUATION OF LATENT CLASS ANALYSIS

James F. Williams (M. A. Thesis) Jun. 1965 94 p refs (Grant NsG-398)

(NASA-CR-63870; TR-65-19) CFSTI: HC $3.00/MF $0.75

The purpose of this project is to empirically evaluate the theoretical model of latent class analysis proposed by T. W. Anderson (*Psychometrika*, 1954, 19) to determine if a population of respondents could be divided into a finite number of distinct groups or classes. A basic assumption of the latent class model is that the responses of subjects in the same class to different dichotomous items are statistically independent. Using the manifest probabilities of positive response of the persons in a random sample, the computational method provides estimates of the latent parameters, that is, the proportion of population in each latent class and probability of positive response with each item for each latent class. A history of the development of this topic includes a description of the computational procedures of B. F. Green, Jr. (*Psychometrika*, 1951, 16) and Anderson. A modification of Anderson's is tested using a population of known characteristics. The properties of the solution are described and an evaluation of the method is given. Author

N65-28872*# Naval School of Aviation Medicine, Pensacola, Fla.

HABITUATION TO COMPLEX VESTIBULAR STIMULATION IN MAN: TRANSFER AND RETENTION OF EFFECTS FROM TWELVE DAYS OF ROTATION AT 10 RPM

Fred. E. Guedry, Jr. Mar. 1965 32 p refs Joint rept. with NASA *Its* Rept.-109

(NASA Order R-93)

(NASA-CR-63865; NSAM-921) CFSTI: HC $2.00/MF $0.50 CSCL 06S

In three experimental runs, a total of 9 men rotated at 10 RPM for 12 days. Control subjects were tested at comparable intervals. Rotating chair tests conducted before and after the 12-day run demonstrated that nystagmus and subjective effects produced by head movements during the accustomed direction of rotation (CCW) had diminished markedly. In the unaccustomed rotation direction (CW) 1 hour after room rotation, nystagmus and subjective reactions approximately equaled reactions prior to the 12-day run. The unequal reduction of reactions was attributed to conditioned compensatory reactions which would facilitate reactions during CW rotation and counteract reactions during CCW rotation. Two days after the 12-day run, responses to both rotation directions were suppressed as compared with initial levels of response; compensatory reactions had apparently dissipated. Some response decline was still present 3 weeks after the 12-day run, but tests after 3 months revealed considerable recovery toward initial response levels. Reactions to passive whole-body angular acceleration were not greatly altered by the 12-day run. Author

N65-28878# Joint Publications Research Service, Washington, D. C.
OXYHEMOGRAM RECORDING ON AN OSCILLOGRAPH FOR DETERMINING BLOOD FLOW TIME
V. A. Degtyarev 15 Jul. 1965 6 p refs Transl. into ENGLISH from Patol. Fiziol. i Eksperim. Terapiya (Moscow), v. 9, no. 2, Mar.-Apr., 1965 p 79-81
(JPRS-31,093; TT-65-31591) CFSTI: $1.00

A method is described for determining blood flow time by recording the oxyhemogram on the tape of an oscillograph on which a pneumogram is recorded simultaneously. A sample of such a simultaneous oxygen-pneumogram recording at a tape-movement rate of 3.5 mm/sec is shown. The oxyhemogram is recorded by means of the attachment which is described in detail. The pneumogram is recorded by a carbon pickup cut into the bridge circuit of the oscillograph unit. One advantage of this method is that other physiological parameters may be recorded on the oscillograph simultaneously with the oxyhemogram and pneumogram, such as electrocardiogram, arterial pressure, pulse rate, etc. The high speed of the tape-winding mechanism of the oscillograph may also be used with success for analyzing rapid fluctuations of oxygen saturation of the arterial blood. E.E.B.

N65-28883# Atomic Weapons Research Establishment, Aldermaston (England).
CHELATING AGENTS. PART 2: RADIOELEMENT REMOVAL AND THE STRONTIUM-90 PROBLEM
J. H. Grimes, A. J. Huggard, and K. T. B. Scott Apr. 1965 43 p refs
(AWRE-O-4/65) HMSO: 6s

The radioelements which at present constitute hazards to humans are considered with respect to their behavior in the body. Theoretical considerations for their removal from blood and from bone are presented, and suggestions are made for the properties of a suitable chelating agent. Chelation with the alkaline earth metals is discussed and the possibilities of obtaining a strontium-preferring chelating agent are outlined. Author

N65-28885# Atomic Weapons Research Establishment, Aldermaston (England).
THE DETERMINATION OF THE PARTICLE SIZE DISTRIBUTION OF THE PARTICULATE MATERIAL COLLECTED DURING THE DOUBLE TRACKS AND CLEAN SLATE 1 EVENTS OF OPERATION ROLLER COASTER
J. P. Friend and D. M. C. Thomas (Isotopes, Inc.) Feb. 1965 35 p refs
(AWRE-O-20/65) HMSO: 5s

The overall size-plutonium distributions for Double Tracks and Clean Slate 1 were determined and found to be the same within experimental error. The distributions are not log-normal and the contradictory estimates of the geometric standard deviation in TG57 from impactors and the deposition model are explained on a rational basis. Author

N65-28921# John B. Pierce Foundation of Connecticut, New Haven
SKIN AND SUBCUTANEOUS TEMPERATURE CHANGES DURING EXPOSURE TO INTENSE THERMAL RADIATION
J. A. J. Stolwijk and J. D. Hardy Oct 1964 32 p refs
(Contract DA-49-146-XZ-124)
(DASA-1566; AD-615477)

Radiometric measurements have been made of the skin temperature changes occurring during irradiation of the body by high intensity thermal radiation with square wave pulses. The experimental values of skin temperature rise during irradiation were compared with those calculated by the finite differences method for various skin layers with the best available values for optical and thermal properties of each skin layer, using an analog computer. Subcutaneous temperatures can be calculated from surface temperature data; it is indicated that most of the radiation is absorbed in the first 0.05-0.15 mm of skin through combined effects of absorption and scattering. Author

N65-29010# Joint Publications Research Service, Washington, D. C.
CYBERNETIC SYSTEMS COMPONENTS
26 Jul. 1965 152 p refs Transl. into ENGLISH of the book "Elementy Kiberneticheskikh Sistem" Tbilisi, USSR "Metsniyereba" Publishing House, 1964 p 1-173
(JPRS-31240; TT-65-31737) CFSTI: $5.00

A compilation of various studies on the design and application of components and devices for cybernetic systems is presented. Subject matter covered includes the analysis and synthesis of cybernetic systems and devices, some research results on data coding and conversion using digital computers, and methods of improving the reliability of analog-discrete control systems. Among the topics discussed are diode logic elements in printed circuits for microwave applications, tunnel diode circuit stability; voltage-to-code and continuous-to-discrete converters; gray code counters; fast decimal to binary conversion; linear transformations between binary and gray codes; stability of systems with feedback; generation processes in pulse systems with delayed feedback using reflected signals; and number comparisons for computer use. C.T.C.

N65-29011# Joint Publications Research Service, Washington, D. C.
A HUMAN EXPOSED TO EXTREME CONDITIONS OF SPACE TRAINING
A. Koreshkov 27 Jul. 1965 6 p Transl. into ENGLISH from Tekhn. Molodezhi (Moscow), no. 6, 1965 p 18-19
(JPRS-31250; TT-65-31747) CFSTI: $1.00

An account of the training, both physically and emotionally, of cosmonauts who will be exposed to conditions of outer space is given. Psychological reactions to parachute jump training are studied, and basic physiological indices of the man are periodically recorded by transmitters attached to their bodies. Other exercises used for training, are diving, ice hockey, and trampolin. The cosmonauts are placed in temperature, pressure, acoustic, solitude, and sensory restriction chambers, and information on their physiological processes are transmitted outside the chamber. Some of the chambers used for testing have special physical exercises, which produce high physiological pressures. L.S.

N65-29032 Czechoslovak Academy of Sciences, Prague.
THE NERVOUS CONTROL OF SKIN POTENTIALS IN MAN
Karel Sourek 1965 96 p refs *Its* Rozpravy Vol. 75, No. 1

Experiments are discussed for cases where the extent and localization of a traumatic or surgical lesion in some part of the nervous system could be verified. Patients with a traumatic lesion of a peripheral nerve, a surgical lesion of the sympathicus, a complete traumatic lesion of the spinal cord, partial surgical lesions of the spinal cord, and patients after removal of certain parts of cerebral hemispheres were observed. It was noted that: (1) After the severence of a

peripheral nerve the reflex skin-potential reaction disappears from the affection region. (2) After the severance of the lumbar or thoracic sympathicus the reflex skin-potential reactions disappear from the corresponding region but reappear after some months. (3) The severance of the cervical and thoracic spinal cord results in an immediate and permanent loss of the reflex skin-potential reaction below the level of the lesion. (4) After resections of different parts of cerebral hemispheres there are no major changes in the reflex skin-potential reactions on the periphery. (5) On the periphery both the reflex skin-potential reflex and the evoked skin-potential reaction are transmitted with a small velocity. E.E.B.

N65-29063# Joint Publications Research Service, Washington, D. C.
BIOLOGY AND CYBERNETICS
V. Parin et al 12 Jul. 1965 7 p Transl. into ENGLISH from Izvestiya (Moscow), 6 Jun. 1965 p 5
(JPRS-31029; TT-65-31527) CFSTI: $1.00

The application of cybernetics to the field of biology is discussed. Its principle application is the investigation of general laws governing the processes of self-control and self-organization in the living organism. Cybernetics views living organisms as intricate dynamic systems whose constituent parts are interrelated while the organism itself is interrelated to the external world. It conceives all living organisms as a distinctive ladder of living systems at different stages of development. Cybernetic techniques applied to the biological areas of heredity, evolutionary processes, aging, biological rhythms, and the automatic control of biological functions are discussed. R.N.A.

N65-29119# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
EFFECT OF ADENOSINETRIPHOSPHORIC ACID (ATP) ON THE METABOLISM OF PHOSPHOPROTEINS IN THE LIVER AT RADIATION INFLICTION
R. P. Vinogradova 12 Apr. 1965 11 p refs Transl. into ENGLISH from Ukr. Biokhim. Zh. (Kiev), v. 35, 1963 p 274–279
(FTD-TT-64-1163/1; AD-614962)

The effect of lethal dosages of X-rays on the adenosine triphosphate (ATP) content in the liver and the effect of ATP on the exchange of phosphoproteins in various periods of the radiation illness in guinea pigs were investigated. Approximately 0.35 moles of ATP per 1 gram of incubated normal liver tissue resulted in an increase in the amount and intensity of phosphoprotein phosphorus restoration. The addition of ATP to liver tissue exposed to lethal doses of X-ray radiation had no effect on the content or intensity of phosphoprotein phosphorus restoration. The ATP content in the liver decreases rapidly after exposure to lethal X-ray doses. The maximum reduction in ATP was observed on the tenth day after exposure. The failure of ATP to stabilize the liver of exposed animals may be due to disturbances in the fermentative systems which transfer the excess of phosphoric acid from ATP to phosphoprotein. R.N.A.

N65-29131# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
MOLECULAR GENETICS AND THE EFFECTS OF RADIATION ON HEREDITY
N. P. Dubinin 2 Jun. 1964 433 p Transl. into ENGLISH of the book "Molekulyarnaya Genetika i Deystviye Izlucheniy na Nasledstvennost" Moscow, Gosatomizdat, 1963 p 3–239
(FTD-TT-63-1214/1+2; AD-608460)

Current research on molecular genetics is discussed to include the physical and chemical bases of heredity, the deciphering of the genetic code, the influence of radiation on human heredity and molecular genetic structures, and the control of the genetic mutability of organisms. The use of radiation to investigate cellular processes at the molecular level and the experimental approach to genetics by the use of ionizing radiations are emphasized. E.E.B.

N65-29147*# California Univ., Berkeley.
[EXPERIMENTAL RESEARCH ON HEMODYNAMIC AND RELATED PHYSIOLOGICAL FUNCTIONS IN PRIMATES, AND PRIMATE HEMODYNAMICS AND METABOLISM IN AN ORBITING SATELLITE] Semiannual Status Report, 1 Aug. 1964–31 Jan. 1965
Nello Pace [1965] 18 p *Its* Rept. No. 6
(Grants NsG-170; NsG-513)
(NASA-CR-63915) CFSTI: HC $1.00/MF $0.50 CSCL 06C

This paper reports the present status of work performed to establish physiological procedures and instrumentation necessary for the automatic measurement of hemodynamic and metabolic parameters during prolonged periods of weightlessness. Specifically reported are: (1) evaluation of the monkeys to be used in experimental situations; (2) couch trials and isolation studies performed on some of the monkeys; (3) hemodynamic and hematological studies; and (4) urine analyses. N.E.A.

N65-29149*# Itek Corp., Palo Alto, Calif. Vidya Research and Development.
THEORETICAL AND EXPERIMENTAL STUDY OF THE ELASTIC BEHAVIOR OF THE HUMAN BRACHIAL AND OTHER HUMAN AND CANINE ARTERIES
E. Glenn Tickner and Alvin H. Sacks 20 Nov. 1964 113 p refs
(Contract NAS2-1137)
(NASA-CR-63917; Vidya-162) CFSTI: HC $4.00/MF $0.75 CSCL 06P

A combined theoretical and experimental investigation has been carried out to determine the elastic behavior of various excised human and canine arterial segments. The specimens were subjected to the combined loads of internal pressure and axial tension, and measurements were made for each loading condition. Arteries tested included the human brachial, external iliac, superior mesenteric and splenic, as well as the canine femoral and thoracic aorta. The arterial wall behaves as a nonlinear, homogeneous, anisotropic, compressible material and can be described by six elastic constants for each level of strain. Both the circumferential and axial stiffness are found to increase with internal pressure and both approach the value for the collagenous fibres at very high internal pressure and axial weight, respectively. The radial stiffness is found to be essentially independent of either internal pressure or axial loading. The relationship of this behavior to the presence and orientation of the collagen fibres is discussed in detail. The length of the arterial segment increases with pressure at low axial stress, but decreases with pressure at high axial stress. At in-vivo levels of internal pressure and axial stress, the artery length remains essentially unchanged, independent of loading. Further, at in-vivo levels, the artery behaves as though it were transversely isotropic, with equal stiffness in the circumferential and axial directions. Author

N65-29152# Queens Coll., Flushing, N. Y.
A LATENT STRUCTURE FOR THE SIMPLEX
W. A. Gibson [1960] 15 p refs
(Grant Nonr(G)-00033-63)
(AD-609676)

The Guttman simplex is refined for use in studying nonlinear relations in psychology. This simplex, which is a correlation matrix in which the values of the correlations decrease monotonically with increasing distance from the main diagonal, is based on a purely qualitative scale. A quantitative scale is proposed, in the form of a single underlying continuum for both variables. It is shown that transformation matrices can then be developed, such that when applied to an empirical correlation matrix, the result is a matrix of standard nonlinear regression scores. J.M.D.

N65-29159# John B. Pierce Foundation of Connecticut, New Haven.
SPATIAL SUMMATION OF PAIN FOR LARGE BODY AREAS
D. Murgatroyd Oct. 1964 50 p refs
(Contract DA-49-146-XZ-124)
(DASA-1568; AD-615479)

Spatial summation of pain was investigated using high intensity infra-red radiation. Cutaneous pain thresholds were determined for a total of eight subjects using apertures ranging from 1 cm^2 to 200 cm^2 on the face area, and 10 cm^2 to 1500 cm^2 for large body areas. Two methods of determining threshold—reaction time and method of constant stimuli—were utilized. Skin temperature at threshold was determined by a radiometric measuring device especially designed for use during skin heating with infrared quartz lamps. Values so determined were checked by a computer solution of skin temperature rise using the best available data on the optical and thermal properties of the skin and found to be in close agreement. Results indicate that final skin temperature at threshold varied from 39.3° C to 46.7° C depending on subject, size of aperture, and area of body irradiated. A significant lowering of final skin temperature at threshold for the larger area occurred for all subjects when comparing apertures 1 cm^2 and 3 cm^2 on forehead and face areas, and apertures 10 cm^2 and 40 cm^2 on chest and back. A slight decrease in final sking temperature at threshold was generally noted for aperture sizes 5 cm^2 and 200 cm^2 on face areas but was not consistent for all subjects. When 40 cm^2 apertures were compared with full back and chest exposures, a higher threshold for the very large areas was obtained for three of the four subjects used. Author

N65-29160# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE DYNAMICS OF EMOTIONAL-VOLITIONAL PROCESSES DURING PARACHUTE JUMPS BY ASTRONAUTS
G. F. Khlebnikov and V. I. Lebedev 11 May 1965 16 p refs Transl. into ENGLISH from Vopr. Psikhol. (Moscow), no. 5, 1964 p 3-10
(FTD-TT-65-437/1; AD-615534)

Soviet cosmonauts were observed during preliminary parachute jumping trainings. The registration of changes of hand strength and the heart-rate disclosed the dynamics of the emotional 'tuning' of cosmonauts to the coming parachute jumpings. On the first day of parachute jumping, emotional reactions were significant and markedly different from emotional reactions of well-trained parachutists. Subsequently, the reactions became more adequate; and due to the training of volitive processes, the emotional manifestation at the repeated parachute jumpings became weak. The emotional reactions to danger are characterized by 'sthenic' excitation which is evoked by the activation of the conscious regulation of behavior. All cosmonauts had the most stable positive emotions at the second stage of parachute jumping trainings (jumping onto the water, during nights, in the diving suits). TAB

N65-29171*# Public Health Service, Washington, D. C. Biophysics Section.
REDUCTION OF BACTERIAL DISSEMINATION. GERMICIDAL ACTIVITY OF ETHYLENE OXIDE. REDUCTION OF BACTERIAL CONTAMINATION ON SURFACES Third Quarterly Summary Report of Progress
May 1965 14 p
(NASA Order R-137)
(NASA-CR-63895) CFSTI: HC $1.00/MF $0.50 CSCL 06T

Experiments to determine characteristics of shedding of bacterial populations from the skin of adult males who have used a conventional bath soap without a specific antimicrobial agent and a germicidal detergent containing hexachlorophene for reduction of skin flora are reported. Preliminary results indicated little reduction of the bacterial populations shed by individuals using the conventional soap without hexachlorophene. The counts obtained from the same subject during the period when the germicidal detergent was used are markedly lower than those obtained when conventional soap was used. The study of the action of ethylene oxide gas against dust particulates laden with spores of *B. globigii* was continued using a static system for exposing contaminated glass surfaces. The results showed that a high level of kill was achieved under the test conditions; however, a small percent of the slides yielded growth when incubated in nutrient medium. Data on the survival of *B. globigii* on various surfaces exposed to 50° C and 40% relative humidity are also presented. E.E.B.

N65-29182# Joint Publications Research Service, Washington, D. C.
PROCEDURES FOR THE GRAPHIC RECORDING OF THE QUANTITY OF BIOLOGICAL FLUIDS
P. V. Lakhin et al 27 Jul. 1965 7 p refs Transl. into ENGLISH from Fiziol. Zh., Akad. Nauk Ukr. RSR (Kiev), v. 10, no. 4, Jul.-Aug. 1964 p 558-560
(JPRS-31269; TT-65-31766)

A method for reliable graphic recording of secretory and excretory processes using a piezoelectric crystal recording element and a specially constructed ac amplifier is described. The method avoids the shortcomings of the mechanical systems of recording and the actions of electric current on the drops of solution. In recording drop counts, the amplifier converts the impact oscillations into single impulses thus rendering the recording system relatively free of inertness. R.N.A.

N65-29209# Istituto Superiore di Sanita, Rome (Italy). Laboratori di Fisica.
INTERACTION BETWEEN DNA AND RNA OF *B. STEAROTHERMOPHILUS* INVOLVING ONLY ONE HALF OF THE TOTAL DNA
M. Ageno, M. Arca, E. Dore, C. Frontali, L. Frontali et al 15 Dec. 1964 53 p refs
(ISS-64/47)

Experiments are described, which demonstrate that only one of the two strands of a bacterial DNA is able to give a complex with ribosomal RNA. These observations are done on a new kind of hybrid molecule, which is formed at room temperature, between one, well defined, strand of DNA, and ribosomal RNA fragments. The properties of the complex are studied, and the DNA strand not involved in the formation of the complex is isolated by a chromatographic procedure; its inability to renature with itself is verified. Author

N65-29239# Autonetics, Anaheim, Calif.
LABORATORY STUDIES IN AIR-TO-GROUND TARGET RECOGNITION. V: THE EFFECTS OF AIRCRAFT SPEED AND TARGET TYPE
R. L. Calhoun and H. L. Snyder 31 May 1965 31 p refs (T5-990/3111)

A laboratory simulation experiment was performed to determine the effect of target type and ground speed on air-to-ground target recognition. The aircraft's forward view was simulated from color motion pictures obtained in flight. Examples of four target types were selected. Performance was measured in terms of probability and range of correct recognition. The average recognition range was significantly affected by target type; in spite of the initial four-type target breakdown, performance results indicated that there were only two functionally distinct types. A *post hoc* examination of target pictures suggested a possible visual basis for the performance outcomes. The problem of target classification is discussed. Author

N65-29243# Rochester Univ., N. Y.
MITOCHONDRIA AND RADIATION SENSITIVITY OF CELLS
E. Tsinga and G. W. Casarett 19 Jul. 1965 77 p refs
(Contract W-7401-ENG-49)
(UR-666)

Albino male rats were exposed to 600 r total-body irradiation and sacrificed thereafter at various time intervals up to 40 days. Samples of pancreas, intestine, thymus, liver, kidney, adrenal and testis were prepared for histopathological and mitochondrial study by means of the optical-microscope. Globulation, clumping and disappearance of the mitochondria were observed in the degenerating radiosensitive cells of the intestine, thymus, and testis after irradiation. No changes in the morphology, number, or distribution of the mitochondria were detected in the radioresistant parenchymal cells of the pancreas, liver, kidney, and adrenal, or other radioresistant cells in any of the organs studied. It was concluded that mitochondrial morphology was relatively resistant to the actions of x-rays and that the effects observed were not specific for irradiation but secondary to other injuries in cells. Author

N65-29246# Joint Publications Research Service, Washington, D. C.
THE EFFECTS OF CLIMATIC CONDITIONS ON CHRONIC IRRADIATION BY SUPERHIGH-FREQUENCY ENERGY
A. Ya. Loshak 28 Jul. 1965 9 p refs Transl. into ENGLISH from Gigiyena i Sanit. (Moscow), no. 6, Jun. 1965 p 18–22 (JPRS-31280; TT-65-31777) CFSTI: $1.00

A comparative physiological examination of a large group of persons working under conditions of hot and temperate climate was made to determine the effects of climatic conditions on chronic irradiation by centimeter waves with a flux density from units of a microvolt to several hundred microvolts per sq cm for one to six hours per day. It was observed that irradiation under hot climate conditions produces more frequent and pronounced functional changes in the individual than under temperate climate conditions. The nervous system is the most sensitive to the combined effects of microwaves and high temperature. It was concluded that to prevent the appearance of changes in the state of health of personnel of installations in the hot climate areas professional screening in the assignment and acceptance for this work must be carried carefully; medical examinations should be conducted no less than twice a year; and strict observance of the requirements of safety techniques and industrial sanitation should be observed. E.E.B.

N65-29348 Joint Publications Research Service, Washington, D. C.
STUDIES ON MUTUALLY INHIBITORY RETINAL TRANSIENT REACTIONS
Yun-Chiu Wang, Chu-Ying Cheng, and Hui-Ling Hou *In its* Transl. on Communist China's Sci. and Technol. No. 196 12 Jul. 1965 p 33–37 refs (See N65-29342 18-34) CFSTI: $3.00

N65-29350# Joint Publications Research Service, Washington, D. C.
CYBERNETIC AND COMPUTER TECHNIQUES AS APPLIED TO PSYCHOLOGY IN THE SOVIET UNION
13 Jul 1965 65 p refs Transl. into ENGLISH of 7 articles from Vopr. Psikhologii (Moscow), no. 2, 1965 p 3–16, 28–34, 49–74, 173–180
(JPRS-31062; TT-65-31560) CFSTI $3.00

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7. NEW BOOKS OF THE PROSVESHCHENIYE (ENLIGHTENMENT) PUBLISHING HOUSE p 58–61

N65-29351 Joint Publications Research Service, Washington, D. C.
ON A POSSIBLE APPROACH TO MODELING THE HUMAN PSYCHIC SPHERE
N. M. Amosov, E. T. Golovan', S. Ya. Zaslavskiy, and V. S. and V. S. Starinets *In its* Cybernetic and Computer Tech. as Applied to Psychol. in the Soviet Union 13 Jul. 1965 p 22–28 refs (See N65-29350 18-05) CFSTI: $3.00

An investigation was conducted to construct a model of the genesis and analysis of sentences, taking into account certain peculiarities of the emotional sphere and organization of human memory. During the operation of the model, elements of the input words are given certain emotions and the whole word is given some emotional state even before the input word arrives at the model. When the model has gone through a certain number of cycles, it may independently realize the indicated operations by employing a certain amount of data stored in its long term memory. R.N.A.

N65-29373*# Texas Woman's Univ., Denton. Nelda Childers Stark Lab. for Human Nutrition Research.

FUNDAMENTAL INVESTIGATION OF LOSSES OF SKELETAL MINERAL IN YOUNG ADULT HUMAN MALES AND COLLATERALLY IN YOUNG ADULT MALE PIGTAIL MONKEYS (MACACUS NEMESTRIMA) THROUGH IMMOBILIZATION FOR VARYING PERIODS OF TIME, COUPLED WITH A STUDY OF METHODS OF PREVENTING OR REDUCING MINERAL LOSS

Pauline Beery Mack, Betty Bohon Alford, Ralph E. Pyke, Arcienegas Klapper, Sue Nell English et al. 31 Mar. 1965 55 p refs

(Grant NsG-440)

(NASA-CR-63993) CFSTI: HC $3.00/MF $0.50 CSCL 06E

A discussion of two 14-day bed rest studies, including collateral ambulatory pre-bed rest and post-bed rest periods, is presented. In the first study four subjects were fed a basic diet which provided 2.0 grams of calcium per day during pre-bed, and post-bed rest periods. The subjects respectively lost 3.86, 3.00, 6.50, and 6.48 percent of bone mass during bed rest. They had a mean overall daily calcium balance of −0.257, −0.320, −0.293, and −0.205 grams, respectively. In the second study five subjects were daily fed 0.5 grams of calcium during bed rest after they had been equilibrated on a diet which provided 1.5 grams of calcium per day. During bed rest the subjects did not consume all of the food offered them, rejecting chiefly some of the bread. As a result they consumed a mean ranging from 0.295 to 0.463 grams of calcium daily. This group was in marked negative calcium balance with mean daily calcium [illegible] values ranging from −0.507 to −0.813 grams. R.N.A.

N65-29381*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

VISUAL MASKING USING DIFFERENT TEST STIMULUS PATTERNS

Robert C. Boyle [1964] 20 p refs Presented to Armed Forces NRC Comm. on Vision, Washington, 23–24 Apr. 1964

(NASA-TM-X-51978) CFSTI: HC $1.00/MF $0.50 CSCL 06P

Visual masking is defined as the gradual reduction of correct responses to the orientation of a patterned test stimulus as the temporal interval between the test stimulus and a succeeding brighter masking stimulus is decreased. To indicate the test stimulus direction, a four-position response switch was activated which stopped the timing counter and initiated the stimulus repositioning. The preselected stimulus position, and response latency were printed out on the digital printer. It was determined that a value of 28.6 milliseconds would be the minimum latency of a visual evoked potential for a bright stimulus which filled the entire eye. It was concluded that these latencies could have important ramifications for the operation of high velocity spacecraft, and, in cases of the extreme velocities associated with space flight, traditional concepts of pilot observation of the external environment will require modification. R.W.H.

N65-29386*# Yeshiva Univ., New York.

TOTAL ADAPTATION TO PRISMATIC DISPLACEMENT IN THE ABSENCE OF REAFFERENCE

Sidney Weinstein, Eugene A. Sersen, [illegible]vin Weisinger, Larry Fisher, and Milton Richlin [1964] 8 p

(Grants NsG 489, VRA RD 427)

(NASA CR 58609) CFSTI: HC $1.00/MF $0.50 CSCL 06P

A study was conducted to determine whether 100% adaptation to prismatic displacement can be achieved without any bodily movements. Such compensation was demonstrated by 8 out of 46 subjects. An analysis of variance was performed for each subject comparing his preexposure and postexposure mean with zero per cent adaptation (preexposure mean) and with 100% adaptation (preexposure mean plus 7.42°). In addition to the 8 subjects reaching 100% adaptation, 15 subjects achieved adaptation which was significantly greater than zero, ranging from 18% to 90%. Of these 15 subjects, 4 achieved adaptation which did not differ significantly from 100%. All 15 subjects who achieved positive adaptation did so within three ten-minute exposure periods, 6 within the first trial. Of the 8 subjects who achieved 100% adaptation, two each achieved it within trials two, three, four, and five. Of these 8 subjects, 7 achieved significant positive adaptation by the first trial, and the other by the third trial. R.N.A.

N65-29387*# Kaiser Foundation Research Inst., Richmond, Calif.

SPECIFIC NUCLEOSIDE TRIPHOSPHATASES IN CRUDE EXTRACTS OF *ESCHERICHIA COLI*

I. D. Raacke [1964] 30 p refs Submitted for Publication Prepared in Cooperation with Calif. Univ., Berkeley

(Grants NsG-479; NSF G-19532; NIH GM-07924-02)

(NASA-CR-59104) CFSTI: HC $2.00/MF $0.50 CSCL 06M

The distribution and general properties of nucleoside triphosphatases in crude extracts of *Escherichia coli* were studied. All four triphosphates studied were hydrolyzed by the extracts. The rate of release of inorganic phosphates is highest from ATP, followed by CTP, GTP, and UPT. From 80% to 90% of the total enzyme activities are sedimentable in a sucrose density gradient. The specific activity (per mg protein) is highest in the polysome fraction. The enzymes can be released from the polysomes by treatment with ribonuclease in the cold. The distribution of each activity is affected in a different way by variations of pH and salt concentration in the extraction buffer or the gradient, showing that four triphosphatases are involved. The enzymes have an alkaline pH optimum, require Mg^{++} for maximum activity, are not inhibited by fluoride and azide, and are not stimulated by dinitrophenol, Na^{+}, K^{+}, or amino acids. Correlation of the enzyme activity peaks for the four substrates throughout the gradient showed that they do not coincide with each other. CTPase is not bound to the same macromolecular component as ATPase and GTPase. R.N.A.

N65-29388*# Kaiser Foundation Research Inst., Richmond, Calif.

DIFFERENTIAL DISTRIBUTION OF RNA AND PROTEIN IN THE RIBOSOMAL FRACTIONS OF *ESCHERICHIA COLI*

I. D. Raacke [1964] 28 p refs Submitted for Publication Prepared in cooperation with Calif. Univ., Berkeley

(Grants NsG-479; NSF G-19532)

(NASA-CR-59068) CFSTI: HC $2.00/MF $0.50 CSCL 06A

The RNA to protein ratio profiles of sucrose density gradient separated crude extracts and ribosomal preparation of *E. coli* were used to study the homogeneity of ribosomes, and to determine the effects of buffer salts, pH, ribonuclease treatment, and differential centrifugation on all ribosomal components. Different RNA to protein ratios were obtained for different components in the ribosomal region of the gradient. The ratios were always highest in the 70s or 100s components and lower in the polysome region. The ratio profile in the ribosomal region showed well defined and periodically spaced peaks, indicating the presence of protein rich and protein poor components within each sedimentation class of ribosomes. Peak heights in the ratio profile and the difference in protein content between the polysome region and the main peak were largest in crude extracts, and became attenuated in the course of purification of the ribosomes. The profiles provide a sensitive analytical test for homogeneity of ribosomes and permit detection of subtle changes in the components of a preparation. R.N.A.

N65-29416*# Chicago Univ., Ill.
ELECTRON MICROSCOPIC AND BIOCHEMICAL STUDIES OF PYRUVATE DEHYDROGENASE COMPLEX OF ESCHERICHIA COLI
Humberto Fernandez-Moran, Lester J. Reed, Masahiko Koike, and Charles R. Willms (Texas Univ., Austin) 26 Jun. 1964 14 p refs Submitted for Publication
(Grant NsG-441)
(NASA-CR-58980) CFSTI: HC $1.00/MF $0.50 CSCL 06M

Examination of the Escherichia coli pyruvate dehydrogenase complex and its component enzymes in the electron microscope indicates that the complex has a polyhedral structure with a diameter of about 300 to 350 Å and a height of 200 to 250 Å. The lipoic reductase-transacetylase aggregate, consisting of about 64 subunits, occupies the central portion of the polyhedron and has the appearance of a tetrad of 130 to 150 Å. Surrounding this tetrad are about 16 molecules of pyruvate decarboxylase and about 8 molecules of dihydrolipoic dehydrogenase arranged into two rings laid one above the other. The sequence of these latter molecules cannot yet be specified. However, many of these molecules are similar in appearance and dimensions (70 to 90 Å) to those observed in electron micrographs of the isolated pyruvate decarboxylase component of the complex. The reconstituted complex closely resembles the native complex in appearance. Author

N65-29431*# National Aeronautics and Space Administration. Ames Research Center, Moffet Field, Calif.
HUMAN RESTRAINT SYSTEMS DEVELOPMENT FOR USE IN ACCELERATION RESEARCH
Hubert C. Vykukal and E. Gene Lyman [1964] 25 p refs
(NASA-TM-X-54780) CFSTI: HC $1.00/MF $0.50 CSCL 05E

The NASA, Ames Research Center, has a continuing need for pilot-restraint systems suitable for use in research programs designed to investigate the performance and physiological well-being of pilots during severe acceleration. Various concepts in restraint systems have been evaluated at the Ames Research Center and tested under simulated operational conditions. Based on the pilots' acceptance of these systems and on those areas requiring improvements, Ames has initiated a development contract to integrate a state-of-the-art pressure suit and a restraint system for use in full space-mission simulations. Author

N65-29450*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CONVERSION OF ACETATE TO LIPIDS AND CO_2 BY LIVER OF RATS EXPOSED TO ACCELERATION STRESS
D. D. Feller and E. D. Neville [1963] 18 p refs Submitted for Publication
(NASA-TM-X-51940) CFSTI: HC $1.00/MF $0.50 CSCL 06S

Male Sprague-Dawley rats in age groups from 4 to 20 weeks were centrifuged at 4.5 g for periods of 0.5 to 14 days. Slices of liver, kidney, and inguinal adipose tissue were incubated with C^{14}-labeled acetate, and the resulting CO_2 and lipids were measured. When compared with controls liver and adipose tissue from nonfasted centrifuged rats showed an increased formation of C^{14}-lipids while kidney showed a decrease. Liver from fasted centrifuged rats also showed an increased formation of C^{14}-lipids when compared to the fasted noncentrifuged controls. The increase in acetate conversion varied with age of animal and duration of exposure. No significant change in C^{14}-acetate oxidation was noted in either fed or fasted centrifuged animals as compared to their corresponding controls. The total lipid content of the tissues from centrifuged rats was generally lower than in the controls and was also a function of age of the animal and time of exposure. Author

N65-29471*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
VOLUNTARY DEHYDRATION
John E. Greenleaf [1964] 70 p refs Submitted for Publication
(NASA-TM-X-51938) CFSTI: HC $3.00/MF $0.75 CSCL 06P

In this study of the physiology of thirst and drinking, the literature on the lag in rehydration following water loss in man and other animals is reviewed. This lag is termed voluntary dehydration. While most animals rehydrate fairly rapidly, the rat and man do not. Man requires 24 hours or longer to regain a water deficit of six percent of his body weight whereas most other animals can do it in one hour or less. Man regains the lost water at a constant rate, and cannot force down water beyond one liter without inducing vomiting. There are many factors which influence the physiology of drinking, and attempts to explain the phenomenon on the basis of a single factor have not been successful. There is a need for research on the relationships among the many variables applicableto water metabolism and to determine how they are related to the time factor in drinking. J.M.D.

N65-29485*# Kaiser Foundation Research Inst., Richmond, Calif. Lab. of Comparative Biology.
FATE OF SPECIFIC RIBONUCLEOSIDE TRIPHOSPHATASES ON PURIFICATION AND RECONSTITUTION OF THE RIBOSOMAL SYSTEM OF ESCHERICHIA COLI
I. D. Raacke and J. Fiala [1964] 72 p refs Submitted for Publication Prepared in Cooperation with Calif. Univ., Berkeley
(Grants NsG-479; NSF G-19532; NIHGM-07924-02)
(NASA-CR-59029) CFSTI: HC $1.00/MF $0.50 CSCL 06M

The relative changes in RNA, protein, and four triphosphatases, which occurred when a crude extract of *E. Coli* was separated into ribosomal and supernatant fractions, and when the purified ribosomes recombined with the supernatant, were investigated. It was shown that the protein and the RNA were mainly lost from the heavy and light particle fractions. The relative loss of protein was greater than RNA as shown by the increased RNA to protein ratio of the ribosomes, as compared to the crude extract. It was noted that the enzyme peaks in the purified ribosomes were sharper than those in the crude extract, showing that the ribosomes remain heterogeneous after purification. The specific activity of the enzymes was highest in the heavy regions of the gradient, the same as in the crude extracts, and low in the main peak. Most of the low triphosphatase activity in the supernatant was due to small amounts of incompletely sedimented particles. It was concluded that many possible and previously unrecognized differences exist between ribosomal preparations which were identical by conventional sucrose density gradient analysis. R.W.H.

N65-29487*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
EFFECTS OF WEIGHTLESSNESS ON MAN DURING U.S. SUBORBITAL AND ORBITAL FLIGHTS
Siegfried J. Gerathewohl [1963] 43 p refs
(NASA-TM-X-51935) CFSTI: HC $2.00/MF $0.50 CSCL 06S

The astronauts' responses to weightlessness during the Project Mercury flights are analyzed. All abnormalities attributed to weightlessness during the flights were well within the tolerance limits of the human organism. Consistent trends in response changes during the flights were best reflected by the vital signs. Cardiovascular, pulmonary and metabolic changes were found which may be associated with weightlessness. A correlation between duration of weightlessness and response change in cardiac and respiration rates during reentry

stress is apparent. There are no psychological or physiological contra-indications to embarking on longer spaceflight missions but the adverse effects of orthostatic hypotension and orthostatic tachycardia--observed after the longest flights--should first be investigated in a manned earth orbiting laboratory. J.M.D.

N65-29615# Whirlpool Corp., St. Joseph, Mich.
WATER RECLAMATION FROM URINE THERMOELECTRIC SYSTEM Final Report, May 1963-Oct. 1964
Duane C. Nichols. Wright Patterson AFB, Ohio, AMRL, Mar. 1965. 21 p. refs
(Contract AF 33(657)-11479)
(AMRL-TR-65-29; AD-615979)

This project was initiated to design, fabricate, and test a thermoelectric system for the recovery of potable water from urine in aerospace applications. The unit built is an integral system, which yields quality potable water at a performance factor of 146 watt-hours per pound. It has a capacity of processing 12 liters of urine per day with a batch size of 1 liter per run. Further development work should be undertaken toward obtaining better efficiencies, a decrease in size, and a reduction in weight. Author

N65-29623*# National Aeronautics and Space Administration, Washington, D. C.
PHYSIOLOGICAL EFFECTS OF GRAVITATION [FIZIOLOGICHESKIYE EFFEKTY GRAVITATSII]
O. G. Gazenko and A. A. Gyurdzhian. Aug. 1965. 23 p. refs. Transl. into ENGLISH of a paper presented at the 8th Plenary Meeting and 6th Intern. Space Sci. Symp., Buenos Aires, 10-21 May 1965
(NASA-TT-F-376) CFSTI: HC $1.00/MF $0.50 CSCL 06S

The physiological effects of weightlessness are discussed, as they were measured and reported by the Russian cosmonauts. The possibilities of adaptation to space environment by training and the mechanisms of compensation and vicarization (adaptive substitution) of the analyzers and processes of the biological entity are considered. The authors present recommendations for cosmonaut training for distant and prolonged flights. Author

N65-29648*# National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY A Continuing Bibliography
May 1965. 163 p. refs
(NASA-SP-7011(11)) CFSTI: HC $1.00/MF $1.00 CSCL 06S

Annotated references are presented, which concentrate 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 to articles describing similar effects on biological organisms of lower order are also included. Related topics such as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development are also listed. C.T.C.

N65-29649*# National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY A Continuing Bibliography
Jun. 1965. 109 p. refs
(NASA-SP-7011 (12)) CFSTI: HC $1.00/MF $0.75 CSCL 06E

Aerospace Medicine and Biology is a continuing bibliography which, by means of periodic supplements, serve as a current abstracting and announcement medium for references on this subject. The subject coverage concentrates on the biological, physiological, psychological, and environment 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 is placed on applied research, but reference to fundamental studies and theoretical principles related to experimental development are also included. The contents of this issue are comprised of abstracts that were prepared by NASA, AIAA, and The Library of Congress (LC). N.E.A.

