NASA SP-7011 (117)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 117)

JULY 1973

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges:

STAR (N-10000 Series)	N73-19992—N73-21894
IAA (A-10000 Series)	A73-24973—A73-27990

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NASA SP-7011 (117)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 117)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in June 1973 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

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1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NASA SP-7011 (117)		

4. Title and Subtitle	5. Report Date
AEROSPACE MEDICINE AND BIOLOGY A Continuing Bibliography (Supplement 117)	July 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
	10. Work Unit No.
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, D.C. 20546	11. Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This special bibliography lists 353 reports, articles, and other documents introduced into the NASA scientific and technical information system in June 1973.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Aerospace Medicine Bibliographies Biological Effects	Unclassified - Unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	
Unclassified	Unclassified	107	

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II

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 353 reports, articles and other documents announced during June 1973 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

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 of 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 references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1973 Supplements.

AVAILABILITY OF CITED PUBLICATIONS

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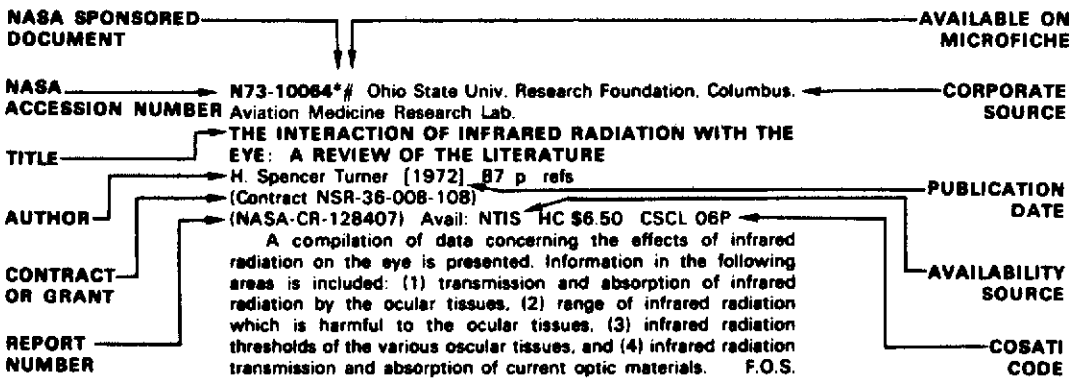

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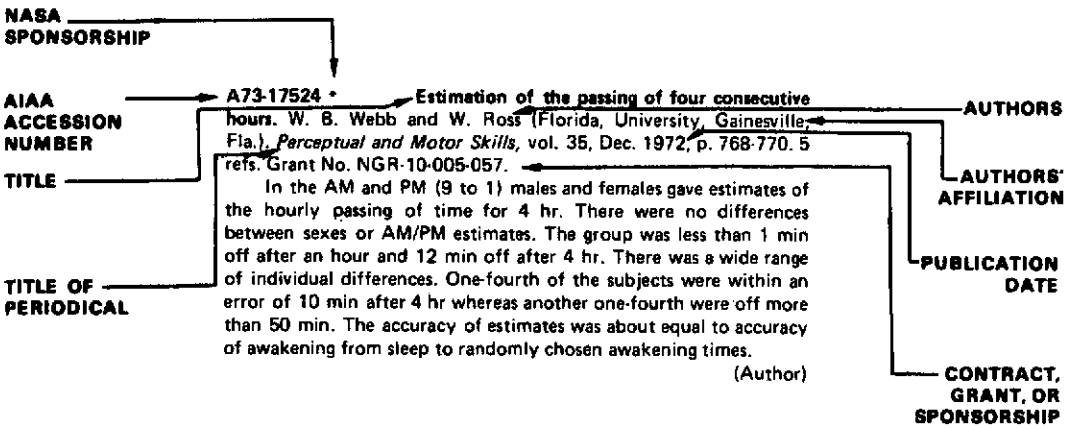

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 117) JULY 1973

IAA ENTRIES

A73-24976 **Problem of localization in the median plane - Effect of pinnae cavity occlusion.** M. B. Gardner (Bell Telephone Laboratories, Inc., Murray Hill, N.J.) and R. S. Gardner. *Acoustical Society of America, Journal*, vol. 53, Feb. 1973, p. 400-408. 33 refs.

Localization of sound sources outside the median plane is influenced primarily by differences in head shadow and arrival time of the signal at the two ears of the observer. For sources located within this plane, localization is influenced primarily by the irregularities of the pinna. By progressively occluding these cavities, it is shown that localization ability decreases with increasing occlusion, that it is better for signals in the anterior than in the posterior sector of the median plane, and that high-frequency signal content is more important than the low. A number of hypotheses regarding localization in the median plane are noted. (Author)

A73-25036 # **Vitamin metabolism alteration under increased atmospheric pressure (Izmenenie vitaminnogo obmena v usloviiakh povyshennogo atmosfernogo davleniia).** I. M. Buznik, A. P. Miasnikov, and V. L. Korsak. *Voenno-Meditsinskii Zhurnal*, Jan. 1973, p. 60-62. In Russian.

Investigation of the effect of increased atmospheric pressure upon the excretion of group-B vitamins and their derivatives, as well as of ascorbic acid in 13 young male subjects, excluding professional divers. The excretion of group-B vitamin derivatives was found to increase and that of ascorbic acid to diminish. The implications of these findings are discussed. M.V.E.

A73-25037 # **Classification of sources of contaminants (Klassifikatsiia istochnikov vrednykh primesei).** A. A. Konychev. *Voenno-Meditsinskii Zhurnal*, Jan. 1973, p. 62-66. In Russian.

For sources of air contamination in closed manned spaces, a classification is proposed that groups these sources by contaminant generating mode into active and passive ones. The active source group consists of mechanical, electrical, and chemical systems and elements whose contaminant generation processes result of necessity from the very operation of the respective system or element. This group includes also man, the most complex of all contamination sources. The passive group consists of two subgroups, namely those of induced and spontaneous sources respectively. The induced source subgroup includes sources set in operation by such extraneous inducing factors as air motion, high temperatures, electric current, etc. The second subgroup consists of sources spontaneously releasing contaminants under most conditions, e.g., fuels, alcohols, phenols, etc. M.V.E.

A73-25038 # **Experimental study of emotional stress in operators (Eksperimental'noe izuchenie emotsional'nogo napriazheniia u operatorov).** V. A. Bodrov. *Voenno-Meditsinskii Zhurnal*, Jan. 1973, p. 70-73. In Russian.

Problems associated with the development of techniques for assessing the performance stability of human operators in the face of upsetting psychic factors are reviewed. Performance measuring techniques applied to tasks of continuous count at a prescribed rate, sensomotor reaction to light or sound signals, signal discrimination, and error detection are among the problem aspects discussed. M.V.E.

A73-25039 # **The problem of organism responsiveness in aviation medicine (Problema reaktivnosti organizma v aviatsionnoi meditsine).** E. M. Iuganov and V. I. Kopanev. *Voenno-Meditsinskii Zhurnal*, Jan. 1973, p. 74-76. In Russian.

Review of the various approaches of aviation medicine along its history to problems of assessing the magnitude of environmental effects on organism responsiveness to factors affecting successful pilot task performance and flight safety predictability. The effects considered include those of high and low temperatures, oxygen lack or excess in inhaled air, increased or decreased acceleration of gravity and/or atmospheric pressure, and various stress impacts. M.V.E.

A73-25040 # **Neurological fatigue-indices of flight crews of long-range and military transport aviation (Nevrologicheskie pokazateli utomleniia letnogo sostava dal'nei i voenno-transportnoi aviatsii).** A. G. Panov and N. I. Komandenko. *Voenno-Meditsinskii Zhurnal*, Jan. 1973, p. 76-78. In Russian.

A73-25041 # **Characteristics of vasomotor alterations during brief arbitrary hyperventilation according to data from rheographic and plethysmographic studies (Kharakteristika vazomotornykh izmenenii pri korotkoi proizvol'noi giperventiliatsii po dannym reograficheskogo i pletizmograficheskogo issledovaniia).** V. L. Fantalova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 75, Jan. 1973, p. 9-14. 11 refs. In Russian.

A73-25042 # **Effect of excessive glucose administration on the lipid level, glycolysis rates, and oxygen uptake in the tissues of the liver, heart, cerebrum and aorta (Vliianie izbytochnogo vvedeniia gliukozy na uroven' lipidov, skorost' glikoliza i potreblenie kisloroda tkaniami pecheni, serdtsa, golovnogo mozga i aorty).** Iu. P. Ryl'nikov (Iaroslavskii Meditsinskii Institut, Yaroslavl, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 75, Jan. 1973, p. 53-57. 13 refs. In Russian.

A73-25043 # **Procedures for polarocochleography and for pressure measurement in the inner ear perilymph in acute experiments on animals (Metodika poliarokokhleografii i izmereniia davleniia perilimfy vnutrennego ukha u zhivotnykh v ostrom opyte).** V. A. Romanov (Semipalatinskii Meditsinskii Institut, Semipalatinsk, Kazakh SSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 75, Jan. 1973, p. 89-91. 5 refs. In Russian.

A73-25133 **Backward masking and enhancement of multi-segmented visual targets.** W. N. Dember, W. D. Mathews, and M. Stefl (Cincinnati, University, Cincinnati, Ohio). *Psychonomic Society*,

Bulletin, vol. 1, no. 1A, Jan. 1973, p. 45-47. 8 refs. NSF Grant No. GB-33621; Grant No. NIH-EY-00481-06.

The present experiment was designed to replicate and elaborate two earlier findings: (1) that certain visual targets comprising alternating black and white pie-shaped segments are both relatively difficult to detect in the absence of a masking figure and relatively easy to detect when followed by a masking stimulus, and (2) that detection of some such targets is actually enhanced when the annular masking figure is presented. In general, those results were obtained in this experiment, though enhancement was evident for targets having from 16 to 32 segments, whereas previous research suggested that the enhancement effect would fail somewhere between the values of 16 and 32. (Author)

A73-25136 * **Incidence of Lucké renal adenocarcinoma in Rana pipiens as determined by histological examination.** P. B. Marlow and S. Mizell (Georgetown University, Washington, D.C.; Indiana University, Bloomington, Ind.). *National Cancer Institute, Journal*, vol. 48, Mar. 1972, p. 823-829. 19 refs. Grant No. NGR-15-003-053.

A73-25143 * **Organization of brain tissue - Is the brain a noisy processor.** W. R. Adey (California, University, Los Angeles, Calif.). *(Conference on the Physical Principles of Neuronal Organismic Behavior, Coral Gables, Fla., Dec. 18-20, 1970.) International Journal of Neuroscience*, vol. 3, 1972, p. 271-284. 31 refs. Grants No. PHS-NB-01883; No. PHS-MH-03708; No. NGR-05-007-195; Contracts No. AF 49(638)-1387; No. N00014-69-A-0200-4020.

This paper presents some thoughts on functional organization in cerebral tissue. 'Spontaneous' wave and unit firing are considered as essential phenomena in the handling of information. Various models are discussed which have been suggested to describe the pseudorandom behavior of brain cells, leading to a view of the brain as an information processor and its role in learning, memory, remembering and forgetting. (Author)

A73-25145 * **The diluter-demand oxygen system used during the international Himalayan expedition to Mount Everest.** F. D. Blume and N. Pace. *American Alpine Journal*, vol. 18, 1972, p. 93-101. 5 refs. Grant No. NGL-05-003-024.

The diluter-demand regulators are designed in such a way that as the individual inspires he simultaneously draws ambient air and pure oxygen from a tank into his mask. The size of the ambient air orifice is made directly proportional to the barometric pressure by use of a passive aneroid valve. As altitude increases the ambient air orifice is automatically made smaller and the individual inspires a greater proportion of oxygen. G.R.

A73-25181 **Field of view and target uncertainty in visual search and inspection.** J. W. Schoonard and J. D. Gould (IBM Thomas J. Watson Research Center, Yorktown Heights, N.Y.). *Human Factors*, vol. 15, Feb. 1973, p. 33-42. 14 refs.

This study is aimed at an improved understanding of the inspection of miniature computer components. It was found, for complex stimuli simulating integrated circuit chips, that subjects failed to detect over half of the targets in a 15- or 16-sec visual-scan interval. Defects were usually detected quickly or not at all. Removing the time constraint by extending the visual scan interval to 2 min. did not substantially improve detection performance. The elimination of target uncertainty, by placing targets on all stimuli and informing subjects of this fact prior to search, had no apparent effect on inspection errors. Restricting the field of view of subjects to a series of small areas of the stimulus did not enhance the detection of the targets used in this study. (Author)

A73-25182 **Group performance in a visual signal-detection task.** D. E. Clement (South Florida, University, Tampa, Fla.). *Human Factors*, vol. 15, Feb. 1973, p. 43-52. 15 refs.