N65-29650*# Stanford Univ., Calif. Dept. of Genetics.
PROTON MAGNETIC RESONANCE SPECTRA OF SOME PROTEINS, I RIBONUCLEASE, OXIDIZED RIBONUCLEASE, LYSOZYME AND CYTOCHROME C
Morton Mandel. [1965] 22 p. refs. Submitted for Publication
(Grant NsG-81)
(NASA-CR-58662) CFSTI: HC $1.00/MF $0.50 CSCL 06A

Proton magnetic resonance spectra of twenty common amino acids and some representative di- and tripeptides obtained at a fixed frequency of 100 Mc are presented. The effect of peptide bonds on chemical shifts, and steric conformational changes are discussed. Tables showing the chemical shifts of amino acid protons in D_2O, and the chemical shifts of amino acid protons in peptides with respect to the corresponding group in the free amino acid are given. NMR spectra are shown for ribonuclease, oxidized ribonuclease, lysozyme, and cytochrome C. L.S.

N65-29652*# Brandeis Univ., Waltham, Mass. Dept. of Biochemistry.
USE OF QUANTITATIVE MICRO-COMPLEMENT FIXATION FOR DETECTION OF SMALL DIFFERENCES IN PROTEIN STRUCTURE
Morris Reichlin, Allan C. Wilson, and Lawrence Levine. [1965] 16 p. refs
(Grant NsG-375)
(NASA-CR-58660) CFSTI: HC $1.00/MF $0.50 CSCL 06A

Three techniques (the quantitative precipitin reaction, macrocomplement fixation and micro-complement fixation) have been compared for their capacity to distinguish chicken from turkey H_4 lactic dehydrogenase, human from chimpanzee serum albumin, and chicken from turkey ovalbumin. With each immune system, greater serological differences were found by micro-complement fixation. It is suggested that the greater sensitivity exhibited by micro-complement fixation may reflect the measurement of a more avid fraction of the antibody population. Hence, even a slightly different conformation in a heterologous antigen might be expected to lead to dissociation of the antigen-antibody aggregates that are required for complement fixation. Author

N65-29726*# National Aeronautics and Space Administrstion, Washington, D. C.
THE EFFECT OF DIETETIC MEASURES ON THE OSMOTIC BALANCE OF THE BLOOD IN NORMAL PERSONS, PART 1 [UBER DEN EINFLUSS DIATETISCHER MASSNAHMEN AUF DAS OSMOTISCHE GLEICHGEWICHT DES BLUTES BEIM NORMALEN MENSCHEN, 1 MITTEILUNG]

Anton Regnier Jul. 1965 .46 p refs Transl. into ENGLISH from Z. Exptl. Pathol. und Therap. (Berlin), v. 18, 1916 p 139–164
(NASA-TT-F-9439) CFSTI: HC $2.00/MF $0.50 CSCL 06P

A one-time increase in salt intake without increased water intake combined with a normal diet, leads either to a temporary rise in the molecular concentration of the blood which is partially determined by the influx of achloride mineral constituents, or to protracted hydremia with a delayed elimination of table salt. With a concurrent restriction of the water intake, an initial disturbance of the isotonicity of the blood may occur since the appropriate quantities of the water are not replaced rapidly enough by the cellular fluid deposits. A one-time increase in water consumption leads to an increased elimination of NaCl and N. An increased fluid consumption over a period of 11 days causes relatively more water to be excreted through the kidneys and less by extrarenal routes. In this case, the blood thickens and its molecular concentration increases. The kidneys do not lose their normal concentration capacity. During a salt-poor diet an increase in extrarenal elimination may occur. In the observed case, the blood thickened and the molecular concentration increased. N.E.A.

N65-29740*# National Aeronautics and Space Administration, Washington, D. C.
DATA PROCESSING SYSTEMS IN SPACE BIOLOGY [AVTOMATICHESKIY KONTROL' I METODY ELEKTRICHESKIKH IZMERENIY]
R. M. Bayevskiy, A. D. Voskresenskiy, O. G. Gazenko, A. D. Yegorov, N. A. Chekhonadskiy et al Jun. 1965 9 p refs Transl. into ENGLISH from Tr. IV Konfi, v. 2, 1962 Redaktsionnoizdatel'skiy Otdel Sibirskogo Otdeleniya An SSSR (Novosibirsk), 1964 p 100–105
(NASA-TT-F-9514) CFSTI: HC $1.00/MF $0.50 CSCL 06B

Changes in the needs of experimental information and the use of data processing, especially probability-statistical methods, are discussed. A differentiation is made between investigative and control systems of data processing in relation to unique space biology conditions, with Vostok flights used as examples. Progress is also reported on automating information analysis, such as expressing biological indicators by mathematical equations. Present needs and corrections in such areas of space biology as information theory are discussed. C.T.C.

N65-29750# Space and Flight Equipment Association, Rolling Hills, Calif.
PROCEEDINGS OF 2ND NATIONAL FLIGHT SAFETY, SURVIVAL AND PERSONAL EQUIPMENT SYMPOSIUM
[1964] 278 p refs Symp. held at San Diego, Calif., 28–30 Oct. 1964

Symposium papers on oxygen systems and related equipment; survival, search, and rescue; escape, parachutes, and related equipment; protective clothing, restraint equipment, and safety are presented. For individual titles see N65-29751–N65-29771.

N65-29752 Sierra Engineering Co., Sierra Madre, Calif.
OXYGEN BREATHING MASKS: SELECTION, FIT, AND APPLICATION
Aaron Bloom *In* Space and Flight Equipment Assoc. Proc. of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 9-15 (See N65-20750 18-05)

The use of various types of oxygen breathing masks is discussed, their identification characteristics presented, hardware relationships correlated, and fit techniques and applications described. R.N.A.

N65-29753 North American Aviation, Inc., Los Angeles, Calif.
SURVIVAL, SEARCH, AND RESCUE—OPERATION TRAINING TECHNIQUES FOR GENERAL AVIATION PILOTS AND AIRCRAFT OWNERS
Bob Minner *In* Space and Flight Equipment Assoc. Proc. of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 16–19 (See N65-29750 18-05)

Ideas are presented for initiating and carrying out a continuous and progressive survival program, including the problems of search and rescue; and aimed at the general aircraft owner, private pilot, and executive flight crews. R.N.A.

N65-29754 National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.
AN IMPROVED TECHNIQUE FOR HANDLING INJURED PERSONS IN THE WATER
Richard A. Pollard and Glenn A. Shewmake *In* Space and Flight Equipment Assoc. Proc. of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 20–23 (See N65-29750 18-05)

A rescue technique, using the standard Stokes litter, is described for rapid on scene assistance following a parachute landing in water and allows for the possibility of broken bones. The Stokes litter provides excellent immobilization and is large enough to accommodate a man clothed in full pressure garment. There is no need to move the patient from the litter until he is within the hospital. Pneumatic cells, selectively inflated, have been added to supoort the head and limbs in water and to provide a platform for first aid. The inflation cells uninflated and stowed have little weight and bulk and do not interfere with the use of the litter as a standard Stokes litter. After being secured to the litter by a rescue team, the patient is recovered by helicopter and transported to a medical facility. R.N.A.

N65-29755 Federal Aviation Agency, Oklahoma City, Okla. Civil Aeromedical Research Inst.
FLOTATION CHARACTERISTICS OF AIRCRAFT PASSENGER SEAT CUSHIONS
Ernest B. Mc Fadden and James M. Simpson *In* Space and Flight Equipment Assoc. Proc. of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 24-35 refs (See N65-29750 18-05)

Various types of open cell polyether foam aircraft passenger seat cushions were investigated to determine their flotation characteristics. Seat cushions were pool tested under a static load of 14 pounds and later field tested by human subjects in light wave action. It was found that the static buoyancy testing did not simulate actual conditions of use and provided deceptive and erroneous information. In the static tests the cushions supported their loads from 18 to 60 hours while in human testing under simulated conditions the cushions provided less than 8 minutes of adequate flotation. Recommendations were made for providing a simple means of attaching the cushion to the survivor's body, and for using a combination of open and closed cell foam materials which would furnish adequate flotation with respect to quantity and duration without a sacrifice of seat cushion comfort. R.N.A.

N65-29756 Federal Aviation Agency, Oklahoma City, Okla. Civil Aeromedical Research Inst.
DEVELOPMENT OF A TRITIUM SELF-LUMINOUS LIFE RAFT LIGHT SOURCE
Ernest B. Mc Fadden, J. D. Garner, and R. A. Masler (U.S. Radium Corp., Morristown, N. J.) *In* Space and Flight Equipment Assoc. Proc. of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 36–51 refs (See N65-29750 18-05)

A self-luminous life raft light source designed as an aid to evacuation and liferaft boarding is described and evaluated. The light source operates continuously as a result of bombardment of a phosphor by beta particles emitted by tritium gas. It does not depend on any external source of energy for illumination, is not affected by temperature extremes, and has a duration of 12.6 years. The unit is not considered a radiation hazard. When mounted parallel to the plane of the life raft tube at a position of 45 degrees from the horizontal, the source is visible through an arc in excess of 180 degrees and is therefore visible to a survivor boarding the raft from above or from the water. The source is instantly visible upon raft inflation, is not subject to activation delays or failures, is ruggedly constructed, extremely reliable, and requires no maintenance. R.N.A.

N65-29757 Aerospace Medical Div. Arctic Aeromedical Lab., Fort Wainwright, Alaska.

DEVELOPMENT OF AN ARCTIC SHELTER

John F. Lee *In* Space and Flight Equipment Assoc. Proc of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 52-57 (See N65-29750 18-05)

A program is being conducted to design and test an Arctic survival shelter having lightweight, low package volume, high thermal protection, and ease of erection. The shelter is based on the principle that the earth serves as a massive heat sink and that this heat can be trapped in an insulated fabric shelter along with the survivor's body heat to provide enough warmth for survival. Various shelter materials and designs were tested and the results are presented R.N.A.

N65-29758 Air Force Dept., Norton AFB, Calif. Life Sciences Div.

SURVIVAL FOLLOWING AIR FORCE AIRCRAFT ACCIDENTS, 1 JANUARY 1958–31 DECEMBER 1963

William R. Detrick and Anchard F. Zeller *In* Space and Flight Equipment Assoc. Proc. of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 58-72 (See N65-29750 18-05)

A study was conducted to determine survival problems following aircraft accidents. Approximately 10% of the accidents studied resulted in a survival situation. With the exception of the first few minutes in a water situation, survival for most crew members was not an insurmountable problem. The total number of accidents has diminished but the number of survival accidents remains constant. In most accidents adequate equipment was provided but too often it failed or was lost when needed. In rescue, the most difficult problem was in locating downed crewmen. Location aids, other than visual devices, have so far proven unsatisfactory. Flotation devices are considered essential for survival in water accidents. R.N.A.

N65-29759 Air Force Systems Command, Wright-Patterson AFB, Ohio. Air Force Flight Dynamics Lab.

LOCATION AND RETRIEVAL CONCEPTS FOR REENTRY CREW ESCAPE SYSTEMS

J. M. Peters *In* Space and Flight Equipment Assoc. Proc of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 73-96 (See N65-29750 18-05)

A study is presented on location problems associated with reentry crew escape systems. The equations of motion for escape capsules having lift to drag ratios from 0.2 to 2.0 were solved to determine the ground area attainable for those capsules returning to earth from 300 mile orbits. The landing capabilities with respect to the probability of a successful recovery of the downed crew were determined. The study indicates that an escape capsule with a lift to drag ratio of 1.0 represents the simplest capsule with enough maneuvering capability to reach suitable landing areas. An escape concept is presented, emphasizing that the successful conclusion of escape requires the determination of the necessary maneuver to reach a desirable landing area, the physical execution of that maneuver, and the transmission of escape information to recovery forces. R.N.A.

N65-29760 Federal Aviation Agency, Oklahoma City, Okla. Civic Aeromedical Research Inst.

SURVIVAL OF HIGH VELOCITY FREE-FALLS IN WATER

Richard G. Snyder *In* Space and Flight Equipment Assoc. Proc of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 97-117 refs (See N65-29750 18-05)

Forty-four cases of free-falls survived by individuals impacting water environments under conditions of high velocity (50 ft/sec. to 116 ft/sec., corrected for aerodynamic drag) have been intensively investigated and analyzed. Ages varied from 7 to 80 years and the study included 34 males and 10 females. The falls occurred in 17 states, mainly over a three year period, and included all known survivals of water impact at over 50 ft/sec. It was found that the most survivable body orientation, by a factor of 5–7 times, is a feet-first impact in which critical velocity for human survival was approximately 100 ft/sec. No correlation of velocity with degree of injury was found, although distinct patterns of injury were shown. Factors believed to influence human survival tolerances are discussed. Author

N65-29761 Weber Aircraft Corp., Burbank, Calif.

THE F-106 OPERATIONAL ZERO ALTITUDE–ZERO VELOCITY ESCAPE SYSTEM

E. L. James and W. F. Ziegler *In* Space and Flight Equipment Assoc. Proc. of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 118-122 (See N65-29750 18-05)

The development of a reliable zero air speed, zero altitude ejection seat for the F-106 jet aircraft is discussed. An injection system is described which employs a cartridge actuated drogue gun to ballistically eject the pilot chute and much of the main canopy thus reducing the parachute deployment time. In rocket sled tests the ejection seat equipped with the gun deployed parachute system qualified with successful performances at velocities ranging from 90 to 450 knots. The ejection system, while lacking the sophistication and supersonic capability of conventional systems, offers true zero zero capability with a high level of reliability rarely attained in ejection seats. R.N.A.

N65-29768 Gerry Mountain Sports, Inc., Denver, Colo.

COLD WEATHER SURVIVAL CLOTHING

Robert W. Swartz *In* Space and Flight Equipment Assoc. Proc. of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 223-224 (See N65-29750 18-05)

Cold westher survival clothing which conserves body heat by trapped air insulation is discussed. The body's heat control system is reviewed, the merits of quality goose down are discussed, various survival clothing designs are described, and packing recommendations for the clothing are given. R.N.A.

N65-29769 National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

HUMAN RESTRAINT SYSTEMS DEVELOPMENT FOR USE IN ACCELERATION RESEARCH

Hubert C. Vykukal *In* Space and Flight Equipment Assoc. Proc of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 225-243 refs (See N65-29750 18-05)

Various pilot restraint systems were tested and evaluated under simulated high acceleration conditions. The restraint systems are described and include the modified NASA couch, the universal pilot restraint suit, the soft torso restraint and

the restraint harness-pressure suit system. Using the modified NASA couch, pilots were able to perform control functions without undue discomfort, but, the couch cannot be molded to the body shape while it is in a high acceleration environment and it lacks universal fit. The universal pilot restraint suit eliminates these problems and pilot performed well while subjected to EBI, EBO, and EBD accelerations. However, it has poor provision for lateral restraint at high EBL and EBR accelerations. The soft torso restraint provides more positive support for EBO, EBL, and EBR than the universal pilot restraint suit, but the lack of rigid support from the axilla to the waist allows the rib cage to flatten under EBI acceleration causing difficulty in breathing. R.N.A.

N65-29770 Rocketdyne, Canoga Park, Calif.
SYSTEM SAFETY AS A TECHNICAL DISCIPLINE
George A. Peters and Frank S. Hall *In* Space and Flight Equipment Assoc. Proc. of 2nd Natl. Flight Safety, Survival and Personal Equipment Symp. [1964] p 244-260 refs (See N65-29750 18-05)

Descriptions are given of some representative safety engineering tasks that are being performed by safety specialists; some other areas in which similar effort could yield significant results are also described. Several methods of safety design analysis are discussed, and a new approach to the quantification of system safety is presented. The goals of system safety engineering as a technical discipline are defined and its relationship with related technical disciplines is made explicit. R.N.A.

N65-29773*# Miami Univ., Coral Gables, Fla. Inst. of Molecular Evolution.
[INVESTIGATIONS IN SPACE-RELATED BIOLOGY] First Annual Report
1 Jun. 1965 97 p refs
(Grant NsG-689)
(NASA-CR-64060) CFSTI: HC $3.00/MF $0.75 CSCL 06A

Research progress in space related biosciences is reported on evolution of chymotrypsin and trypsin, extraterrestrial macromolecular sampler, the origin of optical activity from physical particles, optical resolution of an amino acid by a steroselective Ligand exchange reaction, optical resolution of DL-aspartic acid, DL-glutamic acid, DL-asparagine or DL-glutamine by inoculation, formation of amino acids by pyrolysis of ammonium formate or formamide, synthesis of alpha-amino acid menthyl esters, analysis of proteinoid synthesized in presence and absence of terrestrial crustal materials, heterogeneity of thermal proteinoids, catalytic activity of hematin, catalytic activity in proteinoids, nutritive quality of thermal and Leuchs proteinoids, phosphorylation of nucleosides, thermal oligonucleotides, ultraviolet photomicrographic evidence for a membrane in proteinoid microspheres, catalytic activity and polynucleotide in proteinoid microspheres, and concepts relative to the thermal theory of origins. Also included are ultrastructural, biochemical, and immunochemical studies on marine invertebrate gametes, and sperm-egg interaction and physiological studies on gamete interaction in alga, *Chlamydomonas*. R.N.A.

N65-29782*# AiResearch Mfg. Co., Los Angeles, Calif.
BLOOD PRESSURE MEASURING SYSTEM 54803, PROJECT GEMINI Final Report
J. S. Gould 7 Apr. 1965 155 p
(Contract NAS9-2887)
(NASA-CR-65057; FC-4550) CFSTI: HC $5.00/MF $1.00 CSCL 06K

Efforts on the development of a blood pressure measuring system for Project Mercury are discussed. The electronic blood pressure measuring system differs slightly in principle from the standard clinical instrumentation. The difference in the two instruments is that the stethoscope is replaced by a microphone, the output of which is conditioned by an electronic amplifier and selective filter. The resulting output on a strip chart recorder is a plot of cuff pressure vs time, depicting the selective bleed-down with superimposed pulses from the Korotkoff sound detection channel. The first pulse during bleed-down denotes the systolic pressure, while the last pulse denotes the diastolic pressure. N.E.A.

N65-29790# Joint Publications Research Service, Washington, D. C.
GROWTH OF SOME MYCOBACTERIA ON PETROLEUM AND PETROLEUM PRODUCTS
I. T. Nette, N. N. Grechushkina, and I. L. Rabotnova 2 Aug. 1965 13 p refs Transl. into ENGLISH from Prikl. Biokhim. i Mikrobiol. (Moscow), v. 1, no. 2, Mar.-Apr. 1965 p 167-174 (JPRS-31360; TT-65-31857) CFSTI: $1.00

The isolation and identification of cultures of microorganisms that actively utilize petroleum products, and the possibility of their growth on various concentrations of oils and fuels and on individual hydrocarbons were studied. Most of the cultures identified were mycobacteria which actively used hydrocarbons; these predominated in all cases. Experiments showed that petroleum and petroleum products are most actively utilized by cultures of *M. mucosum*, *M. lacticolum*, and three strains of bacterium. Most of the isolated strains grew on the C_1-C_4, C_6-C_{10}, C_{12}, and C_{16} alkanes. On oils without an aqueous medium with mineral salts, the microorganisms did not grow. It was shown that *M. mucosum* and *M. lacticolum* can use all fractions of paraffin petroleum boiling at 122° to 500° F. C.T.C.

N65-29792# Federal Aviation Agency, Oklahoma City, Okla. Civil Aeromedical Research Inst.
FATIGUE IN AVIATION ACTIVITIES
Stanley R. Mohler Mar. 1965 17 p refs
(AM-65-13)

This report gives a comprehensive survey of work in the field of aviation fatigue. Both current work still in process and earlier work are surveyed. The nature of fatigue itself is discussed, along with all possible factors that contribute to both physical and mental fatigue. Topics covered include flight-time limitations, indicators of excessive fatigue, new developments related to intercontinental flight and Forest Service flights, and the author's detailed comments and recommendations. Author

N65-29820*# Texas Inst. for Rehabilitation and Research, Houston.
THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION. PART VI: THE EFFECT OF THE PERFORMANCE OF PERIODIC FLACK MANEUVERS ON PREVENTING CARDIOVASCULAR DECONDITIONING OF BEDREST
Fred B. Vogt, David Cardus, Carlos Vallbona, and William A. Spencer (Baylor Univ. Coll. of Med.) Washington, NASA, Jul. 1965 41 p refs
(Contract NAS9-1461)
(NASA-CR-176) CFSTI: HC $2.00/MF $0.50 CSCL 06E

Six subjects participated in two 3-day bedrest periods: the first period consisted of bedrest alone, the second period consisted of bedrest plus periodic Flack maneuvers, and the periods were separated by 4 days to allow for recovery. At the end of the first period, 3 of 6 subjects experienced convulsive syncope while performing the Flack maneuver in the 70 degree tilt position. The subjects had not recovered at the start of the

second period of bedrest. Repeated Flack maneuvers during bedrest did not prevent manifestation of orthostatism found with bedrest. Author

N65-29832# Joint Publications Research Service, Washington, D. C.
AN EXPERIMENTAL PSYCHOLOGICAL STUDY OF SKILLED ATHLETES WITH USE OF THE CONTROLOGRAPH
Ya. I. Tsurkovskiy 2 Aug. 1965 10 p refs Transl. into ENGLISH from Probl. Psikhologii Sporta (USSR), no. 1, 1960 p 254-260
(JPRS-31374; TT-65-31871) CFSTI: $1.00

Data collected from laboratory experiments, objective observations, word surveys, and subjects' efforts are combined to study skilled athletes by use of a controlograph. The athlete-subject is required to perform specified tasks in two different ways, and he is required to monitor himself after he becomes familiar with the controlograph. Indices for various tasks are presented in tabular form, and it is concluded that the proposed method can be applied for the psychological diagnosis of athletes in various fields. The data indicate that systematic sports exercises favor a broad development of the mental processes and develop capacity for self-control to insure success in sports activity. Further, it is stated that these results support the position that the motor habits of an athlete are formed consciously. While such a systematization is considered somewhat schematic in character, it is felt that the controlograph study can establish interrelationships between temperaments and controlability for subgroups of athletes. M.W.R.

N65-29855# European Atomic Energy Community, Brussels (Belgium)
STUDY ON THE IDENTIFICATION METHODS OF IRRADIATED FOODSTUFFS
A. Lafontaine and L. Bugyaki Apr. 1965 33 p refs
(EUR-2402.f) Available from Belg. Am. Bank and Trust Co., New York, Account No. 22.186: 50 Belg. Fr.

After a brief review of the economic and health considerations involved in the preservation of foodstuffs, the authors mention the various methods generally used and set out the principles which led to the proposal to use ionizing radiations for this purpose. The authors point out that uncertainty as to the wholesomeness of irradiated foods still exists in scientific circles in spite of extensive research. Nevertheless, certain countries have already permitted several kinds of irradiated food to be distributed for consumption. There are grounds to expect that the marked zone for certain of these products will not stop at the national frontiers. The problem therefore arises, of how to identify irradiated products and how to ascertain the dose employed for irradiation, if any. The methods suitable for such a purpose include measurement of the paramagnetic state of the atom, electrophoresis, measurement of the oxido-reduction potential, polarography, chromatography, spectrophotometry, colorimetry, microscopic examination of the tissues, immunological changes, microbiology, deterioration of the packaging and changes in the organoleptic characteristics. Author

N65-29860# Medical Research Council, London (England).
ASSAY OF STRONTIUM-90 IN HUMAN BONE IN THE UNITED KINGDOM. PART I: RESULTS FOR 1964
Lord Shawcross et al Feb. 1965 18 p refs
(Rept.-10) HMSO: 1s 9d

The results of assays of strontium 90 in samples of human bone from subjects who died in the first half of 1964 are presented as part of a survey on the effects of radioactive fallout. Details of the bone samples and the assay results are tabulated. Minimum, maximum, median, and mean Sr^{90} values for four age groups—newborn, 0 to 4 years, 5 to 19 years, and 20 years and over—were compared with values for 1963. The values were higher in the first three age groups with a considerable increase in the 0 to 4 year group. R.N.A.

N65-29871# Harry Diamond Labs., Washington, D. C.
AN EASY WAY TO DETERMINE THE SHAPE OF A DRIVING FUNCTION FROM THE RESPONSE OF A LINEAR SYSTEM
John S. Wicklund 20 Apr. 1965 17 p refs
(ADL-TM-65-19; AD-616126)

A method is described for correcting data to account for the response of the measuring device. It is particularly useful for work with transient signals, and numerical examples of this application are given. Author

N65-29883# Inter-American Nuclear Energy Commission, Washington, D. C.
5th INTER-AMERICAN SYMPOSIUM ON THE PEACEFUL APPLICATION OF NUCLEAR ENERGY
1965 274 p refs Symp. held at Valparaiso, Chile, 9-13 Mar. 1964; Sponsored in cooperation with Govt. of Chile and U. S. AEC

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N65-29886# Rochester Univ., N. Y. Medical Div.
THE EFFECT OF WIDE X-RAY BEAM AND FINITE PHANTOM THICKNESS ON 1000 KVP X-RAY DEPTH DOSE
H. D. Maillie and H. Mermagen Aug. 1965 23 p refs
(Contract W-7401-ENG-49)
(UR-667) CFSTI: $1.00

Pseudo-infinite phantom dose measurements were made over a field for studying the effect of wide X-ray beam and phantom thickness on 1000 KVP X-ray dose, to improve the dose accuracy in X-irradiation of animals. Normally the dose is estimated by extrapolation from available dose tables. It was found that depending upon the field area and the thickness of the tissue-like mass involved, an exit surface dose will be considerably lower than the dose at a similar depth within a semi-infinite phantom. In determining the center-beam depth dose, it was demonstrated that errors of as much as 30% low may be incurred if such doses are derived from published depth dose tables. Data are presented in tabulated and graphic form. L.S.

N65-29915# Kansas Univ., Kansas City. Dept. of Physiology.
CARBON DIOXIDE, OXYGEN, AND ACIDITY$_2$-THE INTERACTION AND INDEPENDENT EFFECTS ON BREATHING OF THESE FACTORS IN THE ARTERIAL BLOOD Final Report, Aug. 1961-Aug. 1963
Robert William Hamilton, Jr. and E. B. Brown, Jr. Brooks AFB, Tex., AF School of Aerospace Med., Dec. 1964 47 p refs
(Contract AF 41(657)-400)
(SAM-TR-64-94; AD-462984)

Experiments were conducted on pentobarbital anesthetized dogs and on trained unanesthetized dogs to determine the independence or degree of interaction among the three chemical stimuli: O_2, CO_2, and H^+ (measured in arterial blood) as respiratory stimulants. The interaction of the $CO_2 - H^+$ complex and low oxygen, as described by others, was reconfirmed. Further dissection of this relationship indicated that the interaction is between CO_2 and O_2 and the H^+ is not involved. The interaction of CO_2 and H^+ was determined with oxygen tension held above 200 mm Hg, at which level it is unimportant as a respiratory stimulant. It appears that the response to CO_2 decreases as the level of H^+ increases and vice versa. We interpret this as a negative interaction between these two chemical agents. Author

N65-29924# Air Force Systems Command, Kirtland AFB, N. Mex. Air Force Weapons Lab.
PROTON ABSORPTION IN DOSE-EQUATED MATERIALS Technical Report, 1 Sep.–1 Dec. 1964
Joseph F. Janni Apr. 1965 185 p refs
(AFWL-TR-65-3; AD-616703)

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

N65-29966*# Northrop Space Labs., Huntsville, Ala.
APOLLO EXTENSION SYSTEM PAYLOADS. MANNED FLYING SYSTEM (MFS) KINESTHETIC EFFECTS
D. W. Thomas Jun. 1965 30 p refs
(Contract NAS8-20082)
(NASA-CR-61079) CFSTI: HC $2.00/MF $0.50 CSCL 05H

An analysis of the kinesthetic effects of astronaut movements on the center of gravity of the lunar flying vehicle is presented. The moment capability of the attitude control system is 35 lb ft for the pitch axis and 48.3 lb ft for the roll axis. This corresponds to a center of gravity shift of .208 ft for the pitch axis and .278 ft for the roll axis. The reaction jets are sized to control a disturbance torque which is 40% of the control power available. Using this 40% criteria the center of gravity shift that the system can tolerate is 1 inch for the pitch axis and 1.33 inch for the roll axis. The results indicate that a suited astronaut can exceed this limitation through body motions. R.N.A

N65-29998# Air Force Systems Command, Kirtland AFB, N. Mex. Air Force Weapons Lab.
X-RAY ABSORPTION IN DOSE-EQUATED MATERIALS Technical Report, 1 Jan.–1 Jun. 1964
Benton C. Clark and Joseph F. Janni May 1965 152 p refs
(WL-TR-64-134; AD-616773)

The calculated values and comparisons of X-ray interaction parameters for a number of materials are presented so that possible dosimetric media may be directly compared and evaluated with several selected radiation effects media. The photon energies considered range from 0.01 Mev to 100 Mev. The calculational approach as well as the resultant tabulations are presented in detail. Author

N65-30015# Air Force Systems Command, Wright Patterson AFB, Ohio. Foreign Technology Div.
CHANGES IN THE ELECTROENCEPHALOGRAM AND DERMA-GALVANIC REACTIONS IN THE PROCESS OF FORMATION OF TENTATIVE RELATIONSHIP BETWEEN MOTORIAL AND VISUAL ANALYZERS IN HUMANS
V. M. Vasil'yeva 3 Jun. 1965 15 p refs Transl. into ENGLISH from Zh. Vysshei'nervnoi Deyatel'nosti (Moscow), v. 14, no. 5, 1964 p 755–762
(FTD-TT-65-434/1+2; AD-615995)

A pairing was made of the kinesthesic and photo stimulations in man with a view to forming a temporary connection between the motor and visual analysers. Proprioceptive stimulation was achieved by the movement of the muscles provoked by stimulation of the ulnar nerve through the skin by threshold impulses of a rectangular current not accompanied by tactile effect. After several pairings of the stimuli a conditioned EEG response was elaborated: the movements of the muscles resulted in the same depression of the alpha-rhythm in the occipital area as the photic stimulations paired with them. The dynamics of EEG and SGR changes in the course of formation of such a reaction is characterized by a number of regularities inherent in temporary connections between exteroceptive stimuli. Author

N65-30036# Benson (Robert W.) and Associates, Inc., Nashville, Tenn.
EXPERIMENTAL BONE AND TISSUE VIBRATOR ASSEMBLY Final Report, Jun. 1963–Aug. 1964
Robert W. Benson Wright-Patterson AFB, Ohio. AMRL. Apr 1965 33 p refs
(Contract AF 33(657)-11335)
(AMRL-TR-65-11; AD-615916)

A special purpose laboratory vibrator has been developed for use in experimental investigations of hearing by bone and tissue conduction and of mechanical driving point impedance of tissue and bone. The vibrator assembly is floated on an air bearing to provide resonance-free operation over the frequency range of 100–10,000 cps and at intensity levels of 60 decibels above threshold of hearing. Special sensors within the unit provide measurement of the tip velocity of the alternating pressure transmitted by the head and the force due to an external load. Design features and calibration procedures are discussed in this report. Author

N65-30098# School of Aerospace Medicine, Brooks AFB, Tex.
COPING AND DEVELOPMENTAL THEORY: APPLICABILITY TO SELECTIVE STUDY OF NORMAL MEN
Paul M. Fine and Charles L. Jennings Apr. 1965 39 p *Its* Rev. 1-65
(AD-617745)

A result of a preliminary research is presented to show how coping devices may be observed, categorized, rated, and used in selection procedures. A tape recorded clinical interview based on developmental theory obtained information about individual coping techniques. The interview was independently evaluated by three psychiatrists using a rating list of coping devices. This list concretely demonstrated the application of developmental theory. A research proposal was presented to demonstrate how clinically derived developmental theory can also be adapted to statistical research. The proposal uses a battery of psychologic tests to obtain estimates of ego strengths and coping styles, and a questionnaire to obtain information about events during different developmental stages. R.N.A

N65-30099# Princeton Univ., N. J.
ANALYSIS OF MEMORY FOR CHANGING INFORMATION Final Report, Mar. 19, 1964–Jun. 30, 1965
Sam Glucksberg 1 Jul. 1965 13 p refs
(Contract DA-31-124-ARO(D)-199)
(AROD-5038-2; AD-617525)

Three series of experiments were performed. The first two concerned the interplay of a limited set of variables in sequential memory tasks which involved keeping track of changing information. The third focussed upon the examination of interference effects in very short-term memory (VTM). The first two series of studies compared the effects of selected traditional variables in (a) standard incremental memory tasks, such as paired-associate and serial learning, with the effects of those same variables in (b) sequential keeping-track tasks. The aim of this research was to specify the ways in which the two kinds of tasks differ. The purpose of the third series, concerning interference effects in VTM, was to evaluate the extent to which interference effects can account for decrements in memory performance over very short time intervals (0-1 second). Author

N65-30119# Graflex, Inc., Rochester, N. Y.
FILMSTRIP TECHNIQUES FOR INDIVIDUALIZED INSTRUCTION
William H. Trow and Edgar A. Smith (AMRL) Wright-Patterson AFB, Ohio, AMRL, May 1965 18 p refs
(Contract AF 33(657)-11339)
(AMRL-TR-65-78; AD-617607)

In the preparation of filmed programed instruction, several considerations are involved in the choice between slides and filmstrips. In this report, the considerations of revision, quantity, length, storage, recycling, aspect ratio, change time, random access and continuous repetition are briefly discussed. A comparison of costs of preparing a master of the filmed program and duplicate copies is made. As a guide to the preparation of filmstrips by staff photographers, some of the problems involved are discussed, namely, single-frame cameras, the preparation of flat copy, exposure and splicing. Other film formats with possible application in audio-visual programing are described. Author

N65-30134# George Washington Univ., Washington, D. C. Human Resources Research Office.
FUNCTIONAL AND APPEARANCE FIDELITY OF TRAINING DEVICES FOR FIXED-PROCEDURE TASKS
John A. Cox, Robert O. Wood, Jr., Lynn M. Boren, and H. Walter Thorne Jun. 1965 51 p refs
(Contract DA-44 188-ARO-2)
(TR-65-4; AD-617767)

Twelve training devices of reduced fidelity were prepared. Several five-man groups were trained using each device, and then each man was given a proficiency test. Intelligence of trainees, teaching method, and instructor effects were statistically controlled. No significant differences in proficiency or length of training time were found to be associated with the training device used, regardless of degree of functional or appearance fidelity. As a field test under more realistic Army conditions, with military instructors and soldiers chosen at random, a low fidelity device was used to train one group while another group was instructed with high fidelity equipment. A comparison of proficiency levels and training times showed only change differences between these two groups. Author

N65-30136# Graflex, Inc., Rochester, N. Y.
AN EXAMINATION OF THE FEASIBILITY OF MODULAR DESIGN FOR AUDIOVISUAL AUTOINSTRUCTIONAL EQUIPMENT
William H. Trow and Edgar A. Smith (AMRL) Wright-Patterson AFB, Ohio, AMRL, May 1965 33 p refs
(Contract AF 33(657)-11339)
(AMRL-TR-65-79; AD-617608)

The increasing need for audiovisual autoinstructional equipment in a wide range of applications has created a major problem in development of satisfactory equipment to meet the varying demands. Each specific situation requires a certain combination of optical, mechanical and electronic functions which cannot necessarily be adapted to subsequent usages of the equipment. This results either in the costly acquisition of many similar pieces of equipment or in undesirable restrictions on the instructional techniques that might be used. This study examines existing and potential areas of application for audiovisual autoinstructional equipment and proposes a modular approach in the development of new equipment. Each module would embody a separable major function and would be interchangeable in the system. The proposed basic modules would include: (1) a slide-changer module, (2) a filmstrip module, (3) a family of screen modules, (4) a family of light source modules, (5) an audio record and playback module, (6) three signal pulsing modules, (7) a multiple-choice response module, and (8) a write-in response module. Many of these would allow operational alternatives or modification for specialized applications for maximum versatility. Author

N65-30149# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
INCREASING THE RELIABILITY OF OBJECTIVE PERCEPTION OF VOCAL SOUNDS BY INTRODUCING A REPEATED DEMAND
G. I. Tsemel' 18 May 1965 7 p ref Transl. into ENGLISH from Akad. Nauk SSSR. Lab. Sistem Peredachi Informatsii, Probl. Peredachi Informatsii (USSR), no. 15, 1963 p 77–79
(FTD-TT-65-104/1+2; AD-617656)

For raising the reliability of machine perception, an example is used to illustrate the principle of repeated demand of a word, unclearly pronounced, with unusual dispersion of parameters. In a test of 1320 words, in which 12 people participated, results showed that the repeated demand concept led to a substantial rise in reliability of perception. C.T.C.

N65-30156# Bell Aerosystems Co., Buffalo, N. Y.
INTRA-CREW COMMUNICATION OF B-52 AND KC-135 STUDENT AND COMBAT CREWS DURING SELECTED MISSION SEGMENTS
Maurice Siskel, Jr., Francis D. Lane, William E. Powe, and Ralph E. Flexman Wright-Patterson AFB, Ohio, AMRL, May 1965 29 p ref
(Contract AF 33(616)-7681)
(AMRL-TR-65-18; AD-617598)

An experiment was carried out to compare within-crew communications in B-52 and KC-135 aircraft during peacetime training flights as functions of crew experience and selected mission segments. Crew transmission and message rates were obtained from tape recordings of crew communications on the aircraft interphone system during takeoffs and bomb runs in the bomber and takeoffs and air refuelings in the tanker. In each case, samples were obtained from student crew solo missions and from the combat crew training missions. On the basis of earlier work, it was hypothesized that as a result of their lower level of coordination, the less experienced student crews would have a higher rate of communication than the

more experienced combat crews. In two of the comparisons, this hypothesis was confirmed while in two others it was not. Because none of the differences were statistically significant, the results were discussed in terms of the trends which were indicated and several unavoidable compromises in experimental control. Author

N65-30175# Medical Coll. of Virginia, Richmond.
ACUTE BRAIN DAMAGE INDUCED BY X-IRRADIATION. 1: CYTOCHEMICAL AND BIOCHEMICAL STUDIES OF NEUROGLIAL NUCLEIC ACIDS Final Progress Report, 23 Apr. 1964–31 Jul. 1965
Robert H. Brownson [1965] 7 p
(Contract AT(40-1)-2904)
(TID-21440)

An investigation was conducted to determine the effects of X-irradiation on certain features of DNA cytochemistry peculiar to pyknotic neurological cells. Radiated pyknotic cells of corpus callosum were found to be resistant to depolymerization of DNAase as well as to hydrolysis by HCl; the radiation-induced aggregation of DNA fluoresces a bright yellow–orange before and after treatment by these techniques. Since normal nonradiated cells do not exhibit any of these characteristics, these findings are considered to support the concept that resistance to depolymerization is due to a change in molecular configuration. Using direct tissue electrophoresis there were different patterns for control and irradiated cells, and there was a definite increase in pyknotic cells following irradiation. As the length of radiation increased, the ratio of these cells per gram of tissue decreased, perhapes indicating possible recovery of nuclei from X-ray. M.W.R.

IAA ENTRIES

A65-27775 #
PORPHYRIN PIGMENTS OF GREEN SULFUR BACTERIA [PORFIRINOVYE PIGMENTY ZELENYKH SEROBAKTERII].
V. E. Uspenskaia (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR).
Akademiia Nauk SSSR, Doklady, vol. 162, June 1, 1965, p. 940-943. 16 refs. In Russian.

Determination of porphyrin pigments formed by green sulfur bacteria, Chloropseudomonas ethylicum, containing bacterioviridin with maximum absorption in ether at 600 mμ, as a means of investigating the structure and tracts of the biosynthesis of bacterioviridin. The procedure used in the experiments is described. It is found that green sulfur bacteria release into the medium not only uro- and coproporphyrin but also several pigments of porphyrin nature. Of particular interest is the accumulation of porphyrins closely related to (but not identical with) protoporphyrin and Mg-protoporphyrin. These compounds are believed to constitute intermediate products in the synthesis chain of bacterioviridin. The remaining pigments can be hardly considered to be predecessors of bacterioviridin. They may be derivatives or degradation products of bacterioviridin. V.P.

A65-27927
INDUSTRIAL INSTRUMENTS HELP TRAIN GEMINI ASTRONAUTS.
Instrumentation, vol. 18, 2nd Quarter, 1965, p. 16-18.

Brief description of the manner in which certain industrial instrumentation is used in two of the Project Gemini mission simulators. Some instruments used in the spacesuits of the trainees are named, and a diagram of the temperature-control system of a suit is explained. R.A.F.