Sixteen male subjects were run in groups of four on 720 trials of a 16-alternative, forced-choice, visual signal-detection task. The first and third blocks of 240 trials required individual judgments concerning target location. The second block of 240 trials required a group decision as to target location for two groups of subjects, and individual responses followed by a group decision for the other two groups. Comparisons were made among individual performance, real group performance, and the performance of two types of pseudo-group (derived from individual data) using an information-integration and a decision-threshold model. (Author)

A73-25183 **Laddermil and ergometry - A comparative summary.** E. Kamon (Pittsburgh, University, Pittsburgh, Pa.). *Human Factors*, vol. 15, Feb. 1973, p. 75-90. 45 refs. Grant No. NIH-8-R01-OH-00308; Contract No. N00014-67-A-0402-0009.

The merits of the laddermill as an ergometer for measuring man's major physiological responses to work are presented, together with a literature-based summary of other commonly used ergometers. The paper shows that the relationships between oxygen uptake, work rate, pulmonary ventilation, and heart rate can be described in simple linear equations. The linear relationship between the oxygen uptake (energy expenditure) and the work rate for ladder-climbing, cycling, cranking, and running is presented and the more complicated relationship of oxygen uptake to walking speed is discussed. In addition, the linear relationships of oxygen uptake to ventilation and to heart rate are given for arms and legs at submaximal and maximal work levels. (Author)

A73-25184 * **Analysis of swimming motions.** J. Gallenstein (Ohio State University, Columbus, Ohio) and R. L. Huston (Cincinnati, University, Cincinnati, Ohio). *Human Factors*, vol. 15, Feb. 1973, p. 91-98. 17 refs. Grant No. NGL-36-004-014.

This paper presents an analysis of swimming motion with specific attention given to the flutter kick, the breast-stroke kick, and the breast stroke. The analysis is completely theoretical. It employs a mathematical model of the human body consisting of frustrums of elliptical cones. Dynamical equations are written for this model including both viscous and inertia forces. These equations are then applied with approximated swimming strokes and solved numerically using a digital computer. The procedure is to specify the input of the swimming motion. The computer solution then provides the output displacement, velocity, and rotation or body roll of the swimmer. (Author)

A73-25198 # **The problem of memory (K voprosu o pamiati).** M. N. Livanov. *Uspekhi Fiziologicheskikh Nauk*, vol. 4, Jan.-Mar. 1973, p. 19-30. 14 refs. In Russian.

Studies concerning the nature of memory are quoted in support of a hypothesis that links memory with the high lability of the cerebral substrate and assumes that the trace processes in biopotentials merely reflect the inertness of cerebral activity. Experiments on animals with cortex activity analysis during conditioned reflex stimulation are discussed to substantiate the hypothesis. V.Z.

A73-25199 # **The engram as an equivalent of triggering afference (Engramma kak ekvivalent puskovoi afferentatsii).** N. Iu. Belenkov (Ministerstvo Zdravookhraneniia SSSR, Meditsinskii Institut, Gorki, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 4, Jan.-Mar. 1973, p. 53-64. 25 refs. In Russian.

Review of studies concerning the physiological mechanisms of instrumental reflexes and voluntary actions, with particular attention to the important role of memory in storing the engrams of received stimuli. An afferent-perception synthesis concept is proposed in which stimulus engrams are substituted for triggering stimuli, and models of useful results of future actions are incorporated. These models constitute the engrams of past efficient actions and are the equivalents of the actual stimuli producing instrumental reflexes and useful voluntary actions. V.Z.

A73-25200 # **Central-peripheral mechanisms of motor functions (Tsentral'no-perifericheskie mekhanizmy dvigatel'nykh funktsii).** L. S. Gambarian (Akademiia Nauk Armianskoi SSR, Institut Eksperimental'noi Biologii, Yerevan, Armenian SSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 4, Jan.-Mar. 1973, p. 74-102.

105 refs. In Russian.

Review of papers concerning the functional and morphological structures of various events of motor activity. It is pointed out that the cerebrum contains no specialized centers controlling complete motor acts but does contain transmitter sequences which form a single morphological-physiological ensemble of central integration. It is also shown that motions are formed and controlled in accordance with the polyanalysor principle. V.Z.

A73-25310 Radiation protection at the work site: Scientific, technical and organizational aspects; Annual Scientific Conference, 6th, Karlsruhe, West Germany, May 17-19, 1972, Reports (Strahlenschutz am Arbeitsplatz: Wissenschaftliche, technische und organisatorische Aspekte; Wissenschaftliche Jahrestagung, 6th, Karlsruhe, West Germany, May 17-19, 1972, Tagungsberichte). Meeting sponsored by the Fachverband für Strahlenschutz. Edited by W. Koelzer (Gesellschaft für Kernforschung mbH, Karlsruhe, West Germany). Würenlingen, Switzerland, Fachverband für Strahlenschutz, 1972. 322 p. In German.

The papers deal with protection against reactor radiation, recommendations of the International Commission on Radiological Protection, measurement of alpha-activity in the air, experience in handling radioactive waste and in the decontamination of facilities and devices, norms and standards for protection of personnel against radiation, advances in neutron dosimeter technology, and problems associated with the use of radiation for medical purposes. Some scientific, economic, and organizational aspects of protection against radiation are covered.

Individual items are announced in this issue. V.P.

A73-25311 # New norms and standardization trends for dosimetry and protection against radiation (Neue Normen und Standardisierungstrends für Dosimetrie und Strahlenschutz). D. Nachtigall (Ruhr, Pädagogische Hochschule, Dortmund, West Germany). In: Radiation protection at the work site: Scientific, technical and organizational aspects; Annual Scientific Conference, 6th, Karlsruhe, West Germany, May 17-19, 1972, Reports. Würenlingen, Switzerland, Fachverband für Strahlenschutz, 1972, p. 137-145; Discussion, p. 145, 146. In German.

The impact of the introduction of SI units, the definition of new dose concepts, and advances made in the field of microdosimetry on the existing norms is examined. Some trends toward standardization, in particular with respect to calibration methods, are noted. Much attention is given to developments in neutron dosimetry. V.P.

A73-25314 # Future trends of dosimetry with humans (Zukunftstendenzen der Personendosimetrie). E. Piesch (Gesellschaft für Kernforschung mbH, Karlsruhe, West Germany). In: Radiation protection at the work site: Scientific, technical and organizational aspects; Annual Scientific Conference, 6th, Karlsruhe, West Germany, May 17-19, 1972, Reports. Würenlingen, Switzerland, Fachverband für Strahlenschutz, 1972, p. 207-220; Discussion, p. 220. 32 refs. In German.

The current status of dosimetry and its shortcomings are reviewed, and means of improving the routine protection of personnel dealing with radiation are examined. These include a modernization of the absolute (10-year old) recommendations for protection against radiation, improvement of measuring accuracy by developing means of reducing the influence of the body effect, the proper selection of dosimeters, and improved automatic processing of dosimeter data. V.P.

A73-25326 * Physiological response to exercise after space flight - Apollo 7 to Apollo 11. J. A. Rummel, E. L. Michel, and C. A. Berry (NASA, Manned Spacecraft Center, Houston, Tex.). *Aerospace Medicine*, vol. 44, Mar. 1973, p. 235-238. 8 refs.

Exercise response tests were conducted preflight and postflight on Apollo missions 7 to 11. The primary objective of these tests was to detect any changes in the cardiopulmonary response to exercise that were associated with the space flight environment and that could have limited lunar surface activities. A heart-rate-controlled bicycle ergometer was used to produce three heart rate stress levels: 120 beats per minute for 6 minutes; 140 beats per minute for 3 minutes and 160 beats per minute per 3 minutes. Work load, blood pressure and respiratory gas exchange were measured during each stress level. Significant decreases were observed immediately postflight in the following dependent variables at a heart rate of 160 beats per minute: work load, oxygen consumption, systolic blood pressure, and diastolic blood pressure. No changes occurred in work efficiency at 100 watts or the ventilatory equivalent for oxygen at 2.0 liters per minute. (Author)

A73-25327 EEG activity of rats compressed by inert gases to 700 feet and oxygen-helium to 4000 feet. P. B. Bennett and A. N. Dossett (Royal Naval Physiological Laboratory, Gosport, Hants., England). *Aerospace Medicine*, vol. 44, Mar. 1973, p. 239-244. 23 refs.

A73-25328 Sensitivity of the brain to repeated expesures of hyperbaric oxygen. S. Lavy, H. Shoham, and D. Harel (Jerusalem, Hebrew University, Jerusalem; Israel Defence Forces, Tel Aviv, Israel). *Aerospace Medicine*, vol. 44, Mar. 1973, p. 254, 255. 14 refs.

A preliminary study investigating the susceptibility of rats to repetitive daily exposures to HOP was carried out. When the first electrical discharge is used as an early sign of oxygen toxicity, the latency of its appearance remains unchanged and it can be assumed that the animals suffered no permanent brain damage. This finding does not support the previous reports that repetitive exposures increase susceptibility to oxygen poisoning. (Author)

A73-25329 Utilization of human voice for estimation of man's emotional stress and state of attention. P. V. Simonov and M. V. Frolov (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Aerospace Medicine*, vol. 44, Mar. 1973, p. 256-258.

The investigation presents results concerning a study of man's voice frequencies as related to his physical and emotional well being. Analyses are shown of objective characteristics of speech in pilots and cosmonauts as well as in actors. These are compared under different emotional states of the individual in order to determine speech characteristics and stress, fatigue and emotional states. The purpose of the study is to ascertain the physical and emotional state of the individual through changes in speech characteristics which consequently do not demand direct personal nor instrument contact with the individual. (Author)

A73-25330 Results of electron microscopic studies in the rat brain under oxygen at high pressure. K. von Schnakenburg and H. Nolte (Bundesministerium der Verteidigung, Marine, Schiffahrtmedizinisches Institut, Kiel, West Germany). *Aerospace Medicine*, vol. 44, Mar. 1973, p. 259-264. 12 refs.

A73-25331 Quantitative influence of CO2 inhalation on thermal sweating in man. Y. Houdas, M. Bonaventure, A. Sauvage, G. Houdas, and A. Ginestet (Lille, Université, Lille, France). *Aerospace Medicine*, vol. 44, Mar. 1973, p. 265-268. 21 refs.

Three nude, resting human subjects were placed in a warm dry environment (40 C). After the steady state was achieved they were submitted to inhalation of normoxic mixture with 4 per cent carbon dioxide. Respiratory and thermal parameters, including the total evaporative heat loss rate, were continuously monitored. The initial, brief action of CO2 inhalation was a decrease in evaporative rate accompanied by a rise in skin temperature. Secondarily, a significant increase in evaporative rate was observed, followed by a decrease in both skin and deep temperatures. These phenomena can be explained only by a 'non-thermal' action of carbon dioxide on the thermal pathways and/or the thermal controller. (Author)

A73-25332 Single breath nitrogen washout method for measurement of functional residual capacity. S. T. Chiang (National Defence Medical Centre, Taiwan, Nationalist China) and R. Yang (Taiwan Veterans General Hospital, Taiwan, Nationalist China).

Aerospace Medicine, vol. 44, Mar. 1973, p. 269-271. 9 refs. Research supported by the National Science Council of Nationalist China.

A73-25333 Serum creatine phosphokinase activity and urinary excretion of creatine and creatinine in man during acclimatization to high altitude and in high altitude natives. K. K. Srivastava, Y. B. M. Rao, S. K. Bhardwaj, A. Chander, and M. S. Malhotra (Defence Institute of Physiology and Allied Sciences, Delhi, India). *Aerospace Medicine,* vol. 44, Mar. 1973, p. 272-275. 17 refs.

A73-25334 # Combined effects of noise and vibration on human tracking performance and response time. H. C. Sommer and C. S. Harris (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio). *Aerospace Medicine,* vol. 44, Mar. 1973, p. 276-280. 5 refs. Research supported by the U.S. Environmental Protection Agency.

In our laboratory, vibration has been shown to be the primary cause of performance impairment in studies of the combined effects of noise and vibration on human tracking performance. Noise has had little consistent effect when presented alone, and has added little or not at all to the impairment produced by vibration. In two studies with heat included as a third stressor, vibration presented alone had a slightly more adverse effect on tracking performance than combined heat, noise and vibration. In the present experiment, 12 subjects were exposed to lower noise and vibration levels for a longer period of time than used previously. These results parallel previous findings from studies of combined noise, heat, and vibration, and give support to a subtractive interaction interpretation of the combined effects of noise and vibration on human tracking performance. (Author)

A73-25335 # Effect of whole-body vibration on peripheral nerve conduction time in the Rhesus monkey. W. N. Floyd, A. B. Broderson, and J. F. Goodno (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio). *Aerospace Medicine,* vol. 44, Mar. 1973, p. 281-285. 19 refs.

A73-25336 * Cardiac arrhythmias during exercise testing in healthy men. E. F. Beard (NASA, Manned Spacecraft Center; Baylor University, Houston, Tex.) and C. A. Owen (Kelsey-Seybold Clinic, Houston, Tex.). *Aerospace Medicine,* vol. 44, Mar. 1973, p. 286-289. 11 refs.