A65-27950
IDENTIFICATION OF FREE RADICALS INDUCED BY X RAYS IN DEOXYRIBONUCLEIC ACID IN THE SOLID PHASE [SUR L'IDENTIFICATION DES RADICAUX LIBRES INDUITS PAR LE RAYONNEMENT X DANS L'ACIDE DESOXYRIBONUCLEIQUE EN PHASE SOLIDE].
Albert Van de Vorst and Marc Richir (Liège, Université, Département de Physique Atomique et Moléculaire, Liège; Institut d'Astrophysique, Cointe-Sclessin, Belgium).
Académie des Sciences (Paris), Comptes Rendus, vol. 260, no. 24, June 14, 1965, p. 6458-6461. 6 refs. In French.

Study of the variations, as a function of the temperature of the irradiation and of observation, of the form of the electron paramagnetic resonance spectrum of degraded DNA. It is considered that the spectra obtained differ among themselves in a way remarkably like those corresponding to the DNAs of high molecular weight. Thus, for example, at normal temperatures, a degraded DNA yields a characteristic thymine line, while a DNA of high molecular weight gives a line analogous to that resulting from the superposition of signals obtained in guanine and cytosine taken separately. In each case, the variations of the spectrum form with temperature seem to introduce an isomerization effect of the free radical. F.R.L.

A65-28200
SIGNS OF LIFE - CRITERION-SYSTEM OF EXOBIOLOGY.
Joshua Lederberg (Stanford University, School of Medicine, Dept. of Genetics, Palo Alto, Calif.).
Nature, vol. 207, July 3, 1965, p. 9-13.

Systematic criticism of the theoretical basis and operational methods of exobiology, the study of extraterrestrial life. The discussion in this case is limited to the possibility of life on Mars and is based on the supposition that the three evolutionary stages characterizing the earth's history have their counterparts in the development of Mars. Various approaches which might prove to be fruitful in determining the present stage of evolution of Mars are suggested. The launching of a Mars-orbiting observatory is considered an essential prerequisite to an actual landing on Mars. A.B.K.

A65-28291
THE PILOT'S FUNCTION IN COMPLEX FLIGHT-CONTROL SYSTEMS [FUNKTIONEN DES PILOTEN IN KOMPLEXEN SYSTEMEN DER FLUGFÜHRUNG].
Konrad Steininger (Deutsche Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Bad Godesberg, West Germany).
Zeitschrift für Flugwissenschaften, vol. 13, June 1965, p. 194-204. 32 refs. In German.

Consideration of the role of human control in a man-machine system, viewed from the psychological aspect. The importance of the human pilot as a unit within the functions of the control circuit of a manned aircraft is increasing with the complexity of the whole man-machine system. The comparison thus established between the specific performances of a control circuit incorporating a human pilot and that constituted by technical devices is justified only if the utility, reliability, and the economy of the man-machine system is to be proved. The efficiency of sensors and the limits to the capacity of data computing are considered in detail. Among the motor control responses of the pilot the functions of guiding, stabilizing, and damping must be distinguished, both from the psychological point of view as well as from that of the theory of control, according to the different frequencies of control dynamics. The dynamic characteristics of a system at the point of transfer between automatic to human control or vice versa are the factors which determine the transition from autopilots to self-adaptive flight-control systems. This transition evolves in line with the growth of the pilot's trust in automatic control. (Author) D.P.F.

A65-28331 #
THE FIRST SPACE EXPEDITION - MEDICOBIOLOGICAL INVESTIGATIONS [PERVAIA KOSMICHESKAIA EKSPEDITSIIA - MEDIKO-BIOLOGICHESKIE ISSLEDOVANIIA].
P. Vasil'ev, V. Kovalev, and V. Terent'ev.
Aviatsiia i Kosmonavtika, vol. 47, June 1965, p. 22-26. In Russian.

Results of clinical observations of the reactions of the crew of the Soviet three-man space flight aboard the Voskhod. Various tests carried out during and after the flight are described. The changes occurring in the state of the organism are found to be of functional and temporary nature, disappearing two or three days after the flight. It is said that the vestibular stability of the cosmonauts and their resistance to optokinetic stimuli can be increased by an appropriate training cycle. A.B.K.

A65-28377
THE ROLE OF HUMIDITY IN THE EVALUATION OF THE STRESS IMPOSED ON MEN WORKING IN HOT ENVIRONMENTS.
Paul E. Smith, Jr. and Lucien Brouha (Du Pont de Nemours and Co., Inc., Haskell Laboratory, Wilmington, Del.).
(International Symposium on Humidity and Moisture, 1st, Washington, D.C., May 20-23, 1963.)
IN: HUMIDITY AND MOISTURE - MEASUREMENT AND CONTROL IN SCIENCE AND INDUSTRY. VOLUME 2 - APPLICATIONS. [A65-28376 17-20]
Symposium sponsored by NBS, U.S. Weather Bureau, American Society of Heating, Refrigerating and Air-Conditioning Engineers; American Meteorological Society; and Instrument Society of America. Edited by E. J. Amdur.
New York, Reinhold Publishing Corp., 1965, p. 12-16. 7 refs.

Investigation of the effect of relative humidity and temperature on the heartbeat of men subject to stresses imposed by work. Heartbeat has proved to be a useful measure of the stress imposed on workers in hot environments. When the total number of heartbeats for a given period, including work and recovery (cardiac cost), is plotted against the enthalpy of the environment in which the work was performed, a set of linear relations is disclosed, parallel to each other and humidity-dependent. When the data are corrected for the radiant heat load, the points fall on a single straight line. Consequently, it is possible to assess the relative importance of the three means of heat loss from the body which are convective, evaporative, and radiant. The data presented cover a variety of work levels and environments. They indicate that evaporation, which is humidity-dependent, is the most effective means of heat loss. (Author) D.P.F.

A65-28378
A NEW METHOD FOR COMPLETELY DESCRIBING MAN'S THERMAL ENVIRONMENT.

J. R. Breckenridge (U.S. Army, Research Institute of Environmental Medicine, Natick, Mass.) and A. H. Woodcock.
(International Symposium on Humidity and Moisture, 1st, Washington, D.C., May 20-23, 1963.)
IN: HUMIDITY AND MOISTURE - MEASUREMENT AND CONTROL IN SCIENCE AND INDUSTRY. VOLUME 2 - APPLICATIONS.
[A65-28376 17-20]
Symposium sponsored by NBS; U.S. Weather Bureau; American Society of Heating, Refrigerating and Air-Conditioning Engineers; American Meteorological Society; and Instrument Society of America.
Edited by E. J. Amdur.
New York, Reinhold Publishing Corp., 1965, p. 17-23.

Investigation of the principles of heat and moisture exchange to show that the globe thermometer satisfactorily predicts the energy exchange between man and his environment. Such a globe correctly combines the effects of air temperature, temperature of the surroundings, and solar radiation if the globe is painted the correct shade of gray. From this analysis a method is proposed whereby three globes are used to predict the range of heat losses possible in a given environment within which man may adjust his heat loss to match his metabolic heat production. The minimal heat loss, when the man is not sweating, is determined using two globes, one electrically heated, to indicate both temperature and the effect of wind. The maximal heat loss, with the skin wet with sweat and being cooled by evaporation, is also determined by including a globe with a wetted surface. Nomograms are provided for determining these limits on heat loss from readings on the globes.
(Author) D.P.F.

A65-28379
WATER VAPOR AS A CRITICAL COMPONENT IN SEALED CABINS AND PRESSURE SUITS.
Paul Webb (Webb Associates, Yellow Springs, Ohio).
(International Symposium on Humidity and Moisture, 1st, Washington, D.C., May 20-23, 1963.)
IN: HUMIDITY AND MOISTURE - MEASUREMENT AND CONTROL IN SCIENCE AND INDUSTRY. VOLUME 2 - APPLICATIONS.
[A65-28376 17-20]
Symposium sponsored by NBS; U.S. Weather Bureau; American Society of Heating, Refrigerating and Air-Conditioning Engineers; American Meteorological Society; and Instrument Society of America.
Edited by E. J. Amdur.
New York, Reinhold Publishing Corp., 1965, p. 78-84. 22 refs.

Examination of the critical role of water vapor in maintaining human comfort and thermal balance in small sealed spaces. In the small closed space of a sealed cabin or full pressure suit, the human occupant represents the dominant source of water vapor, and unless an adequate heat sink is provided, the increase in water-vapor pressure in the enclosure may lead to loss of thermal equilibrium and body heat storage. A number of laboratory experiences and flight projects have borne out the need to deal precisely with the water vapor source and sink relationship. The rates of water vapor produced by man are quite variable, since both insensible and sensible water loss are influenced by a number of environmental conditions. It is shown that the relative humidity terminology is a misleading way of expressing humidity, since the apparently safe 50% RH condition means far too much water vapor at temperatures above 80 or 90°F. A rather narrow range of water-vapor pressure is recommended, in the 5- to 10-torr range, with a narrow temperature band for design purposes covering a broad spectrum of activities, clothing, and external environments. (Author) D.P.F.

A65-27427 #
THE INTERACTION OF LASER BEAMS WITH METALS.
Carl M. Verber and Albert H. Adelman (Battelle Memorial Institute, Columbus, Ohio).
Battelle Technical Review, vol. 14, July 1965, p. 3-8. 10 refs.
Grant No. AF AFOSR 640-64.

Discussion of research concerned with the mechanisms and immediate results of the laser-metal interaction. Three types of interaction between light and metals are considered: thermal effects, multiple photon effects, and electric field effects. The first type depends on the energy content of the light beam and involves the conversion of this energy to heat at or near the metal surface. The second relies on the description of light as a beam of photons and produces effects that arise from the quantum nature of light. The third type of interaction involves effects that are due to the electromagnetic field associated with the light beam. Properties of three types of laser systems are tabulated. B.B.

A65-27428 #
PROSPECTS FOR ELECTRIC PROPULSION IN SPACE.
Donald S. Edgecombe (Battelle Memorial Institute, Columbus, Ohio).
Battelle Technical Review, vol. 14, July 1965, p. 17-21. 7 refs.

Description of the four types of electric propulsion engines receiving greatest attention for space use, their capabilities, and problems associated with their development. Contact-ionization engines are now considered to be the most promising type. Existing models can be further improved by developing better designs, materials, and better knowledge of the erosion process. The thermal arc-jet is presently the most highly developed electric engine. Arc-plasma engines may become strong competitors of ion engines; however, the arc-plasma system is relatively so new that the greatest interest at present is in understanding its operation and improving its performance by varying the system configuration and operating parameters. B.B.

A65-27429
SOME OPTICAL PROPERTIES OF GROUP II-VI SEMICONDUCTORS. I.
D. C. Reynolds, C. W. Litton, and T. C. Collins (USAF, Office of Aerospace Research, Aerospace Research Laboratories, Wright-Patterson AFB, Ohio).
Physica Status Solidi, vol. 9, no. 3, 1965, p. 645-684. 43 refs.

Summary of the recent theoretical and experimental work on intrinsic and extrinsic excitons in Group II-VI semiconductors, and a discussion of certain cooperative phenomena, such as phonon interactions, that are related to the exciton problem. Exciton theory as applied to Group II-VI semiconductors is developed and the symmetries of the compounds zincblende and wurtzite investigated. The effect of external magnetic and electric fields is discussed in terms of the Stark effect. Experimental observations of intrinsic excitons are described with particular reference to the exciton spectrum of CdS, ZnO, CdSe, ZnSe, and CdTe. The theory of spatial resonance dispersion is developed including an investigation of the effect of noninfinite exciton mass on the reflectivity of insulating crystals near an isolated exciton line. D.P.F.

A65-27430
PHONON SPECTRUM OF CAESIUM BROMIDE.
J. D. Dheer and B. Sharan (Indian Institute of Technology, Dept. of Physics, Delhi, India).
Physica Status Solidi, vol. 9, no. 3, 1965, p. 701-708. 19 refs.

An extension of Sharan's and Tiwari's work to the evaluation of the phonon spectrum of cesium bromide. Heat capacity and Θ_D vs T curves show the usual behavior at low temperature. The present extrapolated value of Θ_0 is 149°K and is in agreement with the theoretical calculations of Marshall. (Author) D.P.F.

A65-28616
BIOSCIENCE IN ORBIT.
Irwin Stambler.
Space/Aeronautics, vol. 44, July 1965, p. 46-54.

Evaluation of NASA and USAF-sponsored programs for biological research in space. NASA has a prime responsibility to serve the scientific community; the Air Force biological program is aimed at gaining data on long-time effects of space flight under severe environmental conditions. The NASA program contemplates 20 experiments for three Biosatellite payloads, which will be aloft for 3, 21, and 30 days. The first will fly a large number of small experiments - in general, lower-order organisms with short life cycles. The principal experiment on the three-week flight will be a group of rats, and the 30-day flight will be designed around a rhesus monkey. The three-day flight will study the effects of weightlessness and radiation, and the 21-day payload is concerned solely with the effects of weightlessness. The goal of the 30-day flight is to monitor the brain functions and performance of a monkey under prolonged weightlessness. The environmental control system is extensively described. Various aspects of USAF in-space biological tests, as well as ground-based research, are discussed.
F.R.L.

A65-28630 #

THE APPLICATION OF HYDROPHILIC AND HYDROPHOBIC SURFACES FOR PHASE SEPARATION IN A LOW-G ENVIRONMENT.

J. M. Smith, R. M. Cima, and Yi-Sheng Li (Lockheed Aircraft Corp., Lockheed Missiles and Space Co., Sunnyvale, Calif.).

USAF, Office of Scientific Research, and Lockheed Aircraft Corp., Lockheed Missiles and Space Co., Symposium on Fluid Mechanics and Heat Transfer Under Low Gravitational Conditions, Palo Alto, Calif., June 24, 25, 1965, Paper. 18 p.

Use of hydrophobic (nonwetting) and hydrophilic (wetting) surfaces to control the water and gas phases in life-support processes involving the separation of gases and liquids under low-g conditions: (1) the extraction of condensed moisture from an airstream to control humidity, (2) the collection of urine and other liquid wastes, (3) the distillation of liquid wastes to obtain usable water, and (4) the management of liquid supplies of expendable materials such as water and oxygen. The theoretical basis for the phase-separation process is discussed, and the principles involved are demonstrated. A humidity-control system embodying these principles is described, and performance test data are presented. F. R. L.

A65-28943

GAZENKO DISCUSSES SOVIET SPACE MEDICINE.

Oleg G. Gazenko (Academy of Sciences, Physiology Dept., Moscow, USSR).

(American Astronautical Society and Illinois Institute of Technology, Research Institute, Post Apollo Space Exploration Symposium, Chicago, Ill., May 4-6, 1965, Paper.)

Aviation Week and Space Technology, vol. 82, June 7, 1965, p. 40, 41, 43, 45.

Discussion of medical investigation conducted on board Voskhod 1 and 2. The effect of prolonged weightlessness and radiation hazards was measured. The electrocardiogram, pneumogram, and various hygienic parameters of the atmosphere in the suit were recorded. It was found that the cardiac rate of the cosmonauts increased slightly, and a study of the oculograms showed a high rate of eyeball movement. Pulse and respiratory rates increased but quickly returned to normal. Changes in the regulation of autonomic functions in weightlessness were noted, and arterial pressure was measured and blood samples taken. The results of the physiological observations made in the course of the flight revealed no evidence that the principal functional systems had been disrupted. M. F.

A65-29012

ISOTOPIC MEASUREMENTS ON THE LIFE-CYCLE OF TISSUE CELLS.

G. Hevesy (Stockholm, University, Institute for Organic Chemical Research, Stockholm, Sweden).

IN: ISOTOPIC AND COSMIC CHEMISTRY.

Edited by H. Craig, S. L. Miller, and G. J. Wasserburg.

Amsterdam, North-Holland Publishing Co., 1964, p. 34-44. 20 refs.

Measurement of the life cycle of tissue cells with the aid of labeled isotopes. It is shown that the life cycle of nondividing tissue cells can be determined by labeling the desoxyribonucleic acid of the cells in utero and measuring the rate of disappearance of the radioactive label with time. An alternative method is seen to be the measurement of the rate of incorporation of a radioactive label into the desoxyribonucleic acid of the cells to be investigated. The effect of different agents administered on the life cycle of cells is considered, as well as the connection between life cycle and detoxication going on in the organism. The diurnal variation of the life cycle of tissue cells and the agents responsible for these variations are discussed. (Author) A. B. K.

A65-29013

LIQUID WATER AND THE ORIGIN OF LIFE.

Stanley L. Miller (California, University, Dept. of Chemistry, La Jolla, Calif.).

IN: ISOTOPIC AND COSMIC CHEMISTRY.

Edited by H. Craig, S. L. Miller, and G. J. Wasserburg.

Amsterdam, North-Holland Publishing Co., 1964, p. 103-113. 28 refs.

NSF Grant No. G-22000.

Discussion of the origin of life and the growth of living organisms in nonaqueous solvents. This possibility cannot be proved impossible, but it is very unlikely. The temperature limits for living organisms in an aqueous medium are at most between -80° and +150°. Various solutes that could depress the freezing point of water are examined. The freezing point can be raised in a dense atmosphere by the formation of gas hydrates. Some of these hydrates are denser than water and the oceans would freeze from the bottom up. These considerations limit the number of planets on which life can arise and persist. (Author) A. B. K.

A65-29057

BLOOD OXYGEN CHANGES INDUCED BY FORWARD ($+G_x$) ACCELERATION.

Natalio Banchero, Lucille Cronin, A. Clark Nolan (Minnesota, University, Mayo Graduate School of Medicine, Rochester, Minn.), and Earl H. Wood (Mayo Clinic and Mayo Foundation, Rochester, Minn.).

Aerospace Medicine, vol. 36, July 1965, p. 608-617. 32 refs.

National Institutes of Health Grant No. H-3532; American Heart Association Grant No. CI 61 10; Grant No. NsG-327; Contract No. AF 33(657)-8899.

Experiments on six dogs, performed under morphine-pentobarbital anesthesia, exposed to forward accelerations of 2, 4, and 6 g for 1 min, and 6 g for 3 min while in the horizontal, 15° head-up, and 15° head-down positions breathing room air. Exposures to 6 g were repeated while the animals were breathing 99.6% oxygen. Oxygen saturations of blood from femoral and pulmonary arteries were recorded continuously by cuvette oximeters. Pulmonary arterial-venous shunting was estimated from blood saturations. Systematic changes in femoral artery oxygen saturation did not occur at 2 g, although a small average decrease (4%) was observed at 4 g. Decreases occurred at 6 g, averaging 11 (range 5-17)% at the end of the 60-sec exposure. Return to control values was nearly complete 50 sec after the exposure. The average increase in pulmonary arterial-venous shunt from 1 g values when air was breathed was 17%. Values for shunts at 6 g when oxygen was breathed were similar. The oxygen saturation of mixed venous blood decreased during the exposures to 2, 4, and 6 g, minimal values occurring about 20 sec after return to 1 g. Changes in blood oxygen saturation were not systematically affected by the presumed differences in intrathoracic blood volume and position of the diaphragm associated with the 15° head-up or 15° head-down positions. The decreases in oxygen saturation of arterial blood observed in these dogs during exposure to acceleration were similar to those observed previously in healthy unanesthetized human beings. (Author) F. R. L.

A65-29058

EFFECTS OF SLEEP DEPRIVATION ON VISUAL FUNCTION.

A. Paul.

Aerospace Medicine, vol. 36, July 1965, p. 617-620. 10 refs.

Study of effects on 20 students, 18 years of age, who were deprived of sleep for 50 hr. Before, during, and after this period of sleep deprivation visual examinations were repeated at intervals, testing visual acuity, muscle balance, stereoscopic vision, tachistoscopic perception, and color vision. Only after 46 hr of sleeplessness was a very small decrement noticed. After a short period of sleep (five hr) visual function returned to its original state. (Author) F. R. L.

A65-29059 #

MICROWAVE HEATING - A STUDY OF THE CRITICAL EXPOSURE VARIABLES FOR MAN AND EXPERIMENTAL ANIMALS.

Lothar O. Hoeft (USAF, Systems Command, Aerospace Medical Div., Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio).

Aerospace Medicine, vol. 36, July 1965, p. 621, 622. 6 refs.

Attempt to derive a theoretical basis for extrapolation of the results of microwave heating experiments from various species of animals to man, and to suggest ways to improve experiments designed to investigate nonthermal effects of microwaves. The exposure times required to produce a 5°C temperature rise in man and experimental animals were calculated as a function of the microwave intensity, using a simplified model. These calculations show that, while the intensity for which infinitely long exposures are permitted is approximately the same for all species, higher intensities will elevate temperatures quicker in small animals than in

larger ones. This difference in heating rates should be taken into account in experiments designed to investigate the nonthermal effect of microwaves. F. R. L.

A65-29060
OXYGEN REGENERATION TEST UNIT FOR ZERO GRAVITY OPERATION.
Andrew D. Babinsky (Thompson Ramo Wooldridge, Inc., Cleveland, Ohio).
(Aerospace Medical Association, Meeting, Miami, Fla., May 12, 1964, Paper.)
Aerospace Medicine, vol. 36, July 1965, p. 623-628.

Development of a CO_2 reduction reactor, as a result of theoretical and experimental studies, capable of continuous operation at a high rate of reaction. The capability for continuous removal of product carbon has been developed. Satisfactory long-duration operation (25 days) of the CO_2 reduction unit has been demonstrated. Development of an oxygen regeneration unit which is adaptable to zero gravity operation also required the development of other critical components such as the water condenser-separator and electrolysis unit. It is considered that additional catalyst studies should be conducted to reduce the rate of catalyst consumption now obtained through the use of iron catalysts. Unit development and testing should continue until an oxygen regeneration test unit is actually tested in orbit. (Author) F. R. L.

A65-29066 #
OXYGEN TOXICITY - ULTRASTRUCTURAL AND METABOLIC ASPECTS.
Philip Felig (USAF, Systems Command, Aerospace Medical Div., Research Laboratories, Wright-Patterson AFB, Ohio).
(Joint Committee on Aviation Pathology, Scientific Session, 5th, U.S. Armed Forces Institute of Pathology, Washington, D.C., Oct. 12-14, 1964, Paper.)
Aerospace Medicine, vol. 36, July 1965, p. 658-662. 25 refs.
NASA-supported research; Contract No. AF 33(615)-1849.

Review of evidence indicating that exposure of rats to oxygen at 760 torr and at 258 torr results in subcellular hepatic and renal alterations, in the absence of pulmonary histopathology. Mitochondrial changes including enlargement, clumping, and increased numbers of cytolosomes containing degenerating membranes constitute the striking findings. Thyroid overactivity is excluded as the basis for these changes inasmuch as protein-bound iodine is reduced (at 760 torr) or remains the same (at 258 torr). The possibility that alterations in the redox state of pyridine nucleotides may be the responsible toxic cellular mechanism is suggested by the protective action of sodium lactate and by in-vitro studies on agents inducing mitochondrial swelling. (Author) F. R. L.

A65-29067
AEROSPACE TOXICOLOGY PROCEDURES - CURRENT PRACTICES AND TRENDS AT THE ARMED FORCES INSTITUTE OF PATHOLOGY.
Leo R. Goldbaum and Thaddeus J. Domanski (U.S. Armed Forces Institute of Pathology, Toxicology Branch, Washington, D.C.).
(Joint Committee on Aviation Pathology, Scientific Session, 5th, U.S. Armed Forces Institute of Pathology, Washington, D.C., Oct. 12-14, 1964, Paper.)
Aerospace Medicine, vol. 36, July 1965, p. 662-664.

Emergent findings pertaining to an altered approach to the analysis of biologic specimens for the presence of therapeutic concentrations of a number of the basic drugs commonly employed. Direct ether extraction is applied to a relatively small amount of urine or solid tissue. Drug separation and purification are accomplished by simple alkaline distillation. Drug identification and quantitative estimation are made by means of gas-liquid chromatography, ultraviolet spectrophotometry, and chemical tests. Comments are confined to qualitative aspects of these studies. (Author) F. R. L.

A65-29068
MEDICAL EVALUATION OF AIRMEN EXPOSED TO ALTITUDES IN EXCESS OF 50,000 FEET.
Charles I. Barron (Lockheed Aircraft Corp., Lockheed-California Co., Burbank, Calif.), A. H. Schwichtenberg, and Robert R. Secrest (Lovelace Foundation and Clinic, Albuquerque, N. Mex.).
(Aerospace Medical Association, Meeting, New York, N.Y., Apr. 27, 1965, Paper.)
Aerospace Medicine, vol. 36, July 1965, p. 665-668. 6 refs.

Study of effects on military and civilian pilots who have been exposed to environmental conditions existing at contemplated supersonic transport flight altitudes for total periods of 250 to 2000 hr. These pilots have undergone extensive medical examinations, and the results of the examinations are compared to those obtained from pilots with no exposure above 50,000 ft. The examinations were especially designed to assess the effects of high-altitude radiation, and included extensive ophthalalmalogical, neurological, hematological, and genetic studies, as well as background radiation determinations. In not a single case in the exposed group could a physical defect be causally related to high-altitude radiation. The findings indicate man's ability to safely tolerate the environmental stresses existing at high altitudes. Based on this study there is every reason to expect that the knowledge gained in design reliability and safety can be successfully applied to the SST, making high-altitude, high-speed flight as safe and as routine as current jet operation. (Author) F. R. L.

A65-29092 #
VISUAL AND MOTION SIMULATION TECHNIQUES.
John Lott Brown (Pennsylvania, University, School of Medicine, Dept. of Physiology, Philadelphia, Pa.).
IN: CONFERENCE ON THE ROLE OF SIMULATION IN SPACE TECHNOLOGY, VIRGINIA POLYTECHNIC INSTITUTE, BLACKSBURG, VA., AUGUST 17-21, 1964, PROCEEDINGS. (Circular No. 4, Part C). [A65-29089 18-11]
Conference supported by NASA and NSF.
Blacksburg, Va., Virginia Polytechnic Institute, 1965, p. XIV-1 to XIV-34. 34 refs.

Discussion of some fundamental characteristics of the visual system which are relevant to motion simulation and survey of motion simulation techniques. Visual tasks considered are the discrimination of size, distance, and relative motion. Arguments are presented for the inclusion of motion in otherwise stationary simulations, and some experiments on the effects of motion on humans are reported. S. H. B.

A65-29100 #
SENSORY, PERCEPTUAL, AND PHYSIOLOGICAL ASPECTS OF SENSORY DEPRIVATION.
Sidney Weinstein (Yeshiva University, Albert Einstein College of Medicine, Bronx, N.Y.).
IN: CONFERENCE ON THE ROLE OF SIMULATION IN SPACE TECHNOLOGY, VIRGINIA POLYTECHNIC INSTITUTE, BLACKSBURG, VA., AUGUST 17-21, 1964, PROCEEDINGS. (Circular No. 4, Part D). [A65-29097 18-11]
Conference supported by NASA and NSF.
Blacksburg, Va., Virginia Polytechnic Institute, 1965, p. XXII-1 to XXII-25. 63 refs.
Grant No. NsG 489.

Discussion of some of the effects of sensory deprivation and their implications for space travel. The results of several studies, particularly those conducted at McGill University, are reported. In general, when an individual is deprived of sensation his judgment suffers, he is spatially and temporally disoriented, and his ability to perceive things visually, auditorily, and tactually is changed. A proposed simulation study of sensory deprivation in space travel is outlined. S.H.B.

A65-29101 #
EFFECT OF LOW-GRAVITY ON PHYSIOLOGICAL PROCESSES.
Siegfried J. Gerathewohl (NASA, Washington, D.C.).
IN: CONFERENCE ON THE ROLE OF SIMULATION IN SPACE TECHNOLOGY, VIRGINIA POLYTECHNIC INSTITUTE, BLACKSBURG, VA., AUGUST 17-21, 1964, PROCEEDINGS. (Circular No. 4, Part D). [A65-29097 18-11]
Conference supported by NASA and NSF.
Blacksburg, Va., Virginia Polytechnic Institute, 1965, p. XXIII-1 to XXIII-36. 40 refs.

Discussion of problems involved in low-gravity experimentation and summary of data on the effects of prolonged weightlessness. An analysis of the data obtained from manned exposures to low-gravity states shows that certain neurophysiological and physiological functions of the American and Russian astronauts were affected by the zero-g conditions. No change in their state of health was noted during the inflight periods. It is indicated that a certain adaptation of the major vital functions to the weightless condition occurs which is generally characterized by a state of reduced metabolism and an associated state of decreased pulmonary and cardiac activity.
S.H.B.

A65-29102 #
EFFECTS OF HIGH-GRAVITY ON PHYSIOLOGICAL PERFORMANCE.
Randall M. Chambers (U.S. Naval Air Development Center, Johnsville, Pa.).
IN: CONFERENCE ON THE ROLE OF SIMULATION IN SPACE TECHNOLOGY, VIRGINIA POLYTECHNIC INSTITUTE, BLACKSBURG, VA., AUGUST 17-21, 1964, PROCEEDINGS. (Circular No. 4, Part D). [A65-29097 18-11]
Conference supported by NASA and NSF.
Blacksburg, Va., Virginia Polytechnic Institute, 1965, p. XXIV-1 to XXIV-71. 45 refs.

Summary of the effects of high gravity on the physiological and psychological performance capabilities of man, together with a review of some of the simulation studies which have concentrated on these aspects of high-gravity phenomena. The emphasis is placed on problems involving high sustained linear accelerations. A number of conclusions are drawn concerning such factors as performance tolerance, protection against g-forces, visual decrement, acceleration training, illusions of motion, and emotional processes.
S.H.B.

A65-29103 #
CLOSED ATMOSPHERES.
George A. Albright (Republic Aviation Corp., Farmingdale, N.Y.).
IN: CONFERENCE ON THE ROLE OF SIMULATION IN SPACE TECHNOLOGY, VIRGINIA POLYTECHNIC INSTITUTE, BLACKSBURG, VA., AUGUST 17-21, 1964, PROCEEDINGS. (Circular No. 4, Part D). [A65-29097 18-11]
Conference supported by NASA and NSF.
Blacksburg, Va., Virginia Polytechnic Institute, 1965, p. XXV-1 to XXV-64. 55 refs.

Discussion of the simulation of closed-atmosphere environments. The role of simulation in the field of closed atmospheres is to elucidate and resolve the physiological and engineering problems associated with a closed environment and to derive and test the life support system design requirements for future manned space systems. Simulation studies are necessary to (1) determine man's physiological tolerance; (2) develop, test, and qualify the life support system and subsystems; and (3) establish that man can survive and perform as a man-machine integrator of the manned space system. Several simulation projects are discussed, including the Gemini atmosphere-validation program.
S.H.B.

A65-29377 #
SPACECRAFT STERILIZATION - THERMAL CONSIDERATIONS.
Erwin Fried and Richard J. Kepple (General Electric Co., Missile and Space Div., Spacecraft Dept., King of Prussia, Pa.).
American Institute of Aeronautics and Astronautics, Annual Meeting, 2nd, San Francisco, Calif., July 26-29, 1965, Paper 65-427. 12 p. 6 refs.
Members, $0.50; nonmembers, $1.00.
Contract No. NAS 8-11372.

Discussion of the engineering problems and heat transfer considerations involved in achieving and maintaining the required sterilization temperature of entry and landing vehicles for future planetary exploration programs. The major reason for such sterilization is avoidance of the introduction of earth organisms onto other planets where they could interfere with biological experimental observations. Methods to perform this task with a minimum of deleterious effects are proposed. The technique currently considered most acceptable is heating of the spacecraft for as long as 24 hr at a temperature of 135°C in an atmosphere of dry, inert gas. Experimental results are presented for a typical landing vehicle which was subjected to a thermal sterilization environment cycle.
B.B.

A65-29441 #
A PROTOTYPE TWO-GAS REGENERATIVE LIFE SUPPORT SYSTEM SUITABLE FOR ADVANCED SPACE MISSIONS.
J. M. Smith and T. M. Olcott (Lockheed Aircraft Corp., Lockheed Missiles and Space Co., Sunnyvale, Calif.).
American Institute of Aeronautics and Astronautics, Annual Meeting, 2nd, San Francisco, Calif., July 26-29, 1965, Paper 65-501. 15 p.
Members, $0.50; nonmembers, $1.00.

Description of a two-gas regenerative life-support system providing for the following functions: total pressure and oxygen partial pressure control, thermal and humidity control, regenerative CO_2 removal, trace contaminant removal, water reclamation from urine and atmospheric condensate, and atmospheric circulation. Component sizes and power characteristics approximate those for a four-man system, assuming a resupply period of 90 days. The average oxygen demand per man was assumed to be 1.8 lb/day, and CO_2 production was estimated at 2.25 lb/man/day. The system as described is presently being evaluated through a series of unmanned tests. Trace contaminant removal is based on cocoanut-shell charcoal as an absorbant and a heated Pt, Pd catalyst on Al_2O_3 as an oxidizer. Water is recovered from urine by vacuum distillation; CO_2 is removed in a regenerable silica-gel/molecular sieve.
D.P.F.

A65-29668 #
DIGITAL COMPUTER SIMULATION OF THE BIOTHERMAL MAN.
R. S. Layne and R. S. Barker (Douglas Aircraft Co., Inc., Advance Biotechnology Dept., Life and Environmental Systems Branch, Santa Monica, Calif.).
American Institute of Aeronautics and Astronautics, Annual Meeting, 2nd, San Francisco, Calif., July 26-29, 1965, Paper 65-500. 12 p. 12 refs.
Members, $0.50; nonmembers, $1.00.

Description of the theoretical bases, the analytical relationships, and the programing methods for a digital computer model of man's biothermal system. This model is intended to fill a significant gap in the digital computer simulation of manned space flight - i.e., the simulation of man's thermal properties, thermoregulatory mechanisms, and interrelations with the environment, in the steady and transient states. The mathematical model employed is a one-dimensional model which can portray the overall effects of the environment (including clothing, air, space suit, and cabin) on body temperature, body heating, the control of body temperature, and man's thermal effect on the environment. The model consists of 25 discrete nodes, each with a lumped thermal capacitance. Man himself consists of four nodes representing, respectively, skin subcutaneous tissue, muscles, and the so-called thermal core. The equations relating conduction, convection, and radiation heat transfer between nodes and heat storage in the nodes are solved by the forward finite-difference approximation method. The model is limited in that specific localized problem areas on the body cannot be studied. Nevertheless, this approach is a necessary and practical first step toward the development of a model that takes into account the functional and anatomical diversities of the human body and the variety of environments which will be imposed during space flight. The theoretical and empirical bases that are discussed are applicable to a more advanced, more detailed three-dimensional model.
(Author) F.R.L.

A65-29680 #
MANEUVERING IN FREE SPACE [V BEZOPORNOM PROSTRANSTVE].
V. Stepantsov, A. Eremin, and S. Alekperov.
Aviatsiia i Kosmonavtika, vol. 47, July 1965, p. 48-53. In Russian.

Consideration of methods of orienting the human body under conditions of weightlessness in the absence of a support. Various techniques for making the body rotate by moving the arms and legs are described. It is shown that the most favorable methods of rotating the body are those initiated by movements of the legs. A rotation where the legs are spread apart in a scissors-like fashion in the front-to-back direction is singled out for particular attention and is recommended as the main method to be used in orienting the body about its longitudinal axis.
A.B.K.

LC ENTRIES

A65-81543
THE FORMATION AND FLOW OF THE COCHLEAR FLUIDS. II. STUDIES WITH RADIOACTIVE POTASSIUM (K^{42}).
Y. B. Choo and David Tabowitz (N. Y. Eye and Ear Infirmary, Res. Dept., Section of Otolaryngol., New York).
Annals of Otology, Rhinology and Laryngology, vol. 74, Mar. 1965, p. 140–145. 8 refs. John A. Hartford Found. supported research.

Studies on formation and flow of the cochlear fluid were conducted on cats with the use of radioactive potassium (K^{42}). The animals were injected K_2CO_3 intraperitoneally at time intervals from 30 min. to 48 hrs. The data received suggest that at high concentrations of K^{42} in the endolymph the radioisotope could move into the perilymph by diffusion through the basilar and Reissner's membranes. However, studies with radioactive sodium showed a parallel increase of concentration of sodium in the perilymph, endolymph, and cerebrospinal fluid. In the current study, as the K^{42} approaches a steady state value in the endolymph, there is an increasing concentration of K^{42} in the perilymph. It appears that the increased concentration of K^{42} occurs by diffusion.

A65-81544
EFFECTS OF ROTATORY LABYRINTHINE STIMULATION ON THE ELECTRIC ACTIVITY OF THE PARAFLOCCULUS AND OTHER CEREBELLAR LOBES IN THE CAT [EFFETTI DELLA STIMOLAZIONE LABERINTICA ROTATORIA SULL'ATTIVITA' ELETTRICA DEL PARAFLOCCULO E DI ALTRI LOBULI CEREBELLARI, NEL GATTO].
E. Riva Sanseverino and A. Urbano (Bologna and Catania U., Ist. di Fisiol. Umana, Italy).
Bollettino della Societa Italiana di Biologia Sperimentale, vol. 41, Jan. 31, 1965, p. 89–91. 7 refs. In Italian.

Isolated brain preparations were made on 28 cats exposing the dorsal and ventral paraflocculus, paramedianus and ansiformis lobes, uvula, and folium-tuber vermis. Rotatory stimulation of the labyrinth included rotation of the table carrying the animal for 5–60 seconds with a velocity of 30–40 turns per minute, changing the direction of rotation or acceleration 5–10 times per minute. Rotatory labyrinthine stimulation of the non-anesthetized cat with isolated brain preparation produced a notable increase in the amplitude of the bioelectric wave of the electrogram from the dorsal and ventral paraflocculus, and an increase of amplitude of bioelectric wave of the uvula, nodule, and flocculus. These alterations appeared soon after initiation of rotation of the animal and persisted for a short time in the post-rotatory period. The increase of amplitude of the potentials from these cerebellar areas during labyrinthine stimulation was less than that found in the paraflocculus. The electrical activity of the cortex of folium-tuber vermis and paramedianus and ansiformis lobes presented changes during and soon after rotatory labyrinthine stimulation, characterized by an increase in the amplitude of the corticocerebellar pulsations. Activity of these areas was less intense than that found in the paraflocculus.

A65-81545
FACTS ABOUT LEAD AND INDUSTRIAL HYGIENE.
Don G. Fowler (Lead Ind. Assoc., Inc., New York, N. Y.)
Journal of Occupational Medicine, vol. 7, Jul. 1965, p. 324–329. 26 refs.

Inorganic lead enters the body primarily through the respiratory tract as fumes, dust, or mist. The approximate level of absorption of lead into the body can be estimated by measurements of lead concentration in the whole blood or in urine. The 80 μg./100 g. level in whole blood may indicate developing lead intoxication. Urine concentration varies greatly, depending on the water intake. As safeguards against lead poisoning in industry routine hygiene procedures should be practiced such as supervision by an industrial hygienist, maximum health and safety protection, adequate ventilation, periodic medical examination of personnel, instructions in handling of materials, and frequent inspection of facilities.

A65-81546
SOME RADIATION EFFECTS ON FOOD SATIATION IN THE RHESUS MONKEY.
A. A. McDowell and W. Lynn Brown (Tex. U., Dept. of Psychol., Austin).
Journal of Genetic Psychology, vol. 106, Jun. 1965, p. 217–220.
Contract AF 41(609)-2005.

Food-satiation tests conducted with control monkeys and with monkeys exposed to chronic fast-neutron radiation more than four years earlier show control subjects to take significantly more trials to food satiation than do irradiated subjects. A replication of the tests with control subjects and with subjects exposed to nuclear radiations more than five years earlier gave similar results. In the second instance, the control subjects also ingested to satiation significantly more grams of food per pound of body weight than did the irradiated subjects. The results argue for a long-term effect on food consumption of radiatin exposure.

A65-81547
THE EFFECT OF GAMMA RADIATION UPON OPERANT WATER-REINFORCEMENT BEHAVIOR.
James E. Wicker and W. Lynn Brown (Tex. U., Dept. of Psychol., Austin).
Journal of Genetic Psychology, vol. 106, Jun. 1965, p. 295–299. 9 refs.
Contract AF 41(657)-382.

Twenty-three male albino rats were trained to work a single lever for water reinforcement. After 21 days of baselining, three groups of six rats each were matched on the basis of the 21 days. The remaining five rats were placed in a fourth group. The first group was designated as the control group and was sham-irradiated. The second was irradiated with Cobalt 60 for a dose of 200 roentgens (r) at a rate of 100r per minute. The third group was given 400r at this rate. The fourth group (five rats) was given 800r at this same rate. Following the radiation day, responses were taken for four days. Then exactly one week following this initial exposure, the radiation treatment was replicated on these same rats, and another four days of data obtained. A variance analysis was used, with the data grouped into one four-day period prior to radiation and one four-day period following each radiation exposure. The main effect for periods was found significant (beyond the .001 level) with responses decreasing from period to period; however, the groups-by-periods interaction was also found significant (beyond the .05 level), with responses decreasing as dosage increases. The results of this study indicate that gamma radiation depresses operant water-reinforcement behavior, and that this depression is proportional to radiation dosage. These results are consistent with those obtained for food reinforcement.