Clinically healthy male executives who participate in a long-term physical conditioning program have demonstrated cardiac arrhythmia during and after periodic ergometric testing at submaximal and maximal levels. In 1,385 tests on 248 subjects, it was found that 34% of subjects demonstrated an arrhythmia at some time and 13% of subjects developed arrhythmia on more than one test. Premature systoles of ventricular origin were most common, but premature systoles of atrial origin, premature systoles of junctional origin, paroxysmal atrial tachycardia, atrioventricular block, wandering pacemaker, and pre-excitation were also seen. Careful post-test monitoring and pulse rate regulated training sessions are suggested for such programs. (Author)

A73-25337 # Positive /+Gz/ acceleration tolerances of the miniature swine - Application as a human analog. R. R. Burton (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine,* vol. 44, Mar. 1973, p. 294-298. 13 refs.

A73-25338 Comparison of the metabolic effects of centrifugation and heat stress in man. M. H. Harrison (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Aerospace Medicine,* vol. 44, Mar. 1973, p. 299-303. 30 refs.

The metabolic effects of centrifugation and heat stress have been studied in six subjects. The contribution of haemoconcentration to the metabolic effects of the heat exposure was assessed from changes in haemotrocrit and plasma protein concentration. Exposure to 3G for 20 min, and exposure to 50 C db, 38 C wb until central body temperature reached 39 C, increased blood NEFA and glycerol levels. It is suggested that this lipolytic effect of both stress conditions indicates an increase in catecholamine secretion. (Author)

A73-25339 # Clinical applications of averaging techniques in studies of vestibulo-oculomotor function. I - Basic techniques and illustrative cases. J. W. Wolfe, F. A. Brogan, and J. T. Mann (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine,* vol. 44, Mar. 1973, p. 308-311.

A73-25340 Implications of psychoanalytic factors for Air Force operations. S. M. Silverman (USAF, Cambridge Research Laboratories, Bedford, Mass.) and D. H. Lufkin (USAF, Aerospace Environmental Support Center, Ent AFB, Colo.). *Aerospace Medicine,* vol. 44, Mar. 1973, p. 312-316. 9 refs.

Current design considerations for air operations utilize primarily psychophysics or physiological psychology. For the man-machine system, however, the psychic response of the individual to different environmental contexts becomes important in terms of his mental state, attitudes, and predispositions towards certain types of decisions. In this paper examples are given of one class of environments, the enclosed self-sustaining space. A psychoanalytic interpretation is applied and some ways are indicated in which this environment can be modified to give better results from an operational standpoint. (Author)

A73-25341 # Retinal damage thresholds for multiple pulse lasers. R. W. Ebbers and I. L. Dunsky (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine,* vol. 44, Mar. 1973, p. 317, 318. 10 refs.

A Q-switched neodymium laser, operating at a wavelength of 1.06 micron and capable of being repetitively pulsed, was used to determine retinal damage threshold on 100 rhesus monkey eyes. Irradiations were made with repetitive pulse frequencies of 10 pps and 20 pps at exposure times of 0.5 and 1 sec., as well as with single pulses. Statistical comparison of ED-50 values, calculated by probit analyses, indicates no significant difference between the single pulse ED-50 and the ED-50 for the maximum energy pulse in any of the trains of pulses. Thus, a cumulative effect could not be demonstrated under the conditions of this experiment. (Author)

A73-25342 Development of neurosurgical instrumentation and procedures for emergency use in null and low-gravity environments - A speculative approach. P. Lake (Eisenhower Medical Center, Palm Desert; Southern California, University, Los Angeles, Calif.). *Aerospace Medicine,* vol. 44, Mar. 1973, p. 319-323. 6 refs.

A73-25423 The structure of particle tracks. R. Katz, S. C. Sharma, and M. Homayoonfar (Nebraska, University, Lincoln, Neb.). In: Topics in radiation dosimetry. New York, Academic Press, Inc., 1972, p. 317-383. 58 refs. AEC-NSF-supported research.

The theory of delta-ray track effects in various systems is discussed, covering glass and LiF solid state dosimeters, dry solid biological substances, organic scintillators, and ferrous sulfate. Responses of biological cells to heavy ions, fast neutrons, stopped pions, and mixed radiation fields are analyzed. A cellular survival model and a one-hit model of detector response are described. A theory of cell inactivation by heavy monoenergetic ions is developed, is extended to a general radiation environment, and is applied to 14-MeV neutrons, to stopped negative pions, and to heavy-ion cancer therapy. A new concept of 'radiation quality' is introduced. A parameter is derived to substantiate this concept. V.Z.

A73-25475 # Portable electro-phonocardiograph using magnetic tape recorder equipped with patient's voice print. C. Sato, M. Hirano, and T. Sakamoto (Iwate Medical University, Morioka, Iwate; Tokyo, University, Tokyo, Japan). *Japanese Heart Journal,* vol. 13, Nov. 1972, p. 478-487. 18 refs.

A73-25568 * Apparent paradoxical patterns of anaerobic glycolysis and hexokinase activity in the red blood cells of acutely bled rats, with evidence that the responses were in part hormone-dependent. J. C. Sabine (NASA, Ames Research Center, Moffett

Field, Calif.). *British Journal of Haematology*, vol. 23, Oct. 1972, p. 491-498. 14 refs.

A73-25573 * Gravity as a factor in the animal environment. A. H. Smith (California, University, Davis, Calif.). *(American Society of Animal Science, Symposium on Influence of Environment on Nutrient Requirements of Animals, Davis, Calif., Aug. 2, 1971.) Journal of Animal Science*, vol. 35, Sept. 1972, p. 635-641. 39 refs. Grant No. NGR-05-004-008.

Review of current knowledge, research, and research planning on the influence of gravity upon living organisms. Discussed factors affecting the adaptability of animals to increased acceleration fields include age, sex, posture, and body size. Affected functions and aspects reviewed cover growth and mature body size, body composition, maintenance feed requirements, and feed utilization efficiency. It is expected that research involving the exposure of animals to altered gravity states will lead to new biological concepts of very broad importance. M.V.E.

A73-25588 Electrical phenomena in the heart. Edited by W. C. De Mello (Puerto Rico, University, San Juan, P.R.). New York, Academic Press, Inc., 1972. 423 p. $26.

The current state of knowledge on the electrophysiology of the heart is outlined in review and summary papers covering a wide range of subjects from the ultrastructure of heart cells and the molecular organization of the heart cells membrane to mechanisms of sealing and excitation-contraction coupling. The major topics include electrical properties of embryonic heart cells, correlation between the ultrastructure and the function of intercellular contacts, membrane lipids and cardiac electrogenesis, excitation and repolarization processes in heart cells, active ion transport in the heart muscle, electrophysiology of the sinoatrial node, the membrane capacitance of heart cells, cardiac innervation and synaptic transmission in the heart, atrioventricular transmission, and the healing-over process in cardiac and other muscle fibers. T.M.

A73-25589 Electrical properties of embryonic heart cells. N. Sperelakis (Virginia, University, Charlottesville, Va.). In: Electrical phenomena in the heart. New York, Academic Press, Inc., 1972, p. 1-61. 193 refs. Research supported by the American Heart Association; Grant No. PHS-HE-11155.

Electrophysiological studies of embryonic heart cells are surveyed with respect to experimental procedures employed and the nature and significance of results obtained to date. Studies of intact embryonic chick hearts as a function of embryonic age cover the ultrastructure of myocardial cells, (Na+, K+)-ATPase activity, tissue electrolyte analyses, and membrane electrical properties. The ultrastructure and metabolism of cultured embryonic heart cells are also described along with membrane electrical properties and interactions among cells. T.M.

A73-25590 Correlation between the ultrastructure and function of intercellular contacts. W. K. Berger (Saarland, Universität, Homburg, West Germany). In: Electrical phenomena in the heart. New York, Academic Press, Inc., 1972, p. 63-88. 71 refs.

Past observations on the ultrastructure of intercellular relationships in the cardiac muscle are reviewed, and experiments relevant to the problem of activity transmission in the heart are described. Models for excitation spread based on new morphological and experimental data are discussed in a manner that outlines the present level of knowledge and the need for specific further research. T.M.

A73-25591 Membrane lipids and cardiac electrogenesis. W. C. De Mello (Puerto Rico, University, San Juan, P.R.). In: Electrical phenomena in the heart. New York, Academic Press, Inc., 1972, p. 89-110. 47 refs. Research supported by the Puerto Rico Heart Association; Grants No. NIH-HE-10897; No. NIH-NS-07464.

Available experimental data on the molecular structure and lipid composition of the cell membrane are reviewed along with research on the effects of membrane phospholipids on the membrane potential of cardiac and other excitable cells. Topics considered include the influence of calcium on the membrane potential of a myocardial cell treated with phospholipase C, the possibility of protein barriers around pacemaker cells, and the role of triglycerides. T.M.

A73-25592 Excitation process in heart cells. J. Dudel (München, Universität, Munich, West Germany). In: Electrical phenomena in the heart. New York, Academic Press, Inc., 1972, p. 111-132. 44 refs.

The rising phase (depolarization) of the action potential of vertebrate cardiac cells is examined along with characteristics of the pacemaker potential - the slow depolarization initiating the upstroke in spontaneously active cardiac cells. The information presented constitutes a review and compilation of available research materials in this field. The use of the voltage clamp technique in cardiac preparations is described, and measured current relationships are examined. T.M.

A73-25593 The repolarization process of heart cells. D. Noble (Oxford University, Oxford, England) and R. W. Tsien (Yale University, New Haven, Conn.). In: Electrical phenomena in the heart. New York, Academic Press, Inc., 1972, p. 133-161. 39 refs.

Recent experimental results on charge transfer mechanisms are related to older studies in an attempt to provide an explanation of the major principles involved in understanding the repolarization process of cardiac muscle. Ionic current mechanisms which are responsible for the repolarization time course are considered mainly for Purkinje fibers, but results obtained for ionic mechanisms in other heart cells are summarized. T.M.

A73-25594 Active ion transport in heart muscle. H. G. Haas (Heidelberg, Universität, Heidelberg, West Germany). In: Electrical phenomena in the heart. New York, Academic Press, Inc., 1972, p. 163-189. 87 refs.

Theoretical and experimental criteria of active ion transport in excitable cells are discussed, and a molecular model of ion transport is examined which involves a mobile carrier medium shuttling between opposite faces of the membrane. Recent studies in this area are surveyed in an attempt to delineate the current state of knowledge and to elucidate the major problems in understanding bioelectric phenomena in the heart muscle. The transfer of sodium, potassium, and calcium ions is treated in terms of available flux measurements, and active ion transport is correlated with cardiac excitation features. T.M.

A73-25595 Electrophysiology of the sinoatrial node. T. C. West (California, University, Davis, Calif.). In: Electrical phenomena in the heart. New York, Academic Press, Inc., 1972, p. 191-217. 63 refs.

Comprehensive review of the present state of knowledge on the functions of pacemaker cells in the sinoatrial node. Topics considered include the ionic and metabolic principles of pacemaker activity, the manner in which these mechanisms are reflected in the observed electrical activity, the membranal effects of neurohormonal control factors on pacemaker cells, the comparison of normal automaticity in the sinoatrial node with the automaticity arising from ectopic foci, and the effects of cardioactive drugs on regions of cardiac automaticity. T.M.

A73-25596 The membrane capacitance of heart cells. H. A. Fozzard (Chicago, University, Chicago, Ill.). In: Electrical phenomena in the heart. New York, Academic Press, Inc., 1972, p. 219-233. 37 refs. Grant No. PHS-HE-11665.

The capacitive property of heart muscle is a very important factor in understanding the excitable behavior of the tissue. The physical principles underlying the biological concept of capacitance

are briefly discussed, and the physiological significance of membrane capacitance (in excitation, conduction, and as a membrane marker) is interpreted on the basis of currently available data. Measurements of membrane capacitance in Purkinje fibers, ventricular muscle, atrial muscle, and other tissues are surveyed. T.M.

A73-25597 Cardiac innervation and synaptic transmission in heart. M. Anderson and J. del Castillo (Puerto Rico, University, San Juan, P.R.). In: Electrical phenomena in the heart. New York, Academic Press, Inc., 1972, p. 235-261. 165 refs.

Recent research on regulatory innervation of the vertebrate heart through the parasympathetic and sympathetic divisions of the automatic nervous system is surveyed, and experimental results are reviewed for the features of efferent and afferent sympathetic and parasympathetic fibers, histological aspects of the innervation, and the terminations of nerve fibers. The release of neurotransmitters, the stimulation of cardiac nerves, and the electrical effects of stimulating the cardiac nerves are examined. T.M.

A73-25598 Atrioventricular transmission. C. Mendez and G. K. Moe (Masonic Medical Research Laboratory, Utica, N.Y.). In: Electrical phenomena in the heart. New York, Academic Press, Inc., 1972, p. 263-291. 69 refs.