A65-81548
INTESTINAL ABSORPTION OF ^{45}Ca IN ADULT AND OLD HUMAN SUBJECTS.
A. Caniggia, C. Gennari, L. Cesari, and S. Romano (Siena U., Inst. of Med. Semeiotics, Italy).
Gerontologia, vol. 10, 1964/65, p. 193–198. 16 refs.

Intestinal absorption of calcium in middle age adults and elderly subjects was studied by the use of $Ca^{45}Cl_2$ given orally at fasting. The venous blood withdrawn at short intervals was tested for appearance time and maximal peak of radioactivity. Urine and fecal radioactivity was determined a few hours after the ingestion. The results indicated that intestinal calcium absorption is not reduced with age, up to 70 years; only subjects over 70 years of age showed slower absorption, and lower retention.

A65-81549
SPACE MEDICINE RE-ASSESSED.
Peter Howard (R. A. F. Inst. of Aviation Med., Farnborough, Great Britain).
New Scientist, vol. 27, Jul. 8, 1965, p. 92–93.

The second International Symposium on Basic Environmental Problems of Man in Space held in Paris in June, 1965, gave an opportunity for a review of experiences gained by the American and Soviet astronauts in the Gemini and Voskhod programs. The program included discussions of ecophysiology, psycho-physiology, engineering psychology, special man-machine problems, and biotechnology. The main interest of the meeting centered around the extravehicular adventures of Leonov and White with emphasis o energy expenditure, orientation and the difference in the Soviet and American space suits. The meeting also provided the occasion for looking forward to a future already full of the race to the moon.

A65-81550
MONITORED EXERCISE–TOLERANCE TESTING IN CORONARY DISEASE.
Brendan Phibbs.
Rocky Mountain Medical Journal, vol. 62, Jul. 1965, p. 29–31, 41. 6 refs.

One hundred-twenty cases of "positive" monitored exercise tolerance tests are summarized. Continuous oscilloscopic monitoring of bicycle ergometer or Master Two-Step exercise increases the safety and the accuracy of stress testing for the following reasons: (1) The electrocardiogram (EKG) change precedes anginal symptoms and occurs at energy levels much below the standard Master exercise in a significant number of cases; therefore the test can be halted at an earlier and presumably safer time. (2) EKG changes are often so transient that only continuous monitoring will detect them in many cases: conventional means may produce "false negative" tests. (3) Potentially dangerous arrhythmias appeared without symptoms during stress testing at energy levels well below the standard Master exercise test. (4) Absence of symptoms during acute myocardial ischemia make it unwise to rely on the patient's description of his sensations as a means of conducting stress testing.

A65-81551
THE EFFECT OF PROTECTORS IN THE CASE OF IRRADIATION BY SUBLETHAL DOSES [DEISTVIE PROTEKTOROV PRI OBLUCHENII V SUBLETAL'NYKH DOZAKH].
S. P. Iarmonenko, A. G. Konopliannikov, N. N. Suvorov, and V. M. Fedoseev (USSR, Acad. of Med. Sci., Inst. of Hyg. of Labor and Prof. Diseases, Moscow; M. V. Lomonosov Moscow State U.; and S. Ordzhonikidze All-Union Chem.-Pharmacol. Inst., Moscow, USSR).

The retention of radio protective characteristics by S,β-aminoethyluronium dihydrobromide and 5-metoxytryptamine hydrochloride, during exposure to sublethal doses (300–950 rad) of x-ray radiation was studied in white mice. The number of marrow cells in the thigh bone was taken as an index of protective action. The results indicate that the protective action of these compounds consists primarily of preventing primary damage to the bone marrow without affecting the value of the factor of decreasing dose. There was a gradual decrease in the coefficient of protection when the dose was decreased. After a 100r dose or less, it was not possible to establish the protective action because of variance in results. The faster process of regeneration of bone marrow cells in radioprotected animals, as compared with controls, may be connected with differences in the mitotic phase of the regenerative system.

A65-81552
A STEP TEST FOR INDUCING MAXIMAL WORK.
Frederick W. Kasch, William H. Phillips, William D. Ross and J. E. Lindsay Carter (San Diego State Coll., Phys. Educ. Res. Lab., Calif.)
Journal of the Association for Physical and Mental Rehabilitation, vol. 19, May–Jun. 1965, p. 84–86. 9 refs.

At the present time, there is no universally recognized technique for inducing maximal work to determine maximal oxygen uptake. Investigators have used a variety of treadmills, bicycles, cranks, and step benches. Moreover, the procedures often have unique features and some of these are not reported. As yet, there has not been adequate experimentation relating oxygen uptake values obtained on the same subject by specifically trained investigators using the various methods. Thus, for the present, each team of investigators must satisfy themselves that in their hands, the method being used by them gives reproducable results on the same subject. The practices and procedures which are routine for a step test in the authors' laboratory are presented.

A65-81553
THE DAILY ADRENAL RHYTHM IN EQUATORIAL AMERINDIANS.
H. Simpson (Glasgow U. Infirmary, Dept. of Pathol., Great Britain).
Journal of Endocrinology, vol. 32, May 1965, p. 179–185. 14 refs.

The circadian rhythm of urinary 17-hydroxycorticosteroid (17-OHCS) excretion in Europeans and Equatorial Amerindians (from South Dutch Guiana) has been compared. The precise daily habits of the Equatorial Amerindians did not result in a more marked rhythm of 17-OHCS excretion. Amerindian men and women excreted much less 17-OHCS than their European counterparts; the difference is still substantial when body weight is taken into consideration. The rhythm of 17-OHCS excretion in Amerindians had a minimum and maximum corresponding to their early reveille and bedtime, confirming the importance of environmental stimuli in setting the timing of the rhythm.

A65-81554
CAPACITY OF MAN FOR WORK IN CONDITIONS OF WEIGHTLESSNESS [RABOTOSPOSOBNOST' CHELOVEKA V USLOVIIAKH NEVESOMOSTI].
A. V. Eremin, I. I. Kas'ian, I. A. Kulosov, V. I. Kopanev, and V. I. Lebedev.
Izvestiia Akademii Nauk SSSR, Seriia Biologicheskaia, no. 3, May–Jun. 1965, p. 329–334. 13 refs. In Russian.

The authors summarize Soviet experimental results and foreign publications data on the effect of prolonged weightlessness on astronauts' performance. During a flight lasting five days, the degree of performance was maintained on a high level if the astronauts were properly secured to their seats. When they were required to perform complicated tasks during a prolonged period of weightlessness, their level of performance became lower. In order to maintain a high degree of performance during space flight, two factors are important: (1) a very stringent medical examination of future space crew members, and (2) extensive physical training preparatory to any space mission.

A65-81555
VALIDATION OF A CAREFULNESS TEST BATTERY.
H. G. Osburn, Daniel E. Sheer (Houston U., Tex.), and Cecil J. Mullins (USAF, Wright Air Develop. Center, Personnel Lab., Wright-Patterson AFB, Ohio).
Educational and Psychological Management, vol. 25, Summer 1965, p. 525–534. 5 refs.
Contract AF 41(657)-409.

An experimental battery of 11 simple tests requiring attention to detail in order to avoid errors, was administered to 687 airmen prior to their taking one of three technical courses at Shepard Air Force Base. The criterion measures were (1) Final Course Grade, (2) Performance Score–standing in course measured by performance tests, (3) Multiple Choice Score, (4) Academic Washback, and (5) Carefulness Rating obtained from the instructors. The carefulness tests showed low but in many cases statistically significant validity coefficients. The most promising carefulness measures are unspeeded tests which involve a relatively extended stimulus-response chain.

A65-81556
DEVELOPMENT OF DEHYDRATED MEAT AND FISH SALADS FOR MILITARY USE.
J. M. Tuomy.
Food Technology, vol. 19, Jun. 1965, p. 46, 50.

The feeding of personnel under stress conditions of space flight or in combat requires products which can be eaten without any processing or rehydration. These products must be stable, have high caloric values in order to conserve space, and they must be acceptable to the subject. On the basis of these considerations, the author suggests several types of salads which can be dehydrated and compressed into bar form. Formulas for four mayonnaise-containing salads, (chicken, tuna, salmon, and potato) are given.

A65-81557
CORRELATION OF AUDITORY AND VISUAL AUTOKINETIC EFFECTS.
Theodore I. Anderson.
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 697–707. 18 refs.

This study involved an investigation of the relationships between visual and auditory autokinetic phenomena. An apparatus was designed to obtain quantifiable records of the perceived auditory autokinetic loudness and pitch effects. Several methods were devised to score these records. When the auditory and visual autokinetic scores were correlated, all of the obtained coefficients were positive, four correlations were significant at the .05 level (only one was expected by chance), and one correlation at the .01 level. Some associated unanswered questions are discussed to indicate certain problems for future investigation. The statistical analyses indicate a tentative affirmation of the hypothesis that both the auditory and visual autokinetic phenomena are to a significant extent determined by a central, relatively stable perceptual style.

A65-81558
EFFECTS OF INTENSE NOISE ON PROCESSING OF CUTANEOUS INFORMATION OF VARYING COMPLEXITY.
R. L. Brown, W. D. Galloway, and K. R. Gildersleeve (U. S. Army Infantry Human Res. Unit, Fort Benning, Ga.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 749–754. 15 refs.
Contract DA 44-188-ARO-2.

Thirty-six enlisted men identified a series of electropulse messages under varying auditory noise conditions. Three levels of message complexity were combined factorially with intermittent noise, continuous noise, and no-noise conditions. Subjects in Simple message groups were asked to indicate on each trial which one of five electrode locations was stimulated. Compound message groups identified both location of stimulation (1 of 5 loci) and pulse duration (0.2, 1.6, or 2.5 sec.). Finally, subjects in Complex message groups received electropulses at 1 of 5 loci, 1 of 3 durations, and 1 of 2 intensities (1.0 or 1.3 volts d.c.). The amount of information transmitted $0(I_t)$ under differing noise conditions did not differ significantly. I_t did increase significantly with an increased number of coded elements. However, discrimination accuracy was not affected by the increased code difficulty. It is concluded that intense auditory noise has little effect upon the reception and processing of cutaneously presented information.

A65-81559
COMMENT ON EXPERIMENTS BY WEINSTEIN, ET AL. ON SELF-INDUCED MOVEMENT AS A DETERMINANT OF SPATIAL ADAPTATION.
R. H. Day (Monash U., Victoria, Australia), and G. Singer (Sydney U., Australia).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 755–756. 7 refs.

Two recent papers by Weinstein, et al (1964) have presented evidence against self-induced movement as a primary determinant of adaptation to prismatic displacement of the visual field. It is shown here that the design of one experiment renders these data invalid as evidence against the role of self-induced movement. It is also suggested that there is need for clarification of the terms "positive" and "negative" adaptation since the direction of these is a function of whether or not the subject is permitted vision during the pre- and post-exposure tests.

A65-81560
STIMULUS REINFORCEMENT DURING SENSORY DEPRIVATION.
Kenneth M. Goldstein (Princeton U., N. J.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 757–762. 17 refs.

The study explores the need for sensory stimulation during sensory deprivation. Confined and nonconfined subjects were compared on time spent button-pressing for visual, auditory, visual and auditory, or no stimulation. There were 8 treatment groups of 10 human subjects each. Subjects

in confinement spent more time button-pressing than did nonconfined subjects. Subjects receiving pleasant visual stimulation spent more time button-pressing than did subjects not receiving such stimulation. No significant relationship was found between button-pressing behavior and performance on a variety of tests.

A65-81561
COMPARISON OF ELECTROMYOGRAPHIC AND MICROSWITCH MEASURES OF AUDITORY REACTION TIME.
Louis D. Costa, Herbert G. Vaughan, Jr., and Lloyd Gilden (Albert Einstein Coll. of Med., New York, N. Y.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 771–772.
Grants NIH MH-06723; NB-03356.

The reaction times of three subjects to clicks at 10, 30 and 90 db. above their individually measured thresholds were obtained. It was concluded that use of a microswitch for signaling motor response introduces a significant delay in comparison with an electromyographic measure. Large reliable individual differences in amount of switch lag were found. Switch lag decreased slightly as intensity was increased.

A65-81562
MANIFEST ANXIETY: UNIFACTORIAL OR MULTIFACTORIAL COMPOSITION?
Walter D. Fenz and Seymour Epstein (Mass. U., Amherst).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 773–780.
11 refs.
Grant NIH MH 01293.

The study investigates three subscales of manifest anxiety, consisting of symptoms of striated muscle tension, symptoms of autonomic arousal, and feelings of fear and insecurity. There was both a general factor of anxiety and a specific factor associated with striated muscle tension. Further evidence for the specific nature of striated muscle tension was indicated by its positive relationship to feelings of hostility, its failure to relate to a personality variable of inhibition, and the relatively high score obtained by males. It was hypothesized that striated muscle tension is more closely associated with overt activity than autonomic symptoms, which represent a deeper level of inhibition. Discrepant results of studies using the Taylor Manifest Anxiety Scale may be due to a failure to take into account the differential contribution of items relating to different kinds of anxiety.

A65-81563
EFFECTS OF CONTROL-DISPLAY COMPATIBILITY AND MONITORING CUES ON MULTIPLE-TASK PERFORMANCE.
Seward Smith, Richard J. Farrell, and Barbara K. Gonzalez (Boeing Co., Seattle, Wash.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 781–785.
5 refs.

Ninety subjects participated in an experiment involving simultaneous performance on warning-light, meter-centering, and tracking tasks. Switch/motor control-display compatibility (natural, unnatural, and inconsistent) and monitoring tone cues (directional, nondirectional, and no cues) were varied. Each subject performed 40 20-sec. trials under one experimental condition (one of the nine possible combinations of the two independent variables). Directional cues and consistent control-display relationships resulted in the best performance; absence of tone cues and the inconsistent relationship resulted in the poorest. Meter-task data revealed no control-display relationship differences but tracking and combined-task data did. Monitoring tone cues significantly improved performance. Multiple-task performance is not necessarily predicted from knowledge of single-task performance.

A65-81564
FIELD INDEPENDENCE–DEPENDENCE AND SUSCEPTIBILITY TO DISTRACTION.
Morton Bloomberg (Skidmore Coll., Saratoga Springs, N. Y.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 805–813.
31 refs.

A reversible perspective task was administered to field-independent and field-dependent subjects. The hypothesis was that field-independent subjects are less susceptible to distraction than field-dependent subjects and that field dependent subjects are more influenced by the introduction of additional distracting stimuli. The effect of additional distracting ;stimuli was measured by requiring the recitation of digit series backward during one part of the reversible perspective task. The theory was partially confirmed in that before the recitation of digits backward, field-independent subjects reported more reversals than field-dependent subjects. However, additional distracting stimuli affected field-independent subjects to a greater extent. It is suggested that the theory of susceptibility to distraction needs qualifications and that task ambiguity might be a critical dimension to consider in future research on field independence–dependence.

A65-81565
SUCCESSIVE COMPARISON OF VISUAL SIZE: I. POSITIVE TIME ERROR.
Yasuo Morikawa (Waseda U., Tokyo, Japan).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 814.

Positive time error in judging the size of a test figure (S_2) after viewing of the inspection figure (S_1) was found to be an inverse function of the pause duration. This is interpreted in support of the hypothesis derived from the studies on figural aftereffects. However, there was no difference in the amount of inhibition of S_1 to S_2 obtained by successive and by simultaneous comparison methods.

A65-81566
AFTEREFFECTS OF DELAYED AUDITORY FEEDBACK.
Susan Zalosh and Leonard F. Salzman (Rochester U. School of Med. and Dentistry, N. Y.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 817–823.
12 refs.

This experiment was designed to test whether there are after-effects on speech to delayed auditory feedback and whether the after-effects, if any, are a function of the severity of disruption of speech under the feedback condition. Fifty-seven subjects, divided into three equal groups, were exposed to various combinations of delay time and intensity of feedback. Comparisons of present post-sidetone responses revealed no evidence of after-effects on speech. No relationship to induced severity of speech disruption was found.

A65-81567
EFFECTS OF INDUCED MUSCLE TENSION AND AUDITORY STIMULATION ON TACHISTOSCOPIC PERCEPTION.
John L. Andreassi (U. S. Naval Training Device Center, Port Washington, N. Y.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 829–841.
22 refs.
PHS; and U. S. Naval Training Device Center supported research.

The effect of accessory stimulation upon tachistoscopic perception of geometric figures was studied. In experiment I, the subjects were tested on two successive days in a complete factorial design (Subjects X Treatments) in which degree of induced muscle tension (IMT) and level of task difficulty were manipulated. An IMT level of 1/2 of maximum resulted in significantly ($p<.10$) improved visual perception. In experiment II, artificial pupils were employed to test the hypothesis that improved performance was due to pupil dilation. Eight subjects from experiment I were tested on five successive days and performance at 1/2 maximum IMT was again significantly ($p<.05$) improved, thus precluding pupil dilation as the reason for the results obtained in experiment I. In experiment II, performance at the middle level of task difficulty benefited significantly ($p<.05$) from IMT. Experiment III investigated the effects of four levels of auditory stimulation (white noise) on tachistoscopic perception in a new group of 32 subjects. Perception was significantly ($p<.05$) improved with the 1/4 of maximum noise level at the easiest level of difficulty. Results were interpreted within the framework of the activation concept. Recent neurophysiological data point to the ascending reticular activating system as a possible mediator which could influence cortical and retinal areas in the facilitation of tasks such as tachistoscopic perception.

A65-81568
DEVELOPMENT OF ISOMETRIC STRENGTH AT DIFFERENT ANGLES WITHIN THE RANGE OF MOTION.
Gene A. Logan (Southwest Mo. State Coll., Springfield), Jane A. Mott (Smith Coll., Northampton, Mass), and Aileene Lockhart (Southern Calif. U., Los Angeles).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 858.
Southern Calif. U. supported research.

The extent to which specific isometric exercise at two angles influences strength measures at other angles within the range of motion was investigated in female subjects. The exercised subjects made significant gains at 110^0 and 140^0. The control subjects made no gains at 3 angles but lost unaccountably at angles nearing complete extension, 20^0 and 50^0. The disparities may be explained on psychological grounds. The results indicate that strength gains due to isometric exercise regimens seem to appear more in the range of motion nearing complete flexion than complete extension, and that there is some spread effect or generality in strength gains.

A65-81569
SOCIAL DIFFERENCES IN AUDITORY PERCEPTION.
Herbert G. Birch, Ira Belmont, and Eric Karp (Albert Einstein Coll. of Med., New York, N. Y.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, 861–870. 20 refs.
Assoc. for the Aid of Crippled Children and Natl. Assoc. for Retarded Children supported research.
Grant NIH HD 00719.

Two groups differing in social background and ethnicity were found to respond differently to an auditory time error task. The white middle-class group tended to overestimate the intensity of the second of two objectively equal stimuli and showed a rising curve of overestimation as the time interval between stimuli increased from 1 to 5 sec. In contrast, a lower-class group of Negro subjects tended to underestimate the second stimulus and to show a decreasing tendency to do so over time. Indirect analysis suggested that social class and not ethnicity was the critically effective variable in producing the obtained differences but did not exclude the possibility of interaction between these variables. Results reinforce the view that even within a given society, social class and ethnic differences are associated with alterations in an aspect of perceptual functioning which may be pertinent to learning and attention.

A65-81570
EFFECT OF RADIATION ON AUDITION AND CONDITIONED RESPONSES IN THE SPANISH GOAT.
Albert Casey and George M. Krise (Tex. A and M U., Radiation Lab., Austin).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 871-872. 5 refs.

Weekly gamma irradiation failed to produce significant changes in the auditory thresholds of Spanish goats. Likewise, no effects on the latency and probability of conditioned responses were observed. The discrepancy between the present findings and similar Russian work is pointed out.

A65-81571
EFFECTS OF RANDOM AND ORDERLY PRESENTATIONS OF VISUAL SEQUENCES.
Paul L. Weene (USAF Decision Sci. Lab., Beford, Mass.)
Perceptual and Motor Skills, vol, 20, Jun. 1965, Part 1, p. 897-903. 6 refs.

Sections of figures were presented visually in random and orderly sequences. Later identification was easier for orderly sequences and for faster presentations. Fixation and size of section had no effect.

A65-81572
SYNCHRONIZATION ERROR IN ATTEMPTS TO MOVE THE HANDS SIMULTANEOUSLY.
Neil R. Bartlett (Ariz. U., Tucson) and Carroll T. White (Navy Electron. Lab., San Diego, Calif.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 933-937.

Means and standard deviations are reported for the synchronization error in the initial motion of attempts to move the two hands simultaneously. For alert, trained subjects (N = 12) the error appears to be independent of whether the movement is made on signal or at subject's option.

A65-81573
DRUG-INDUCED FATIGUE DECREMENT IN AIR TRAFFIC CONTROL.
L. R. C. Haward (Graylingwell Hosp., Chichester, Great Britain).
(Brit. Psychol. Soc., Conf., London, Dec. 1964).
Perceptual and Motor Skills, vol. 20, Jun 1965, Part 1, p. 952.

Investigation of a newly synthesized central stimulant (5-phenyl-2-imino-4-oxo-oxazolidin) in the context of the air traffic control procedure (ATC) indicated that: (1) vigilance in an ATC task became progressively impaired after 90 min., (2) a placebo had no significant effect upon this impairment, (3) the stimulant in 20 mg. doses significantly reduced this impairment, and was more effective at a higher level of impairment, (4) no side effects were noted at 20-mg. doses, and (5) doses above 20-mg. eventually exacerbated the condition.

A65-81574
INFLUENCES OF RESPIRATORY CYCLE ON SIMPLE REACTION TIME.
Monte Buchsbaum and Enoch Callaway (Calif. U., Langley Porter Neuropsychiat. Inst., Berkeley).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 961-966. 12 refs.
Contract Nonr 2931 (00); Grants Calif. Dept. of Mental Hyg. 62-1-33 and 62-1-24; and Grants PHS 1-GS-53 and FR-00122-03.

The effect of respiration on simple auditory reaction time was studied. In the first study, reaction times and respiratory phase data were collected during spontaneous breathing; in study 2, a warning light signaled the subject to hold his breath in either inspiration or expiration. Both experiments showed faster reaction times with expiration. This is contradictory to reaction time findings reported by other investigators who have studied effects of respiration.

A65-81575
A FACTOR INFLUENCING MOTOR OVERFLOW.
Roy Yensen (New South Wales U., Australia).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 967-968.

While the active arm isometrically supported a weight which under normal circumstance did not lead to motor overflow in the contralateral "inactive" arm, it was found that a single flexion and extension of the "inactive" arm resulted in marked overflow activity in that arm. Electromyographic techniques were used to observe this phenomenon in 6 subjects.

A65-81576
LINEAR MODEL FOR VISUAL TRANSFER CHARACTERISTICS IN THE MESOPIC REGION--RESPONSE/STIMULUS PEAK-TO-PEAK MEASUREMENTS OF SPATIAL SINE-WAVE PATTERNS.
Olof Bryngdahl (Roy. Inst. of Technol., Inst. of Opt. Res. and Dept. of Phys. II, Stockholm, Sweden; and Xerox Corp., Res. and Eng. center, Webster, N. Y.)
Optica Acta, vol. 12, Jan. 1965, p. 1-12. 10 refs.

Transfer characteristics of the human visual system at well above contrast threshold conditions when viewing luminance distributions varying sinusoidally in one direction in space were examined by psychophysical means. Information over a wide spatial frequency range was achieved by restricting the measurements to extreme values of the response as well as of the sine-wave stimulus variation. The ratio between the peak-to-peak value of the apprehended brightness variation and the average luminance of the stimulus distribution was found to be approximately linearly related to the stimulus modulation when viewing a sinusoidally varying luminance distribution of fixed spatial frequency in the mesopic region. Image quality parameters and the nonexistence of a modulation transfer function of the visual system are discussed.

A65-81577
THE VISUAL PERCEPTION OF MOVEMENT IN THE ABSENCE OF AN EXTERNAL FRAME OF REFERENCE.
P. R. Boyce (Reading U., J. J. Thomson Phys. Lab., Whiteknights Park, Great Britain).
Optica Acta, vol. 12, Jan. 1965, p. 1-12. 10 refs.
Grant PHS NB 01233-07.

The threshold of perception of movement in the absence of an external frame of reference is studied, for conditions (a) constant distance moved, (b) constant duration of movement. It was found that at velocities faster than 8-10 min. arc/sec. the percentage of correct reports rapidly approached 100%. At slower velocities the success achieved in identifying the movement was time-dependent. A sampled data model is proposed as a suitable mechanism to explain the results.

A65-81578
SEEKING INFORMATION TO REDUCE THE RISK OF DECISIONS.
Ward Edwards and Paul Slovic (Mich. U., Ann Arbor).
American Journal of Psychology, vol. 78, Jun. 1965, p. 188-197.
Contracts DA-36-039-SC-78801; and AFOSR 192-63.

Undergraduate subjects were asked to perform information-seeking tasks of two types. In standard tasks, a subject paid for looks at the cells of a 16-cell matrix and was rewarded if he found the unique cell. In inverse tasks, the subject was fined for finding the unique cell and rewarded for each cell investigated which was not the unique one. The basic dependent variable, strategy-score, was the number of cells the subject looked at for tasks in which he did not find the unique cell. For tasks in which he did find it, elaborate rules were used to infer what he would have done had he not found it. The subjects performed remarkably well; about half the strategies used were optimal or approximately so, and serious divergences from the optimum were very rare. Performance was less good on standard than on inverse tasks, and slightly less so on tasks with more complex costs and payoffs than on tasks with simpler costs and payoffs. Half the subjects were too cautious and half were too incautious in tasks for which both were possible. Individual subjects usually were consistent in being cautious or incautious.

A65-81579
MILD STRESS AND PROBLEM-SOLVING.
Wilbert S. Ray (Bethany Coll., W. Va.).
American Journal of Psychology, vol. 78, Jun. 1965, p. 227-234. 24 refs.
Contract Nonr 2315(00).

Three experiments are described. One was a repetition of a previously reported experiment in which a personal condition interfered with problem solving as compared with an impersonal condition. The replication failed to find a difference between the conditions. In other experiment a set for speed inhibited problem solving, as did frustration in the third. It was suggested that, above a minimal level necessary to produce work at the problem, further increase of drive-level would produce increasing inhibition of problem-solving, the effect being greater with complex problems. Our experiments contradict the first half of the inverted-bow-shaped relation between motivation and problem-solving which has been postulated by previous theorists.

A65-81580
BACKGROUND REFLECTANCE AND THE CATEGORY-SCALING OF GRAY PAPERS.
Irwin Pollack (Applied Psychol. Res. Inst., Great Britain).
American Journal of Psychology, vol. 78, Jun. 1965, p. 243-250.

Three conclusions, relating background-reflectance to the brightness-category scale, appear to be warranted from the present experiment: (1) The effect of background-reflectance alters the shape of the category of brightness, rather than introducing either a local deformity in the region of the background or a shift of the entire function of the category. The effect of background-reflectance upon the scale of brightness is maintained over large variations in the area of the test-patch, the viewing illumination, and

the number of response categories. (3) The effect of background-reflectance is obscured by rating-scale procedures which impose severe restrictions upon the category-responses, e.g. the methods and procedures of category-sorting and market-scaling.

A65-81581
FURTHER VALIDATION OF SUBJECTIVE SCALES FOR LOUDNESS AND BRIGHTNESS BY MEANS OF CROSS-MODALITY MATCHING.
R. T. Root (U. S. Army Personnel Res. Office, Washington, D. C.) and Sherman Ross.
American Journal of Psychology, vol. 78, Jun. 1965, p. 285–289. 7 refs.

The present study was designed to examine the equal-sensation function for loudness and brightness to ascertain whether the slope of this function could be predicted on a knowledge of the two exponents (0.30 for the loudness function, and 0.33 for brightness). According to the above, the slope of the equal-sensation function relating intensities on the two continua should be given by the ratio of the two exponents, i.e. the slope should approximate 0.91. Ten subjects matched the apparent intensity of auditory stimuli presented by the experimenter with visual stimuli (red light) under the subject's control. Analysis of the results showed the slope to be 0.908. The extremely close correspondence between the expected and observed values for the slope of the equal-sensation function attests to their validity.

A65-81582
SKIN-CONDUCTANCE, ALPHA-ACTIVITY, AND VIGILANCE.
D. R. Davis (Leicester U., Great Britain) and Andjelko Krkovic (Zagreb U., Yugoslavia).
American Journal of Psychology, vol. 78, Jun. 1965, p. 304–306. 5 refs.

The relationship between skin-conductance, alpha-activity, and auditory vigilance was studied. A trend-analysis shows that these three measures appear to be associated over a 90-min. vigil. During the course of a vigil, the subject becomes drowsy, as shown by decreases in electroencephalogram alpha-activity, skin-conductance, and level of performance. It is also confirmed by the subject's replies to a questionnaire. It is suggested that this drowsiness is produced by the lack of varied stimulation from the task and from the environment.

A65-81583
A SUBSURFACE MARINE BIOSPHERE ON MARS?
Hubertus Strughold (AF Systems Command, Aerospace Med. Div., Wright Patterson AFB, Ohio).
Astronautics and Aeronautics, vol. 3, Jul. 1965, p. 82–86. 18 refs.

A hypothesis advanced more than a century ago proposed that the primordial oceans on Mars froze and were covered by an accumulation of dust. Instead of diffusing into space, the water of Mars remained locked as a layer of ice, about 1/2 kilometer thick, under a layer of soft soil. The present development of this hypothesis suggests that because of the great distance between Mars and the Sun, the surface temperature on Mars is below the freezing point of water, but it may increase in the interior of the planet approximately 3^{o} C. for each 100 meters of depth. If this is the case, the temperature within the crust in the equatorial region would rise above the melting point of ice at a depth of 500 meters. Therefore, there should be a reservoir of liquid water below the layer of ice. Through occasional fissures in the ice, the water may rise to the surface as fog. The biosphere on Mars may, under these conditions, have two sections: land surface and underground water table. Underground marine surface life is still possible as baryphilic chemoautotrophs, several examples of which are found on Earth.

A65-81584
DISEASE TRANSMISSION BY AIRCRAFT.
Frederick R. Ritzinger (USAF School of Aerospace Med. Aeromed. Indoctrination Dept., Brooks AFB, Tex.)
(World Congr. of Prophylactic Med. and Social Hyg., Austria, 1960).
Military Medicine, vol. 130, Jul. 1965, p. 643–647. 16 refs.

The airplane as a common vehicle for global travel has intensified and complicated the problem of spreading disease from one country to another. The various ways by which disease can be spread by air travel include: contaminated food, water, or cargo; arthropod vectors of disease; or infected persons. Dissemination of disease by infected passengers appears to be the greatest threat. Although a number of communicable diseases have been transported in aircraft, smallpox is the only disease which has been reported to have propagated serious outbreaks or epidemics. Although current International Sanitary Regulations are adequate, more stringent quarantine control and international cooperation might have averted many of these episodes.

A65-81585
ETIOLOGY AND TREATMENT OF EXPERIMENTAL DECOMPRESSION SICKNESS WITH SPECIAL REFERENCE TO BODY LIPIDS.
C. W. Gowdey and R. B. Philp (Western Ontario U., Med. School, Dept. of Pharmacol., London, Canada).
(Joint Committee on Aviation Pathol., 5th Sci. Session, Washington, D. C., Oct. 12–14, 1964).
Military Medicine, vol. 130, Jul. 1965, p. 648–652.

The incidence and severity of bends in rats following prolonged exposure to compressed air was related to the amount of body fat regardless of the age of the animal. There appeared to be a critical fat/water ratio beyond which the severity of bends was markedly increased. Injections of Heparin of partially-depolymerized hyaluronic acid (PDHA) before compression in old, heavy rats did not influence the subsequent development of bends on decompression but before exposure to altitude in similar heavy rats were without effect on the bends. PDHA reduced the incidence of bends in smaller rats, and was significantly more beneficial than Heparin, which prolonged the clotting time in doses effective against the bends. Bishydroxycoumarin in doses which produced marked prolongation of the prothrombin times did not alter either incidence or severity of the bends. It is suggested that the ameliorative effects of Heparin and PDHA are more likely associated with their lipaemia-clearing (and perhaps surface) activity than with anticoagulant properties.

A65-81586
IDENTIFICATION IN AVIATION PATHOLOGY.
P. J. Stevens (R.A.F. Inst. of Pathol. and Trop. Med., Halton, Great Britain).
(Joint Committee on Aviation Pathol., 5th Sci. Session, Washington, D. C., Oct. 12–14, 1964).
Military Medicine, vol. 130, Jul. 1965, p. 653–661. 8 refs.

The aviation pathologist is intimately concerned with identification of the casualties of an aircraft accident. Although usually about 50 per cent identification in these accidents will be simple the remainder will require specialized knowledge and examination. The aviation pathologist is peculiarly well placed, being essentially a forensic pathologist, to take charge of or to act as the coordinating member of an identification team. In his fulfilling such a function, bodies will be subjected to one comprehensive examination serving the purposes both of identification and the investigation of the medical aspects of the accident; there should be no question of identification teams handling bodies and possibly destroying or altering evidence of importance to the aviation pathologist, or the pathologist pursuing his autopsy without having regard to the importance of identification.

A65-81587
SPINAL CORD CONVULSIONS IN THE DEVELOPING RAT AT ALTITUDE (12,470 FT., 3,800 M.)
Louise M. Heim (Calif. U., Dept. of Physiol., Berkeley; and White Mountain Res. Sta., Big Pine).
Nature, vol. 207, Jul. 17, 1965, p. 299–300. 6 refs.

Spinal cord convulsions were produced by direct electrical stimulation of the cord in decapitated rats with implanted electrodes. The experimental animals were divided into two age groups: 11-day old and 28-day old. Significance of differences between sea-level and altitude-exposed animals was calculated by the t-test. Duration of flexion in 11-day-old altitude-born (12,470 ft., 3,800 m) rats was significantly longer and duration of extension did not change significantly when compared with sea-level controls. Duration of extension was significantly increased in the 28-day rats born at altitude as compared with sea-level controls; duration of flexion was decreased but not significantly. The delay in central nervous system maturation in rats born at 12,470 ft. may be attributed, in part, to changes in the function of the spinal cord.

A65-81588
GRAVITY AND MAN [SCHWERKRAFT UND MENSCH].
Otto H. Gauer.
Bild der Wissenschaft, vol. 1, Jan.–Mar. 1964, p. 28–35. In German.

The influence of gravity of the human organism has resulted in the evolution of many adaptation mechanisms, which become apparent only in the instances when they fail, e. g. motion sickness, orthostatic collapse, etc. Therefore, a change in gravity is an excellent way to study body functions. Aeromedical, historical, and clinical research on the effects of weightlessness, subgravity, and acceleration forces are reviewed. Cardiovascular values in the standing position constitute the norm for the human being rather than the usual clinical values derived from measurements in the supine position.

A65-81589
THE CROSS-GROUP STABILITY OF PEER RATINGS OF LEADERSHIP POTENTIAL.
Lenonard V. Gordon and Francis F. Medland (U. S. Army Personnel Res. Office, Washington, D. C.).
Personnel Psychology, vol. 18, Summer 1965, p. 173–177. 6 refs.

Operational peer ratings were obtained at the fourth week of Basic Training in two companies of 20 squads each. At the same time two or three platoon sergeants also ranked and rated by squad men in their platoon. After these two sets of ratings, squads were reorganized including barrack association and training assignment. Then at the end of the final four weeks of Basic Training, peer ratings by squad and cadre ratings were obtained again. For comparison purposes, peer and cadre ratings were obtained also from two additional companies at the end of the 4th and 8th weeks. Product-moment correlations were calculated for average peer ratings between the 4th and 8th week, as well as for the cadre ratings between the 4th and 8th week for each man. On the basis of results, it is concluded that peer ratings of leadership

potential are primarily related to observed or inferred attributes of the individual rather than fortuitous factors associated with group composition. The findings support the use of peer ratings of leadership potential obtained in one group for selection of leaders, in some other group with the same task orientation and drawn from the same general population.

A65-81590
GAS EXCHANGE OF ALGAE. I. EFFECTS OF TIME, LIGHT INTENSITY, AND SPECTRAL-ENERGY DISTRIBUTION ON THE PHOTOSYNTHETIC QUOTIENT OF CHLORELLA PYRENOIDOSA.
Elizabeth C. B. Ammann and Victoria H. Lynch (Lockheed Missiles and Space Co., Res. Lab., Palo Alto, Calif.).
Applied Microbiology, vol. 13, Jul. 1965, p. 546-551. 12 refs.

Continuously growing cultures of Chlorella pyrenoidosa Starr 252, operating at constant density and under constant environmental conditions, produced uniform photosynthetic quotient (PQ = CO_2/O_2) and O_2 values during 6 months of observations. The PQ for the entire study was 0.90±0.024. The PQ remained constant over a threefold light-intensity change and a threefold change in O_2 production (0.90±0.019). At low light intensities, when the rate of respiration approached the rate of photosynthesis, the PQ became extremely variable. Six lamps of widely different spectral-energy distribution produced no significant change in the PQ (0.90±0.025). Oxygen production was directly related to the number of quanta available, irrespective of spectral-energy distribution. Such dependability in producing uniform PQ and O_2 values warrants a consideration of algae to maintain a constant gas environment for submarine or spaceship use.

A65-81591
HIGH ALTITUDE PULMONARY EDEMA: A CLINICAL STUDY.
N. D. Menor (Army Med. Corps, Mhow, Madhya Pradesh, India).
New England Journal of Medicine, vol. 273, Jul. 8, 1965, p. 66-73. 7 refs.

A clinical study of 101 patients with high-altitude pulmonary edema diagnosed and treated at a hospital located at 11,500 feet is presented. The incidence of the disease was 5.7 per 1000 among persons taken by air to an altitude of 11,500 feet. The disease was found to affect all types, including those employed on sedentary duties. The symptomatology, physical findings and laboratory and radiologic findings are discussed. The etiology of the condition is considered, and it is suggested that myocardial dysfunction secondary to hypoxia is a likely cause. The treatment suggested is mainly that of acute heart failure.

A65-81592
THE EFFECT OF CONTINUOUS LIGHT OR DARKNESS ON THE SUBCOMMISSURAL ORGAN AND GLOMERULAR ZONE OF ADRENALS OF THE WHITE RAT.
G. Zboray (Eötvös Loránd U., Inst. of Gen. Zool., Budapest, Hungary).
Acta Biologica Academiae Scientiarum Hungaricae, vol. 15, 1965, p. 337-341.

Groups of twelve white male rats were placed for a month in a dark and a continuously lighted room. Control animals spent the same time in a room lighted for 6 to 18 hours every day. Continuous light resulted in a considerable decrease of the lipid content and a decrease in the relative weight of the pineal gland. In continuous darkness there was no change in the lipid content and relative weight of the pineal gland. The subcommissural organ (in the hypothalamus) remained the same in all three groups. Thus, in rats, it apparently has lost the light sensitivity which still exists in Amphibia. Atrophy of the pineal gland as a result of light exposure had no effect on the zona glomerulosa of the adrenal cortex and excludes any functional connection with respect to light-evoked reactions between the pineal body and the adrenal cortex.

A65-81593
EXPERIMENTAL INVESTIGATION OF HEART METABOLISM IN ANOXIA [EXPERIMENTELLE UNTERSUCHUNGEN UBER DEN HERZSTOFFWECHSEL WAHREND SAUERSTOFFMANGELS].
L. Benda, D. Doneff, and K. Moser (I. Med. Universitätsklin., Vienna, Austria).
Wiener Zeitschrift für Innere Medizin, vol. 46, Feb. 1965, p. 49-56. 12 refs. In German.

Energy-rich phosphates were determined in the heart of guinea pigs at various stages during nine minutes of asphyxia. One minute after the onset of asphyxia, there was a distinct fall of creatine phosphate, which had disappeared completely after 5 minutes of asphyxia. The decrease in adenosine triphosphate after two minutes of asphyxia continued until the end of the experiment. Orthophosphate showed a linear rise during the whole experiment. The values for adenosine monophosphate were increased in the first five minutes and then fell gradually. The pattern of changes in the energy-rich phosphates in the heart in asphyxia is discussed.

A65-81594
EFFECT OF COLD EXPOSURE AND HIBERNATION ON THE THYROIDAL ACTIVITY OF MESOCRICETUS AURATUS
L. S. Tashima (Harvard U., Biol. Labs., Cambridge; and Harvard Med. School, Dept. of Anat., Boston, Mass.)
General and Comparative Endocrinology, vol. 5, Jun. 1965, p. 267-277. 42 refs.

Low environmental temperature produced in the golden hamster no histological hyperactivity but increased significantly uptake and conversion ratios. Chromatograms of thyroid hydrolysates of cold-exposed and control hamsters were similar. No significant differences in the protein-bound iodine level and the red cell uptake of triiodothyronine were demonstrated between these two groups. The half-life of I^{131} in radioactive thyroxine was significantly shorter in cold-exposed hamsters. It is concluded that the thyroid gland does not play an important causative role in the initiation of hibernation. In hibernating hamsters, there was an extremely low incorporation of I^{131}. Chromatograms of thyroid hydrolysates revealed that monoiodothyronine and diiodothyronine were present while triiodothyronine and thyroxine were not detectable. No significant differences were observed in the protein-bound iodine levels of hibernating and control hamsters. The red cell uptake of hibernating hamsters was significantly lower than in controls. In vitro incubation of thyroid glands at 37°C. revealed a significantly lower uptake of I^{131} in tissue from hibernating hamsters. It is suggested that the reduced activity of the thyroid gland observed in vivo during hibernation is due to the direct effect of lowered temperature on the metabolism of the thyroid gland and the decreased secretion of thyrotropin by the pituitary gland.

A65-81595
EFFECTS OF SPACE FLIGHT FACTORS ON THE PHYSIOLOGICAL PROCESSES DURING GERMINATION OF SEEDS IN SOME HIGHER PLANTS [VLIIANIE FAKTOROV KOSMICHESKOGO POLETA NA FIZIOLOGICHESKIE PROTSESSY PRI PRORASTANII SEMIAN NEKOTORYKH VYSSHIKH RASTENII].
L. K. Gordon, T. S. Kanter, V. V. Antipov, and V. G. Vysotskii.
Kosmicheskie Issledovaniia, vol. 3, May-Jun. 1965, p. 473-479. In Russian.

The conditions of space flight did not affect the viability of higher-plant seeds which were carried by the Soviet spacecraft "Vostok 5" and "Vostok 6". The cosmic conditions, however, affected some of the meristematic cells without changing, in most cases, the germinating and growth processes. Some histochemical changes were noted, such as an increase in activity of polyphenol oxidase and cytochrome oxidase.

A65-81596
EFFECT OF SPACE FLIGHT CONDITIONS IN THE SPACECRAFTS "VOSTOK-5" AND "VOSTOK-6" ON THE CHROMOSOMES OF THE PRIMARY ROOTS IN GERMS OF SEEDS IN SOME HIGHER PLANTS [VLIIANIE USLOVII KOSMICHESKOGO POLETA NA KORABLIAKH-SPUTNIKAKH "VOSTOK-5" I "VOSTOK-6" NA KHROMOSOMY].
N. L. Delone, N. A. Rudneva, and V. V. Antipov.
Kosmicheskie Issledovaniia, vol. 3, May-Jun. 1965, p. 480-487. 19 refs. In Russian.

The effect of cosmic conditions was studied on chromosomes of primary roots from seeds of some higher plants which were on board the Soviet spacecraft "Vostok-5" and "Vostok-6". In some cases the number of structural changes in chromosomes was increased, as compared with controls. The number of changes in chromosomes was greater than the number of changes in chromatids. Recombinations exceeded the gragmental changes. The changes effected by the cosmic flight were different from those found after gamma-radiation exposure.

A65-81597
EFFECT OF COLD AND RESTRICTION OF MOVEMENT ON MAST CELLS AND METACHROMASIA OF RAT SKIN.
Agathe Castelli and Michael M. Clay (Columbia U., Coll. of Pharm., New York, N. Y.; and Miami U., Dept. of Pharmacol. Fla.)
Nature, vol. 207, Jul. 3, 1965, p. 89-90. 7 refs.

The effect of cold and restriction of movement on mast cells and metachromasia of skin was studied in rats confined to small cages for 2 and 14 days. The ambient temperature was maintained at 12 + 2°C. Frozen, stained sections of all layers of skin from decapitated animals were examined for the intensity of ground substance metachromasia and the number of mast cells. After 14 days of stress, the skin showed many areas containing individually dispersed extracellular metachromatic granules, cells with granules clumped together in irregular and angular shapes, as well as areas of the ground substance which failed to stain metachromatically. An increase in the mean mast cell density was due primarily to an increase in cells with ruptured cell walls. The highest mast cell density was found in subcutaneous tissue, followed in decreasing order by panniculus carnosus, dermis and the zone immediately below the basal layer of epidermis.

A65-81598
THE INFLUENCE OF BACTERIAL SPECIES ON PULMONARY RESISTANCE TO INFECTION IN MICE SUBJECTED TO HYPOXIA, COLD STRESS, AND ETHANOLIC INTOXICATION.
G. M. Green and E. H. Kass (Boston City Hosp., Channing Lab., Thorndike Mem. Lab., and Second and Fourth (Harvard) Med. School, Depts. of Bacteriol. and Immunol., and Med., Boston, Mass.)
British Journal of Experimental Pathology, vol. 46, Jun. 1965, p. 360-366. 7 refs.

Grants NIH AI 03901 and HD 01288; and N. Y. Tuberc. and Health Assoc. supported research.

In an experimental model of airborne bacterial infection, the clearance by the lung of three strains of bacteria (Proteus mirabilis, Staphylococcus albus, and S. aureus) was studied, and the effects of several environmental agents (hypoxia, cold stress, and ethanol intoxication) on the clearance of each strain was assessed. In untreated mice, the bacterial clearance activity of the lungs was most effective against S. albus, less against S. aureus, and least against Pr. mirabilis, with 99, 87, and 70%, respectively, of the viable organisms cleared in 4 hr. The difference among the bacterial species in their resistance to pulmonary clearing was further depicted in ethanol intoxicated mice. While the clearance of S. albus and S. aureus was significantly depressed, that of Pr. mirabilis was inhibited completely. By contrast, hypoxia affected very little the clearance of Pr. mirabilis, but inhibited significantly the clearance of the staphylococci. Cold stress, on the other hand, inhibited clearance with an approximately equal effect on both S. albus and Pr. mirabilis. In general, the resistance of the male animals was affected more intensely than that of female mice.

A65-81599

CARDIOVASCULAR SYMPATHETIC TONE AND STRESS RESPONSE RELATED TO PERSONALITY PATTERNS AND EXERCISE HABITS. A POTENTIAL CARDIAC RISK AND SCREENING TEST.

Wilhelm Raab and Hans J. Krzywanek (Vt. U., Div. of Exptl. Med., Dept. of Med., Burlington).

American Journal of Cardiology, vol. 16, Jul. 1965, p. 42–53. 64 refs. Grant PHS HE-02169.

Among 200 professional men with emotionally highly excitable personality patterns and with completely sedentary living habits displayed the highest cardiac sympathetic tone at rest, and the highest cardiac adrenergic response levels under mild standard sensory and mental stresses (telephone bell, flicker light, mental arithmetic). The criteria used for assessment of sympathetic cardiac adrenergic activity were heart rate, length of the isometric tension period of the left ventricle, and relative length of the left ventricular systole in per cent of the cardiac cycle. No clear relations were demonstrable between personality patterns and exercise habits on the one hand, and blood pressure levels and reactions, serum cholesterol concentration, obesity and smoking habits on the other. Parental cardiovascular morbidity was higher in the groups of subjects with exaggerated sympathetic activity. The applied technic for direct measurement of cardiac chronotropic and inotropic adrenergic activity at rest and under stress is expected to be useful for prospective epidemiologic and preventive cardiac reconditioning studies.

A65-81600

CIRCULATORY DYNAMICS DURING THE COLD PRESSOR TEST.

Murray A. Greene, Adolph J. Boltax, George A. Lustig, and Edward Rogow (Bronx-Lebanon Hosp. Center, Dept. of Med. Cardiopulmonary Lab., New York, N. Y.)

American Journal of Cardiology, vol. 16, Jul. 1965, p. 54–60. 17 refs. Grant PHS H-4344; and John Polachek Found. for Med. Res. supported research.

Circulatory dynamics during the cold pressor test were studied in normotensive and hypertensive individuals. Most of the subjects responded with statistically significant increases in blood pressure. However, only 50% of the hypertensives demonstrated vascular hyperreactivity. In addition, the pressor responses were quantitatively similar in the hypertensive and normotensive groups. These data indicate that the pressor reaction to the cold stimulus is not altered in hypertension. The cold pressor test represents a widespread stimulation (neurogenic) of multiple components of the cardiovascular system, the quantitative and qualitative aspects of which are not predictable on a clinical basis and are similar in hypertensive and normotensive individuals. Major cardiodynamic changes during this stimulus, in addition to the pressor response, include increased peripheral arterial resistance, increased cardiac output due to increased heart rate, and increased pulmonary artery pressures.

A65-81601

THE ANALYSIS OF THE AFTEREFFECT PRODUCED ON CHROMOSOMES BY γ-RAYS AND 660 MEV ENERGY PROTONS [ANALIZ POSLEDEIST-VIIA GAMMA-LUCHEI I PROTONOV S ENERGIEI 660 MEV NA KHROMOSOMY].

V. V. Khvostova, L. V. Nevzgodina, and N. P. Dubinin (USSR, Acad. of Sci., Inst. of Biol. Phys., Moscow).

Doklady Akademii Nauk SSSR, Seriia Biologiia, vol. 161, 1965, p. 1219–1221. 9 refs. In Russian.

The effects of gamma-rays and protons with 660 Mev energy on chromosomes of air-dried peas, planted 2 days, were studied 6 and 12 months after the exposure to radiation. Protons of 660 Mev energy produced injury of chromosomes at the moment of exposure, which was similar to the effects of fast neutrons on tissues. However, judging by the small number of structural changes in chromosomes, the effect could be considered as very slight.

A65-81602

ACCLIMATIZATION OF OLDER MEN TO WORK IN HEAT.

Sid Robinson, H. E. Belding, F. C. Consolazio, S. M. Horvath, and E. S. Turrell (Ind. U., Dept. of Anat. and Physiol., Bloomington; Pittsburgh U., Pa.; Army Med. Res. and Nutr. Lab., Denver, Colo.; Calif. U. Berkeley; and Marquette U., Milwaukee, Wis.).

Journal of Applied Physiology, vol. 20, Jul. 1965, p. 583–586. 8 refs. Grant DA-MD-49-193-63-G91.

Four men, ages 44-60, repeated work experiments in the heat by which they had demonstrated on themselves rapid acclimatization to work in a hot climate 21 years earlier. The work, heat stress, and duration of exposure were those originally found to cause marked hyperpyrexia and circulatory strain in unacclimatized men (mean age 31 years) on the 1st day in the heat. Under these conditions, the subjects sweated at 1.3-1.5 kg./hr. Tolerance of the men on the 1st day of exposure was no less than when they were younger. Body temperatures and heart rates of the older men were lowered in successive days of exposure and the work was judged progressively easier. Final values of body temperature reached after 5-7 days of exposure were about the same as observed originally after the same number of exposures. Thus, these older men exhibited about the same degree of strain during work in the heat as they did 21 years earlier and acclimatized about as well.

A65-81603

BLOOD SERUM ENZYME ACTIVITY OF DOGS EXPOSED TO HEAT STRESS AND MUSCULAR EXERCISE.

E. Bedrak (Negev Inst. for Arid Zone Res., Dept. of Environ. Med., Beersheva, Israel).

Journal of Applied Physiology, vol. 20, Jul. 1965, p. 587–590. 24 refs. Ford Found. and B. de Rothschild Found. for the Advan. of Sci. in Israel supported research.

The activity of several clinically important enzymes was determined in dogs exercised in a temperate environment, exposed to heat stress alone, and exercised in a hot environment before and after heat acclimatization. Enhanced activities of glutamic oxalacetic transaminase (GOT) ($P < 0.01$), glutamic pyruvic transaminase (GPT) ($P < 0.05$), lactic dehydrogenase (LDH), phosphohexose isomerase (PHI) ($P < 0.05$), acid phosphatase (ACP), alkaline phosphatase (ALP), aldolase (ALD), and lipase (LIP) were observed in all dogs exposed to the various physiological stresses. The alteration in enzyme activities of acclimatized dogs was generally smaller than in nonacclimatized animals. Comparison between the two control groups (heat acclimatized versus nonacclimatized) indicates a significant increase in LDH activity ($P < 0.01$) and lower activities of PHI ($P < 0.05$), ACP ($P < 0.05$), and ALP ($P < 0.01$) in heat-acclimatized dogs.

A65-81604

BODY COMPOSITION AND ATHEROSCLEROSIS IN COCKS AFTER LONG EXPOSURE TO HEAT AND COLD.

Hans Fisher, Paul Griminger, and H. S. Weiss (Rutgers-State U., Dept. of Animal Sci., Nutr. and Physiol. Labs., New Brunswick, N. J.)

Journal of Applied Physiology, vol. 20, Jul. 1965, p. 591–596. 18 refs. PHS N. J. Heart Assoc., and Sussex County Heart Assoc. supported research.

Three groups of adult cocks were exposed respectively to 2, 21, and 32° C. temperatures for a 15-month experimental period. Food consumption, body weight, body composition, feather composition and weight, atherosclerosis and fatty acid composition of plasma, liver and depot fat were studied. It was found that with the use of a pelleted diet the cold-exposed cocks maintained the same body weight as the control group (21° C.). The heat-exposed birds were lighter in weight than either controls or cold-exposed cocks and had significantly less body fat and water. Severity of atherosclerosis was not affected in the cold-exposed cocks, despite greatly increased caloric intake. The liver fat of the cold-exposed cocks was significantly higher in di- and hexaenoic acids than that of the controls or heat-exposed birds. The depot fat of heat-exposed birds was lower in monoenoic and higher in dienoic acid than that of controls or cold-exposed birds. The cold-exposed cocks also had significantly more feathers and feather lipid than the other two groups.

A65-81605

CRITICAL STUDIES ON DETERMINATION OF THYROID SECRETION RATE IN COLD-ADAPTED ANIMALS.

O. Heroux (U. S. Naval Radiol. Defense Lab., San Franciso, Calif.) and R. Brauer.

Journal of Applied Physiology, vol. 20, 1965, p. 597–606. 34 refs.

Estimation of thyroid secretion rate by determining the amount of *l*-thyroxine required to block the thyroidal I^{131} release, confirmed that the thyrozine requirement of 6° C. acclimated rats is twice as high as that of 23° C. acclimated controls (5.5 ±0.7 μg./100 g. per day against 2.73 ±0.3 μg./100 g per day). In white rats acclimatized to cold by outdoor exposure during the winter on the other hand, it was only 1.8 ±0.38 μg./100 g. per day. Larger amounts of thyroxine were found in the feces of the 6° C. acclimated rats (1.66 ±0.66 g./100 g. body per wt. per day) as compared to 0.69 ±0.07 μg./100 g. body wt. per day for controls. Urinary elimination rates of I^{131} were more rapid in "6° C. rats" than in controls. These observations indicate that the greater requirement for

thyroxine in cold-adapted rats is at least partly due to greater fecal loss of the hormone. It seems plausible to seek an explanation for the lesser thyroxine requirements of the outdoor winter rats in their fecal elimination rate of that hormone.

A65-81606
CATECHOLAMINES IN PLASMA AND URINE AT HIGH ALTITUDE.
W. L. Cunningham, E. J. Becker, and F. Kreuzer (Nijmegen U., Dept. of Physiol., The Netherlands).
(Dutch Federation of Biomed. Soc., 5th Meeting, Utrecht, The Netherlands, Apr. 9–10, 1964).
Journal of Applied Physiology, vol. 20, Jul. 1965, p. 607–610. 11 refs.
Dutch Found. for Basic Sci. Res. (ZWO) supported research.
Grant Natl. Heart Inst. HE-06446-C2.

The concentration of free epinephrine and norepinephrine in plasma and 24-hr. urine samples, collected from members of the Dutch Monte Rosa expedition (July 1963) was investigated during 17 days at various altitudes up to 4,560 m. The results indicate that the levels of both plasma and urine catecholamines were elevated during the expedition, the plasma levels reaching a maximum towards the end of the 12 days sojurn at 4,560 m. In general, there was a twofold increase in total catecholamine concentration in the samples collected at high altitude as compared to control values at sea level. This difference was due to a significant increase in the norepinephrine concentration; there was little change in epinephrine level.

A65-81607
ALTERATIONS IN PULMONARY MECHANICS WITH AIRWAY OBSTRUCTION DURING REST AND EXERCISE.
John S. Hanson, Burton S. Tabakin, Arthur M. Levy, and Herman L. Falsetti (Vt. U., Coll. of Med., Dept of Med. Cardiopulmonary Lab; and Mary Fletcher Hosp., Burlington).
Journal of Applied Physiology, vol. 20, Jul. 1965, p. 664–668. 17 refs.
Grant Natl. Heart Inst. HE-04010-06, 1-K3-1-HE-7248, and 5T1-HE-5286-05.

The effects of artificial expiratory airway obstruction on pulmonary compliance, work of breathing, and pressure-flow relationships have been studied in five normal young males at rest and during treadmill exercise. The finding of a significant decrease in compliance during resistance breathing strongly suggests that alterations in pulmonary blood volume have occurred. In addition, there is evidence that uniformity of gas distribution within the lung has been impaired, a finding which is constant with previously studied changes in lung volumes secondary to the obstruction.

A65-81608
CARDIOPULMONARY EFFECTS OF CONTINUOUS PRESSURE BREATHING IN HYPOTHERMIC DOGS.
J. Salzano and F. G. Hall (Duke U. Med. Center, Dept. of Physiol. and Pharmacol., Durham, N. C.)
Journal of Applied Physiology, vol. 20, Jul. 1965, p. 669–674. 9 refs.
Contract AF 33(657)-8854; and Grant Natl. Inst. of Neurol. Diseases and Blindness NB-03897.

Continuous pressure breathing was studied in hypothermic, anesthetized dogs. Alveolar ventilation decreased during continuous positive-pressure breathing and increased during continuous negative-pressure breathing. The changes in alveolar ventilation were due to changes in respiratory rate as well as in respiratory dead space. Cardiac output fell significantly during continuous positive-pressure breathing due to a reduction in heart rate and stroke volume. During continuous negative-pressure breathing cardiac output was only slightly greater than during control as a result of a fall in heart rate and an increase in stroke volume. Oxygen consumption was reduced to 60% of control during continuous positive-pressure breathing of 16cm. H_2O but was 25% greater than control during continuous negative-pressure breathing. Qualitatively, CO_2 production changed as did O_2 consumption but was different quantitatively during continuous negative-pressure breathing indicating hyperventilation due to increased respiratory rate. Mean pulmonary artery pressures and pulmonary resistance varied directly with the applied intratracheal pressure. The results indicate that the hypothermic animal can tolerate an imposed stress such as continuous pressure breathing and can increase its oxygen consumption during continuous negative-pressure breathing as does the normothermic animal.

A65-81609
AN IMPROVED SYSTEM FOR PROLONGED EXPOSURE OF SMALL ANIMALS TO ARTIFICIAL LOW PRESSURES.
James Kollias and John Patrick Jordon (Oklahoma City U., Depts. of Biol. and Chem., Okla.)
Journal of Applied Physiology, vol. 20, Jul. 1965, p. 742–744.
NASA Grant NsG 300-63.

A system has been developed for exposing small animals to a low pressure-high oxygen environment. Several unique features such as (1) pressure control, (2) an electronic watering device, and (3) a constant environmental temperature are discussed.

A65-81610
GRADATIONAL STEP TESTS FOR ASSESSING WORK CAPACITY.
Francis J. Nagle, Bruno Balke, and John P. Naughton (Okla. U., Med Center, Depts. of Med. and Physiol. and Neurocardiol. Res. Program; and FAA, Civil Aeromed. Res. Inst., Oklahoma City).
Journal of Applied Physiology, vol. 20, Jul. 1965, p. 745–748. 5 refs.
Grant Natl. Heart Inst. HE-06286-04.

The feasibility of a gradational step test for the assessment of work capacity was investigated. A device was constructed on which the level of a stepping platform could be raised between 2.0 and 50 cm. as subjects continued work at a prescribed stepping rate. Two test procedures applicable to individuals who vary in their state of health from that of a chronically ill patient to a trained athlete are described. Sixty men performed experiments to establish the minute-by-minute metabolic costs of the work in the two tests. The oxygen expenditures ranged from about 12.9 to 40.8 ml./min. per kg. in the 30/min. step test and from approximately 10.7 to 28.8 ml./min per kg. in the 24/min. step test. The procedures are well suited for measuring various physiological parameters during stepping and for establishing physiological working limits. The oxygen costs of the "negative" and "positive" work components in stepping were determined. The cost of negative work was approximately one-third that of the positive work. An equation was derived for predicting the metabolic costs of stepping at various rates and platform levels. Comparisons of predicted and measured oxygen intake values for the 30-step and 24-step tests approximated one another at all levels of energy expenditure.

A65-81611
PSYCHOLOGY OF THE FLIGHT TO THE MOON [DIE PSYCHOLOGIE DES MONDFLUGES].
Siegfried J. Gerathewohl.
Bild der Wissenschaft, vol. 1, Jan.–Mar. 1964, p. 57–64. In German.

A review is presented of the aims of the Moon flight program conducted by the United States, touching upon the psychological and social issues it raises. Preliminary programs, project Mercury and unmanned space probes, explored the adequacy of instruments on one hand and the human performance under physical and psychological stresses of space flight on the other hand. The positive results obtained from this program figured extensively in the planning of Gemini and Apollo projects. The Gemini project attempts to answer questions in the area of the ability of man-machine system to withstand stresses imposed by a flight of five to eight days planned for the Moon trip. With respect to human tolerances, the effects of longer exposures to weightlessness, restriction of movement, cosmic radiation, and the ensuing disturbances of the energy metabolism are still to be investigated. Spatial disorientation and motion sickness may be encountered. Life support and monitoring equipment has to be coordinated with the daily schedule of the astronauts. Certain problems arise from dehydration, increased excretion of minerals, and orthostatic hypotension, as reported from various space flights.

A65-81612
TECHNICAL MODIFICATIONS OF THE BARANY APPARATUS FOR EVOKING OPTOKINETIC NYSTAGMUS [MODIFICAZIONI TECHNICHE DELL'APPARECCHIO DI BARANY PER L'EVOCAZIONE DEL NISTAGMO OTTICOCINETICO].
D. Meglighian, W. Mozzo, and I. Serafini (Padua U., Clin. Otorinolaring Oiatrica, Italy).
Bollettino della Società Italiana di Biologia Sperimentale, vol. 41, Mar. 31, 1965, p. 283–287. 30 refs. In Italian.

Modifications of the rotatory Barany apparatus for evoking optokinetic nystagmus are described and illustrated. Some modifications include limiting the vision of the cylinder in order not to distract the patient's visual field, immobilization of the head, new techniques for electronystagmographic registration and interpretation, and pendular rotation of the cylinder in two directions with variable velocity. Modifications in apparatus as well as in technique not only aid in the correct stimulation and registration of optokinetic nystagmus but also permit easier reading of electronystagmographic tracings.

A65-81613
MEDICAL TASKS DURING TRANSPORTATION OF THE SEVERELY INJURED IN HELICOPTERS [ARZTLICHE AUFGABEN BEIM TRANSPORT VON SCHWERVERLETZTEN MIT HUBSCHRAUBERN].
K. L. Scholler and S. Weller (Chir. Universitatskln., Anasthesieabt., Freiburg i. Br.)
Deutsche Medizinische Wochenschrift, vol. 90, Feb. 19, 1965, p. 344–346. In German.

Helicopter transport is described for patients with severe injuries such as spinal fractures and head trauma. The larger helicopters, "Sikorsky S58" and "Vertol H 21" a particularly well suited for transport of patients with spinal injuries, who require traction or a full cast. Preparation before transport includes alleviating hypovolemia and anemia, tracheotomy if necessary, and sedation with phenothiazines and analgesics. Accompanying anesthetists, equipment includes a full emergency kit and a 5-liter oxygen tank for the spinal patients. In case of a tracheotomy requiring artificial respiration, emergency equipment consists of a 40-liter oxygen respirator secured within the cabin.

A65-81614
NOISE AND CIRCULATION [LARM UND KREISLAUF].
R. Heinecker (Stadtkrankenhaus Kassel, Med. Klin. II, West Germany).
Deutsche Medizinische Wochenschrift, vol. 90, Jun. 11, 1965, p. 1107–1109. 17 refs. In German.

Detrimental effects of noise on the human organism are reviewed. Psychologically, the effects observed subjectively are annoyance or irritability at noise levels of 30 to 65 phon. At higher levels of 65 to 90 phon autonomic nervous reactions are evoked in addition to the subjective effect. With noise levels in excess of 90 phon the autonomic nervous reactions become more intense, temporary noise deafness may appear, severe inner ear disturbances are encountered in long-term exposure, and vomiting occurs as a result of autonomic overstimulation. Work performance declines in quantity and in quality. Noise levels above 90 phon are encountered, among other places, near the older propeller aircraft engines and during the takeoffs of jet aircraft. Experiments point to the importance of individual differences in cardiovascular function in response to noise. Hypertensives more than hypotensives react to noise with considerable circulatory changes. Physical exercise is reported to have a beneficial dampening influence on cardiac reactivity to noise. It may be possible to use exercise to reestablish circulation in the trophotropic direction which minimizes the damaging effects of noise on the cardiovascular system.

A65-81615
MODIFICATIONS OF CONTINUING AMPULLAR POTENTIALS INDUCED BY STIMULATION OF THE EFFERENT VESTIBULAR SYSTEM [MODIFICAZIONI DEI POTENZIALI CONTINUI AMPOLLARI INDOTTE DALLA STIMOLAZIONE DEL SISTEMA EFFERENTE VESTIBOLARE].
O. Sala (Padua U., Clin. Otorinolaring Ojatrica, Italy).
Bollettino della Societa Italiana di Biologia Sperimentale, vol. 41, Jan. 31, 1965, p. 57–59. 9 refs. In Italian.

The efferent vestibular system (s.v.e.) was studied under various experimental conditions in 25 anesthetized decerebrated cats. Cold stimulation of the s.v.e. produced hyperpolarization of labyrinthine receptors and also depolarization of labyrinthine receptors contralateral to those stimulated. Heat stimulation produced opposite effects. Electrical stimulation of the s.v.e. always caused hyperpolarization of the homolateral and contralateral labyrinth. The variations were between 100–200 microvolts, being more effective on the contralateral labyrinth. Electrical stimulation of the s.v.e. produced hyperpolarization which increased the hyperpolarization produced by cold stimulation and decreased the depolarization which followed heat stimulation. The intravenous administration of a subconvulsive dose of strychnine sulfate reduced and abolished the effects of cold, heat, and electrical stimulation. The results demonstrate the existence of a "feedback loop" between the two labyrinths, since after thermal stimulation of one labyrinth, modifications were observed in the opposite continual potentials of the contralateral labyrinth. These effects were mediated by the following structures: stimulated labyrinthine receptors, primary vestibular fibers, vestibular nuclei and bulbopontine reticular substance, cell of origin of efferent fibers, and efferent fibers for contralateral labyrinthine receptors.

A65-81616
STEEPNESS OF APPROACH AND AVOIDANCE GRADIENTS IN HUMANS AS A FUNCTION OF EXPERIENCE: THEORY AND EXPERIMENT.
Seymour Epstein and Walter O. Fenz (Mass. U., Amherst).
Journal of Experimental Psychology, vol. 70, Jul. 1965, p. 1–12. 11 refs. Grant Natl. Inst. of Mental Health MH-01293.

Thirty-three experienced and 33 novice parachutists rated their approach and avoidance feelings at different points in time preceding and following a parachute jump. For the novice parachutists, self-rated avoidance increased up to a point shortly before the jump, and then decreased. For the experienced parachutists, self-rated avoidance increased up to the morning of the jump, decreased to the jump, and increased after the jump. It was concluded that with experience the point of greatest anxiety is displaced backward in time. To account for this phenomenon, a miniature theory was presented which assumed that with continuous exposure to threat, two developments take place, a *heightening of the gradient of anxiety and the development of a gradient of* inhibition of anxiety, the latter having the steeper slope.

A65-81617
VIGILANCE PERFORMANCE WITH A QUALITATIVE SHIFT IN REINFORCERS.
William Bevan and Edward D. Turner (Kan. State U., Manhattan).
Journal of Experimental Psychology, vol. 70, Jul. 1965, p. 83–86. 7 refs. Contract Nonr-3634(01).

This experiment examined the effect of a qualitative shift in reinforcers upon performance in a simple vigilance task. Subjects in five independent groups reported the absence of a tone as it occurred from time to time in a series presented at regular intervals for approximately one hour. An unreinforced group performed at about the 50% detection level throughout. Two groups, one receiving a penny for each correct response throughout and one receiving a mild electric shock for each error, performed equally well and significantly better than the unreinforced group. The best performance occurred in two groups experiencing a qualitative shift in reinforcers from the 1st to the 2nd halves of the experimental task. The direction of change had no demonstrable relationship to the facilitation of performance. Since shock was involved and it was necessary to allow the subject prior knowledge of *his reinforcement treatment, anticipation of the reinforcement shift* became an inevitable adjunctive condition. Anticipation was effective in facilitating performance both before and after the actual occurrence of the shift.

A65-81619
SOME ASPECTS OF CEREBRAL ENZYME ACTIVITY IN THE COURSE OF DEEP HYPOTHERMIA.
E. Păuşescu, Florica Negrea, Niculina Mărculescu, and Rodica Florescu. (Symp. on Deep Hypothermia and Terminal States, Moscow, Sep. 15–19, 1964).
Revue Roumaine de Physiologie, vol. 2, 1965, p. 63–72. 56 refs.

In dogs subjected to deep hypothermia by means of extracorporeal circulation, the enzyme metabolism of the brain was strongly affected by the fall of body temperature and the *associated relation hypoxia. Glutamic-pyruvic* transaminase, glutamic-oxalacetic transaminase, lactic dehydrogenase, and adenosine-triphosphatase activity of the jugular vein blood serum was intensified in various degrees. Changes in the enzymatic activity developed concomitantly with a fall of the concentration of hydrolysable phosphorus and reduced glutathione in the serum. After deep hypothermia, cerebral aspartic acid and chiefly glutamic acid were substantial increase.

A65-81620
STUDIES OF PHAGE PRODUCTION IN ESCHERICHIA COLI K-12 (λ), INDUCED DURING SPACE FLIGHTS OF "VOSTOK-3" AND "VOSTOK-4" [IZUCHENIE FAGOPRODUKTSII E. COLI K-12 (λ), INDUTSIROVANNOI V USLOVIIAKH POLETOV KOSMICHESKIKH KORABLEI "VOSTOK-3" I "VOSTOK-4"].
N. N. Zhukov-Verezhnikov, I. N. Maiskii, A. P. Pekhov et al
Kosmicheskie Issledovaniia, vol. 3, May–Jun. 1965, p. 488–491. 12 refs. In Russian.

Samples of lysogenic bacteria Escherichia coli K-12 (λ), were flown into space on the Soviet spacecraft "Vostok-3" and "Vostok-4". The cultures were tested for the degree of induced phage production at 48, 72, 96 and 120 hours after landing. Induced phage production took place during a period of 48–72 hours after the landing, but later gave way to spontaneous phage formation. The lysogenic effect of protons is characteristic as it was established by previous laboratory methods. Although the effect is similar to that of a 0.3–0.5 rad dose of ionizing radiation, it can be assumed that the effect was not due solely to ionizing radiation, because other factors during the space flight, such as vibration, acceleration, and *weightlessness could contribute to the lysogenic* effect.

A65-81621
A SIMPLE METHOD FOR THE DETERMINATION OF BLOOD δ-AMINO-LEVULINIC-DEHYDRASE: REACTION OF THE ENZYME IN LEAD POISONING [UN SEMPLICE METODO PER LA DETERMINAZIONE DELLA δ-AMINO-LEVULINICO-DEIDRATASI NEL SANGUE. COMPORTAMENTO DELL'ENZIMA NELL'INTOSSICAZIONE SATURNINA].
D. Bonsignore, P. Calissano, and C. Cartasegna (Genoa U., Ist. di Med. del Lavoro; and Ist. di Chim. Biol., Italy).
Medicina del Lavoro, vol. 56, Mar. 1965, p. 199–205. 22 refs. In Italian.

Description is presented of a method for the rapid determination of blood δ-amino-levulinic-dehydrase which is based on the formation of porphobilinogen from δ-amino-levulinic-acid. In normal subjects the enzyme level is 100 ± 20 units, whereas in lead poisoned subjects the level falls to about 20 ± 15 units. Preliminary experiments demonstrate that the inhibition of *δ-amino-levulinic-dehydrase* activity occurs very early during the course of lead poisoning and is due, at least partially, to inhibition of the enzyme. The results obtained by other authors are evaluated on the basis of the principles of the method described.

A65-81622
STUDIES ON THE MECHANISM OF SHOCK: THE EFFECT OF PREVIOUS EXPOSURE TO COLD.
H. B. Stoner (Med. Res. Council Labs., Toxicol. Res. Unit, Carshalton, Surrey, Great Britain).
British Journal of Experimental Pathology, vol. 46, Jun. 1965, p. 278–291. 25 refs.

In experiments carried out in an environmental temperature of 18–22°C. cold-acclimated rats appeared more resistant to hind-limb ischemia than rats of equal weight if they had been in a cold environment sufficiently long for the altered pattern of growth in the cold to lead to anatomical changes which, by reducing the ratio between the weight of the hind-quarters and that of the body, reduced the amount of tissue damaged by the tourniquets. While these cold-acclimated rats were not actually more resistant, they appeared to be because the size of the injury was reduced. Cold-acclimation reduced the rate of the early fall in colon temperature after the period of limb ischemia. This was seen

as soon as the rats were fully acclimated and was not dependent on a reduction in the size of the injury. Ganglionic blockade, before removal of the tourniquets, restored the rate of fall in colon temperature to that seen in rats which had not been exposed to cold. The change in the behavior of the colon temperature after limb ischemia in the cold-acclimated rats is attributed to their increased sensitivity to catecholamines. The results emphasize the difference between the factors responsible for the fall in heat production after injury and those which determine death or survival.

A65-81623
HELICOPTER ROTOR-BLADE INJURIES.
Frank W. Kiel (Armed Forces Inst. of Pathol., Forensic Pathol. Branch, Washington, D. C.)
Aerospace Medicine, vol. 36, Jul. 1965, p. 668–670.

In helicopter accidents six percent of those killed are bystanders struck by a rotor blade. The files of the United States Army Board for Aviation Accident Research, the U. S. Naval Aviation Air Safety Center, the Office of the Deputy Inspector General of the Air Force and the Civil Aeronautics Board contain reports on 17 deaths from rotor-blade injuries. Civilian helicopters were involved in half of the 17 fatal cases, typically the small utility helicopter with a main overhead rotor and a smaller antitorque rotor on the tail. In the earlier years spectators were the usual victims; but ground crewmen and disembarking passengers are the persons being struck more commonly nowadays. In 10 instances it has been the small antitorque rotor that was the wounding agent, while in five cases a main rotor has been involved. Continued vigilance by ground crewmen, repeated warnings to passengers and competent supervision of spectators must be maintained in order to eliminate this completely preventable type of death.

A65-81624
STUDIES OF BIOLOGICAL ACTION OF SPACE FLIGHT FACTORS ON LYSOGENIC BACTERIA IN EXPERIMENTS ON SPACECRAFTS "VOSTOK-5" AND "VOSTOK-6" [ISSLEDOVANIE BIOLOGICHESKOGO DEISTVIIA FAKTOROV KOSMICHESKOGO POLETA S POMOSHCH'IU LIZOGENNYKH BAKTERII V EKSPERIMENTAKH NA KORABLIAKH "VOSTOK-5" I "VOSTOK-6"].
N. N. Zhukov-Verezhnikov, I. N. Maiskii, A. P. Pekhov et al
Kosmicheskie Issledovaniia, vol. 3, May–Jun. 1965, p. 492–494. 7 refs.
In Russian.

The effects of cosmic flight on the lysogenic bacteria Escherichia coli K-12 (λ), as determined during the space flights of "Vostok-5" and Vostok-6", were the same as recorded during the space flights of "Vostok-3" and "Vostok-4". In later experiments it was established that β-mercaptopropylamine could block the formation of the phage particles and lower the level of the spontaneous lysogenic reaction during the space flights.

A65-81625
PULMONARY RETENTION AND EXCRETION OF MERCURY VAPORS IN MAN.
J. Teisinger and V. Fiserova-Bergerova (Inst. of Ind. Hyg. and Occupational Diseases, Prague, Czechoslovakia).
Industrial Medicine and Surgery, vol. 34, Jul. 1965, p. 580–584. 19 refs.

Five experiments were carried out in an exposure chamber, in which experimental subjects inhaled mercury vapors in a concentration of 100 $\mu g/m.^3$ for seven hours (In one case, 200 $\mu g/m^3$ was used). A retention of 76% was found in nasal inspiration and mouth expiration, while retention decreased up to 20% in mouth inhalation. Retention was constant from the beginning of the experiment. In people who had worked with mercury for many years, retention was unchanged. Mercury is retained predominantly in respiratory tracts (no mercury was found in alveolar air). Pulmonary desaturation is low and rapid in comparison with solvents. Mercury excretion in urine is protracted and irregular, and thus the absorbed amount cannot be estimated.

A65-81626
INHIBITION OF INDUCED ACTIVITY OF NEURONS OF THE OPTIC ZONE DURING THE ACTION OF SOUND STIMULUS [TORMOZHENIE VYZVANNOI AKTIVNOSTI NEIRONOV ZRITEL'NOI KORY VO VREMIA DEISTVIIA ZVUKOVOGO STIMULA].
V. G. Skrebitskii and L. L. Voronin (USSR, Acad. of Med. Sci., Brain Inst., Moscow).
Doklady Akademii Nauk SSSR, Seriia Biologiia, vol. 160, 1965, p. 972–975. 18 refs. In Russian.

The mechanism of inhibition of stimulated activity of visual cortex neurons by the auditory stimulus was studied in rabbits, which had microelectrodes attached to different neurons. The visual stimulus was produced by light flickers of 75 microseconds at intervals of 1–2 sec. The auditory stimulus was provided by sound of 300–1000 c.p.s. The results showed that 48% of studied neurons did not respond to light flickers during the auditory stimulation. In some cases the auditory stimulus inhibited the background activity of neurons. The studies indicated the existence of multisensory convergence in neurons of the primary cortical areas. However, a direct inhibition of sensory awakening could be due to blocking of impulses at the presynaptic site.

A65-81627
REGENERATION EFFICIENCY IN MICE, FOLLOWING THEIR IRRADIATION BY 660 MEV PROTONS [EFFEKTIVNOST' VOSSTANOVLENIIA U MYSHEI POSLE OBLUCHENIIA IKH PROTONAMI 660 MEV].
A. G. Konopliannikov, Iu. B. Kudriashov, and S. P. Iarmonenko (M. V. Lomonosov Moscow State U.; and Acad. of Med. Sci., Inst. of Hyg. of Labor and Prof. Diseases, USSR).
Doklady Akademii Nauk SSSR, Seriia Biologiia, vol. 161, 1965, p. 1448–1450. 24 refs. In Russian.

The ability to regenerate damaged tissues after an exposure to protons with 660 Mev energy was studied in albino mice. The lethal dose for 50% of the animals, which died within 30 days after the exposure ($LD_{50/30}$), was found to be 1160 ± 38 rad for 660 Mev protons, and 590 ± 21 rad for x-rays. Two groups of animals were exposed to 0.5 $LD_{50/30}$, that is, 580 rad for protons and 295 rad for x-rays. The animals were exposed again to $LD_{50/30}$ of x-rays, 2, 6, 13 and 20 days after the first exposure. No permanant damage of bone marrow was noted in these animals. The regeneration of bone marrow tissue proceeded according to the degree of damage during the first exposure. The period of regeneration of 50% of tissue was 2 days after the proton exposure, and 2.5 days after the x-ray irradiation.

A65-81628
REPETITIVE PSYCHOMETRIC MEASURES: SPATIAL ORIENTATION.
Roy B. Mefferd, Jr. and Betty A. Wieland (Veterans Admin. Hosp., Psychiat. and Psychosomat. Res. Lab.; Baylor U. Coll. of Med.; and Houston U., Tex.)
Psychological Reports, vol. 16, Jun. 1965, p. 949–955. 12 refs.

A Spatial Orientation measure with 20 parallel forms was evaluated under various conditions with three samples, totalling 265 subjects. The forms were based on the Thurstone Card Test, but the format and time limits were modified. The new measure correlated at low positive levels with Speed of Closure (.35), Visualization (.28), Number Facility (.27), and Wechsler-Bellevue Vocabulary scores (.43), but factor analyses established that it and the Thurstone Card Test were independent of the other nine measures in the present Repetitive Psychometric Measures battery. Although the internal consistency of single forms was low before practice, it increased with practice.

A65-81630
PHARMACOLOGICAL SUPPORT FOR MAN ON LONG SPACE FLIGHTS.
Carl F. Schmidt (U. S. Naval Air Develop. Center, Aviation Med. Acceleration Lab., Johnsville, Pa.)
Proceedings of the National Academy of Sciences, vol. 53, Jun. 1965, p. 1365–1369.

An appropriate selection of drugs presently available may provide an important contribution to the success of the early Gemini, Apollo, and MOL missions. Such selection could be made in simulation experiments now under way or planned for the near future. A first approximation of such a program is presented.