A relatively long pause elapses between the activation of atrial and ventricular muscles, and the P-R interval represents the time needed by an impulse to travel through a series of tissues with different properties. The process covers a large area of cardiac electrophysiology, and only the principal qualitative aspects of the problem are summarized in the present review of recent research. The exposition is subdivided into sections dealing with the propagation of impulses across the atrioventricular node, propagation through the specialized ventricular conduction system, and propagation across the Purkinje fiber-muscle junctions or transitions. T.M.

A73-25599 Comparative aspects of electrogenesis in myocardial cells. F. V. McCann (Dartmouth College, Hanover, N.H.). In: Electrical phenomena in the heart. New York, Academic Press, Inc., 1972, p. 293-322. 112 refs. Research supported by the American Heart Association, New Hampshire Heart Association, and NIH.

The electrical phenomena recorded by various researchers in heart cells of both vertebrates and invertebrates are compared in order to examine not only the fundamental questions regarding cardiac excitability that they in themselves provoke but also the answers they contribute to the overall problems of cardiac function. The comparison of the origin of cardiac cell electrical activity is based on the neurogenic and myogenic mechanisms for myocardial excitation. Hearts are considered as neurogenic if activating impulses arise in neural elements and as myogenic if the impulse initiation occurs in specialized muscle tissue. T.M.

A73-25600 The healing-over process in cardiac and other muscle fibers. W. C. De Mello (Puerto Rico, University, San Juan, P.R.). In: Electrical phenomena in the heart.
New York, Academic Press, Inc., 1972, p. 323-351. 40 refs. Research supported by the Puerto Rico Heart Association; Grants No. NIH-HE-10897; No. NIH-NS-07464.

Experimental data on the response of many types of cells to surface injury are reviewed in an attempt to delineate major features of physical and electrical sealing processes. Attention is given to the healing over of quiescent myocardial fibers, ionic factors involved in the healing over process of heart tissues, the effects of sodium and calcium on the rate of sealing in heart muscles, the relation between muscle contraction and the healing over, and possible sealing mechanisms. T.M.

A73-25601 Calcium movements and excitation-contraction coupling in cardiac cells. J. B. Bassingthwaighte (Mayo Graduate School of Medicine, Rochester, Minn.) and H. Reuter (Bern, Universität, Berne, Switzerland). In: Electrical phenomena in the heart. New York, Academic Press, Inc., 1972, p. 353-395. 105 refs. Research supported by the American Heart Association; Swiss National Science Foundation Grant No. 3,91,69; Grants No. NIH-HE-9719; No. NIH-K3-He-22649.

Events occurring at the interface between a cardiac cell and the surrounding medium are related to the primary cell functions (contraction and tension development) by deriving a mathematical model of excitation-contraction coupling on a single sarcomere level. The model basically describes the control of sarcoplasmic calcium concentration on a single sarcomere level in the mammalian heart. T.M.

A73-25637 # Theory of cooperative defect formation in a biopolymer molecule under the action of radiation (Teoriia kooperativnogo obrazovaniia povrezhdenii v molekule biopolimera pod deistviem obluchenija). M. D. Frank-Kamenetskii, A. V. Lukashin, and A. V. Vologodskii (Akademiia Nauk SSSR, Institut Atomnoi Energii, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 208, Jan. 21, 1973, p. 721-724. In Russian.

Theoretical considerations are given in support of the theory that strong interactions between the adjacent chain members take place when biopolymers with ordered molecular structures are exposed to UV light and that such interactions produce cooperative properties in biopolymer molecules and stimulate defect formation of a cooperative type. Expressions are derived to describe the development of this phenomenon in a linear homogeneous biopolymer chain. V.Z.

A73-25638 # Quaternary structure /subunit composition/ of human ceruloplasmin (Chetvertichnaia struktura /sub'edinichnyi sostav/ tseruloplazmina cheloveka). I. M. Vasilets, V. P. Kushner, K. A. Moshkov, and S. A. Neifakh (Akademiia Nauk SSSR, Institut Tsitologii, Leningrad, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 208, Jan. 21, 1973, p. 729-732. 15 refs. In Russian.

Ceruloplasmin was obtained according to Broman (1964) from the retroplacental serum of human blood. A molecular ceruloplasmin subunit form, CP-1, was isolated from the ceruloplasmin by gradient elution with a K-phosphate buffer on a hydroxyl apatite column. The CP-1 was subjected to dissociation by five different procedures which yielded proteins with molecular weights from 70,000 to 93,000, showing that the initial CP-1 was split into half-molecules. It is concluded that a molecule of native ceruloplasmin of man contains only two subunits of roughly equal molecular weight. V.Z.

A73-25647 Single unit and evoked potential responses in cat optic tract to paired light flashes. C. K. Peck and D. B. Lindsley (California, University, Los Angeles, Calif.). *Experimental Brain Research*, vol. 16, Feb. 28, 1973, p. 371-382. 11 refs. Grant No. PHS-NS-8552.

A73-25648 Kinetics of oxygen uptake and recovery for supramaximal work of short duration. V. L. Katch (Michigan, University, Ann Arbor, Mich.). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 31, no. 3, 1973, p. 197-207. 34 refs.

Investigation of the kinetics or time pattern of oxygen uptake during exercise and recovery for supramaximal work of short duration. The study was performed upon 35 male college students using a bicycle ergometer. The results include the findings that total oxygen uptake is 10% lower than the maximum oxygen uptake determined on a separate progressive step-increment test, and that maximum oxygen uptake is reached in approximately 2 min in supramaximal work. M.V.E.

A73-25649 Ergonomic assessment of information work (Zur ergonomischen Beurteilung informatorischer Arbeit). W. Rohmert and H. Luczak (Darmstadt, Technische Hochschule, Darmstadt, West Germany). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 31, no. 3, 1973, p. 209-229. 25 refs. In German.

Discussion of an ergonomic concept for the assessment of the endurance limits available and fatigue incurred in the performance of

information tasks. Right and wrong response incidence in the performance of an information task consisting in the video coding of addresses by 16 female and 2 male subjects highly trained in this kind of work was measured along with physiological strains (heart rate, heart rate variability, horizontal and vertical electrooculogram, electromyogram of musculus extensor digitorum and musculus rhomboideus) and stresses (performance time and its information and motor components) as a function of work shift time length. The syntactic information content obtained from an analysis of the coding rules is compared with published data from other sources for an assessment of the difficulty of the model task related to the input information flow rate. M.V.E.

A73-25696 **Understanding the atrial sound.** H. J. N. Bethell and P. G. F. Nixon (Charing Cross Hospital, London, England). *British Heart Journal*, vol. 35, Mar. 1973, p. 229-235. 36 refs.

The term 'atrial sound' is used to refer to the sound associated with atrial systole both in the healthy and the diseased heart, and irrespective of whether the vibrations are audible through the stethoscope or require a phonocardiogram for their detection. The term 'atrial beat' is used to refer to the movement of the apex produced by atrial contraction. The discussion is only concerned with events arising from the left heart. Methods of recording left atrial activity, genesis of the atrial sound, factors influencing timing and audibility, hemodynamic correlations, significance, and clinical applications of the atrial sound are discussed. F.R.L.

A73-25697 **Familial syndrome of midsystolic click and late systolic murmur.** P. Rizzon, G. Biasco, G. Brindicci, and F. Mauro (Bari, Università, Bari, Italy). *British Heart Journal*, vol. 35, Mar. 1973, p. 245-259. 43 refs.

Evidence has recently been produced to show that patients with a midsystolic click and late systolic murmur have a peculiar abnormality of the mitral valve: the systolic ballooning of the leaflets, particularly the posterior one, usually associated with mild mitral insufficiency. Occurrence of similar clinical, phonocardiographic, and electrocardiographic findings in more than one member of each of eigh families studied strongly supports the hypothesis of a genetic basis. The frequent association with findings indicating myocardial involvement is pointed out. Its potential aetiological implications are discussed. (Author)

A73-25698 **Phonocardiogram and apex cardiogram in systolic click-late systolic murmur syndrome.** E. J. Epstein and N. Coulshed (Sefton General Hospital, Liverpool, England). *British Heart Journal*, vol. 35, Mar. 1973, p. 260-275. 65 refs. Research supported by the United Liverpool Hospitals and Peel Medical Trust.

A detailed study was made of the phonocardiogram and external pulse wave recordings in a series of patients with the systolic click (late systolic murmur syndrome). An attempt was made to correlate some of the features of the left ventricular cineangiogram with changes in the apex cardiogram. Phonocardiography and external pulse wave recordings provide useful noninvasive diagnostic information, and in the majority of patients obviate the need for cardiac catheterization and ventriculography. F.R.L.

A73-25699 **Temporal sequence of right and left atrial contractions during spontaneous sinus rhythm and paced left atrial rhythm.** G. G. Belz, G. von Bernuth, R. Hofstetter, D. Röhl, and M. Stauch (Ulm, Universität; Bundeswehrkrankenhaus, Ulm, West Germany). *British Heart Journal*, vol. 35, Mar. 1973, p. 284-287. 17 refs.

A73-25799 **Sensory coding in the mammalian nervous system.** G. Somjen (Duke University, Durham, N.C.). New York, Appleton-Century-Crofts (Neuroscience Series, No. 4), 1972. 389 p. 979 refs. $18.95.

The methods used in sensory physiology are examined along with the mathematical model theories of the ionic mechanisms of neural activity. Aspects of the first-order code are discussed, giving attention to variables of the sensory code, approaches for maintaining the direct contact with the world, the inner senses, the external chemical senses, the inner ear, and the photoreceptors of the retina. Approaches to brain function are considered together with sensory synaptic cascades, the central coding in the somatic senses, the central code of hearing, the central code of sight, and the central code of the chemical senses. G.R.

A73-26079 # **Dynamics of changes in neuron activity regimes of the ascending auditory pathways (Dinamika izmenenii rezhimov aktivnosti neironov voskhodiashchego slukhovogo puti mozga).** N. N. Tavkhelidze (Akademiia Nauk Gruzinskoi SSR, Institut Kibernetiki, Tiflis, Georgian SSR). *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia*, vol. 69, Jan. 1973, p. 41-43. In Russian.

Discussion of the information processing characteristics of the ascending auditory pathways. Changes in individual cell responses to stimulations selected in accordance with a special program are reviewed. The implications of the computer-treated experimental results are examined. M.V.E.

A73-26083 # **Nature and significance of periodic electrical activity variations in the neocortex and the hippocampus during the paradoxical phase of sleep (O kharaktere i znachenii periodicheskogo izmeneniia elektricheskoi aktivnosti novoi kory i gippokampa pri paradoksal'noi faze sna).** T. N. Oniani (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tiflis, Georgian SSR). *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia*, vol. 69, Jan. 1973, p. 157-160. 7 refs. In Russian.

A73-26084 # **Retention of information in the iconic visual memory during recognition of images of varying complexity (Sokhranenie informatsii v ikonicheskoi zritel'noi pamiati pri opoznanii izobrazhenii raznoi slozhnosti).** L. I. Leushina (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Jan. 1973, p. 3-9. 21 refs. In Russian.

A73-26085 # **Interrelations among the suprarenal gluco-corticoid activity, the cardiovascular systems, and the electrolyte metabolism during prolonged work (Vzaimootnosheniia mezhdu gliukokortikoidnoi aktivnost'iu nadpochechnikov, serdechno-sosudistoi sistemoi i elektrolitnym obmenom pri dlitel'noi rabote).** A. A. Viru, P. K. Kyrge, and E. A. Viru (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Jan. 1973, p. 105-110. 20 refs. In Russian.

Review of the results of observations of the effects of prolonged repetitive work performed by athletes subjected to 1-min full-capacity workups on bicycle ergometers. The results of the study include the finding that changes in suprarenal gluco-corticoid activity correlate substantially with changes in blood pressure. M.V.E.

A73-26086 # **Afferent connections of the thermoregulation center (Ob afferentnykh sviaziakh tsentra termoreguliatsii).** L. P. Dymnikova, N. P. Zakharzhevskaia, and K. P. Ivanov (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Jan. 1973, p. 156-163. 17 refs. In Russian.

Study of the responses of single neurons of the anterior and posterior hypothalamus, septum, and ventrobasal thalamus nuclei to thermal stimulations of the skin. The results indicate the existence of extensive connections between the thermoregulation center in the cerebrum and the peripheral thermoreceptors. M.V.E.

A73-26087 # **Posture responses of upper limb muscles during electric stimulation of the vestibular apparatus (O poznykh reaktsiiakh myshts verkhnikh konechnostei pri elektricheskom razdrazhenii vestibuliarnogo apparata).** A. V. Syrovegin (Ministerstvo Zdravookhraneniia SSSR, Nauchno-Issledovatel'skii Institut Gigieny Vodnogo Transporta, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 59, Jan. 1973, p. 169-173. 6 refs. In Russian.