A65-81631
RELATIONS BETWEEN SWEATING, CUTANEOUS BLOOD FLOW, AND BODY TEMPERATURE IN WORK.
S. Robinson, F. R. Meyer, J. L. Newton, C. H. Ts'ao, and L. O. Holgerson (Ind. U., Dept. of Anat. and Physiol., Bloomington).
Journal of Applied Physiology, vol. 20, Jul. 1965, p. 575–582. 14 refs.
Grant DA-MD-49-193-63-G91.

Men worked on a treadmill for individual periods of 5, 5, 10, 10, 10, and 10 min., stopping for 2 min. between each work period to be weighed. Finger and mean skin temperatures decreased at the beginning of work. When room temperature was 25° C. vasodilation occurred in the finger in the third work period as gastrocnemius muscle and femoral vein temperatures reached maximal values. Temperatures of skin and saphenous vein blood rose rapidly as the men reclined during the rest periods and decreased when work was resumed, coinciding with changes of femoral temperature in the opposite directions. These rapid shifts in temperature indicate that during the rest periods the proportion of blood coming from the skin into the trunk of the femoral was greater than during the work periods. The onset of sweating, the rate of its increase in the early stages of these work experiments, and its decline in recovery more nearly paralleled corresponding changes in femoral temperature than any of the other temperatures measured.

A65-81632
MEASUREMENT OF INTRABRONCHIAL PRESSURE IN MAN.
Peter T. Macklem and N. J. Wilson (Roy. Victoria Hosp., Joint Cardio-Respirat. Serv., Montreal, Quebec, Canada).
Journal of Applied Physiology, vol. 20, Jul. 1965, p. 653–663. 29 refs.
Med. Res. Council of Canada; and John A. Hartford Found. supported research.

By measuring total and lateral airway pressures in intact normal man, simultaneously with esophageal pressure, volume, and flow, it was possible to estimate the pressure difference across the wall of the airway, the pressure-flow curves of various segments of the airway, and the compliance of the airway. The results showed that: (1) Expiratory airway compression only occurs between the segmental bronchi and the glottis at volumes between 75 and 25% vital capacity (VC). (2) Expiratory flow is limited by compression of these air-

ways. (3) The resistance of airways between segmental bronchi and trachea is variable, being markedly affected both by lung volume and pleural pressure. Tracheal resistance varies little with lung volume, but considerably with pleural pressure. The resistance of the airways between alveoli and segmental bronchi varies with lung volume but little with pleural pressure. These are probably the major resistance airways during quiet breathing. (4) Airway compliance is inversely related to lung volume. (5) The Bernouilli effect is large in large airways and helps to limit expiratory flow.

A65-81633
MEASUREMENT OF THE CUTANEOUS CIRCULATION.
Harry M. Wright (Kirksville Coll. of Osteopathy and Surg., Dept. of Physiol., Mo.)
Journal of Applied Physiology, vol. 20, Jul. 1965, p. 696–702. 34 refs.
Am. Osteopathic Assoc. supported research.

Relationships between four commonly used indirect methods for study of the cutaneous circulation in intact, unanesthetized man were examined. Skin temperature, thermal conductance, volume plethysmography and the light absorption of the skin (as related to hemoglobin content) were simultaneously recorded on the upper extremities of normal young men as blood flow and blood content of the skin were changed by circulatory arrest, venous occlusion, indirect heating and cooling, and changes in position. Skin temperature and thermal conductance changed along parallel courses as blood flow was changed, while finger volume and reflectance of the skin to light of wavelength 550 mμ both changed in expected directions although along different courses, following passive congestion and decongestion and changes in level of the hand relative to the heart. The advantages, disadvantages, and limitations of each of the methods in the study of cutaneous circulation in man are discussed and compared.

A65-81634
VOLUNTARY DEHYDRATION IN MAN.
John E. Greenleaf and Frederick Sargent II (Ill. U., Dept. of Physiol. and Biophys., Urbana).
Journal of Applied Physiology, vol. 20, Jul. 1965, p. 719–724. 21 refs.
Grants PHS A-4210 and GPM-15,290.

The effects singly and in combination of heat, exercise, and hypohydration upon voluntary dehydration were studied in four acclimated, physically fit, young men. Voluntary dehydration is the delay in complete rehydration following water loss. Hypohydration refers to the state of decreased water content while the osmotic concentration of the body is maintained. Ad libitum drinking during the heat experiments was 146% greater than it was in the cool experiments. Hypohydration increased drinking 109% over the corresponding hydration experiment, exercise increased water intake 41% over resting. Hypohydration and exercise were less effective than heat in stimulating drinking. During the 4 hr. experimental periods, the subjects did not or could not drink enough to compensate for the water lost. Regardless of the magnitude of the water deficit at the beginning of the recovery periods, the rates of rehydration were the same. The more stressful the experiment, the greater the water consumption and, in general, the longer it took to regain the lost water.

A65-81635
SHORT-LATENCY HUMAN EVOKED RESPONSES TO CLICKS.
Truman E. Mast (Central Inst. for the Deaf, St. Louis, Mo.)
Journal of Applied Physiology, vol. 20, Jul. 1965, p. 725–730. 9 refs.
Grants Natl. Inst. of Neurol. Diseases and Blindness B-3856, 2B-5378, and 5T1 NB 5344-03.

The human average evoked response to clicks, recorded from almost any position on the scalp, shows a characteristic short-latency component with its peak at 30 msec. These responses are probably composite, originating partly from muscle and partly from brain. The response recorded from parietal (P_1) to vertex (C_2) differs significantly from a known muscular response from the inion. The 30 msec. component from inion is markedly enhanced by contraction of the posterior neck muscles, while that from P_1-C_2 is little affected. The two responses differ in their relations of amplitude to stimulus intensity. The P_1-C_2 response also differs from temporalis and frontalis muscle responses.

A65-81636
A LARGE ENVIRONMENTAL CHAMBER FOR THE STUDY OF HYPERCAPNIA AND HYPOXIA.
William B. Schwartz and Leslie Silverman (Tufts U. School of Med., Dept. of Med.; Pratt Clin.-New England Center Hosp.; and Harvard U. School of Public Health, Dept. of Ind. Hyg., Boston, Mass.)
Journal of Applied Physiology, vol. 20, Jul. 1965, p. 767–774. 6 refs.
Grants PHS HE-00759 and 5 T1 AP 3-02.

The design and operating characteristics of an environmental chamber which can maintain carbon dioxide concentrations between 1 and 20% and oxygen concentrations between 5 and 21% are described. The chamber, which measures 3.66 x 6.10 m. permits acute and chronic studies to be carried out in either large animals or man. Multiple safety features serve to protect the occupants against failure of equipment or controls. The relative ease with which investigators can work in the chamber, the convenience of long-term operation, and the reliability of the system which controls the gas concentrations provide a unit which has proved useful for the investigation of a variety of physiologic phenomena related to hypercapnia. Preliminary observations indicate that acute and chronic studies of hypoxia will be equally feasible.

A65-81637
POLAROGRAPHIC DETERMINATION OF OXYGEN CONTENT AND CAPACITY IN A SINGLE BLOOD SAMPLE.
Domenic A. Maio and James R. Neville (Aerospace Med. Div., USAF School of Aerospace Med., Physiol. Branch, Brooks AFB, Tex.)
Journal of Applied Physiology, vol. 20, Jul. 1965, p. 774–778. 11 refs.

A polarographic method was described in an earlier report which permits the accurate, rapid determination of oxygen content in small samples of blood. As with the Van Slyke technic, total oxygen capacity was formerly estimated by a separate determination of the oxygen content after complete saturation with oxygen of another portion of the blood sample. Further experience with the polarographic methods has revealed the feasibility of estimating both content and capacity in a single blood sample. The capacity estimate is made possible by the polarographic observation of the quantity of potassium ferricyanide required to convert ferrohemoglobin to ferrihemoglobin. The measurement of oxygen content is performed, as previously described, by the polarographically determined increase in physically dissolved oxygen caused by the release of bound oxygen. By this means, one avoids sampling and random errors inherent in the use of two separate determinations. The method requires only a brief time for performance and ordinary technical proficiency. It is also simple in application.

A65-81638
PLANETS FOR MAN.
Stephan H. Dole (RAND Corp., Santa Monica, Calif.) and Isaac Asimov (Boston U., School of Med., Mass.)
New York, Random House, 1964, x+242 p. 39 refs.
$6.95.

The aim of the book is to suggest the answers to some very basic questions about the ultimate goals of space travel. Many of the topics discussed are highly controversial. However, the author tries to acquaint the reader with basic facts, such as: (1) cosmic distances between stars, (2) human requirements for life support, (3) general properties and distribution of planets, (4) probability of habitable planets, (5) overall view of the sun's neighborhood, (6) intergalactic travel, and (7) space flight and human destiny.

A65-81639
ON THE BIOLOGIC EFFECT OF HIGH ENERGY PROTONS [O BIOLOGICHESKOM DEISTVII PROTONOV VYSOKIKH ENERGII].
P. P. Saksonov, V. V. Antipov, V. S. Shashkov, B. L. Razgovorov, G. F. Murin, and V. S. Morozov.
Doklady Akademii Nauk SSSR, Seriia Biologiia, vol. 162, 1965, p. 688–690. 14 refs. In Russian.

Basing their conclusions on data found in literature and the results of their own experiments on small laboratory animals, the authors state that the relative biological effect of protons with the energy of 120–660 Mev was found to be equal to one. These findings are in accord with the theoretical computations of the specific ionization (6–20 pairs of ions for 1 micron of tissue). In dogs exposed to protons of 510 Mev, and in monkeys exposed to 730 Mev the value of the relative biological effect was found to be higher than one. Evidently, the difference was due to the types of the animal, and the variations in the test techniques. The results of experiments on the antiradiation protective effect of several compounds indicated that some injectables can be used to protect astronauts against cosmic radiation.

A65-81640
EFFECTS OF GLUCOSE ON THE PROCESS OF CHLOROPLAST DEVELOPMENT IN CHLORELLA PROTOTHECOIDES.
Ikuko Shihira-Ishikawa and Eiji Hase (Tokyo U., Inst. of Appl. Microbiol.; and Tokugawa Inst. for Biol. Res., Tokyo, Japan).
(Symp. on Extranucl. Self-Reproducing Systems, Japan, Oct. 1964).
Plant and Cell Physiology, vol. 6, Mar. 1965, p. 101–110. 6 refs.
Contracts Nonr (C)-00054-64 and NR 104-730/11-13-63.

By growing Chlorella prototheocoides in a medium rich in glucose and poor in nitrogen source (urea), chlorophyll-less cells without discernible plastid structure and containing only little RNA and protein were obtained. These cells, called "glucose-bleached" cells, turned green after a certain lag period, when they were incubated in the light in a medium containing the nitrogen source and basic mineral nutrients but without glucose. As has been shown in previous studies, this greening process involves two consecutive steps: a light-independent phase, in which RNA plays an essential role, and a light-requiring phase, in which the chlorophyll formation and full organization of chloroplasts take place, accompanied by the formation of "alkali-stable" protein. Glucose repressed the synthesis of RNA and "alkali-stable" protein which participate in, or are casually related to, the first and second phases of greening respectively. The degree of suppression was determined by the relative concentrations of glucose and the nitrogen source.

A65-81641
PERCEIVED SLANT AS A FUNCTION OF RELATIVE HEIGHT.
Bruce E. Dunn (Minn. U., Morris).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 708.
Grant NSF B1781.

Ten subjects viewed simultaneously at a two-foot distance six outline trapezoids of the same dimensions but differing with respect to the relative heights of their left-end and right-end midpoints. The subjects were told that the stimuli were drawings of rectangles with the left end slanted away from them. The task was to rank the stimuli from most slanted to least slanted. The results support the hypothesis that relative height is a cue to perceived slant.

A65-81642
RELATIONSHIP BETWEEN FUTURE TIME PERSPECTIVE AND TIME ESTIMATION.
P. James Geiwitz (Mich U., Ann Arbor).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 843-844.

Replication of a previous experiment on integration of future time perspective and time estimation carried out with 40 male and female subjects indicated a sex bias. Future time perspective was not correlated significantly with short interval estimates for female subjects.

A65-81643
RESPONSE LATENCY WITH CONSTANT AND VARIABLE INTERVAL SCHEDULES.
William Bevan, Donald L. Hardesty, and Lloyd L. Avant (Kan. State U., Manhattan).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 969-972.
11 refs.
Contract Nonr-3634(01).

Twelve independent groups were used to examine the relationship between response latency and regularity of signal occurrence. In each of 6 groups 20 simple visual signals were presented sequentially at one of 6 constant intervals. Interval durations were 10, 20, 40, 80, 160 or 320 sec. For each constant-interval group tested, there was also a variable-interval group with intervals of the same average duration. For all intervals except one (40 sec.), the variable-interval groups had longer response latencies than the constant-interval groups, the difference in response latency between the constant- and variable-interval groups increasing as a function of the duration of the interval up to intervals of 160 sec. For both constant- and variable-interval groups, response latency varied directly with interval duration.

A65-81644
PERCEPTION BIBLIOGRAPHY: XVIII. PSYCHOLOGICAL INDEX NO. 14, 1907.
R. B. Ammons and C. H. Ammons (Mont. State U., Missoula).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 1, p. 989-992.
97 refs.

This is an alphabetical list of 97 references to work in perception selected from Psychological Index, no. 14, 1907.

A65-81645
EFFECTS OF TIME-SHARING AND BODY POSITIONAL DEMANDS ON CUTANEOUS INFORMATION PROCESSING.
R. L. Brown, W. D. Galloway, and R. A. San Giuliano (U. S. Army Infantry Human Res. Unit, Fort Benning, Ga.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1021-1026.
17 refs.
Contract DA 44-188-ARO-2.

Twelve subjects were asked to interpret a series of coded electrocutaneous pulses while engaged in a visual discrimination task of varying complexity. All subjects performed both tasks in each of four body positions (standing, sitting, kneeling, and prone). Subjects were asked to indicate on each trial which one of four electrode locations was stimulated and whether duration of stimulation was 0.6 or 1.6 sec. A constant intensity of 1.5 v at 60 c.p.s. was employed. Three levels of complexity (no visual stimuli, 4 X 4 metric figures, and 8 X 8 metric figures) were employed in the visual task. In the cutaneous task, analysis of information transmitted, location errors, duration errors, and total errors indicates that time-sharing demand significantly impaired performance, whereas variation in body position had negligible effect.

A65-81646
COMPARISON OF SPATIAL DISCRIMINATION IN THE TEMPORAL AND NASAL SECTORS OF THE MONOCULAR VISUAL FIELD.
Maria Wyke (Natl. Hosp., Neurosurg. Unit, Maida Vale, London, Great Britain) and Stephan L. Chorover (Mass. Inst. of Technol. Cambridge).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1037-1045.
13 refs.
Grant NIH MH 5673

A study comparing monocular visual spatial discrimination in temporal and nasal half-fields was undertaken with the Tuebinger perimeter of Harms (1960). Twenty normal male college students performed a series of spatial visual discriminations in which "standard" and "comparison" stimuli were successively presented at varying distances from a fixation point along the mid-horizontal meridian. The results show that under conditions of relatively prolonged presentation of the test stimuli (1.0 sec.) monocular visual discriminations of this type are performed better with the left eye than with the right. The superiority of the left eye was maintained irrespective of whether nasal or temporal half-fields were tested. Furthermore, for a given eye, there was no significant difference in the performance of nasal and temporal half-fields.

A65-81647
EFFECTS ON HAND-EYE COORDINATION OF TWO DIFFERENT ARM MOTIONS DURING COMPENSATION FOR DISPLACED VISION.
Sanford J. Freeman (Tufts U., Medford, Mass.), Jerold H. Rekosh (Brandeis U., Waltham, Mass.), and Sarah B. Hall (Radcliffe Coll., Cambridge, Mass.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1054-1056.
5 refs.
Contract AF 49(638)-1282.

Comparisons were made between the compensation produced by sagittal and by transverse arm motions under equivalent conditions of exposure and test. Effects of exposure with sagittal motion generalize more to transverse than vice versa. The differences may be related to the greater precision of body midline judgments with sagittal motion.

A65-81648
NON-ADDITIVITY OF PERCEIVED DISTANCE WITH THE MUELLER-LYER FIGURE.
M. M. Taylor (Defence Res. Med. Labs., Toronto, Canada).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1064.

Results of an experiment on the Mueller-Lyer illusion indicate that it is impossible to infer the relations of large perceived distances from the relations of their component perceived distances, and hence that there is no single functional relationship between perceived and physical distance.

A65-81649
A PASSIVE TEST OF THE HELD REAFFERENCE HYPOTHESIS.
Herbert L. Pick, Jr. (Minn. U., Minneapolis) and John C. Hay (Smith Coll., Northampton, Mass.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1070-1072.
8 refs.
Grant NIH MH-07588.

Prism aftereffects were measured using a passive test of eye-hand coordination. Even with this passive test, self-produced movement during prism exposure was found to increase adaptation, in agreement with Held's hypothesis.

A65-81650
RELATIONSHIP BETWEEN VERTICAL ORIENTATION IN THE ROD AND FRAME TEST AND IN A COMPENSATORY TRACKING TASK.
R. Benfari and P. Vitale (Grumman Aircraft Eng. Corp., Res. Dept., Bethpage, N. Y.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1073-1080.
6 refs.

Twelve selected naval aviators were given the Rod and Frame Test and were run through an experimental test involving a compensatory tracking task that had two conditions of proprioceptive feedback (kinetic and static). Five subjects, classified as "body oriented" on the Rod and Frame Test, had a lower root mean square roll score on the compensatory tracking than five subjects classified as "frame oriented". In addition to this finding, the Rod-and-Frame data of the aviator sample were compared to Witkin's and Asch's data of 1948. A striking similarity on both constant and average error was observed between Witkin's and Asch's sample and the present group. Explanation for the differences in performance under the two conditions of the tracking task for the two categories of subjects was offered in terms of perceptual style.

A65-81651
RESEARCH NOTE ON THE STUDY OF HAND MOTIONS.
Elwyn Edwards (Loughborough Coll. of Technol., Leicestershire, Great Britain).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1098.

Measurement of velocity and acceleration of limb movement was carried out by means of piezo-crystal accelerometers in a reciprocal tapping task. The ratio of tapping was a function of movement amplitude and target width. Analysis of the movements indicates that there is an initial period of high acceleration followed by a period of deceleration quite early in the movement. There was no period of constant velocity.

A65-81652
BODILY ACTIVITY AND PERCEPTUAL ACTIVITY.
Keith G. McKitrick (South Fla. U., Gainesville).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1109–1112.
11 refs.
Grant PHS M-5148.

This report describes the results of 2 studies designed to test the hypothesis that there is an inverse relation between bodily and perceptual activity. In study I, 100 college students' bodily movements were recorded by kymograph while they were tested for the autokinetic illusion, reversible figure-ground, Necker cube reversals, and visual figural aftereffects. No significant correlations were found between bodily movement and perceptual scores. Study II involved only autokinetic illusion scores and induced bodily activity of 200 subjects. Significant linear correlations were found in the expected direction, i.e., bodily movement correlated positively with autokinetic latency in both males and females; bodily movement was negatively correlated with extent of autokinetic movement in females. Female subjects in both studies showed significantly greater autokinetic latency than males.

A65-81653
EFFECT OF VISUAL STIMULI ON DREAM CONTENT.
Allan Rechtschaffen and David Foulkes (Chicago U., Ill.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1149–1160.
31 refs.
Grants PHS M-4151; MH-K3-18, 428.

Three subjects slept with their eyes taped open and their pupils chemically dilated while stages of sleep were monitored by EEG and eye movement recordings. Various objects were illuminated in front of the subjects' open eyes. Shortly following the stimulus presentations, the subjects were awakened and reports of dream experiences and other imagery during sleep were obtained. Although there were occasional instances of dream imagery containing light stimulation, there was essentially no evidence for a correspondence between the reported imagery and the specific characteristics of the stimulus objects. The relative functional blindness of sleep fails to support theories stating that dream images are determined by patterns of retinal excitation.

A65-81654
NOTE ON REACTIONS OF EXTROVERTS AND INTROVERTS TO SENSORY DEPRIVATION.
Ascanio M. Rossi and Philip Solomon (Harvard Med. School, Boston; and Boston City Hosp., Mass.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1183–1184.
Contract Nonr-1866(29).

Eleven extroverts and seven introverts were scheduled for two sessions of sensory deprivation. During both sessions, introverts produced more button presses for a promised time-off reward and they scored higher on a discomfort index derived from before–after self-ratings of well-being. Of the five subjects who did not complete the study, three were extroverts who quit during a session and two were introverts who quit between sessions. Interest in these results is attributed to their similarity to those obtained in a previous study by another investigator.

A65-81655
THE PHENOMENAL VERTICAL AND PERCEPTION OF CHANGE IN SPATIAL ORIENTATION.
Susan R. Ballou and Norman L. Corah (Washington U., St. Louis, Mo.)
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1200.
Grant NSF G-22296.

The effect of visual field structure (square frame) on the perception of the degree in orientation of a rod target rotated at a speed below threshold for movement was studied with 96 subjects. Eight conditions were presented with the rod beginning at the true vertical or the phenomenal vertical (PV), frame absent or present, and frame-tilted or vertical if present. In the frame-tilted conditions, the target rod was rotated away from the frame or toward the frame. PV was obtained prior to the four trials administered. Neither the PV nor the direction of target rotation produced significant differences in perceived change of orientation. Frame-tilted conditions produced the greatest lag in detection and the greatest variability in judgments. The data support the hypothesis that adaptation level becomes unstable under the tilted-frame conditions.

A65-81656
DIFFERENTIAL CORTICAL HABITUATION WITH STIMULATION OF CENTRAL AND PERIPHERAL RETINA.
Nathan W. Perry, Jr. and Richard M. Copenhaver (Fla. U., Gainesville).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1209–1213.
7 refs.
Grant NIH NB 04896 -01.

A digital computer extracted and quantified cortical evoked potentials recorded from the scalp of man in response to repetitive light stimulation. The habituation of potentials from stimulation of the central retina was compared with habituation of potentials from stimulation of two peripheral retinal areas. Habituation was more rapid to peripheral stimulation and also significantly greater.

A65-81657
DETECTABILITY MEASURES IN VIGILANCE: COMMENT ON A PAPER BY WIENER, POOCK, AND STEELE.
M. M. Taylor (Defence Res. Med. Labs., Toronto, Canada).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1217–1221.
9 refs.

Results of a study of time sharing and vigilance reported by Weiner, et al. (1964) have been reanalysed from the viewpoint of signal detection theory. The reported decline in probability of detecting a signal is shown to be due entirely to a progressive change in the observers' response criteria and not to a change in the detectability of the signal. In contrast to the original report that time sharing had a non-significant effect on the probability of detecting a signal, the effect on the detectability of the signal is large. The importance of considering detectability rather than detection measures in vigilance studies is stressed.

A65-81658
CONSISTENCY AND TEST–RETEST RELIABILITY OF SPONTANEOUS AUTONOMIC NERVOUS SYSTEM ACTIVITY AND EYE MOVEMENTS.
Frank E. Hustmyer, Jr. and J. Alan Burdick (N. Y. State U., Downstate Med. Center, Albany).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, 1225–1228.
5 refs.

Spontaneous autonomic nervous system (ANS) activity (GSR) was recorded during rest, and frequency of horizontal eye movements was recorded during the viewing of two different dot patterns by 14 subjects. The same tasks were repeated after a 2- to 4-month period. ANS activity during rest was found to be quite consistent over time (rho = .75, $p < .01$) as were eye movements. The within-session rho between eye movements on the pattern was .30 (N.S.) for the first session and .76 ($p < .01$) for the second session. The rhos of eye movements obtained 2 to 4 months apart were .58 ($p < .05$) for a 6-dot stimulus and .77 ($p < .01$) for a 1-dot stimulus. When eye movements for the 2 conditions were combined, rho was .78 ($p < .01$) between the sessions separated by 2 to 4 months.

A65-81659
BEHAVIOR PATTERNS OF GROUPS EXPERIMENTALLY CONFINED.
John A. Hammes and James A. Watson (Ga. U., Athens).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1269–1272.
Contract DOD OCD-OS-62-226.

In a series of tests, behavior patterns of two 30-person fallout shelter occupancy groups were evaluated to determine effects of confinement for 2 weeks under conditions of austerity. With regard to activity patterns, the most time-consuming activities in order of magnitude were sleep, quiet reflection, conversation, and recreation. No adverse fatigue effect was observed.

A65-81660
PERCEPTION BIBLIOGRAPHY: XIX. PSYCHOLOGICAL INDEX NO. 15, 1908.
C. H. Ammons and R. B. Ammons (Mont. State U., Missoula).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1273–1276.
77 refs.

This is an alphabetical listing of 77 references related to perception from the Psychological Index, no. 15, 1908.

A65-81661
COMPONENT AND TOTAL TASK RELATIONS AT DIFFERENT STAGES OF LEARNING A COMPLEX TRACKING TASK.
Edwin A. Fleishman (Am. Inst. for Res., Washington, D. C.) and Benjamin Fruchter (Tex. U., Austin).
(Am. Psychol. Assoc. Conv., Los Angeles, Calif., Sep. 1964).
Perceptual and Motor Skills, vol. 20, Jun 1965, Part 2, p. 1305–1311.
10 refs.
Grant NSF 23840.

Practice on a 3-dimensional complex tracking task was given to 203 subjects for seventeen sessions extending over a period of 6 weeks. Measures of three component performances (azimuth, elevation, and sideslip errors) and two total-performance criterion scores (integrated error and "time on target") were obtained. The intercorrelations of these five measures at 10 critical stages along the learning curve were computed. The resulting 50 X 50 matrix of intertrial and intermeasure correlations was factorlyzed. The differential factor patterns, representing different combinations of part–whole relationships, provided insights into the skill-learning process at different stages of practice, and identified components related to eventual proficiency on the task.

A65-81662
TWO DIFFERENT AFTER-EFFECTS OF EXPOSURE TO VISUAL TILTS.
Ricardo B. Morant and Judith Rich Harris (Brandeis U., Waltham, Mass.)
American Journal of Psychology, vol. 78, Jun. 1965, p. 218–226. 16 refs.
Grant NIH M-3658.

The results indicate that two factors produce tilt after-effects: a localized process resembling Köhler and Wallach's "satiation", and a non-localized process resembling Gibson's "normalization". When the inspection- and test-lines are in the same part of the visual field, these factors summate algebraically. They add to each other when the inspection-line is tilted less than 45° from a vertical or horizontal test-line, and they act in opposition at greater tilts. If a comparison figure in a different part of the visual field is used, only the satiation-like process can be shown.

A65-81663
PERCEPTUAL INVARIANCE IN THE KINETIC DEPTH-EFFECT.
William Epstein (Kan. U., Lawrence).
American Journal of Psychology, vol. 78, Jun. 1965, p. 301–303. 9 refs.
Grant PHS MH 4153-04.

Seventy-five observers matched shadow transformations of a 120° parallellogram oscillating through one of five arcs to a comparison-series. The results show that both internal depth and amount of turning can be judged with relative accuracy. This finding conforms to expectations derived from Gibson's theory and it is compatible with the shape-slant invariance-hypothesis.

A65-81664
DISCRIMINABILITY AS A FUNCTION OF FIGURE COMPLEXITY.
I. M. Schlesinger (Hebrew U. Dept. of Psychol., Jerusalem, Israel).
Journal of General Psychology, vol. 73, Jul. 1965, p. 21–29. 14 refs.

Four series of stimulus patterns consisting of three, five, seven, and nine lights were used in a discrimination task. For all three exposure times employed (five seconds, one second, and 150 mscs.), response times, as well as number of errors, were found to increase significantly with figure complexity. These findings were taken to disconfirm Garner's explanation of the effect of stimulus redundancy (1962). With practice, performance with the more complex patterns became more similar to that with simple ones. Various studies on the effect of stimulus redundancy on discrimination are reviewed, and an explanation of the seemingly contradictory findings is attempted.

A65-81665
COGNITIVE AND PERCEPTUAL DISTURBANCES IN SHORT-TERM SENSORY DEPRIVATION AS A FUNCTION OF DIFFERENTIAL EXPECTANCY LEVELS.
Henry V. Leon and Franklyn N. Arnhoff (Miami U. School of Med., Fla.)
Journal of General Psychology, vol. 73, Jul. 1965, p. 169–176. 20 refs.
Grant NSF 18395.

Seventeen male and 19 female volunteer subjects (mean age 19.9 years) were randomly assigned to three experimental groups and isolated in a McGill-type deprivation chamber for two hours. By varying the amount of information given to subjects about the experiment, different expectancies were developed in the subjects. As a result of the different expectancies, subjects were expected to behave differently under the same experimental conditions. The results indicate significant differences between the groups with respect to reported hallucinations, overall disturbance scores and subjects' estimation of time spent in isolation.

A65-81666
EFFECT OF OXYGEN BREATHING ON THE FOLLOWING HYPOXIA.
Haruo Ikegami and Iwao Takase.
Japanese Journal of Aerospace Medicine and Pyschology, vol. 2, 1965
p. 57–63. 7 refs. In Japanese.

The relation between duration of previous pure oxygen inhalation and prolongation of time of useful consciousness (TUC) was studied in artificially respirated rabbits. TUC involved the period of time from onset of nitrogen inhalation to appearance of high voltage slow waves in electroencephalogram (EEG). TUC in hypoxia, which ranged normally from 36 to 51 sec. and averaged 43 sec., was prolonged by previous oxygen inhalation. Oxygen saturation was reached in one minute of inhalation, and TUC was fixed at about 71 sec. during hypoxia with longer prebreathing. The period of time in which the pulse rate decreased to two thirds the initial and saturated levels by prebreathing of oxygen was fixed in the same way as TUC. These effects of oxygen breathing may be based mainly on the increased oxygen in the lung and to a lesser extent in blood or other tissues. The effects of oxygen prebreathing on EEG and pulse rate following hypoxia were quickly eliminated by interruption of prebreathing. The effects on EEG were eliminated more quickly than those on pulse rate.

A65-81667
THE EFFECTS OF G FORCE ON BODY TEMPERATURE.
Ichiro Saito, Hiroshi Fujiwara, and Masaaki Iwane.
Japanese Journal of Aerospace Medicine and Psychology, vol. 2, 1965,
p. 78–83. 10 refs. In Japanese.

The influence of g force on rectal temperature was studied in rats. The rats, fixed in appropriate cages, were subjected to positive 5, 10, and 15 g; negative 5 g; and transverse 5, 10, and 15 g. The rectal temperature was measured with thermistors at 3-minute intervals after the stress until recovery. In positive g, the rectal temperature decreased 3.2°C., 3.7°C., and 5.4°C. from the control level after 5, 10, and 15 g, respectively, suggesting that the magnitude of decrease of the temperature is a function of the stress. In the case of transverse g, relation is not clear, as the temperature decreases were 2.9°C., 4.1°C. and 3.1°C. at 5, 10, and 15 g, respectively. None of the rats tolerated, the negative 10 and 15 g; and at negative 5 g, temperature decreased 3.1°C. The recovery of the temperature took place immediately after the stress; the greater the stress, the less recovery was revealed. The characteristic finding in recovery was the lack of the tremor which had appeared in recovery from low temperature stress. The possible mechanism for the disappearance of tremor is discussed.

A65-81668
THE EFFECTS OF EXERCISE ON CORONARY AND PULMONARY CIRCULATIONS.
Kiyoshi Hosono, Hironobu Kuwabara, Hideaki Nakayama, and Takao Watanabe (Keio U. School of Med., Dept. of Internal Med., Tokyo, Japan).
Japanese Journal of Aerospace Medicine and Psychology, vol. 2, 1965,
p. 84–89. 20 refs. In Japanese.

Coronary sinus catheterizations were performed in 30 human subjects, 25 patients with coronary sclerosis and 5 healthy subjects. The effects of exercise and hypoxia were observed. No significant difference was observed in coronary circulation in either group of subjects while at rest. In some subjects with coronary sclerosis, myocardial oxygen consumption (MOC) was significantly decreased with exercise and induced hypoxia. One of these subjects had an anginal attack during exercise and in this case both coronary blood flow and MOC decreased significantly. In normal subjects, the cardiac output was increased and the mean pulmonary circulation time was reduced in exercise and hypoxia. In subjects with coronary sclerosis, pulmonary circulation time was prolonged.

A65-81669
ELECTRORETINOGRAM AT HIGH ALTITUDE IN THE LOW PRESSURE CHAMBER, AND UNDER GRAVITATIONAL STRESS.
Genyo Mitarai and Sadaharu Takagi (Nagoya U., Res. Inst. of Environ. Med., Japan).
Japanese Journal of Aerospace Medicine and Psychology, vol. 2, 1965,
p. 90–95. 9 refs. In Japanese.

To analyze the effect of high altitude and +10 g on electroretinograms, the latency and the amplitude of a- and b-waves evoked by a strong stroboscopic flash of light with intensity of about 1000 lux and about one msec. duration were measured in unanesthetized rabbits. With increasing altitude, the amplitude of a- and b-waves first augmented supernormally at 2000 to 3000 m., but decreased progressively at altitudes higher than 4000 meters. Upon return to normal pressure, the amplitude increased again rapidly, and, at altitude lower than 5000 meters, it reached frequently supernormal magnitude for an extended period. The wavelettes superimposed on the b-wave changed almost parallel to the changes of b-waves described above. The load of +10-g stress by centrifuge yielded almost the same results on the amplitude and latency changes of a- and b-waves as those in the low-pressure experiment. During and after centrifugation, the wavelettes decreased in amplitude and sometimes disappeared independently with the b-wave, differing from the effect of high altitude.

A65-81670
NEW DEVELOPMENTS IN FACET DESIGN AND ANALYSIS.
Uriel G. Foa (Israel Inst. of Appl. Social Res., Jerusalem).
Psychological Review, vol. 72, Jul. 1965, p. 262–274. 19 refs.
Contract AF 61(052)-121; and Grant NIH M-2669.

In multivariate research design, the systematic definition of the set of variables in terms of more basic sets, the facets, leads to the prediction of the empirical interrelationship among the variables. Two principles are suggested for predicting the results from the facet structure of the variables: the principle of contiguity and the semantic principal components. The application of these concepts to a number of studies in different behavioral areas suggests that they have predictive power. It is further shown that facet elements can be classified into specific and nonspecific to the set of variables and that variables containing specific elements tend to be related to the set of variables more than variables containing nonspecific elements. Systematic design alone does not guarantee correct prediction of empirical results. In fact, for a given area of behavior several alternative formalizations appear possible, and they will usually lead to different hypotheses. While the choice of a given facet design rather than another may depend on the intuition of the investigator, it appears also to be related to the psychology of concept formation and to the influence of language on this process.

A65-81671
EFFECT OF PROLONGED INHALATION OF PURE OXYGEN AT LOWERED BAROMETRIC PRESSURE ON ANIMALS [VLIIANIE NA ORGANIZM ZHIVOTNYKH DLITEL'NOGO DYKHANIIA CHISTYM KISLORODOM V USLOVIIAKH PONIZHENNOGO BAROMETRICHESKOGO DAVLENIIA].
N. A. Agadzhanian, Iu. P. Bizin, G. P. Doronin, A. G. Kuznetsov, and A. R. Mansurov.
Zhurnal Vysshei Nervnoi Deiatel'nosti, vol. 15, May–Jun. 1965, p. 438–444.
9 refs. In Russian.

The functional state of various systems of the organism was studied, as well as some characteristics of water and salt metabolism, during a prolonged (up to 100 days) stay of albino rats at reduced pressure corresponding to an altitude of 10,000 m. (198 mm. Hg) in an atmosphere of pure oxygen. The oxygen tension in the alveolar air under these conditions remained at a level approximating ground values. No pronounced or dangerous changes were observed under such conditions in the animal. Firmly established chain motor-conditioned reflexes were not impaired. They completely maintained their structure and the temporary characteristics of individual links. During the first 30 days, changes were observed in the water and salt metabolism. They were manifest in the lowered hydrophilic capacity of the skin, diminished chloride content in the blood, their greater elimination with urine, and also a loss of weight by the animals. As adaptation mechanism became active, the changes also became less pronounced. X-ray and morphological investigations showed a reduced volume of the lungs in the first few days, which was of a reversible functional nature.

A65-81672
EVOKED POTENTIALS OF THE AUDITORY SYSTEM [O VYZVANNYKH POTENTSIALAKH SLUKHOVOI SISTEMY].
Ia. A. Al'tman and A. M. Maruseva (USSR, Acad. of Sci., I. P. Pavlov Inst. of Physiol., Lab. of Auditory Analyser Physiol., Leningrad).
Zhurnal Vysshei Nervnoi Deiatel'nosti, vol.15, May-Jun. 1965, p. 539-549. 39 refs. In Russian.

Evoked potentials of five levels of the auditory system of the cat (cochlea, cochlear nucleus, inferior colliculus, medial geniculate body and auditory cortex) were investigated. Significant differences in the slope of the amplitude curves were obtained: the amplitude curve of N_1 (neural component of the round window response) showed a rapid growth on each step of intensity increment of the click between 0-90 db. above visual detection level (VDL): the amplitude of the cortical response grew between 0-40 db. above VDL, the further growth of intensity being practically ineffective. Differences between the recovery cycle curves of the investigated levels of the auditory system were established. The amplitude curve and the recovery cycle curve of N_1 served as basic material for comparing the distribution of the elements by two main properties: thresholds and recovery time. It was established that the distribution of thresholds is wide, while the distribution of recovery time is narrow. Analogous distribution curves for the central levels of the auditory system, which could help to understand their functional properties, may be obtained with the help of the microelectrode technique.

A65-81673
RADIATION INFLUENCE ON VEGETATIVE FUNCTIONS OF ORGANISM BY INJECTION OF RADIOPROTECTORS [VLIIANIE RADIATSII NA VEGETATIVNYE FUNKTSII ORGANIZMA V USLOVIIAKH VVEDENIIA ZASHCHITNYKH VESHCHESTV].
P. F. Minaev and A. P. Mironova (USSR, Acad. of Sci., Inst. of Biol. Phys., Moscow).
Radiobiologiia, vol. 5, 1965, p. 362-366. In Russian.

The x-ray irradiation of the cerebellum in dogs produced no noticeable changes in respiration or blood pressure during exposure to 15-20 kr doses. The changes in the character of respiration and the amplitude of heart beat were noticed 30 min. after the beginning of the exposure, but the fall of blood pressure took place after the end of the irradiation procedure. The intraperitoneal injections of 20 mg. of nembutal, 3 mg. of hexonium (hexamethonium), and 500 μg. of alynamine per kg. of body weight before exposure prevented these changes.

A65-81674
CYTOLOGICAL ANALYSIS OF THE ACTION OF HIGH ENERGY PROTONS. V. COMPARATIVE DATA OF THE ACTION OF 660 MEV PROTONS AND CO^{60} γ-RAYS ON TESTES [TSITOLOGICHESKII ANALIZ DEISTVIIA PROTONOV VYSOKIKH ENERGII. V. SRAVNITEL'NYE DANNYE O DEISTVII PROTONOV 660 MEV I γ-LUCHEI CO^{60} NA SEMENNIKI].
E. S. Caidova, V. N. Ivanov, and S. P. Iarmonenko (USSR, Acad. of Med. Sci., Inst. of Hyg., Labor, and Prof. Diseases, Moscow).
Radiobiologiia, vol. 5, 1965, p. 393-401. 28 refs. In Russian.

Entire body irradiation by 660 Mev protons and CO^{60} gamma-rays caused reversible changes in the structure and function of testes in mice and rats, which received 500-700 rad and 250 rad, respectively. A 685-rad dose of 660 Mev protons or a 430-rad dose of gamma-rays produced the same effect. The animals lost the reproductive ability after the exposure without any sign of recovery during the first six months. The biological effect of the gamma-rays was more pronounced than that of the protons. The relative biological effect of the protons, computed on the basis of 50% recovery of testis weight, was 0.6-0.7 in mice.

A65-81675
THE ACTION OF CHEMICAL RADIOPROTECTORS BY FRACTIONATED IRRADIATION. I. AET DISTRIBUTION IN THE ANIMAL ORGANISM DEPENDING ON THE DOSE OF A PROTECTOR, THE WAY OF INJECTION AND IRRADIATION CONDITIONS [DEISTVIE SREDSTV KHIMICHESKOI ZASHCHITY V USLOVIIAKH FRAKTSIONI ROVANNOGO OBLUCHENIIA. I. RASPREDELENIE AET V ZHIVOTNOM ORGANIZME V ZAVISIMOSTI OT DOZY PROTEKTORA, PUTI VVEDENIIA I USLOVII OBLUCHENIIA].
S. P. Iarmonenvo, V. G. Ovakimov, G. F. Palyga, V. M. Fedoseev, and A. G. Tarasenko (USSR, Acad. of Med. Sci., Inst. of Hyg., Labor, and Prof. Diseases, Moscow; and M. V. Lomonosov, Moscow State U., USSR).
Radiobiologiia, vol. 5, 1965, p. 423-427. 10 refs. In Russian.