Investigation of the effects of electric stimulation of the vestibular apparatus on the electromyogram of upper limb muscles in man. The results obtained suggest that changes observed in the

electric activity of upper limb flexor muscles result from the reticular formation activity arising in response to electric stimulation of the vestibular apparatus, whereas changes observed in extensor muscles represent the totality of the influences descending along the reticulospinal and vestibulospinal tracts. M.V.E.

A73-26116 Changes in microvascular diameter and oxygen tension induced by carbon dioxide. B. R. Duling (Virginia, University, Charlottesville, Va.). *Circulation Research*, vol. 32, Mar. 1973, p. 370-376. 24 refs. Grant No. NIH-12792.

Microvascular diameters in the hamster cheek pouch were measured with a Vickers image-shearing eyepiece and oxygen tension (PO2) was measured amperometrically. An attempt was made to quantify the effect of CO2 on the perivascular PO2, investigate the effect of CO2 on microvascular diameter, and study the interactions between CO2 and O2. Possible mechanisms coupling tissue metabolisms and flow were investigated. It was found that CO2 altered both the diameter and the PO2 of microvessels. F.R.L.

A73-26120 Circadian rhythms in catecholamines in organs of the golden hamster. G. M. Lew and W. B. Quay (California, University, Berkeley, Calif.). *American Journal of Physiology*, vol. 224, Mar. 1973, p. 503-508. 25 refs. Grants No. PHS-NS-06296; No. PHS-HD-04103.

Norepinephrine (NE) and epinephrine (E) contents of adrenal glands, spleen, heart, and whole brain were extracted and determined fluorometrically from male golden hamsters (Mesocricetus auratus) under three conditions: (1) cold acclimated at 5 C (and not hibernating) for 4 months, (2) hibernating under the same ambient conditions, and (3) nonhibernating at 22 C. Results presented are consistent with most of the physiological and histochemical observations contrasting the peripheral adrenergic systems of hibernators and nonhibernators among small mammals. (Author)

A73-26121 Adrenal influence on the supercompensation of cardiac glycogen following exercise. J. L. Poland and D. A. Trauner (Virginia, Medical College, Richmond, Va.). *American Journal of Physiology*, vol. 224, Mar. 1973, p. 540-542. 15 refs. Grant No. NIH-HE-12634.

Cardiac glycogen concentrations were determined in control rats and in adrenalectomized rats prior to and after a swimming bout to exhaustion. The exercise-induced supercompensation of cardiac glycogen reached a peak approximately four hr following exercise and required about 24 hr to recover its preexercise level. It is found that glucocorticoids are essential for the normal pattern of cardiac glycogen recovery following exercise. V.Z.

A73-26122 Lactate, alpha-GP, and Krebs cycle in sea-level and high-altitude native guinea pigs. E. Mensen de Silva and A. Cazorla (Universidad Peruana, Lima, Peru). *American Journal of Physiology*, vol. 224, Mar. 1973, p. 669-672. 24 refs. DA Grant No. 66-G-123.

Lactate and alpha-glycerophosphate were measured enzymatically in tissues of guinea pigs native to high altitude (14,000 ft) and native to sea level in a study of anaerobic glucose metabolism during acute anoxia. Gas-liquid chromatography was also applied to measure Krebs-cycle intermediates in the animals. Lactate and alpha-glycerophosphate contents were lower and succinate contents were much higher in the tissues of high-altitude rats. V.Z.

A73-26196 Colour selectivity in orientation masking and aftereffect. W. J. Lovegrove and R. Over (Queensland, University, Brisbane, Australia). *Vision Research*, vol. 13, May 1973, p. 895-901. 17 refs.

Color selectivity was studied in two experiments in orientation masking and in tilt aftereffects on a group of subjects. A three-field tachistoscope was used for successive exposures of a fixation point in the first experiment with a grating and a blank field. An oscilloscope was used in the second experiment for displaying a grating with test stimuli and images which could be varied by rotating a Dove prism in the viewing aperture. The results suggest that the observed McCullough effect is due to the adaptation of neural analysors to both orientation and wavelength. V.Z.

A73-26197 On neural inhibition, contrast effects and visual sensitivity. S. L. Guth (Indiana University, Bloomington, Ind.). *Vision Research*, vol. 13, May 1973, p. 937-957. 21 refs. NSF Grant No. GB-8232X.

Analysis of experimental data shows that the visual perception contrast increment thresholds are increased when the test field with a darker center is surrounded by a brighter annular area. This effect is reversed when the brightness of the center of the field is equal to or higher than that of the surrounding annular area. An explanation is proposed for this phenomenon. V.Z.

A73-26198 Apparent contraction and disappearance of moving objects in the peripheral visual field. R. H. Day (Monash University, Clayton, Victoria, Australia). *Vision Research*, vol. 13, May 1973, p. 959-975. 22 refs.

Experiments are carried out to determine the nature of the apparent contraction of a light arc rotating at 0.5 to 2 rps when the arc is observed against a darker peripheral field. Continuous luminance gradients, step-function gradients, and the disappearance of a trailing stimulus are covered. Arcs and aperture pairs of uniform luminance are compared at different angular velocities. Special attention is given to the masking and retromasking effects involved. The masking is possibly linked with the activity of the recently discovered Y-type or transient ganglion cells. V.Z.

A73-26199 The influence of wavelength on visual adaptation to spatially periodic stimuli. A. Y. Maudarbocus and K. H. Ruddock (Imperial College of Science and Technology, London, England). *Vision Research*, vol. 13, May 1973, p. 993-998. 17 refs.

A73-26200 Binocular rivalry and binocular fusion of after-images. N. J. Wade (Dundee, University, Dundee, Scotland). *Vision Research*, vol. 13, May 1973, p. 999, 1000. Research supported by the Science Research Council.

It is shown that a fusion of negative after-images of differently oriented gratings can be achieved during observations by both eyes under conditions of intermittent illumination rivalry, when a dark or continuously illuminated background is used. The fusion effect depends on both the rate of flash stimuli and the spatial separation of the gratings. V.Z.

A73-26216 Effect of acute exposure to CO2 on lung mechanics in normal man. J. R. Rodarte and R. E. Hyatt (Mayo Clinic and Mayo Foundation, Rochester, Minn.). *Respiration Physiology*, vol. 17, Mar. 1973, p. 135-145. 30 refs. Research supported by the American Thoracic Society; Grant No. PHS-HL-12229.

The effect of CO2 on lung mechanics was examined in 10 healthy men at rest. Measurements were begun after each breathed an inspired concentration of 6% CO2 in air for 5 min. Lung volumes, expiratory flow-volume curves, static pressure-volume curves of the lung, and pulmonary conductance were measured. CO2 breathing produced a small but statistically significant increase in total lung capacity. Pulmonary conductance measured by a flow-interruption technique increased markedly in one subject but decreased in all others. The decrease in conductance was not prevented by treatment with a bronchodilator and was considered the result of an increase in laryngeal resistance. (Author)

A73-26217 Mechanics of breathing in high altitude and sea level subjects. J. C. Cruz (Universidad Peruana, Lima, Peru). *Respiration Physiology*, vol. 17, Mar. 1973, p. 146-161. 41 refs. DA Grants No. G-0026; No. G-0030.

The mechanics of breathing in fourteen healthy male subjects were studied, using the airway interruption technique. Eight subjects, born at high altitude, were studied at 4350 m. Four of these were studied again at 150 m on the third day after their arrival. Six sea level medical students were studied for comparison at both altitudes.

All measurements were carried out in the sitting position. Airway resistance, lung compliance, and work of breathing were determined. Results are extensively discussed, compared, and evaluated. F.R.L.

A73-26218 Comparison of blood and alveolar gas composition during rebreathing in the dog lung. C. J. Yu, B. Lutherer, A. R. Guyatt, and A. B. Otis (Florida, University, Gainesville, Fla.). *Respiration Physiology*, vol. 17, Mar. 1973, p. 162-177. 22 refs. Contract No. AF 41(609)-3158.

A73-26219 Studies of alveolar-mixed venous CO2 and O2 gradients in the rebreathing dog lung. A. R. Guyatt, C. J. Yu, B. Lutherer, and A. B. Otis (Florida, University, Gainesville, Fla.). *Respiration Physiology*, vol. 17, Mar. 1973, p. 178-194. Contract No. AF 41(609)-3158.

A73-26220 Role of the arterial chemoreceptors in ventilatory adaptation to hypoxia of awake dogs and rabbits. P. Bouverot, V. Candas, and J. P. Libert (CNRS, Laboratoire de Physiologie Respiratoire, Strasbourg, France). *Respiration Physiology*, vol. 17, Mar. 1973, p. 209-219. 26 refs.

Awake dogs and rabbits trained to wear a respiratory mask were studied in an altitude chamber at sea level and at altitudes from 3000 to 4000 m. Resting ventilation, pulmonary gas exchanges, arterial pH and gas tensions, and ventilatory responses to NaCN injection and to transient O2-inhalation were studied before and after chronic bilateral carotid chemodenervation. Cutting both sinus nerves reduced the arterial chemoreflex drive of breathing in dogs and abolished it in rabbits. At low altitude, sino-carotid body denervation was accompanied by a hypoventilation, an increase in arterial CO2 pressure, and a decrease in arterial oxygen pressure and arterial pH. During acute hypoxia all intact animals hyperventilated and exhibited a resulting arterial hypocapnia; hyperventilation was slight in denervated dogs; chronically chemodenervated rabbits did not hyperventilate. (Author)

A73-26221 Differential effects of central versus peripheral vision on egocentric and exocentric motion perception. Th. Brandt, J. Dichgans, and E. Koenig (Neurologische Universitätsklinik, Freiburg im Breisgau, West Germany). *Experimental Brain Research*, vol. 16, Mar. 19, 1973, p. 476-491. 18 refs. Research supported by the Deutsche Forschungsgemeinschaft.

Egocentric and exocentric motion perception was studied in five experiments on 43 subjects who sat in a rotating chair inside an independently rotating cylindrical drum with a wall striped white and black in alternation. The rotation of the drum was invariably perceived by the subjects as self-rotation indistinguishable from the rotation of the chair. Tests with stimuli rotating in opposite directions indicated that peripheral stimuli were responsible for exocentric perception, while the optokinetic nystagmus and egocentric motion perception were concentrated in the center of the visual field. V.Z.

A73-26222 * Adjustment of saccade characteristics during head movements. P. Morasso, E. Bizzi, and J. Dichgans (MIT, Cambridge, Mass.). *Experimental Brain Research*, vol. 16, Mar. 19, 1973, p. 492-500. 13 refs. Research supported by the Sloan Foundation, Deutsche Forschungsgemeinschaft and Consiglio Nazionale delle Ricerche; Grants No. NIH-RO1-NS-09343; No. NGR-22-009-308.

Saccade characteristics have been studied during coordinated eye-head movements in monkeys. Amplitude, duration, and peak velocity of saccades with head turning were compared with saccades executed while the head was artificially restrained. The results indicate that the saccade characteristics are modulated as a function of head movement, hence the gaze movement (eye+head) exactly matches saccades with head fixed. Saccade modulation is achieved by way of negative vestibulo-ocular feedback. The neck proprioceptors, because of their longer latency, are effective only if the head starts moving prior to the onset of saccade. It is concluded that saccades make with head turning are not 'ballistic' movements because their trajectory is not entirely predetermined by a central command. (Author)

A73-26223 Influence of synchronized sleep upon spontaneous and induced discharges of single units in visual system. T. Sato, M. Yamamoto, and H. Nakahama (Tohoku University, Sendai, Japan). *Experimental Brain Research*, vol. 16, Mar. 19, 1973, p. 533-541. 46 refs.

A73-26287 Electrocardiographic evidence of left atrial hypertension in acute myocardial infarction. P. A. N. Chandraratna and M. Hodges (Rochester, University, Rochester, N.Y.). *Circulation*, vol. 47, Mar. 1973, p. 493-498. 20 refs. Research supported by the University of Rochester; Grant No. NIH-HE-05500.

A73-26288 Angina pectoris in men - Prognostic significance of selected medical factors. C. W. Frank, E. Weinblatt, and S. Shapiro. *Circulation*, vol. 47, Mar. 1973, p. 509-517. 17 refs. Grant No. NIH-HE-05794.

Prognosis of men whose first manifestation of coronary heart disease was angina without antecedent infarction was found to resemble closely that of men followed after an initial MI. Overall mortality over a period of 4.5 years following a baseline examination was the same in the two cohorts: 17.5%. In both groups of men, electrocardiographic abnormalities and blood pressure elevation identified subsets of coronary patients with a relatively poor prognosis, but the course of disease was apparently not influenced by the serum cholesterol level. Among the men with angina no relationship emerged between symptomatic status at time of baseline and risk of mortality in the ensuing observation period. (Author)

A73-26289 The sick sinus syndrome. M. I. Ferrer (Columbia University; Columbia-Presbyterian Medical Center, New York, N.Y.). *Circulation*, vol. 47, Mar. 1973, p. 635-641. 25 refs. Grant No. PHS-HE-02001.

A review of sick sinus syndrome studies is given, covering the diverse manifestations of the syndrome, and indirect indications of its presence. It is pointed out that provocative tests are of some value but are not entirely satisfactory and that the therapy for the chronic form will eventually be a ventricular artificial pacemaker. V.Z.

A73-26319 * Forced guidance and distribution of practice in sequential information processing. L. R. Decker and C. A. Rogers, Jr. (Arizona, University, Tucson, Ariz.). *Perceptual and Motor Skills*, vol. 36, Apr. 1973, p. 415-419. 11 refs. Grant No. NGR-03-002-091.

Distribution of practice and forced guidance were used in a sequential information-processing task in an attempt to increase the capacity of human information-processing mechanisms. A reaction time index of the psychological refractory period was used as the response measure. Massing of practice lengthened response times while forced guidance shortened them. Interpretation was in terms of load reduction upon the response-selection stage of the information-processing system. (Author)

A73-26320 Target-detection performance as a function of noise intensity and task difficulty. H. D. Warner and N. W. Heimstra (South Dakota, University, Vermillion, S. Dak.). *Perceptual and Motor Skills*, vol. 36, Apr. 1973, p. 439-442. Grant No. AF-AFOSR-69-1822.

The purpose of the present investigation was to determine the effects of intermittent white noise with a 30% on-off ratio on target-detection performance under 4 levels of noise intensity and 3 levels of task difficulty. The 2 measures of performance were response latency and detection errors. The results showed that intensity interacts with task difficulty to determine the effect of intermittent noise on target-detection performance with both performance facilitation and decrement obtained. (Author)

A73-26321 **Possible stimulus hypothesis and visual space perception.** R. Britten (North Queensland, James Cook University, Townsville, Australia). *Perceptual and Motor Skills*, vol. 36, Apr. 1973, p. 495-502. 14 refs.

Consideration of the implications of the possible stimulus hypothesis for perceptual constancy and for tests of invariance hypotheses. It is shown that explanations for the perception of objects in space should be more complex than Helmholtz and Koffka have indicated and that Gibson's theory would be more precise and broader in scope if the possible stimulus hypothesis were recognized as an essential part of the theory. A.B.K.

A73-26322 **Effects of prolonged dark adaptation on autokinetic movement.** R. C. White (Acadia University, Wolfville, Nova Scotia, Canada). *Perceptual and Motor Skills*, vol. 36, Apr. 1973, p. 521, 522. 5 refs.

To determine the effects of prolonged dark adaptation on autokinetic movement two groups of 10 subjects with equal numbers of men and women were subjected to 1 hr or 5 min of dark adaptation before tests on autokinetic judgments. Subjects dark adapted for 1 hr had shorter latency of onset of movement than subjects with 5 min of dark adaptation. There was no significant difference between men and women. (Author)

A73-26361 **Computer analysis of the orthogonal electrocardiogram and vectorcardiogram in 939 cases with hypertensive cardiovascular disease.** D. McCaughan, D. Littmann, and H. V. Pipberger (U.S. Veterans Administration Hospital, Washington, D.C.). *American Heart Journal*, vol. 85, Apr. 1973, p. 467-482. 46 refs. Grant No. NIH-HL-15047-01.

A73-26362 **Maximal oxygen intake and nomographic assessment of functional aerobic impairment in cardiovascular disease.** R. A. Bruce, F. Kusumi, and D. Hosmer (Washington, University, Seattle, Wash.). *American Heart Journal*, vol. 85, Apr. 1973, p. 546-562. 25 refs. Grants No. PHS-HE-09773; No. PHS-HE-13517-01; No. PHS-HE-05281; No. PHS-HS-00092; No. NIH-RR-37.

A73-26477 * **Chemical evolution - Recent syntheses of bioorganic molecules.** E. Stephen-Sherwood and J. Oro (Houston, University, Houston, Tex.). *(Lunar Science Institute, Conference on Space Biology, Houston, Tex., Oct. 11, 12, 1971.) Space Life Sciences*, vol. 4, Jan. 1973, p. 5-31. 223 refs. NASA-supported research.

Review of the important developments that have occurred in abiological biomonomer and biopolymer synthesis since about 1967, and discussion of their significance for the field of chemical evolution and the origin of life. The major portion of the review is devoted to important developments in the abiotic formation of bioorganic monomers and their condensation to biopolymers under conditions presumed to have prevailed on the primeval earth. Special attention is given to contributions shedding light on the mechanism of synthesis and selection of amino acids and on interactions of amino acids and polypeptides with nucleotides and oligonucleotides. M.V.E.

A73-26478 * **The prospect of life on Jupiter.** C. Ponnamperuma (Maryland, University, College Park, Md.) and P. Molton (NASA, Ames Research Center, Exobiology Div., Moffett Field, Calif.). *(Lunar Science Institute, Conference on Space Biology, Houston, Tex., Oct. 11, 12, 1971.) Space Life Sciences*, vol. 4, Jan. 1973, p. 32-44. 12 refs.

We have simulated electrical discharges in the Jovian atmosphere, using anhydrous methane-ammonia mixtures, and shown the formation of simple aliphatic nitriles, amino-nitriles, and their oligomers. Including hydrogen sulfide in the gas mixture, it appears that sulfur-containing amino-nitriles are not formed, since the hydrolysate of the products did not contain the corresponding amino-acids. There is a strong analogy between these reactions and the classical spark reactions simulating the primitive earth's atmosphere. We are attempting a closer simulation of Jupiter's atmosphere by using appropriate temperature and pressure conditions. It seems that prebiotic synthesis on Jupiter may have reached an advanced state. As an alternative approach we have tested the survival ability of common terrestrial microorganisms in aqueous media at 102 atmospheres pressure and at 20 C in a simulated Jovian atmosphere. E. coli, S. marcescens, A. aerogenes, and B. subtilis will all tolerate 24 hr under these conditions with little death. (Author)

A73-26479 **Chemical volatilization as a technique for the detection of extraterrestrial biopolymers and possible metabolic products.** W. Henderson, W. C. Kray, and M. Calvin (California, University, Berkeley, Calif.). *(Lunar Science Institute, Conference on Space Biology, Houston, Tex., Oct. 11, 12, 1971.) Space Life Sciences*, vol. 4, Jan. 1973, p. 45-59. 37 refs.

A73-26480 * **Criteria for distinguishing biogenic and abiogenic amino acids - Preliminary considerations.** K. A. Kvenvolden (NASA, Ames Research Center, Planetary Biology Div., Moffett Field, Calif.). *(Lunar Science Institute, Conference on Space Biology, Houston, Tex., Oct. 11, 12, 1971.) Space Life Sciences*, vol. 4, Jan. 1973, p. 60-68. 29 refs.

Criteria to determine the mode of origin of amino acids can be established by consideration of their structure, enantiometric distribution, composition, and relative abundance. A population of dominantly protein amino acids with one enantiomeric configuration most likely had a biological origin. Biological amino acids do racemize, however, so the absence of optical activity would not rule out the possibility that the amino acids in a racemic mixture were originally synthesized biologically. For racemic amino acids, therefore, structure, composition and relative abundance become important in ascertaining the origin of these compounds. Abiotically synthesized amino acids have a population composed of both protein and nonprotein structures present as racemic mixtures. (Author)

A73-26481 * **A search for porphyrin biomarkers in Nonesuch Shale and extraterrestrial samples.** J. H. Rho, A. J. Bauman, H. G. Boettger (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.), and T. F. Yen (Southern California, University, Los Angeles, Calif.). *(Lunar Science Institute, Conference on Space Biology, Houston, Tex., Oct. 11, 12, 1971.) Space Life Sciences*, vol. 4, Jan. 1973, p. 69-77. 29 refs. Contract No. NAS7-100.

An organic solvent extract of billion year old Nonesuch Shale was examined for porphyrins by means of fluorometry and high resolution mass spectrometry. It appears to contain at least three or more classes of porphyrins, one similar to tetraphenyl porphin and the others more complex. Many are apparently chelated with copper, nickel, zinc, iron and vanadyl and are highly aromatic. We have also examined the extracts of Apollo 11, 12 and 14 surface fines for porphyrins by spectrophotofluorometry, but we found none. (Author)

A73-26482 * **Effect of lunar materials on plant tissue culture.** C. H. Walkinshaw (U.S. Department of Agriculture, Washington, D.C.; NASA, Manned Spacecraft Center, Houston, Tex.), S. Venketeswaran (Houston, University, Houston, Tex.), P. S. Baur, T. E. Croley, V. E. Scholes (North Texas State University, Denton, Tex.), J. D. Weete (Lunar Science Institute, Houston, Tex.), R. S. Halliwell (Texas A & M University, College Station, Tex.), and R. H. Hall. *(Lunar Science Institute, Conference on Space Biology, Houston, Tex., Oct. 11, 12, 1971.) Space Life Sciences*, vol. 4, Jan. 1973, p. 78-89. 11 refs.

Lunar material collected during the Apollo 11, 12, 14, and 15 missions has been used to treat 12 species of higher plant tissue cultures. Biochemical and morphological studies have been conducted on several of these species. Tobacco tissue cultures treated with 0.22 g of lunar material exhibited increased greening more complex chloroplasts, less cytoplasmic vacuolation and greater vesiculation. Pine tissue cultures reacted to treatment by an increased deposition of tannin-like materials. The percentage of dry weight and soluble protein was increased in cultures treated with either lunar or terrestrial rock materials. (Author)

A73-26483 * Response of tobacco tissue cultures growing in contact with lunar fines. J. D. Weete (Lunar Science Institute, Houston, Tex.), C. H. Walkinshaw (U.S. Department of Agriculture, Washington, D.C.; NASA, Manned Spacecraft Center, Houston, Tex.), and J. L. Laseter (New Orleans, Louisiana State University, New Orleans, La.). *(Lunar Science Institute, Conference on Space Biology, Houston, Tex., Oct. 11, 12, 1971.) Space Life Sciences,* vol. 4, Jan. 1973, p. 90-96. 9 refs.

During the quarantine periods following each Apollo mission to the moon, various biological systems were placed in the presence of lunar material to determine if pathogenic agents were present. Although no detrimental effects resulted, various responses by the several plant systems tested were noted. One such response was the increased pigmentation observed in the callus tissue cultures of tobacco. Further investigations revealed that these tissues grown in the presence of lunar material resulted in as much as a 35% increase in total pigments while differences in fatty acid and sterol concentrations were also noted when compared to the controls. It is believed that these changes brought about by the lunar material can be attributed to a change in the nutritional environment caused by its dissolution. (Author)

A73-26484 * The mammalian response to lunar particulates. J. M. Holland and R. C. Simmonds (NASA, Manned Spacecraft Center, Preventive Medicine Div., Houston, Tex.). *(Lunar Science Institute, Conference on Space Biology, Houston, Tex., Oct. 11, 12, 1971.) Space Life Sciences,* vol. 4, Jan. 1973, p. 97-109.

The response of germfree mice to subcutaneous and intraperitoneal injection of aqueous suspensions of lunar fine material (LFM) was evaluated. Both uninjected mice and mice injected with dry heat sterilized LFM were included as controls. After injection, the majority of mice were subjected to serial sacrifice to assess the time course of the tissue response. A smaller group of animals were held for lifespan studies. The observations suggest that LFM is relatively insoluble in tissue and that, while acting as a low grade irritant, it has little tendency to evoke reactive fibrosis. (Author)

A73-26485 An experimental basis for carcinogenic effects of ultraviolet radiation. H. S. Black (Baylor University; U.S. Veterans Administration Hospital, Houston, Tex.). *(Lunar Science Institute, Conference on Space Biology, Houston, Tex., Oct. 11, 12, 1971.) Space Life Sciences,* vol. 4, Jan. 1973, p. 110-123. 31 refs. Research supported by the Morrison Trust and Robert A. Welch Foundation.

It has been demonstrated in this laboratory that skin sterol synthesis is inhibited by light. The principal site of action of light on sterol synthesis appears to be prior to the formation of acetyl coenzyme A in the biosynthetic pathway. Sterol-derived photoproducts produce similar effects as light upon sterol synthesis. These observations suggest more than just a coincidental role of light upon sterols and sterol metabolism in the etiology of skin cancer. (Author)

A73-26486 Active plant growth at freezing temperatures. F. B. Salisbury, S. L. Kimball, B. Bennett, P. Rosen, and M. Weidner (Utah State University, Logan, Utah). *(Lunar Science Institute, Conference on Space Biology, Houston, Tex., Oct. 11, 12, 1971.) Space Life Sciences,* vol. 4, Jan. 1973, p. 124-138. 15 refs.

As a foundation for speculations in exobiology, we are attempting to understand plant responses to extreme environments on earth. We have emphasized active plant growth at low temperatures and in response to ultraviolet light. We have studied the winter environment in the mountains near Logan, Utah and have found several plants that grow under the snow. We have measured chlorophyll synthesis, carbohydrate levels, and ion balances in these plants and established field experiments with hardy and nonhardy varieties of wheat. In the laboratory we have studied characteristics of three enzymes in two wheat varieties, finding a number of interesting differences in response to ultraviolet and low-temperature treatments. (Author)

A73-26487 Results and prospects of microbiological studies in outer space. G. P. Parfenov and A. A. Lukin (Institute for Medico-Biological Problems, Moscow, USSR). *Space Life Sciences,* vol. 4, Jan. 1973, p. 160-179. 52 refs.