The relative distribution of pseudorea (AET-S^{35}) introduced into the organism by various routes did not depend on the dose. The AET concentration in blood and liver of mice reached maximum values 2.5 min. after the intraperitoneal injection, and began to fall after 30 min. The concentration of S^{35} in the brain reached maximum value 30 min. after the injection. After the injection of lethal doses of AET, the concentration in the brain at the moment of death was only 25-50% of the concentration found in animals which received sublethal doses. It appears that the AET effect on the brain tissue was not an important factor in the acute toxic action of the compound. During a series of exposures to small doses of ionizing radiation, the distribution of AET in tissues was the same as during the exposure to a single large dose. This fails to explain the lowering of protective effect when smaller doses of the compound were used.

A65-81676
ON THE MECHANISM OF RADIOPROTECTIVE ACTION OF HYPODERMIC TRANSPLANTATION OF HEMOPOIETIC TISSUES BY ACUTE RADIATION DAMAGES [K VOPROSU O MEKHANIZME RADIOZASHCHITNOGO DEISTVIIA PODKOZHNYKH TRANSPLANTATSII GEMOPOETICHESKIKH TKANEI PRI OSTRYKH LUCHEVYKH PORAZHENIIAKH].
V. A. Revis (Kalinin Med. Inst., USSR).
Radiobiologiia, vol. 5, 1965, p. 428-433. 34 refs. In Russian.

Only transplants of hemopoietic tissues had a radioprotective effect in rabbits which received lethal radiation doses. Transplants of liver of muscle tissue had no effect on the radiation damage. Transplants of preserved bone marrow did not prevent the death of the irradiated animals. The mechanism of radiation protection by the subcutaneous transplants of hemopoietic tissue consists, evidently, in combined action of cellular and humoral factors of the transplant in the irradiated organism.

A65-81677
REACTION KINETICS OF COUPLED PHOTOSYNTHETIC OXYGEN EVOLUTION [CINETIQUES DES REACTIONS LIEES A L'EMISSION D'OXYGENE PHOTOSYNTHETIQUE].
Pierre Joliot (Inst. de Biol. Physico-Chim., Paris, France).
Biochimica et Biophysica Acta, vol. 102, May 25, 1965, p. 116-134. 17 refs. In French.

Highly precise measurements during the first few seconds following illumination of Chlorella pyrenoidosa show an O_2 gush with a span of about 1 sec.; the gush is preceded by a short activation phase during which the velocity of O_2 emission increases rapidly. The kinetics are governed only by one photochemical rate constant (System II) and several thermal rate constants which have been evaluated. Measurement of the initial velocity of O_2 emission permits to obtain a very precise action spectrum of System II. The concentration of the photochemical complex taking part in the reaction is proportional to the quantity of O_2 evolved following a short electronic flash, whereas O_2 evolved during the gush gives a measure of the concentration of an intermediate which leads to regenerate this complex. The compounds are reformed in the presence of light and their concentrations attain maximal values parallely with the velocity of O_2 emission. Their formation is linked to a photochemical reaction sensibilized at high wavelength (System I) and their destruction to the one giving rise to O_2 formation (System II).

A65-81678
PROBLEMS OF NOISE INDUCED HEARING LOSS [PROBLEME DER LARMSCHWERHORIGKEIT].
H. -G. Dieroff (Friedrich-Schiller-U., Klin. fur Hals-Nasen-Ohrenkrankh., Jena, East Germany).
Zeitschrift fur die gesamte Hygiene und ihre Grenzgebiete, vol. 11, May 1965, p. 352-361. 22 refs. In German.

Based on observations of an extensive sampling of industrial workers, the physiology, etiology, and pathology of temporary and permanent hearing damage is reviewed. In addition to noise intensity and duration of exposure, the noise structure (broadband or narrow-band noises, impulse noises, etc.) represents an important factor in determining hearing loss. Auditory fatigue was considerably more pronounced after exposure to pure or narrow-band noise than to white noise. Impulse noises were found to have a particularly-damaging effect even at lower noise intensities. Audiometric examinations on 2000 persons revealed that hearing damage consisted primarily in inner-ear deafness of the cochlear-basal type. Permanent hearing damage in subjects consistently exposed to high-level noise (about 105 db.) progressed in phases as follows: (1) Hearing loss during the first year; followed (2) by adaptation to noise, and finally (3) a rapid and steady increase in hearing loss ("collapse phase"). Women were found to be less susceptible to hearing loss than men.

A65-81679
OXYGEN CONSUMPTION, THERMAL CONDUCTANCE, AND TORPOR IN THE CALIFORNIA POCKET MOUSE PEROGNATHUS CALIFORNICUS.

Vance A. Tucker (Calif. U., Dept. of Zool., Los Angeles).
Journal of Cellular and Comparative Physiology, vol. 65, Jun. 1965, p. 393-403. 35 refs.
NSF supported research.
Grant Nonr 233 (61).

Minimum oxygen consumption of pocket mice in torpor is continuously dependent on body temperature from thermal neutrality to deep torpor. Q_{10} values are between 1.6 and 3.2. The thermal conductance of torpid mice at ambient temperature below 30° is 0.19 ml O_2 (gm. hr. $^{\circ}C.)^{-1}$ which is identical to the minimum thermal conductance of non-torpid mice. Torpid mice at an ambient temperature of 30° have thermal conductance values between 0.23 and 0.40 ml O_2 (gm. hr. $^{\circ}C.)^{-1}$ depending on their posture. Maximum oxygen consumption is linearly related to body tempera ture. At a normal body temperature of 38°, it is 11.6 ml. O_2 (gm. hr.)$^{-1}$ which is no greater than that of similar sized mammals which do not enter torpor. Although Perognathus californicus consistently enters into and arouses from torpor at ambient temperatures of 15° to 30°, the torpor cycle is severely disturbed at temperatures between 10° and 12°. At these temperatures mice show irregular temporal patterns of torpor, do not enter torpor completely, and cannot arouse from torpor if body temperature falls below 15°. Observations on the behavior of torpid and non-torpid P. californicus at various ambient temperatures are included.

A65-81680
THE RELATION BETWEEN THE TORPOR CYCLE AND HEAT EXCHANGE IN THE CALIFORNIA POCKET MOUSE PEROGNATHUS CALIFORNICUS.
Vance A. Tucker (Calif. U., Dept. of Zool., Los Angeles).
Journal of Cellular and Comparative Physiology, vol. 65, Jun. 1965, p. 405-414. 24 refs.
NSF supported research.
Grant Nonr 233 (61).

In the pocket mouse, the measured time course of body temperature and oxygen consumption during entry into torpor compare favorably with theo-retical curves calculated under conditions of minimum heat production and maximum heat loss. Thus P. californicus appears able to "switch off its thermostat" so that oxygen consumption during entry into torpor falls almost to the minimum level for a given body temperature. Heat loss during entry into torpor appears to be facilitated by an increase in thermal conductance. During arousal from torpor, body temperature increases faster than can be accounted for assuming maximum heat production and minimum heat loss. This could be explained by anaerobic heat production and by a decreased thermal conductance resulting from the posterior vasoconstriction typical of arousing hibernators. Torpor periods of short duration are feasible, for it can enter torpor and arouse immediately thereafter at an ambient tempera-ture of 15° with an expenditure of energy only 55% of that required to maintain a high body temperature over the same period of time. Arousal from torpor at an ambient temperature of 15° requires about 75% of the total energy expenditure.

A65-81681
RED CELL AND PLASMA SODIUM AND POTASSIUM CHANGES IN THE SAN DIEGO POCKET MOUSE DURING HIBERNATION.
William DeW. Andrus, Stuart E. Starr, and Richard R. Strathmann)Pomona Coll., Zool. Dept., Claremont, Calif.)
Journal of Cellular and Comparative Physiology, vol. 65, Jun. 1965, p. 415-418. 20 refs.
Grant NIH 2G-945; and Claremont Graduate School and U. Center supported research.

As compared to that of active animals, blood from Perognathus fallax torpid at an ambient temperature (T_A) of 15°C. (hibernation) shows a de-crease in red cell K and increases in cell Na and plasma K, and analyses of blood from animals hypothermic at $T_A = 25^{\circ}$C. (aestivation) suggest increases in cell Na and plasma K. Blood electrolyte metabolism of this hibernating rodent shows no special resistance to hypothermia.

A65-81682
PROBLEMS ASSOCIATED WITH MEASUREMENT OF ACOUSTIC TRANSIENTS.
George J. Harbold, Richard P. Tegt, and John W. Standeven. (U. S. Naval Missile Center, Life Sci. Dept., Bio-Acoust. Div., Point Mugu, Calif.)
Aerospace Medicine, vol. 36, Aug. 1965, p. 767-773.

The literature dealing with measurements of gunfire, blast, shock-wave, over-pressure, etc., indicates conventional accept...e and use of labora-tory quality microphones, tape recorders, level rec...ers, impact noise analyzers and similar equipment. Evaluation of th...se types of systems by this laboratory has indicated serious limitations in response to acoustic transients, i.e., peak intensities of impulse noise from small arms fire was found to be much greater than previously reported (24 db. or 16 times the peak pressure); also, measured values were not in accord with theoretical values. In view of these limitations a study was initiated to investigate the possibility of a system for impulsive noise measurement with extended transient response, which would afford accuracy and flexibility necessary for field studies of a variety of weapons. This study reports the progress from the effort to date. Limitations of conventional systems are discussed. Pictorial evidence is included to illustrate how an extended transient response can overcome limitations of earlier systems.

A65-81683
PROPOSED BIOLOGICAL EXPLORATION OF MARS BETWEEN 1969 AND 1973.
Nature, vol. 206, Jun. 5, 1965, p. 974-980.

Biological exploration of Mars may produce information on evolutionary processes over the broadest range. Man wants to test the hypothesis that the origin of life is a probable event in the evolution of all planetary environments the histories of which resemble his planet. The specific aims of such mission would be: (1) determination of physical and chemical conditions of the Martian surface as a potential environment for life; (2) determination whether or not life is or has been present on Mars; (3) characterization of that life, if present; and (4) investigation of the pattern of chemical evolution, in the absence of life. The problems associated with the biological exploration of Mars are diverse, and the task of implementation raises challenges, which in many respects are wholly novel. It will require cooperation of many scientific disciplines and may take the efforts of several generations.

A65-81684
KINETIC VISUAL ACUITY: THE EFFECT OF INCREASED LEAD-IN TIME ON KINETIC VISUAL ACUITY.
Sally I. Miller and Carolyn E. Reeder (Northampton Coll. of Advanced Technol., London, Great Britain).
British Journal of Physiological Optics, vol. 22, 1965, p. 46-52. 10 refs.

The effect of variations in "lead-in" period on kinetic visual acuity was studied in subjects seated with the eye level just above a mirror used in the experiment and screens viewed binocularly. Free head movement was allowed. Kinetic visual acuity was measured at each angular velocity at "lead-in" times of 0.2 sec., and 0.4 sec. The maximum value of kinetic visual acuity was obtained after about 20 runs. The kinetic visual acuity was measured at 0.2 sec. viewing time of the target for speeds from 10°/sec. to 140°/sec. The results indicate that an increase in the "lead-in" time from 0.2 sec. to 0.4 sec. is followed by overall improvement in kinetic visual acuity. This improvement may be largely due to increased target travel time allowing a greater "lock" on the target by the eyes. The latter suggests that kinetic visual acuity would be obtained maximally if the arc over which the target travelled is unrestricted. The method of tracking was of importance. Head movement was not necessary for tracking a target moving at less than 60°/sec. because at such low speed saccadic eye movement was minimal. Above 60°/sec. both, saccadic eye movements and head movements were employed, and kinetic visual acuity fell off markedly, until a new head and eye movement technique was learned. An improved level of kinetic visual acuity was maintained when readings at the lower velocities were repeated.

A65-81685
QUANTITATIVE TACTUAL-KINESTHETIC JUDGMENT.
A. V. Churchill (Defence Res. Med. Labs., Toronto, Canada).
Perceptual and Motor Skills, vol. 20 Jun. 1965, Part 2, p. 1147-1148.

The results of a previous experiment showed that a bilateral kinesthetic difference did not obtain when tactual-kinesthetic judgments were made with the left and right hands. The present experiment was designed to eliminate the possible contribution of visual and kinesthetic figural aftereffects to the directional bias of errors. Results indicate that performance was equivalent with the left and right hands.

A65-81686
THRESHOLD PERCEPTION OF THE MOTOR SKILLED.
Joel Rosentswieg (Tex. Woman's U., Denton).
Perceptual and Motor Skills, vol. 20, Jun. 1965, Part 2, p. 1182.

Threshold levels of sensory perception in audition, balance, kinesthesia, pressure, and vision were determined in 183 school boys with scores in high and low quartiles on the Iowa Revision of the Brace Motor Ability Test. The mean score for each modality except audition at 6000 c.p.s. tended to favor the motor skilled, but no t test was significant. It is concluded that the absolute level of perceptual threshold, as measured, was not a critical factor in the motor performance of the subjects.

A65-81687
HAZARD OF NOISE IN AN OXYGEN STATION [RIZIKO HLUKU V KYSLIKOVE STANICI].
Ladislav Jerman and Frantisek Polacek.
Pracovni lekarstvi, vol. 17, 1965, p. 149-152. 10 refs. In Czech.

The authors investigated the hazard of noise in a newly built oxygen production station which was operated on a trial basis for less than two years. By assessing the level of noise and acoustic pressure it was found that the permissable values of these were exceeded by as much as 113 db. In the noise spectra marked maximum values were found at frequencies of 125 c.p.s. and 500 c.p.s. The staff operating the production equipment

was exposed for 83 to 98% of their working hours to the action of excessive noise. In view of the short period of exposure so far no marked damage to hearing was observed. Improvements were planned by placing the switch boards in corridors acoustically isolated from the other space. The operators will be able to watch the equipment and reach the machines, if necessary, by the shortest route. For this they will be provided with devices which will protect them against noise.

A65-81688
RESPIRATORY AND CIRCULATORY CHANGES AFTER EXPERIMENTAL FAT EMBOLISM [VERANDERUNGEND DER ATMUNG UND DES KREISLAUFS NACH EXPERIMENTELLER FETTEMBOLIE].
D. Herber, W. Braasch, W. Meesmann and P. Schenck (Heidelberg, Med. Universitatsklin., West Germany).
Archiv für Kreislaufforschung, vol. 47, May 1965, p. 37–60. 145 refs. In German.

In dogs, intravenous injections of a lard and paraffin mixture produced an increase in total and dead-space ventilation, and a decrease in oxygen partial pressure. Vagotomy modified only the rate and depth of breathing without affecting other changes caused by fat embolism. The hemodynamics were also affected by increasing the arterial pulmonary vascular resistance, which resulted in a rise of pulmonary arterial pressure. This rise was caused primarily by a mechanical block of the arterioles of the pulmonary vascular bed. There was no indication of a humoral effect or collateral constriction. A decrease in arterial pressure and cardiac output was caused by a reduced flow to the left ventricle. The increase in pulmonary vascular resistance and reduced coronary flow to the right ventricle led to overloading and finally to damage of the right myocardium, an increase in the right auricle pressure, dilation of the right heart chamber, and an abnormal electrocardiogram. Vagotomy or atropine injections did not affect the hemodynamic shift. The role of hypoxia, collateral vasoconstriction, and the effect of serotonin are discussed.

A65-81689
NORMAL VALUES OF CARDIOVASCULAR FUNCTION DURING PHYSICAL WORK. IV. THE DEPENDENCY OF PULSE RATE AND STROKE VOLUME ON HEART MINUTE VOLUME [DAS NORMALVERHALTEN DER FUNKTIONSGROSSEN DES KREISLAUFS UNTER KORPERLICHER ARBEIT. IV. MITTEI LUNG: DIE ABHANGIGKEIT DER PULSFREQUENZ UND DES SCHLAGVOLUMENS VOM HERZMINUTENVOLUMEN].
W. Noder (Münster U., Bäderwiss. Inst. des Staatsbades Salzuflen, Bad Salzuflen, West Germany).
Archiv für Kreislaufforschung, vol. 47, May 1965, p. 61–72. 13 refs. In German.

The relationship of pulse rate and stroke-volume and the cardiac minute volume was studied in a group of healthy male adults, at rest and during physical exercise. The results show that during physical exercise the pulse rate and the stroke volume vary by the square root of the cardiac minute volume.

A65-81690
AN ANALYSIS OF AVERAGE RESPONSE COMPUTATIONS BASED ON APERIODIC STIMULI.
Daniel S. Ruchkin (N. Y. Med. Coll., Dept of Psychiat., Brain Res. Labs., New York).
IEEE Transactions on Bio-Medical Engineering, vol. BME-12, Apr. 1965 p. 87–94. 10 refs.
Grant NIH MH-05901; and Rochester U. supported research.

Average response computation has come to be a widely used method for the study of evoked potentials recorded from the central nervous system. A mathematical analysis of the mean and variance of the average response computation is presented here. It is shown that an average response computation based upon periodic stimuli will not effectively reduce certain forms of neuroelectric interference. It is further shown that if the stimuli are suitably aperiodic, then the interference can be suppressed.

A65-81691
THE EFFECTS OF "DRY" HEAT ON THE CIRCULATION OF MAN. CEREBRAL HEMODYNAMICS.
Elmerice Traks and Salvatore M. Sancetta (Western Reserve U., Dept. of Med., Cleveland; and Cleveland Metropol. Gen. Hosp., Ohio).
American Heart Journal, vol. 70, Jul. 1965, p. 59–65. 12 refs.
Grant PHS H-4302.

The effect of an exposure to a warm and dry environment (98°F. and 40 percent relative humidity) for two hours on the cerebral blood flow was investigated in resting, normal subjects, as well as in patients with diseased left ventricles. The reduced perfusion pressure caused by the ensuing reduction in the systemic arterial pressure was attended by a maintenance of the cerebral blood flow at control levels. This was due to a significant reduction in the cerebral arterial resistance caused, at least in part, by a significant elevation of the arterial pCO_2.

A65-81692
EFFECTS OF RADIANT HEAT ON DIFFERENT REGIONS OF THE BODY. 1. TIME OF APPEARANCE OF SWEAT AND THE CUTANEOUS TEMPERATURE IN DIFFERENT REGIONS OF THE BODY HEATED BY INFRARED RADIATIONS, IN SUBJECTS SPECIFICALLY ACCLIMATIZED AND NONACCLIMATIZED [SUGLI EFFETTI DEL CALORE RADIANTE SU REGIONI DIVERSE DEL CORPO UMANO. NOTA 1. TEMPO DI COMPARSA DEL SUDORE E TEMPERATURA CUTANEA IN VARIE REGIONI DEL CORPO SOTTOPOSTE A IRRADIAZONE INFRAROSSA IN SOGGETTI SPECIFICATAMENTE ACCLIMATATI E NON].
V. Wyss (Turin U., Ist. di Fisiol., Umana, Italy).
Medicina del Lavoro, vol. 56, Apr. 1965, p. 293–303. 22 refs. In Italian.

In considering the effects of radiant heat on man, the author has investigated the time sequel in which sweat appears on the face and on equal surface areas of the thorax and abdomen, in subjects acclimatized and non-acclimatized to locally applied infrared heat. The source of heat was an electric fire (with a metal spiral) at 1040–1060°C. the incident thermal flux being equal to $0.044 \frac{cal}{cm^2/sec.}$. The subjects exposed the chosen surface to the heat through a window, of adjustable dimensions, in a screen cooled by circulating water, which protected the rest of the body from the heat. In non-acclimatized subjects sweat began to appear after an exposure of 180 sec. first on the abdomen and thorax and then on the face; the cutaneous temperature was lower on the face than in the other two regions. In acclimatized subjects sweat first appeared on the face (after 15–30 sec. exposure), then on the abdomen and finally on the thorax, the cutaneous temperaures rising in the same order. The topographical order of appearance of sweating independence between cutaneous temperature and appearance of sweating and the differences in times of sweating are discussed; it is suggested that besides peripheral reflex mechanisms, sweating may also be connected with central mechanisms, which need not necessarily involve the anterior hypothalmus.

A65-81693
SEGMENTAL CEREBRAL VASCULAR DISEASE IN A SUBJECT EXPOSED TO THE RISK OF CARBON DISULFIDE POISONING [VASCULOPATIA CEREBRALE SEGMENTARIA IN SOGGETTO ESPOSTO A RISCHIO SOLFOCARBONICO].
Umberto Maugeri (Pavia U., Ist di Med. del Lavoro, Italy).
Lavoro Umano, vol. 17, Mar. 1965, p. 118–124. 7 refs. In Italian.

A case of a young man exposed since only 22 months to the risk of carbon disulfide poisoning is described. The subject showed vascular lesions exclusively localized to the encephalic arterial district and revealed prevailingly by the bifrontal derivation of the cranial rheography and by the opthalmoangiography. The possible significance of this circumscribed localization of the cerebral vascular changes in relation to the symptomatology presented by the subject, is described. The hypothesis is advanced that in the carbon disulfide poisoning these lesions may be chronologically the first sign of the cerebral vascular damage induced by the toxic substance.

A65-81694
SPATIAL AND DYNAMIC ASPECTS OF VISUAL FIXATION.
G. M. Jones and J. H. Milsum (McGill U., Montreal, Canada).
IEEE Transactions on Bio-Medical Engineering, vol. BME-12, Apr. 1965 p. 54–62. 36 refs.

The physiological processes concerned with the difficult dynamic task of fixating the retinal image during normal body and head movement are examined with control engineering perspective. Spatial relationships between the two main system inputs (visual and vestibular) and three main outputs (operating on the eye-in-skull, skull-on-body, and body-in-space platforms) are examined in the context of the geometry of the environment with the aid of an information flow diagram. From dynamic considerations a picture emerges in which the visual tracking system had adequate accuracy and dynamic range for following most naturally moving objects when the head is still. But with the head free, the added perturbations of natural movement exceed these tracking capabilities. However, over the frequency range 0.1–5.0 c.p.s. the semicircular canal subsystem then provides angular velocity information for powerful complementary servostabilization.

A65-81695
VENOUS ADMIXTURE DURING EXERCISE IN SITTING POSITION.
A. Holmgren and N. Svanborg (St. Görans Hosp., Lung Clin. and Med. Clin. II; and Hosp. for Infectious Diseases, Clin. Physiol. Lab., Stockholm, Sweden).
Scandinavian Journal of Clinical and Laboratory Investigation, vol. 17, 1965, p. 209–217. 20 refs.

The alveolar-arterial oxygen tension difference in 13 patients with sarcoidosis of the lungs and one patient with bronchial asthma was measured at rest, breathing air and 100 percent oxygen and during exercise, breathing air and 60 percent oxygen in nitrogen. The anatomic shunt was calculated both at rest and during exercise during the oxygen breathing. At rest the shunted blood volume/cardiac output $(\dot{Q}_{SH}/\dot{Q}_T) \times 100$ averaged 6.7 percent, SD ± 3. During exercise $\dot{Q}_{SH}/\dot{Q}_T$ decreased to an average of 1.2 percent, SD ± 1. The higher than normal alveolar-arterial oxygen gradient observed during exercise, breathing air, in nine patients was probably explained by impaired ventilation-perfusion relationships and possibly impaired diffusion.

A65-81696
BASAL METABOLIC RATE IN A GROUP OF YOUNG MEDICAL STUDENTS WITH A NOTE ON BODY SURFACE AREA FORMULAS.
L. Hamberger and O. Lundgren (Göteborg U., Dept. of Physiol., Sweden).
Scandinavian Journal of Clinical and Laboratory Investigation, vol. 17, 1965, p. 281–286. 21 refs.

Basal metabolic rate of 64 males and 19 females 21–24 years of age was estimated by determining "basal" oxygen consumption. The metabolic rate was found to deviate significantly from the standard of Harris and Benedict (1919) (males $p < 0.001$; females $p < 0.05$) and from the normal values of Boothby et al. (1936) (males $p < 0.001$; females $p < 0.01$). Expressed in percent of the respective normal values the mean difference from the standard of Harris and Benedict amounted to –6.7 percent for males and –6.3 percent for females and from the standard of Boothby, Berkson and Dunn to –12.6 percent for males and –8.4 percent for females. Different sources of error were analyzed particularly nitrogen elimination during pure oxygen breathing and temperature increase in the spirometer. None could account for the observed deviation. Identical values for body surface area were in most cases obtained with DuBois' and Isaksson's formulas.

A65-81697
ON THE EFFECT OF PERSANTIN ON THE ULTRASTRUCTURE OF HEART MUSCLE IN THE RAT AFTER AN OVERDOSE AND IN LOW PRESSURE TEST [UBER DEN EINFLUSS VON PERSANTIN AUF DIE ULTRASTRUKTUR DES HERZMUSKELS DER RATTE BEI UBERDOSIERUNG UND IM UNTERDRUCKVERSUCH].
Reinhard Poche and Torsten-Udo Hausamen (Dusseldorf Med. Akad., Pathol. Inst., West Germany).
Virchows Archiv für Pathologie Anatomie und Physiologie und Klinische Medizin, vol. 339, 1965, p. 234–244. 9 refs. In German.

After an overdose of Persantin (5 mg./kg. and 100 mg./kg. i.p.), the myocardium of male albino rats is especially rich in glycogen. The capillaries are dilated. An increased micropinocytosis in the region of the membranes of the endothelial and myocardial cells, and a widening of the transverse tubuli of the myocardial cells suggest an intensified, ingoing transport of substances. The mitochondria are condensed and the mitochondrial granules are more numerous. In addition, especially after injecting of 100 mg./kg., myocardial cells are found with so-called hypoxic changes, which may be related to the hypotensive effect of Persantin. So-called hypoxic changes of the cardiac muscle, like those appearing after threefold exposures to hypobaric pressures, are not prevented by administering Persantin beforehand. The changes are, however, not as marked as in nontreated animals, and especially the swelling of the capillary endothelium after the pretreatment with Persantin is strikingly slight.

A65-81698
CHANGE IN THE BASIC HEMODYNAMIC CRITERIA IN HYPOTHERMIA [ZMINA OSNOVNYKH HEMODYNAMICHNYKH POKAZNYKIV PRY HIPOTERMII].
M. A. Kondratovych, V. M. Taranenko, and O. F. Stoian (Ukrainian Acad. of Sci., O. O. Bogomol'ts Inst. of Physiol., Kiev).
Fiziologichnyi Zhurnal, vol. 11, Mar.–Apr. 1965, p. 172–180. 36 refs. In Ukrainian.

The method of dye dilution was used to study the change in the basic hemodynamic criteria in cats during hypothermia (25°C.) and restoration of the initial body temperature. During hypothermia a considerable decrease (by 50%) occurred in the minute volume. This decrease was associated with the decrease in frequency of cardiac contractions, since the stroke volume was not decreased during hypothermy. The incomplete restoration of the minute volume after warming of the animal was due to the decrease in the stroke volume. The total peripheral resistance to the blood stream rose during hypothermy owing to the increase in blood viscosity; the summary lumen in blood vessels was not substantially altered during this period. After warming, the total peripheral resistance remains raised owing to a rise in vasomotor activity. The mass of circulating blood did not change materially during hypothermy. The circulation time more than doubled.

A65-81699
THE MECHANISM OF ACTION OF MICROWAVES ON THE SKIN [DOPYTANNIA PRO MEKHANIZM VPLYVU MIKROKHVYL NA SHKIRU].
O. O. Slabospytskyi (Ukrainian Acad. of Sci., O. O. Bogomol'ts Inst. of Physiol., Lab of Biophys., Kiev).
Fiziologichnyi Zhurnal, vol. 11, Mar.–Apr. 1965, p. 225–231. 29 refs. In Ukrainian.

The effect of three-centimeter radiowaves on the skin was studied in albino rats and rabbits by local irradiation of these animals for three minutes with various flux densities (FFD): 0.1 and 0.5 W/cm^2, as well as 0.5 W/cm^2, but under conditions excluding heating of the irradiated part of the skin. The temperature in the area of microwave action, the clinical picture, the skin blood supply, and changes in the skin element structure (chiefly nerve formations) were studied. The results showed that damage to skin by microwaves took place only when the skin temperature reached 55°C. Two phases were noted: (1) The initial pathological focus during absorption of thermal energy by the skin and (2) necrosis of the damaged area after the irradiation procedure was terminated.

A65-81700
REACTION OF ALBINO RATS TO THE MULTIPLE EFFECT OF INCREASING VALUES OF TRANSVERSE ACCELERATIONS [REAKTSIIA BILYKH SHCHURIV NA BAHATORAZOVI VPLYVY ZROSTAIUCHYKH VELYCHYN POPERECHNYKH RADIALNYKH PRYSKOREN].
V. V. Matsunin.
Fiziologichnyi Zhurnal, vol. 11, Mar.–Apr. 1965, p. 232–237. 9 refs. In Ukrainian.

General state and behavior, body temperature, hemoglobin content and tolerance to acceleration were studied in albino rats. Accelerations varied from 3 to 53.9 units; the increment of the magnitudes of acceleration was 2.5–10 units; the intervals between the accelerations varied from 8 to 24 hours. The total duration of the experiment was 8–15 days. The results showed that repeated increase in radial acceleration produced a rise in resistance in animals. The best effect was obtained in the experiments where the animals were not secured rigidly, the increment of acceleration was small, and the intervals between the accelerations were long. Acceleration from 30 to 36 units was tolerated by the majority of animals; greater acceleration became fatal.

A65-81701
DYNAMICS OF CHANGES OF SOME FUNCTIONS OF THE BODY PRODUCED BY VIBRATIONS [O DINAMIKEIZMENENII NEKOTORYKH FUNKTSII ORGANIZMA PRI DEISTVII VIBRATSII].
Iu. S. Shevchenko (Leningrad, Inst. of Hyg., Labor, and Prof. Diseases, USSR).
Gigiena i Sanitariia, vol. 3, Mar. 1965, p. 22–26. 7 refs. In Russian.

The effect of general vertical vibrations with a frequency of 40–40 c.p.s. and an amplitude of 0.4–0.45 mm. was studied in albino rats. A dynamic study of the indices, the state of the basic metabolism, the nervous system, the peripheral blood vessels and the blood, was carried out for a period of six weeks. Various systems of the body responded to the stress in a different degree: (1) The blood circulation system was affected first. (2) The metabolic rate dropped after the initial rise. (3) The galvanic skin response showed stability.

A65-81702
THE PROTECTIVE ROLE OF FOOD AND VITAMINS IN RADIATION EFFECT ON THE BODY [O ZASHCHITNOI ROLI PISHCHI I VITAMINOV PRI LUCHEVYKH PORAZHENIIAKH ORGANIZMA].
S. R. Perepelkin (I. M. Sechenov Med. Inst., Radiobiol. Lab., Moscow, USSR).
Gigiena i Sanitariia, vol. 3, Mar. 1965, p. 48–56. 29 refs. In Russian.

Dogs and rats were exposed to a single dose of whole body irradiation with X-rays at doses of 350–400 r and 500–600–700 r respectively. Rats were exposed to irradiation with sublethal doses. During irradiation, the animals were given five diets, differing in quantity and quality of proteins and other animal products. Milk and egg diets had the most protective effect in body irradiation. A weaker protective effect was noted in the case of liver diets, and the least significant curative and preventive effects were obtained with meat and vegetable diets. The enrichment of the food with vitamins C, P, and those of the B group (B_1, B_2, PP, B_6, folic acid) alleviated the gravity of radiation sickness. The vitamin C, P and PP complex produced a somewhat weaker effect.

A65-81703
THE EFFECT OF THE NOISE LEVEL ON THE WORK EFFICIENCY [VLIIANIE UROVNIA SHUMA NA PROIZVODITEL'NOST' TRUDA].
S. D. Kovrigin and A. P. Mikheev (V. V. Kuibyshev Moscow Struct. Eng. Inst., USSR).
Gigiena i Sanitariia, vol. 3, Mar. 1965, p. 28–32. In Russian.

The article deals with the effect of the various noise levels of letter-sorting machines on work efficiency and number of faults made in letter-sorting, depending on the change of the sound pressure levels of from 80 to 95 db. In this connection the authors raised the question on the necessity of industrial noise control and determination of maximal permissible levels of sound pressure in post offices.

A65-81704
WALKING IN SPACE [SHAGI NAD ZEMLEI].
A. Efim'ev.
Nauchno-Tekhnicheskie Obshchestva SSSR, no. 5, May 1965, p. 6–8. In Russian.

The outstanding feature during the space flight of the Soviet spacecraft Voskhod 2 was the special space suit worn by the astronaut who stepped out into space. It was constructed of rubber, cloth, and synthetic materials. The helmet had a tinted visor to protect the astronaut's eyes from the intense solar rays. The suit was provided with a separate system for temperature control and oxygen breathing and an electric network of physiological sensors. The space suit was connected with the cabin by tubing which carried oxygen, cooled air, and flexible electric wires for communication and transmission of physiological data to the telemetric recording apparatus located on board of the spacecraft. The space suit proved to be highly efficient for the astronaut's

life support, protection against extreme temperatures, weightless conditions, ionizing radiations and meteorites, and was sufficiently flexible for free movement in space.

A65-81705
SYNCHRONIZATION OF THE INITIAL AFFERENT FLOW IN THE VISUAL SYSTEM [SINKHRONIZATSIIA NACHAL'NOGO AFFERENTNOGO POTOKA V ZRITEL'NOI SISTEME].
I. A. Shevelev (USSR, Acad. of Sci., Inst. of Higher Nervous Activity and Neurophysiol., Moscow).
Zhurnal Vysshei Nervnoi Deiatel'nosti, vol. 15, May-Jun. 1965, p. 550-559. 21 refs. In Russian.

A description is given of a model of synchronization or of temporary sharpening of the initial afferent flow in the visual system. The model takes into account the multiplication and overlapping of the vertical connections and the changes in the temporary form of signals and sensitivity of elements at different levels of the system. The model is applied to explain the data previously obtained in experiments on anesthetized cats: the lowering of thresholds of the emergence of evoked potentials, the shorter time and higher rate of their development, as well as the diminished signal delay at higher levels of the visual system. The model is morphologically and physiologically substantiated and proceeds from rather simple concepts of multiplication and overlapping of vertical connections between layers consisting of elements with similar properties, and of the deviations in the size of working receptive fields.

A65-81706
EFFECT OF ATTENTION ON EVOKED RESPONSES IN THE CLASSICAL AUDITORY PATHWAY.
C. W. Dunlop, W. R. Webster, and L. A. Simons (Sidney U. Dept. of Physiol., Australia).
Nature, vol. 206, Jun. 5, 1965, p. 1048-1050. 6 refs.

Five cats were chronically implanted, stereotaxically, with bi-polar stainless steel electrodes in the cochlear nucleus (CN), inferior colliculus (IC), and medial geniculate body (MG), in order to study the effect of attention on evoked responses in the classical auditory pathway. The results obtained failed to confirm some of the evidence for the theory of direct reticular influence over the first classical auditory relay, or over any of the classical auditory relays examined during the experiment. This theory proposes that any decrement observed at CN during either attention or habituation is mediated by efferent reticular inhibition. The attention results failed to confirm the finding of marked amplitude decrement in the CN evoked responses during physiological habituation. The results indicate that the search for electrophysiological correlates of attention may be more profitably directed towards areas of the central nervous system outside the relay nuclei of classical sensory pathways.

A65-81707
COMPARISON OF SERUM TOTAL LIPID DURING COLD EXPOSURE IN HIBERNATING AND NON-HIBERNATING MAMMALS.
Arliss Denyes and Joan Baumber (Queen's U., Biol. Dept., Kingston, Ontario, Canada).
Nature, vol. 206, Jun. 5, 1965, p. 1050-1051. 16 refs. Ontario Res. Found. and Natl. Res. Council of Canada supported research.

Comparison of blood serum total lipid during cold exposure was done in hibernating (hamsters) and non-hibernating (rats) rodents. Forty-eight hr., 3-week, or 6 to 8 week exposures of animals to $5^{0} \pm 1^{0}$C. temperature showed that the changes in blood serum total lipid on cold acclimation of rats and hamsters were in opposite directions, although in both species there was a downward trend during the initial cold stress. In hamsters the total serum lipid at 6-8 weeks of cold exposure, during hibernation and during arousal, was considerably higher than in animals kept at room temperature. In rats a significant depression in total serum lipid was observed after 6-8 weeks of cold exposure, as compared with control. On the basis of the established fact that the hamster adrenal thyroid axis does not demonstrate an alarm reaction in the cold, and that this reaction is observed in rats, the blood lipid pattern in these animals should produce reversed data of the actual findings. It is not yet possible to explain these results. Although none of the blood samples showed any evidence of lipemia, there could be a special difference in feeding pattern. There is also a possibility of seasonal alterations of varying patterns of change in blood lipids under cold exposure.

A65-81708
SOME EFFECTS OF RESPIRATORY FREQUENCY ON PULMONARY MECHANICS.
Charles D. Albright and Stuart Bondurant (Ind. U. Med. Center, Dept. of Med., Indianapolis).
Journal of Clinical Investigation, vol. 44, Aug. 1965, p. 1362-1370. 27 refs. Am. Heart Assoc. supported research.
Contract AF 33(616)-8378; Grants PHS HE 04080; HE 06308.

The effect of respiratory frequency on pulmonary mechanics was studied systematically in nine healthy subjects who sat in a body plethysmograph with the head protruding while respiration was driven by sinusoidal plethysmograph pressures at a series of frequencies from 10 to 132 cycles per minute. The total thoracic, pulmonary, and chest wall compliances and resistances varied inversely with frequency and approached their respective resistances as frequency increased. The phase angle between pressure and flow and the time constant also varied inversely with frequency. The absolute values are generally consistent with previous limited observation at isolated frequencies or observations over a smaller range of frequencies. The data presented here support the concept that compliance and resistance are frequency dependent even in normal subjects.

A65-81709
MECHANICAL ASPECTS OF DENERVATED MUSCLE CONTRACTIONS.
F. Palecek (Res. Inst. for Nat. Drugs, Prague, Czechoslovakia).
(Czechoslovac Physiol. Soc., 13th Meeting, Plzen, Jan. 1964).
Physiolia Bohemoslovenica, vol. 14, 1965, p. 28-31.

By correlating muscle weight and the degree of fatigue under standard conditions in vitro it was found that muscle fatigue depends to a great extent on the possibility of oxygenation by diffusion. The correlation holds both for normal and denervated muscles. The part played by the elastic component in muscle fatigue was determined. The passive denervated muscle compliance was lower than in normal muscle. When loading the denervated muscle by a weight corresponding to the average tension output in maximum isometric tetanus, the difference in elongation before and after fatigue was significant. (In normal muscle this difference is highly significant). The changes in the twitch/tetanus ratio in denervated muscles were much less expressed than in normal. As a result of these observations, a hypothesis was formulated that the difference in muscle compliance is partly responsible for the differences seen in the course of fatigue in normal and denervated muscles.

A65-81710
EFFECTS OF SLEEP DEPRIVATION UPON THE PARADOXICAL PHASE OF SLEEP IN CATS.
S. Kiyono, T. Kawamoto, H. Sakakura, and K. Iwama (Osaka U. Med. School, Inst. of Higher Nervous Activity, Lab. of Neurophysiol., Japan).
Electroencephalography and Clinical Neurophysiology, vol. 19, Jul. 1965, p. 34-40. 13 refs.

Cats with chronically implanted electrodes were kept awake for 72 hr. The effects of this sleep loss were studied with special reference to the paradoxical phase of sleep (PPS). In the initial stage of recovery, the average PPS increased 2-3 times and then decreased with some fluctuations, finally reaching the control level within 10-12 hr. When sleep was interrupted every 6 hr., the arousal threshold was determined by high frequency stimulation of the mesencephalic reticular formation. The sleep loss accumulated, and the arousal threshold of PPS was gradually elevated to a level about 1.5 times as high as the control. Decrease of the arousal threshold was accomplished either rapidly or slowly with the progress of recovery. The electrical patterns of the sensorimotor cortical and hippocampal activities showed that PPS obtained at the end of sleepless period was distinguishable from the control PPS: (1) the sensorimotor cortical electroencephalogram (EEG) was reduced in amplitude at all frequency bands but most strongly at bands lower than 10 c.p.s. and (2) the hippocampal EEG was enhanced at almost all frequency bands excepting the bands lower than 5-6 c.p.s. and its theta waves were accelerated in frequency by 1-2 c.p.s.

A65-81711
THE BLASTOMOGENIC ACTION OF HIGH ENERGY PROTONS [BLASTOMOGENNOE DEISTVIE PROTONOV VYSOKIKH ENERGII].
V. N. Strel'tsova, Iu. I. Moskalev, and I. K. Petrovich.
Voprosy Onkologii, vol. 10, 1964, p. 74-77. In Russian.