The domestic and foreign literature on microbiological studies in outer space from 1935 through 1970 is reviewed, with separate references to results obtained with balloons, high-altitude rockets and artificial earth satellites. The results of most experiments warrant the conclusion that spaceflight factors do not interfere with growth, development, cellular and nuclear division or mutagenesis in microorganisms, nor exert a modifying action on the radiation effect. In those cases when effects are observed they are as a rule attributed not to spaceflight factors but to differences in the maintenance conditions of the control and flight series of microorganisms in the period from their shipping from the laboratory till their return for study. (Author)

A73-26488 * Estimating the number of terrestrial organisms on the moon. R. T. Dillon, W. R. Gavin, A. L. Roark, and C. A. Trauth, Jr. (Sandia Laboratories, Albuquerque, N. Mex.). *Space Life Sciences,* vol. 4, Jan. 1973, p. 180-199. 12 refs. NASA-supported research. NASA Order W-12853.

Methods used to obtain estimates for the biological loadings on moon bound spacecraft prior to launch are reviewed, along with the mathematical models used to calculate the microorganism density on the lunar surface (such as it results from contamination deposited by manned and unmanned flights) and the probability of lunar soil sample contamination. Some of the results obtained by the use of a lunar inventory system based on these models are presented. M.V.E.

A73-26489 The effect of prolonged immobilization on diuresis and water intake in rats. J. Sobocinska (Akademia Medyczna, Warsaw, Poland). *Space Life Sciences,* vol. 4, Jan. 1973, p. 200-203. 10 refs.

Diuresis and water intake was determined in 20 male albino rats during 8 weeks of immobilization and in 10 rats in post-immobilization recovery phase. Increases of diuresis and water intake during the immobilization period have been observed. Neither changes in sodium and potassium excretion nor in Na/K ratio were found. As the immobilization of the rats did not cause any changes of their natural body position in relation to the direction of gravity forces, the effect of immobilization on diuresis and water intake could not be related to an ortostatic shift of blood or inhibition of the hypothalamo-hypophyseal antidiuretic system. (Author)

A73-26490 The occurrence of nitrate on the early earth and its role in the evolution of the prokaryotes. J. B. Hall (Hawaii, University, Honolulu, Hawaii). *Space Life Sciences,* vol. 4, Jan. 1973, p. 204-213. 30 refs.

It has been suggested that the evolution of the respiratory system coupled to oxidative phosphorylation occurred under anaerobic conditions in which inorganic compounds, principally nitrate, served as electron acceptors. Such a hypothesis requires that nitrate be produced, consistently and at adequate concentrations for utilization in biological processes, at a time when much of the earth's surface was still in a relatively reduced state. This paper is directed toward a consideration of the possible sources of nitrate under primeval conditions, its stability, and its concentration in sites favorable to the evolution of the bacteria. (Author)

A73-26491 * Life processes in ammonia - Anomalous germination behavior of onion seed in ammonia and amines. S. M. Siegel (Hawaii, University, Honolulu, Hawaii). *Space Life Sciences,* vol. 4, Jan. 1973, p. 214-220. 7 refs. Grant No. NGL-12-001-042.

A73-26497 Complex demodulation of visual evoked responses. D. G. Childers (Florida, University, Gainesville, Fla.). *Electroencephalography and Clinical Neurophysiology,* vol. 34, Apr. 1973, p. 446, 447. 9 refs. Grant No. PHS-EY-00581-06.

Complex demodulation techniques were applied to a summated visual evoked response of a human subject in a study of after-discharges in such responses. The initiation and cessation times of after-discharges could be estimated along with the envelope and frequency of oscillations by complex demodulation. V.Z.

A73-26500 # **Human factors.** R. A. Chorley (Smiths Industries, Ltd., Wembley, Middx., England). *Aviation Review,* Mar. 1973, p. 12-15.

Certain aspects of displays based on new techniques raise new human factors problems. These techniques involve the use of electronic, rather than electromechanical, means of displaying information. The two types of electronic display considered are the cathode ray tube (CRT) and the light emitting diode (LED) displays. The CRT will probably predominate for some time to come due to its versatility in terms of display format, brightness, and color. For applications requiring the display of alpha-numerics only, the LED matrix can provide adequate resolution, and adequate brightness and contrast, at least in red light. The application of electronic display techniques is making it possible to produce a potential reduction in the pilot's visual workload. F.R.L.

A73-26549 # **The operational control of the alpha component in the electroencephalogram by means of auditory feedback (Operante Kontrolle des Alphaanteils im Elektroencephalogramm durch akustische Rückmeldung).** A. Grusche, R. Cohen, and S. Meyer-Osterkamp (Konstanz, Universität, Konstanz, West Germany). *Zeitschrift für experimentelle und angewandte Psychologie,* vol. 20, 1st Quarter, 1973, p. 20-38. 24 refs. In German.

Seven male and three female subjects were used in the investigation. An evaluation of the results shows that the possibility to enhance and reduce the relative alpha component in the EEG according to the principles of operational conditioning with the aid of auditory feedback remains very much in doubt. All subjects experienced the alpha condition as pleasant, while alpha suppression was felt to be strenuous. In the case of alpha suppression, the subjects had the impression that they had found an efficient technique. The experimental results are compared with studies reported by other authors. G.R.

A73-26550 # **The dependence of the negative afterimage on the duration of the stimulus and the stimulus intensity (Die Abhängigkeit des negativen Nachbildes von der Reizdauer und der Reizintensität).** R. Scheller (Trier, Universität, Trier, West Germany). *Zeitschrift für experimentelle und angewandte Psychologie,* vol. 20, 1st Quarter, 1973, p. 153-172. 26 refs. In German.

The investigation reported shows that a prolonged stimulus duration and an enhanced primary stimulus intensity will produce an increase in the duration of the complementary afterimage. A prolongation of the total duration of the time intervals from the disappearance to the reappearance of the negative afterimage can be obtained by increasing the duration of the stimulus. An enhancement of the stimulus intensity, on the other hand, has no effect on the total duration of those intervals. A decrease in the time of latency, which lasts from the time of the image projection to the time of the first appearance of the negative afterimage, depends primarily on an enhancement of the stimulus intensity. G.R.

A73-26588 **Cosmic radiations rates and Concorde (Rayonnements cosmiques et Concorde).** R.-P. Delahaye (Hôpital Bégin, Saint-Mandé, Val-de-Marne, France). *L'Aéronautique et l'Astronautique,* Mar.-Apr. 1973, p. 5-9. 33 refs. In French.

The SST medical board is in charge of the cosmic radiation problem since 1963. Measurements on board prototypes show that radiation rates vary with latitude in the range 0,4-1,7 mrem/flight hour. Solar flares are carefully studied, although a very small part of them can have an impact at the Concorde's height. These small radiation rates are not able (in the present level of radiobiological knowledge) to produce a revealable biological damage. (Author)

A73-26716 **Contrast sensitivity near borders - Significance of test stimulus form, size and duration.** A. Vasilev (B'lgarska Akademiia na Naukite, Institut po Fiziologiia, Sofia, Bulgaria). *Vision Research,* vol. 13, Apr. 1973, p. 719-730. 38 refs.

Experimental investigation of the dependence of the foveal edge effect upon test stimulus size, form, and duration. The obtained results show that the use of different test stimuli may account for the discrepancy in data reported in the literature. The selective lowering of foveal sensitivity may be the result of adaptation or masking at the level of receptive fields of prolonged form or at the level of spatial frequency filters of the same orientation as the boundary. M.V.E.

A73-26717 **The ultrastructural organization of the photoreceptor membranes and the intradisc spaces of the vertebrate retina as revealed by various experimental treatments.** V. L. Boroviagin, T. A. Ivanina, and D. A. Moshkov (Akademiia Nauk SSSR, Institut Biofiziki, Pushchino-on-Oka, USSR). *Vision Research,* vol. 13, Apr. 1973, p. 745-752. 24 refs.

A73-26718 **The effects of edge sharpness and exposure duration on detection threshold.** D. C. Hood (Columbia University, New York, N.Y.). *Vision Research,* vol. 13, Apr. 1973, p. 759-766. 30 refs. Research supported by Columbia University; Grant No. NIH-NB-01453.

Investigation of the effects of edge sharpness on the detection threshold over a range of exposure durations. The results confirm previous findings that the detection threshold is higher for blurred targets if the exposure duration is long. But they also indicate that, at short exposure durations, blurred and sharp targets have identical thresholds. M.V.E.

A73-26719 **Single unit reactions in the visual cortex of the unanesthetized rabbit to the light flashes of different intensities.** V. B. Polianskii, E. N. Sokolov, E. V. Polkoshnikov, and M. M. Zimachev (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Vision Research,* vol. 13, Apr. 1973, p. 809-827. 14 refs.

A73-26720 **Estimation of the variability of the latency of responses to brief flashes.** J. L. Zacks (Michigan State University, East Lansing, Mich.). *Vision Research,* vol. 13, Apr. 1973, p. 829-835. 12 refs.

A psychophysical experiment and model are described for estimating an upper limit to the variability of latency in responses to brief flashes. The model provides a framework for the interpretation of the experimental data obtained and makes it possible to estimate the variability of the physiological responses induced by the stimuli. M.V.E.

A73-26721 **After-effects of movement contingent on direction of gaze.** J. E. W. Mayhew (Bristol, University, Bristol, England). *Vision Research,* vol. 13, Apr. 1973, p. 877-880. 20 refs.

Review of some results obtained in an experimental investigation of gaze-contingent movement after-effects. These results can be readily produced with only a 3-min adaptation procedure consisting in having the test subjects look alternatively at a pattern on their left rotating clockwise and a pattern on their right rotating counterclockwise, and in having them change their direction of gaze every 5 sec by moving only their eyes. After 3 min, the rotation of the patterns is stopped, and the test subjects typically report counterclockwise movement after-effects when they look at the left-hand pattern and clockwise movement at the right-hand pattern. M.V.E.

A73-26749 **Adaptation-level and theory of signal detection - An examination and integration of two judgment models for voluntary stimulus generalization.** J. A. Hebert (Colorado State University, Fort Collins, Colo.). *Acta Psychologica,* vol. 37, Mar. 1973, p. 15-29. 13 refs.

A73-26750 **Interindividual differences in homomodal and heteromodal scaling.** T. Kunnapas, L. Hallsten, and G. Soderberg (Stockholm Universitet, Stockholm, Sweden). *Acta Psychologica,* vol. 37, Mar. 1973, p. 31-42. 24 refs. Research supported by the Swedish Council for Social Science Research.

Thirty-two subjects participated in eight experiments concerning the intensity and duration of auditory and vibrotactile stimulation. Individual scales were obtained for each subject in each experimental condition by the method of magnitude estimation. The standards were either of the same modality as the comparison stimuli (homomodal) or of different modality from the comparison stimuli

(heteromodal). It was found (1) that a power function in its simplest form gave satisfactory description of the relation between the stimulus and subjective intensity or subjective duration in all cases, (2) that about 70% of the interindividual variability could be accounted for by three homogeneous clusters, (3) that the correlations between the exponents over individuals in eight conditions seem to depend on intensity or duration, and on homomodal or heteromodal scaling, and (4) that perceived duration seems to be a more stable attribute than intensity. (Author)

A73-26919 # **Spectral sensitivities of colour mechanisms isolated by the human visual evoked response.** F.-J. Kellermann (Universitäts-Augenklinik, Bonn, West Germany) and E. Adachi-Usami (Max-Planck-Gesellschaft zur Förderung der Wissenschaften, William G. Kerckhoff-Herzforschungsinstitut, Bad Nauheim, West Germany). *Ophthalmic Research,* vol. 4, no. 4, 1972-1973, p. 199-210. 10 refs.

The effects of intense chromatic adaptation on the human visual evoked response (VER) has been studied. For three different backgrounds - yellow, blue-green and purple - the different spectral sensitivity functions were obtained from VER measurements, with peaks in the blue, green and red part of the spectrum, respectively. The relation of these functions to the spectral sensitivities of the cone pigments and color mechanisms isolated psychophysically is discussed. (Author)

A73-26924 **Human respiration under increased pressures.** E. H. Lanphier (New York, State University, Buffalo, N.Y.). In: The effects of pressure on organisms; Society for Experimental Biology, Symposium, 26th, University College of North Wales, Bangor, Caern., Wales, September 6-10, 1971, Proceedings. New York, Academic Press, Inc. (Symposia of the Society for Experimental Biology, No. 26), 1972, p. 379-394. 20 refs. Contract No. Nonr-969(03).