The experimental results of a study of the blastomogenic action of protons with an energy of 120 and 500 Mev, in doses from 25 up to 850 rads, are given. At a later period, after radiation, the rats develop tumors of various tissues. The existence of a certain correlation between radiation doses and frequency and speed of mammary gland tumor appearance was stated. The minimum blastomogenic dose for mammary gland tumors irradiated with protons was equal to 25-50 rads, for tumors of the pancreas, uterus, underlying fat and prostate 100 rads, for leucemia and the thyroid gland 250 rads, and for the testes 300 rads.

A65-81712
USE OF PYRIDOXINE HCL IN ACUTE HYDRAZINE AND UDMH INTOXICATION.
W. B. Frierson (ARO, Inc., Arnold AF Sta., Tenn.)
Industrial Medicine and Surgery, vol. 34, Aug. 1965, p. 650-651.

Two cases of aerozine 50 (unsymmetrical dimethyl hydrazine) intoxication are described in which a 600 mgm. dose of pyridoxine (200 mgm. intravenous and 400 mgm. intramuscular) was administered with no ill effects. Two other cases are described in which vomiting and nausea induced by AZ_{50} were controlled with pyridoxine. It is felt that this drug definitely warded off central nervous system complications and aided in the recovery of these men.

A65-81713
EEG EFFECTS OF THE STIMULUS CESSATION.
J. Ungher and R. Rogozea (R. P. R. Acad. Inst. Of Neurol., Bucharest, Rumania).
Activitas Nervosa Superior, vol. 7, Feb. 1965, p. 1-10. 19 refs.

The electroencephalographic (EEG) changes at cessation of visual or acoustical stimuli were studied in cats with electrodes implanted extradurally in frontal, ectosylvian, and striate areas and into the mesencephalic reticular formation. The EEG changes provoked by stimulus cessation (off-effects, i.e. off-evoked potentials and off-activation) were found in the primary and associated areas as well as in the mesencephalic reticular formation and had, with the exception of some differences, the same characteristics as the EEG changes at stimulus onset (on-effects). While the EEG on-effects appeared at the first presentation of the stimulus, the off-effects were observed only after repeated stimulation (5 to 8 repetitions of sound and 2 to 3 of the light stimulus). After repeated stimulation, both the on- and off-effects had a clear tendency to be extinguished. The properties and development of the EEG off-effects indicate that they represent the EEG component of the orientational reaction and of its habituation. The existence of an orientational reaction after stimulus cessation is supported by a desinhibition of this reaction produced by extra-stimulation. The differences between the EEG on- and off-effects might be due to the different amount of information brought by stimulus onset and stimulus cessation (darkness and silence). Differences have also been found between the EEG components of the orientational reactions elicited by light and sound cessation suggesting that they have different ecological importance.

A65-81714
CARDIOVASCULAR EFFECTS OF ANOXIA AND THE INFLUENCE OF A NEW BETA ADRENERGIC RECEPTOR BLOCKING DRUG.
Luis E. Folie and Domingo M. Aviado (Pa. U. School of Med., Dept. of Pharmacol., Philadelphia).
Journal of Pharmacology and Experimental Therapeutics, vol. 149, Jul. 1965, p. 79–90. 10 refs. PHS and Mead Johnson Res. Center supported research. Grant NSF GB-2334.

The effects of blockade of the beta adrenergic receptors exerted by compound MJ 1999 have been identified in the cardiovascular system of the anesthetized dog. They are as follows: (1) blockade of the vasodilatation of the hindlimb induced by isoproterenol and by reoxygenation following anoxia; (2) blockade of the cardiac effects of isoproterenol (stimulation of force of myocardial contraction and coronary vasodilatation); and (3) reduction of the coronary vasodilator effect of anoxia. The latter is a combination of blockade of cardiac effects of sympathetic nerve stimulation and release of catecholamines known to occur during anoxia. In the perfused coronary artery of the intact dog and in the coronary vessels of the heart-lung preparation, there is a reduction in the vasodilator effect of anoxia.

A65-81715
PSYCHOTROPIC EFFECTS OF CAFFEINE-INDUCED WAKEFULNESS. DIFFERENCES IN SENSITIVITY TO CAFFEINE- INDUCED WAKEFULNESS.
Avram Goldstein, Richard Warren, and Sophia Kaizer (Stanford U. School of Med., Dept. of Pharmacol., Palo Alto, Calif.)
Journal of Pharmacology and Experimental Therapeutics, vol. 149, Jul. 1965, p. 156–159.
Gen. Foods Corp. supported research.

Very large individual differences in the degree of wakefulness (delay of sleep onset) produced by caffeine were demonstrated unequivocally in a group of 20 subjects given caffeine (300 mg.) or placebo before bedtime on 10 successive weeknights. Differences in the extent to which caffeine disturbed the soundness of sleep were also observed. Subjects who habitually drink most coffee tended to report sleeping more soundly than usual on placebo nights and less soundly after caffeine, indicating some chronic disturbance of sleep by caffeine in these individuals. Absorption of caffeine (300 mg. dose) was essentially complete in most subjects, so that no major differences in plasma levels occurred. Plasma levels declined at comparable rates in all subjects. Individual differences in sensitivity presumably arise primarily from intrinsic differences in responsiveness to caffeine at sites of action in the brain, rather than from differences in absorption, distribution, or metabolism of the drug.

A65-81716
A QUANTITATIVE EVALUATION OF VASOCONSTRICTION DURING DEEP INSPIRATION.
K. Fichtel (German Acad. of Sci., Inst. for Cortico-Visceral Pathol. and Therapy, Berlin).
Physiologia Bohemoslovenica, vol. 14, 1965, p. 166–172. 13 refs.

The vascular response to deep inspiration was studied in 24 subjects using plethysmographic recordings of the amplitude, duration, and area of response. This reaction in contrast to vasoconstriction in response to exteroceptive stimuli, was constant, inextinguishable and significantly greater than "spontaneous waves". The intensity of the reaction depended on the time interval between deep breaths, increasing with increasing intervals up to 3–4 minutes. The amplitude was mostly affected. The duration of the response increased less rapidly and the area increased as the product of the duration and amplitude.

A65-81717
A MATHEMATICAL EVALUATION OF OXYGEN CONSUMPTION DURING PHYSICAL EXERCISE AND RECOVERY.
V. Brodan, I. Marek, and E. Kuhn (Charles U., Inst. for Human Nutr. and Inst. of Math., Prague, Czechoslovakia).
Physciologia Bohemoslovenica, vol. 14, 1965, p. 201–205. 17 refs.

In moderate exercise the oxygen debt is due to an alactacidic mechanism only. The curve of oxygen consumption consists of the load and recovery parts. In the first phase oxygen consumption rises exponentially up to steady state. The fall in consumption during recovery is also exponential. Physical fitness is inverse to the lactacidic component during the oxygen debt phase. The assessment of the lactacidic component from the serum lactic level is difficult. A simple mathematical model for determining the parameters of oxygen debt is given, which can be used with a computer to calculate the lactacidic and alactacidic components and, thus, the fitness of the individual. Differential equations defining the processes studied are given.

A65-81718
EFFECT OF BODY POSTURE ON BLOOD COMPOSITION AND CIRCULATION [WPTLYW POZYCJI CIALA NA SKLAD I KRAZENIE KRWI].
Henryk Gaertner, Ludwika Gaertner, Wladyslaw Goszcz, and Tadeusz Pasek.
Acta Physiologica Polonica, vol. 16, Jan.–Feb. 1965, p. 55–64. 16 refs. In Polish.

The observations indicate that it is possible to develop adaptation of blood circulation and respiration, reflected by changes in blood composition, which play an important role in persons often exposed to changes of body posture and gravitational conditions. In a trained person, remaining in an inverted position for 30–50 minutes, the following changes in blood circulation and compositions were noted: (1) increase in leucocytes; (2) decrease in blood clotting time; (3) slight fibrillation and fluctuation in the amplitude of T waves; (4) changes in heart size; (5) dilation of pulmonary vessels; (6) slow pulse; and (7) decrease in ventilation rate.

A65-81719
THE BIOCHEMICAL BASIS OF THE HARVARD STEP-UP FUNCTION TEST [PODSTAWY BIOCHEMICZNE PROBY CZYNNOSCIOWEJ "HARVARD STEP-UP TEST"].
Franciszek M. Spioch and Romuald Kobza.
Acta Physiologica Polonica, vol. 16, Jan.–Feb. 1965, p. 65–80. 19 refs. In Polish.

Concentrations of lactic acid, pyruvic acid, glucose, catecholamines, alkaline reserve and blood pH were studied in 59 miners immediately after performing the Harvard step-up test, and 20 minutes later nineteen gave very good results, 18 good, and 22 moderately good results. Concentrations of lactic and pyruvic acid and alkaline reserve after the test showed significant differences between the groups with different degrees of physical fitness; the difference between the group with moderate and very good physical fitness was highly significant. The concentration of catecholamines was lowered in the group with moderate fitness, and increased in the remaining groups. Blood pH showed the smallest deviation from the initial values in the group with good physical fitness. After 20 minutes' resting the concentrations of lactic and pyruvic acid in the persons with very good physical fitness were significantly lower than in the group with moderate fitness. The findings indicate that the Harvard step-up test is a good method of evaluating physical fitness.

A65-81720
STUDIES ON EXERCISE HYPEREMIA.
Ingemar Kjellmer (Goteborg U. Dept. of Physiol., Sweden).
Acta Physiologica Scandinavica, vol. 64, Supplementum 244, 1965, p. 3–227. 38 refs.
Göteborg U. and Svenska Idrottens vetenskapliga forskningsrad supported research.
Contract AF 61(052)-732; Grant PHS HE-05675-03.

The nature and cause of local circulatory adjustments to changes in muscular activity were studied on cats and dogs with a plethysmographic technique, sometimes combined with isotope methods. The method permits separate evaluation of the reactions of the resistance vessels, the capacitance vessels, the capillary filtration coefficient and the mean capillary pressure in the calf muscles. The method can also be used to estimate the tissue pressure in skeletal muscle. The following conclusions are reached: (1) Exercise reduces blood flow resistance, the reduction varying with the severity of the exercise. Raised capillary pressure leads to a net outward filtration, which is facilitated by a simultaneous increase of the capillary filtration coefficient. (2) The capillary permeability does not change during exercise. (3) Blood flow to, and distribution of blood within, the muscle is determined mainly by metabolic requirements, while pooling of blood in the active muscle is prevented by nervous activity. (4) The net filtration of fluid from blood to active muscles is many times larger than the lymph flow, which results in an accumulation of fluid in contracting muscles. (5) Potassium ions released during exercise reach such a high extracellular concentration that they can account for a major part of the vascular dilatation accompanying muscular activity. When the diffusion gradient between the tissue and blood is taken into account, about two thirds of the hyperemia of exercise may be attributed to the potassium ions. The hypothesis that potassium ions are mainly responsible for the hyperemia of exercise receives indirect support from the fact that, when given intra-arterially, potassium is the only compound known to produce a vascular response identical in every respect with that elicited by exercise.

A65-81721
PHYSIOLOGICAL ASPECTS ON THE STRUCTURE OF VESTIBULAR END ORGANS.
Jan Wersäll and Ake Flock (Karolinska Sjukhuset, Dept. of Otolaryngol. and Gustav V Res. Inst.; and Karolinska Inst., Dept. of Histol., Stockholm, Sweden).
(Internatl. Vestibular Symp., Uppsala, 1963).
Acta Oto-Laryngologica, Supplementum 192, 1964, p. 85–89. 11 refs.
Swedish Med. Res. Council supported research.
Grant NIH NB 03956-01.
An attempt is made to correlate at the cellular level, morphology and function of the vestibular end organs and the closely related lateral line canal organs of mammals. The cells of the vestibular sensory epithelia and lateral line organs are described, and patterns of orientation are derived. The basic electrophysiological principle of the organs is their bi-directional response to stimuli approaching from opposite directions. Polarization curves for hair cell responses to cupular displacement in two opposite directions are included.

A65-81722
THE EFFECT OF ALCOHOL INTOXICATION ON THE VESTIBULAR APPARATUS PARTICULARLY WITH RESPECT TO DISTURBANCES OF THE VESTIBULAR-OCULOMOTOR REGULATORY FUNCTION. II. EXPERIMENTAL RESULTS [DIE WIRKUNG DER ALKOHOLINTOXIKATION AUF DEN VESTIBULARAPPARAT UNTER BESONDERER BERUCKSICHTIGUNG DER STORUNGEN DER VESTIBULAR-OKULOMOTORISCHEN REGELFUNKTION. II. MITTEILUNG ERGEBNISSE EXPERIMENTELLER UNTERSUCHUNGEN].
K. Jatho (Koln U. Hals-Nasen-Ohren-Klin., West Germany).
Zeitschrift für Laryngologie Rhinologie Otologie, vol. 44, Feb. 1965, p. 104–118. 33 refs. In German.
It has been shown that the chief effect of alcohol on the vestibular oculomotor system consists of a subjectively perceptible dislocation of objects in the field of vision. These disturbances cannot be confirmed by spontaneous or test induced vestibular signs. To demonstrate these, several experimental subjects, 18–35 years old and of different weights and body sizes were tested. It was found that the oculomotor disturbances caused by vestibular malfunction can be attributed to deficient repositioning function of the eyes, which coincides with the slow per-rotatory nystagmus phase. A diagramatic tracing of the functional disturbances revealed deficient or complete absence of eye movement in the reverse direction of head movement. The deviation is proportional to the extent and rate of head movement. Applied to a subject's behavior in traffic or operating a vehicle this means that location and direction of an object in the visual field cannot be perceived with adequate promptness when head or body are moved rapidly. This holds true already at blood alcohol concentrations of 0.5% and becomes pronounced at concentrations of 1.0%.

A65-81723
THE EFFECT OF ALCOHOL INTOXICATION ON THE VESTIBULAR APPARATUS PARTICULARLY WITH RESPECT TO DISTURBANCES OF THE VESTIBULAR-OCULOMOTOR REGULATORY FUNCTIONS. I. CRITICAL CONSIDERATION AND INTERPRETATION OF NYSTAGMUS PHENOMENA [DIE WIRKUNG DER ALKOHOLINTOXIKATION AUF DEN VESTIBULARAPPARAT UNTER BESONDERER BERUCKSICHTIGUNG DER STORUNGEN DER VESTIBULAR-OKULOMOTORISCHEN REGELFUNKTION. I. KRITISCHE BETRACHTUNG UND DEUTUNG NYSTAGMISCHER PHANOMENE].
K. Jatho (Koln U. Hals-Nasen-Ohren-Klin., West Germany).
Zeitschrift für Laryngologie Rhinologie Otologie, vol. 44, Jan. 1965, p. 1–15. In German.
The effect of alcohol on the performance of the organism constitutes a medical and legal problem. The blood alcohol concentration is generally regarded as a reliable yardstick in determining the degree of reduction of all the functions in relation to road traffic. The vestibular apparatus and those systems which react to it are particularly sensitive to the effects of alcohol. The data reported in the literature relating to the vestibular apparatus are critically discussed and their origins clarified. The apparent hyperexcitability of the labyrinth is shown to be a paretic phenomenon. The only reliable vestibular symptom is the alcoholic positional nystagmus, which is also of value in assessing the approximate time of consumption of the alcohol. The differential diagnostic value of this form of nystagmus is stressed. The biphasic appearance of the alcoholic positional nystagmus resembles the behaviour of the peripheral and probably also cerebral circulation, and there is probably a causative association present here. The essential action of alcohol on the vestibular-oculomotor mechanism is a subjectively perceptible disturbance in orientation of the eyesight, and not the various forms of nystagmus with its many abnormal features. These oculomotor disturbances are not detectable by the usual vestibular tests, and their features are described and analysed. The feeling of swinging in alcoholic intoxication is to be attributed to a disturbance of the bodily equilibrium and the apparent movement of visual surroundings. These functional disturbances lead to a dimunition of the perceptive functions and also to a loss of competence amid road traffic.

A65-81724
ROTATORY THRESHOLD DETERMINATION AND SUPRATHRESHOLD TESTS OF LABYRINTHINE EXCITABILITY IN NORMAL INDIVIDUALS [DREHREIZSCHWELLENBESTIMMUNG UND UBERSCHWELLIGE LABYRINTHERREGBARKEITSPRUFUNG BEI NORMALPERSONEN].
E. Haas, C. Kraenbring, and H. Pfänder (U. Hals-Nasen-Ohrenklin., Mainz, West Germany); and Altes St. Vincentius-Krankenhaus, Hals-Nasen-Ohrenabt., Karlsruhe, East Germany.
Zeitschrift für Laryngologie Rhinologie Otologie, vol. 44, Mar. 1965, p. 180–189. 9 refs. In German.
Forty-seven normal subjects were examined by rotatory threshold, caloric, and prolonged rotation tests to determine their diagnostic value and any significant connection between the various vestibular reactions. A statistically significant relation was found between threshold values and the variable values of "total amplitude" numbers of the caloric or rotatory nystagmus. The "duration" of the nystagmus is the most reliable criterion in the evaluation of experimental nystagmus and no striking relationship could be demonstrated between the duration values and the threshold figures. These experimental results and our own long experience throw much doubt on the value of the rotatory threshold test in the clinical investigation of vestibular disturbances. This is supported by hitherto unpublished studies of directional preponderance of nystagmus. Caloric testing with hot and cold stimuli as well as prolonged rotation yielded much more conclusive evidence in the evaluation of postrotatory nystagmus II than that obtained by threshold tests.

A65-81725
ANATOMICAL OBSERVATIONS ON THE VESTIBULAR NUCLEI, WITH SPECIAL REFERENCE TO THEIR RELATIONS TO THE SPINAL CORD AND THE CEREBELLUM.
Alf Brodal (Oslo U. Anat. Inst., Norway).
(Internatl. Vestibular Symp., Uppsala, 1963.)
Acta Otolaryngologica, Supplementum 192, 1964, p. 24–51. 62 refs.
The data presented in this review as well as other results of studies of the fibre connections of the vestibular nuclei show us a very complex pattern of interrelations between the individual vestibular nuclei and cell groups and between these and the peripheral vestibular apparatus, the spinal cord and the cerebellum. The vestibular nuclear complex may be considered as a mosaic of minor units, each of them having its particular pattern, especially with regard to its fibre connections. There is still much to be done before the anatomical organization of the vestibular nuclei is known in as great detail as is desirable. The clarification of the minute anatomy of the vestibular nuclei may give hints concerning functional aspects, but these can only be established in meticulous neurophysiological investigations.

A65-83726
EXPERIMENTAL CONTRIBUTION TO EFFECTS OF COLD ON THE EYE [EXPERIMENTELLER BEITRAG ZUR KALTEEINWIRKUNG AM AUGE].
M. Tost, H. Fuhrmeister, and F. Schulze (U.-Augenklin., Halle/Saale, East Germany).
Klinische Monatsblätter für Augenheilkunde, vol. 146, 1965, p. 1–21 45 refs. In German.
The authors present the results of clinical, bacteriological and pathologic anatomical investigations about the effect of low temperatures on the eye of the rat. For the production of a definable local hypothermia, a special applicator was developed employing semi-conductor elements which permits a control of temperature. Already 12 hours after the onset of the experiment, considerable tissue changes which can be confirmed by histological examination are found in the cornea. A mechanical strain of the cornea by the placing of the applicator on the eye does not have to be taken into consideration. Obviously, the tissue already preaffected by the influence of cold is particularly endangered in case of superinfection. Although the inflammatory reaction in the undercooled tissues cannot be avoided with the simultaneous local and general administration of antibiotics (chloramphenicol), secondary cellular lesions from infection can be prevented by this mode of treatment. The findings of the authors are reviewed with reference to the data in bibliography.

A65-81727
A METHOD FOR CONTINUOUS MEASUREMENT OF OXYGEN IN THE AQUEOUS HUMOR AND THE LENS OF THE LIVING EYE [EINE METHODE ZUR FORTLAUFENDEN SAUERSTOFFBESTIMMUNG IM KAMMERWASSER UND GLASKORPER DES LEBENDEN AUGES].
K. W. Jacobi (U.-Augenklin., Marburg/Lahn, West Germany).
Albrecht von Graefes Archiv für Ophthalmologie, vol. 168, 1965, p. 61–69. 16 refs. In German.
Deutsche Forschungsgemein Forschungsgemeinschaft supported research.
A polarographic micromethod, which allows continuous measurements of oxygen tension in vivo in the anterior chamber and the vitreous body of test animals' eyes is described. A platinum microelectrode inserted in a canula brought into the investigated medium. The animals outlive the experi- so that measruements of the same eye can be repeated.

A65-81728
THEORETICAL MAN-MACHINE INTERACTION WHICH MIGHT LEAD TO LOSS OF AIRCRAFT CONTROL.
J. F. Martin (Unica Res. Co., Ltd., Montreal, Canada) and G. Melvill Jones (McGill U., Aeromed. Res. Unit, Montreal, Canada).
Aerospace Medicine, vol. 36, Aug. 1965, p. 713-716. 6 refs.

A theoretical model of a pilot-aircraft interaction wherein the pilot relies entirely upon his sense of the relative gravity vector for orientation information is developed. It is shown that the illusory effects arising from motions could cause him to operate the aircraft controls in a diametrically opposite manner to what would be appropriate. This model may serve as a basis to account for otherwise unexplained losses of control in jet transport aircraft. A series of recommendations for further investigations is proposed.

A65-81729
ENDOCRINE AND METABOLIC CHANGES DURING A 12-HOUR SIMULATED FLIGHT.
Henry B. Hale, James P. Ellis, Jr., and Edgar W. Williams (Aerospace Med. Div., USAF School of Aerospace Med., Physiol. Branch, Brooks AFB, Tex.)
Aerospace Medicine, vol. 36, Aug. 1965, p. 717-719. 17 refs.
USAF School of Aerospace Med. supported research.

Forty-eight young men were studied by means of serial urinary determinations while working in flight simulators for 12 hours. The "flights" began at 0700 hours and ended at 1900 hours. Post-flight values obtained at 2100 hours were compared with control values obtained at 2100 hours on the day before the test. Creatinine excretion did not show statistically significant variation with time. All other urinary constituents were expressed as ratios with creatinine. Simulated flight induced statistically significant elevations in urine volume, urea, uric acid, phosphorus, sodium, the Na/K ratio, 17-hydroxycorticosteroids, epinephrine (E) and norepinethrine (NE). The NE/E ratio fell significantly.

A65-81730
EXPERIMENTAL ANIMAL DECOMPRESSION TO A NEAR VACUUM ENVIRONMENT.
Richard W. Bancroft and James E. Dunn, II (Aerospace Med. Div., USAF School of Aerospace Med. Physiol. Branch, Brooks AFB, Tex.)
(Aerospace Med. Assoc. Meeting, Miami Beach, Fla., May 12, 1964).
Aerospace Medicine, vol. 36, Aug. 1965, p. 720-725. 10 refs.
Contract NASA DPR T-16758-G.

To estimate the times of consciousness, collapse and survival of animals exposed to near-vacuum environments, 125 conscious dogs were rapidly decompressed in either 1 or 0.2 second from 35,000 feet, while breathing oxygen, to a pressure less than 2 mm.Hg. absolute. Groups of six dogs each were exposed to this low pressure for periods of time ranging from 5 to 180 seconds, with and without prior denitrogenation, and then recompressed to 35,000 feet with oxygen in either 5 to 30 seconds. The dogs collapsed within 9 to 10 seconds after decompression, as determined from motion picture films. Simultaneously, the effects of anoxia, water vapor and other evolved gases were apparent, resulting in a generalized muscle spasticity, a few gasps, momentary convulsive seizures, apnea, and gross swelling of the body and extremities. All dogs exposed for less than 120 seconds survived, despite evidence of lung involvement. Respiration recommenced spontaneously either during recompression or at ground level, providing the heart was beating; otherwise, death was inevitable.

A65-81731
EXPERIMENTAL ANIMAL DECOMPRESSIONS TO LESS THAN 2 MM. HG ABSOLUTE (PATHOLOGIC EFFECTS).
James E. Dunn II, Richard W. Bancroft, Webb Haymaker, and John W. Foft (Aerospace Med. Div., USAF School of Aerospace Med., Physiol. Branch, Brooks AFB, Tex.)
(Aerospace Med. Assoc. Meeting, Miami Beach, Fla., May 12, 1964).
Aerospace Medicine, vol. 36, Aug. 1965, p. 725-732. 14 refs.
Contract NASA DPR T-16758-G.

Pathologic examination of tissues of dogs rapidly decompressed to less than 2 mm. Hg absolute was performed. Of the 125 dogs decompressed, 92 were autopsied at three time intervals; within 30 minutes, two to five days and one to three weeks postdecompression. Gross examination of the tissues was done on all autopsied animals. Lung damage was graded 1+ to 4+ according to the amount of edema, emphysema, atelectasis, and/or hemorrhage present. Microscopic examination of the tissues was performed on selected dogs from the various groups. The most impressive finding was the absence of major pathologic damage, except in the lungs, unless the exposure time exceeded 120 seconds. By varying time of decompression and time of exposure to less than 2 mm. Hg, it was possible to separate the pathologic effects of anoxia versus time of decompression. In all dogs the severity of lung damage increased with duration of the anoxic exposure. In groups with comparable exposure times, the dogs decompressed in one second exhibited pulmonary congestion, edema, and hemorrhage, while those decompressed in 0.2 second showed predominantly more petechial hemorrhages and emphysematous changes. Denitrogenation appeared to reduce the incidence and severity of the lung damage.

A65-81732
EFFECTS OF EXPOSURE TO A ROTATING ENVIRONMENT (10 RPM) ON FOUR AVIATORS FOR A PERIOD OF TWELVE DAYS.
Ashton Graybiel, Robert S. Kennedy, Edward C. Knoblock, Fredrick E. Guedry, Jr., Walter Mertz, Michael E. McLeod, James K. Colehour, Earl F. Miller, and Alfred R. Fregly (U. S. Naval School of Aviation Med., Pensacola, Fla.)
Aerospace Medicine, vol. 36, Aug. 1965, p. 733-754. 30 refs.
NASA supported research.

Four carefully selected military personnel undergoing flight training were exposed to constant rotation at a speed of 10 r.p.m. for 12 days in the Pensacola Slow Rotation Room. Environmental and working conditions simulated in many respects those which might be obtained in a rotating orbiting spacecraft. The findings are discussed under three headings: clinical symptoms, clinical laboratory findings and psychophysiological performance. The experiment has demonstrated that countermeasures in addition to adaption are needed if there is immediate exposure to rotational velocities of 10 r.p.m. and that the rotating room is a useful device for further exploration of vestibular and central nervous system mechanisms.

A65-81733
ACUTE EFFECTS OF EXPOSURE TO HYDRAZINE AND HYDRAZINE DERIVATIVES ON RENAL FUNCTION IN THE DOG.
Ethard W. Van Stee (USAF School of Aerospace Med., Brooks AFB, Tex.)
Aerospace Medicine, vol. 36, Aug. 1965, p. 764-767. 5 refs.

Dogs were exposed to approximately equimolar concentrations of hydrazine, methylhydrazine, and 1,1-dimethylhydrazine. The dogs exposed to hydrazine developed significantly decreased para-aminohippurate (PAH) and inulin clearance rates and renal plasma flow rates during the first four hours post-exposure. The decreased glomerular filtration rate was attributed to the decreased renal plasma flow. The decreased PAH clearance was attributed to the decreased glomerular filtration rate and interference with active transport by the proximal renal tubular epithelium. The dogs exposed to methylhydrazine developed decreased PAH and inulin clearance rates. The mechanism producing impairment of renal function following exposure to methylhydrazine was postulated to be similar to the hydrazine-treated group. Exposure to UDMH caused no significant impairment of renal function measurable by these technics.

A65-81734
EFFECTS OF SECOBARBITAL AND D-AMPHETAMINE ON PERFORMANCE DURING A SIMULATED AIR MISSION.
Richard E. McKenzie and Lois L. Elliott (Aerospace Med. Div., USAF School of Aerospace Med., Brooks AFB, Tex.)
Aerospace Medicine, vol. 36, Aug. 1965, p. 774-779. 7 refs.

The operational deployment of high performance fighter aircraft on extended missions poses some significant problems related to the effects of drugs upon pilot proficiency. This study was designed to simulate a pre-mission crew-conditioning program and a 12 hour flight. The research goal was to determine the performance effects of secobarbital taken the night before and of d-amphetamine taken during the mission. The results on 48 subjects indicated that performance decrement, unpredictable by selected psychologic test scores and not related to gross physiologic measures, occurred as a residual effect of secobarbital using the SAM Multidimensional Pursuit Test as the measure of proficiency. Individuals receiving an hypnotic dose (200 mg.) of secobarbital at bedtime demonstrated a performance decrement 10 hours later at the start of their simulated "flight" and continued to demonstrate degraded performance at the completion of their mission 12 hours later. Those subjects who received 5 mg. of d-amphetamine "in flight" showed the often-documented enhancement of performance but those who received secobarbital at bedtime and d-amphetamine "in flight" showed an altered performance response curve in terms of increased latency and lower peak performance.

A65-81735
MATURE AND BIOPHYSICAL EFFECTS OF ULTRASOUND.
Arnold Soren (N. Y. U. School of Med., Dept. of Orthopaed. Bellevue Hosp. New York, Surg. and Rheumatic Diseases Study Group).
Journal of Occupational Medicine, vol. 7, Aug. 1965, p. 375-380. 34 refs.
NIH supported research.

Ultrasound has special features which distinguish it clearly from other modalities of physical therapy. These features are: (1) Capacity to develop heat in depth and limited areas. (2) Mechanical influences that create physical changes, biochemical reactions, and breakdown of tissue. (3) Clinically distinct effects on the voluntary and autonomic nervous system. The customary intensity and frequency of ultrasound leaves cells unharmed; at high intensity, ultrasound may cause damage. Ultrasound has been shown to benefit chronic disorders of the musculoskeletal system. Acute inflammations, particularly those of the blood vessels and nerves, are often complicated rather than helped by ultrasound. Therefore, ultrasound should be clinically employed only by those who have insight into the pathology of the illness, and understanding of the indications and contraindications of this method. Further experimental and clinical observations are needed to evaluate ultrasound fully.

A65-81736
PANCREAS SECRETION AND HYPOTHERMIA [PANKREASEXKRETION UND HYPOTHERMIE].

P. V. Véghelyi, Agnes T. Zsinka, Nonna Faur, and T. Kemény (Med. U. I Kinderklin.; and Inst. für Ernährungswiss., Budapest, Hungary).
Zeitschrift für die gesamte experimentelle Medizin, vol. 139, 1965, p. 305–310. 19 refs. In German.

Pancreatic excretion has been studied in the rat under the influence of secretin and carbaminoyl choline, at normal body temperature and in hypothermia. Volume and total protein content of pancreatic juice as well as the protein content of the individual electrophoretic fractions decreased considerably in hypothermia. The eventual clinical significance of the findings is discussed.

A65-81737
A PHYSICAL BASIS FOR LIFE DETECTION EXPERIMENTS.
J. E. Lovelock.
Nature, vol. 207, Aug. 7, 1965, p. 568–570. 19 refs.
NASA Grant NSG 199-62.

The design of an efficient and unequivocal experiment in extra-terrestrial life detection should take into account a definition of life stated in terms favorable for its recognition, and a description of the past and present environment of the planet to be sampled. The following experiments are suggested for the detection of life, specifically on Mars: (1) search for order in chemical structures and molecular weight distributions, also by sound and by sight; and (2) search for non-equilibrium, principally by differential thermal analysis and gas chromatography mass spectrometry of the atmosphere, and recognition of physical non-equilibrium such as non-random motion. A description of past and present known conditions on Mars is included.

A65-81738
PROBABILITY OF LIFE.
J. H. Fremlin (Birmingham, U. Dept of Phys., Great Britain), and Harold F. Blum (HEW, Natl. Cancer Inst., Bethesda, Md.)
Nature, vol. 207, Aug. 7, 1965, p. 668.

The probability of the origin of life is analogized to probabilities of well-shuffled bridge hands, i.e., approximately 10^{-31}, in opposition to H. F. Blum who has proposed a probability of 10^{-18}, based on an analogy to computer operation.

A65-81739
WALKING, RUNNING AND JUMPING ON THE MOON.
Rodolfo Margaria (Milan, U. Inst. of Human Physiol., Italy).
New Scientist, vol. 27, Jul. 22, 1965, p. 226–227.

The potential energy, kinetic energy, work done against gravity, work due to velocity changes in forward direction, and total work of a man walking at 2.5 mi./hr. and running at 12.5 mi./hr. on Earth are presented. Although the reduced gravity on the Moon will mean that walking and running will require less effort than on Earth, it will reduce the number of steps per minute, so that progress will be slow. To reach a higher speed of progression on the Moon, jumping must be tried, and should be relatively easy due to the disproportionately great muscular power compared with body weight. A jump will take longer, limiting the frequency of jumping; but the greater the push, the greater will be the horizontal component of it and consequently also the speed of progression. A speed as high as running on Earth will probably be possible.

A65-81740
KINETOSIN THERAPY IN SEASICKNESS [DIE BEHANDLUNG DER SEEKRANKHEIT MIT KINETOSIN].
W. May (Bezirkskrankenhaus, Med. Klinik, Schwerin, East Germany).
Das deutsche Gesundheitwesen, vol. 22, Jul. 8, 1965, p. 1234–1237. 59 refs. In German.

The antiemetic kinetosin (previously prothacine compositum) has been tested for prophylaxis and therapy of seasickness with the German commercial marine (on a factory-ship of the Fish-Combine Rostock, on big ferry-boats of the Baltic Sea, as well as on a passenger ship) since 1961. Kinetosin has proved to be a very effective and well compatible substance.

A65-81741
TIME-INTENSITY RELATIONS IN BINAURAL UNMASKING.
H. S. Colburn and N. I. Durlach (Mass. Inst. of Technol., Res. Lab. of Electron., Center for Commun. Sci., Cambridge).
Journal of the Acoustical Society of America, vol. 38, Jul. 1965, p. 93–103. 16 refs.
NASA; NSF; NIH; and Joint Serv. Electron. Program supported research.

Variations in the threshold of a 500-c.p.s. tone masked by random noise were studied as a function of simultaneous shifts in the interaural amplitude ratio and interaural time delay of the tone. The experimental results coincide with the results of theoretical computation based on the equalization and cancellation model and are used to define a time-intensity trade for binaural unmasking. When the binaural unmasking results are interpreted in terms of time-intensity trade, the curves obtained bear no simple relation to those obtained when the time-intensity trade is based on lateralization.

A65-81742
TEMPORARY THRESHOLD SHIFTS FOLLOWING MONAURAL AND BINAURAL EXPOSURE.
W. Dixon Ward (Minn., U. Dept. of Otolaryngol., Minneapolis).
Journal of the Acoustical Society of America, vol. 38, Jul. 1965, p. 121–125. PHS supported research.

The temporary threshold shifts (TTS) following monaural and binaural exposure to three different high-intensity stimuli were compared in 49 listeners. In all cases, the binaural exposures produced less TTS than the monaural, though the difference was greatest at lower frequencies. Results are interpreted to indicate that the middle-ear muscles contract more vigorously for binaural than for monaural, thus producing more reduction of the effective intensity of lower-frequency stimulus components. However, the possibility of influences exerted by efferent or cochleo-cochlear systems cannot be ruled out. The relation of these results to the fact that industrial hearing loss first develops at 4000 c.p.s. is discussed.

A65-81743
THE PRODUCTION OF HEAT BY FAT.
Michael J. R. Dawkins and David Hull.
Scientific American, vol. 213, Aug. 1965, p. 62–67.

Newborn animals and hibernators are known to contain large amounts of brown adipose tissue. The brown fat cells are characterized by several droplets of fat and numerous mitochondria within the cytoplasm. The tissue exhibits a more active oxidative metabolism than does white adipose tissue, and hence has a high heat-producing potentiality. By a series of experiments measuring the degree of heat production and the effects of surgical removal, it was determined that brown fat tissue accounts for more than 80% of the increased body heat produced by a newborn rabbit in the cold. The overall system controlling the production of heat by brown adipose tissue is probably as follows: (1) The temperature receptors in the skin, on sensing cold, send nerve impulses to the brain. (2) The brain relays impulses along the sympathetic nerves to the brown adipose tissue, there the nerve endings release noradrenaline. (3) Noradrenaline activates an enzyme that splits triglyceride molecules into glycerol and free fatty acids, thereby triggering the heat-producing cycle. Thus, the rate of heat production is controlled by the sympathetic nervous system rather than by way of a hormone carried by the bloodstream.

A65-81744
HIGH-ALTITUDE PULMONARY HYPERTENSION.
Inder Singh, P. K. Khanna, Madan Lal, R. S. Hoon, and B. D. P. Rao (Armed Forces Med. Serv., New Delhi, India).
Lancet, vol. 2, Jul. 24, 1965, p. 146–150. 15 refs.

A study of high-altitude pummonary hypertension in 102 temporary residents, aged between 18 and 47 years, revealed that the vulnerable altitude was 11,500 feet in fresh inductees, and between 12,000 feet and 14,800 feet in local inhabitants. In 64 men the high-altitude pulmonary hypertension was primary, and in 38 it followed in the wake of high-altitude pulmonary edema. In the primary cases symptoms of pulmonary hypertension were observed after a stay of 5 to 42 months at high altitude. Symptons regressed within one to 21 months of return to sea level. Two men, however, were permanently affected and one of them died. Histopathological evidence suggests that high-altitude pulmonary hypertension is of obstructive origin, and results from thrombosis of the smaller pulmonary arteries. Pulmonary vasoconstriction, increased blood-volume, and polycythemia probably play a comparatively minor role in the pathogenesis of the disorder. Physical exertion appears to precipitate it in local residents.

A65-81745
DIABETES INSIPIDUS IN A SUBJECT EXPOSED TO TOXIC HAZARDS FROM TETRAETHYL LEAD [DIABETE INSIPIDO IN SOGGETTO ESPOSTO A RISCHIO DI INTOSSICAZIONE DA PIOMBO TETRAETILE].
A. Cavalleri and S. Binaschi (Pavia, U. Ist. di Med. del Alavoro, Italy).
Medicina del Lavoro, vol. 56, Mar. 1965, p. 367–372. 12 refs. In Italian.

A case history is presented of a healthy 31-year old male subject, who twice weekly came in contact with tetraethyl lead during his work in a refinery. It is suggested that the tetraethyl lead damaged the diencephalic structures that regulate the water balance of the body.

A65-81746
EFFECTS OF PROLONGED CENTRIFUGATION IN GROWTH AND ORGAN DEVELOPMENT OF RATS.
Jiro Oyama and William T. Platt (NASA Ames Res. Center, Environ. Biol. Div. Moffett Field, Calif.)
American Journal of Physiology, vol. 209 Sep. 1965, p. 611–615 14 refs.

Mature and weanling Sprague-Dawley female rats were centrifuged at 2.5, 3.5, and 4.7 g for periods of time ranging up to one year. The growth rates and final body weights of weanling rats were significantly lower than those of noncentrifuged control rats. Both mature and weanling rats experienced initially a temporary loss in body weight due to inanition and reduced food consumption. Comparison of organ-to-body weight ratios of 4.5-month and 1-year centrifuged rats with corresponding control rats indicated that prolonged

exposures caused only a few changes. Relative weights of the adrenals of 4.5-month centrifuged rats were reduced, whereas the livers of 1-year centrifuged rats were increased. There was an apparent decrease in red blood cells and a significant decrease in hematocrit values of centrifuged rats. No histopathology was found in any of the centrifuged rats, which could be attributed to the exposure treatment. Results of this study show that rats are able to tolerate prolonged periods of simulated high-gravity environments with little, if any, serious deleterious effects.

A65-81747
APPEARANCE OF EXCESS LACTATE IN ANESTHETIZED DOGS DURING ANEMIC AND HYPOXIC HYPOXIA.
Stephen M. Cain (USAF School of Aerospace Med., Physiol. Dept., Brooks AFB, Tex.)
American Journal of Physiology, vol. 209, Sep. 1965, p. 604-610. 24 refs.

Ten anesthetized, splenectomized dogs were made progressively anemic by replacement of blood with warmed dextran to approximate hematocrits of 30, 20, 15, and 10%. A second group of 10 dogs was made progressively hypoxic by having them inspire 11.4, 9.5, 8.0, and 5.9% O_2 in N_2. Blood gas contents, pH, and gas tensions were measured in arterial and mixed venous bloods. Cardiac output was calculated from the arteriovenous O_2 difference and the O_2 uptake. Excess lactate was calculated from measured levels of lactate and pyruvate in blood water. Excess lactate appeared at higher mixed venous P_{O2} in anemic animals than in hypoxic, 40 mm. Hg versus 20 mm. Hg. When related to total oxygen transport, however, excess lactate appeared at about the same point (12 ml./kg. per min.) in both groups. Because liver has been shown to reduce its oxygen uptake with any lowering of perfusate oxygen content, it was suggested that the excess lactate measured during both anemic and hypoxic hypoxia in anesthetized dogs is largely the result of liver dysfunction with respect to lactate.

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