Increased pressure influences human respiration primarily through the effects of increased gas density. With air and other relatively dense gases, diving encroaches upon the reserve of ventilatory capacity at any depth, and the capacity for physical exertion is progressively reduced beyond a certain depth. The use of helium-oxygen mixtures restores much of this capacity and markedly increases the depth of useful activity. A problem is presented by the 'Chouteau effect.' Hydrogen appears to be an acceptable component of gas mixtures for deep diving. G.R.

A73-26975 * **Helium-cold induced hypothermia in the white rat.** X. J. Musacchia and M. Jacobs (Missouri, University, Columbia, Mo.). *Society for Experimental Biology and Medicine, Proceedings,* vol. 142, Mar. 1973, p. 734-739. 17 refs. Grant No. NGR-26-004-021.

Hypothermia was induced in white rats by exposing them to low ambient temperatures (about 0 C) and a gaseous atmosphere of 80% helium and 20% oxygen (helox). Biological survival, in which revival from hypothermia to normothermia is achieved, and clinical survival, in which one or more functional attributes are monitored in the hypothermic animal until it dies, are examined. The helium-cold method appears to produce a hypothermic state in the rat quite similar to that resulting from such techniques as ice water immersion or hypercapnia + hypoxia. There is a direct relationship between body weight and percent survival. Despite the fact that they require a longer period to become hypothermic, the heavier animals are better able to survive. F.R.L.

A73-27026 **Myocardial contraction velocity and acceleration in man measured by ultrasound echocardiography differentiation.** P.-E. Paulev (Copenhagen, University, Copenhagen, Denmark) and J. F. Pedersen (Gentofte Hospital, Copenhagen, Denmark). *Cardiovascular Research,* vol. 7, Mar. 1973, p. 266-276. 10 refs. Research supported by the Statens Laegevidenskabelige Forskningsrad.

A73-27027 **A simplified method for the in vitro calibration of electromagnetic flowmeters.** A. M. Marlon, M. H. Adams, B. L. Bates, C. L. Profitt, and D. C. Harrison (Stanford University, Stanford, Calif.). *Cardiovascular Research,* vol. 7, Mar. 1973, p. 290-296. 11 refs. Research supported by the Bay Area Heart Association Research Committee; Grants No. NIH-HE-5709; No. NIH-HE-5107.

A73-27048 **An introduction to radiation protection.** A. Martin and S. A. Harbison (Royal Naval College, Greenwich, England). London, Chapman and Hall, Ltd.; New York, Halsted Press, 1972. 299 p. 18 refs. $4.75.

The structure of matter is discussed together with questions of radioactivity, radiation units, biological effects of radiation, natural and man-made radiation, maximum permissible doses, and radiation detection and measurement. Other subjects considered include the external radiation hazard, the internal radiation hazard, nuclear reactor health physics, radioactive waste, X rays and radiography, and radiation protection in medicine. Health physics laboratory techniques are reported along with radiological emergencies, transport regulations, and the organization and administration of health physics services. G.R.

A73-27049 **Molecular evolution and the origin of life.** S. W. Fox (Miami, University, Coral Gables, Fla.) and K. Dose (Mainz, Universität, Mainz, West Germany). San Francisco, W. H. Freeman and Co., 1972. 370 p. 874 refs. $16.

The history of fundamental concepts concerning questions regarding the origin of life is considered together with aspects of cosmology, geological conditions on the primitive earth, the appearance of micromolecules, and the formation of macromolecules. Problems of the self-assembly of polyamino acids and other substances into microsystems are examined, taking into account proteinoid microspheres, coacervate droplets, sulphobes, microsystems from basic and acidic proeinoids, and microsystems from basic proteinoids and polynucleotides. Other subjects discussed include interpretations of experiments with proteinoid microsystems, the origin and evolution of optical activity, perspectives on molecular evolution in organisms, organismic and molecular fossils in ancient sediments, and questions of extraterrestrial molecular evolution. G.R.

A73-27075 * **Microbiological testing of Skylab foods.** N. D. Heidelbaugh, J. L. McQueen (NASA, Manned Spacecraft Center, Houston, Tex.), D. B. Rowley, E. M. Powers (NASA, Manned Spacecraft Center, Houston, Tex.; U.S. Army, Natick Laboratories, Natick, Mass.), and C. T. Bourland (NASA, Manned Spacecraft Center; Technology, Inc., Houston, Tex.). *Applied Microbiology,* vol. 25, Jan. 1973, p. 55-61. 13 refs. Contract No. NAS9-11164.

Review of some of the unique food microbiology problems and problem-generating circumstances the Skylab manned space flight program involves. The situations these problems arise from include: extended storage times, variations in storage temperatures, no opportunity to resupply or change foods after launch of the Skylab Workshop, first use of frozen foods in space, first use of a food-warming device in weightlessness, relatively small size of production lots requiring statistically valid sampling plans, and use of food as an accurately controlled part in a set of sophisticated life science experiments. Consideration of all of these situations produced the need for definite microbiological tests and test limits. These tests are described along with the rationale for their selection. Reported test results show good compliance with the test limits. M.V.E.

A73-27104 # **Comparative analysis of the electrical activity of the cortex and of cerebral subcortical formations in the process of the alteration of conditioned reactions (Sravnitel'nyi analiz elektricheskoi aktivnosti kory i podkorkovykh obrazovanii golovnogo mozga v protsesse peredelkhi uslovnykh reaktsii).** A. I. Shumilina (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti,* vol. 23, Jan.-Feb. 1973, p. 6-14. 12 refs. In Russian.

A73-27105 # **The role of analyzers of conditional and unconditional stimuli in the functional system of the behavioral conditioned-reflex action (Rol' analizatorov uslovnogo i bezuslovnogo razdrazhenii v funktsional'noi sisteme uslovnoreflektornogo povedencheskogo akta).** V. B. Shvyrkov and B. N. Bezdenezhnykh (Akademiia Nauk SSSR, Institut Psikhologii, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, Jan.-Feb. 1973, p. 15-23. 34 refs. In Russian.

A73-27106 # **Emotional stimulation traces in the spectra of EEG and cutaneo-galvanic reaction of man under normal conditions and in the case of memory impairment (Sledy emotsional'nykh razdrazhenii v spektre EEG i KGR cheloveka v norme i pri narushenii pamiati).** L. G. Voronin, V. F. Konovalov, and R. Ia. Senina (Akademiia Nauk SSSR, Institut Biofiziki, Pushchino-on-Oka, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, Jan.-Feb. 1973, p. 34-41. 35 refs. In Russian.

The effects of emotional stresses, caused by memorization of displayed numbers, are studied in the EEGs and cutaneo-galvanic reactions of 22 healthy subjects, 5 chronic alcoholics, and 8 cerebral arteriosclerosis patients with impaired memory. Exaltation of the theta, alpha, and beta rhythms is indicated in subjects with impaired memory. V.Z.

A73-27107 # **Physiological nature of the electroencephalographic and vegetative components of human conditioned reactions (O fiziologicheskoi prirode elektroentsefalograficheskikh i vegetativnykh komponentov uslovnoi reaktsii u cheloveka).** M. Bonfitto, V. M. Vasil'eva, and E. K. Stoeva (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, Jan.-Feb. 1973, p. 42-50. 31 refs. In Russian.

Bipolar EEG recordings and cutaneo-galvanic reaction recordings were taken during the reactions of 30 subjects to rhythmic light stimuli of 1, 2, and 3 sec in sound-proof chamber experiments during which the subjects acted manually according to a program in response to the stimuli. The specific characteristics of the responses of alpha rhythm, cutaneo-galvanic reactions and heart beat rates to light stimuli are discussed. V.Z.

A73-27108 # **Characteristics of the higher nervous activity of monkeys during a postneurotic period (Kharakteristika vysshei nervnoi deiatel'nosti obez'ian v postnevroticheskom periode).** Sh. L. Dzhalagoniia (Akademiia Meditsinskikh Nauk SSSR, Sukhumi, Georgian SSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, Jan.-Feb. 1973, p. 97-104. 13 refs. In Russian.

Seven male baboons were kept for 5 to 6 months in neurotic condition by disrupting their herd-accustomed sexual habit and by altering the illumination schedule of the day. The baboons were then kept under observations over a period of about three years under normal conditions. The normalization of their higher nervous activity remained incomplete and unstable at the end of the period. V.Z.

A73-27109 # **Independence of the recognition of some spatial properties of an image (Nezavisimost' opoznaniia nekotorykh prostranstvennykh svoistv izobrazheniia).** L. I. Leushina and M. B. Pavlovskaia (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 23, Jan.-Feb. 1973, p. 139-145. 12 refs. In Russian.

A tachistoscopic technique is applied to study the relation between the capacities of the human eye to recognize the size of an object and the location of the object in the visual field. Tests suggest the existence of two independent channels responsible for such capacities in the visual system of man. V.Z.

A73-27124 # **Time course of lateral inhibition in the human visual system.** S. Petry, D. C. Hood, and F. Goodkin (Columbia University, New York, N.Y.). *Optical Society of America, Journal*, vol. 63, Mar. 1973, p. 385, 386. 10 refs. Grant No. NIH-MM-19322.

Using a three-channel Maxwellian-view optical system with a tungsten-halogen source to present a background field, edge stimulus, and increment spot, the time course of lateral inhibition of human vision was studied upon two observers. The results obtained are consistent with the hypothesis that the effects of lateral inhibition take time to develop. M.V.E.

A73-27144 * **Automatic microscopy for mitotic cell location.** J. Herron, R. Ranshaw, J. Castle, and N. Wald (Pittsburgh, University, Pittsburgh, Pa.). *Computers in Biology and Medicine*, vol. 2, 1972, p. 129-135. Grants No. PHS-GM-15247; No. PHS-1-R01-EC-00575; Contract No. NASr-169.

Advances are reported in the development of an automatic microscope with which to locate hematologic or other cells in mitosis for subsequent chromosome analysis. The system under development is designed to perform the functions of: slide scanning to locate metaphase cells; conversion of images of selected cells into binary form; and on-line computer analysis of the digitized image for significant cytogenetic data. Cell detection criteria are evaluated using a test sample of 100 mitotic cells and 100 artifacts. M.V.E.

A73-27145 * **Volatile terpenoids from aeciospores of Cronartium fusiforme.** J. L. Laseter (Louisiana, State University, New Orleans, La.), J. D. Weete (Lunar Science Institute, Houston, Tex.), and C. H. Walkinshaw (NASA, Manned Spacecraft Center, Lunar Receiving Laboratory, Houston, Tex.). *Phytochemistry*, vol. 12, 1973, p. 387-390. 20 refs. Research supported by the Cancer Association of Greater New Orleans; Contracts No. NAS9-11339; No. NSR-09-051-001.

Identification of the terpenoids present in the volatile fraction from aeciospores of the gall rust fungus Cronartium fusiforme. The major monoterpenoid hydrocarbons found to be present with only traces of camphene include alpha-pinene, beta-pinene, delta(3)-carene, myrcene, linonene, beta-phellandrene, and delta-terpinene. A number of monoterpenoid alcohols, acyclic sesquiterpenes, and aromatic compounds were also present. M.V.E.

A73-27274 * **The effects of mercury compounds on the growth and orientation of cucumber seedlings.** N. J. Puerner and S. M. Siegel (Hawaii, University, Honolulu, Hawaii). *Physiologia Plantarum*, vol. 26, 1972, p. 310-312. Grant No. NGL-12-001-042.

A73-27443 * **Implantable transducer for in vivo measurement of bone strain.** J. Mallon and D. Germanton (Kulite Semiconductor Products, Inc., Ridgefield, N.J.). *(Instrument Society of America, International Biomedical Sciences Instrumentation Symposium, 10th, Omaha, Neb., May 1-3, 1972.) ISA Transactions*, vol. 12, no. 1, 1973, p. 88-94. 6 refs. Contract No. NAS2-6240.

A73-27446 # **A new phenomenon of an active intraorgan pumping function of skeletal muscles (Novoe iavlenie aktivnoi vnutriorgannoi nasosnoi funktsii skeletnykh myshts).** N. I. Arinchin and G. D. Nedvetskaia (Akademiia Nauk Belorusskoi SSR, Sektor Gerontologii, Minsk, Belorussian SSR). *Akademiia Nauk BSSR, Doklady*, vol. 17, Jan. 1973, p. 84-86. 11 refs. In Russian.

Experimental proof is given for the existence of a pumping action in the interior of organs during the contraction of skeletal muscles. This action is usually obscured by large volumes of low-tension venous blood but can be observed clearly when the venous blood efflux during the contraction of skeletal muscles is blocked. V.Z.

A73-27450 **Human factor aspects of aircraft noise.** H. C. Ganguli (Delhi, University, Delhi, India) and M. S. P. Rao (Indian Air Force, New Delhi, India). Delhi, Vikas Publications, 1971. 185 p. 161 refs. $3.90.

This monograph collates and evaluates the results of the large amount of work done in the field of human factors in aircraft noise. The psychophysical aspects of hearing, aircraft noise and its measurement, the effects of noise on hearing, communication, and performance, the permissible noise level, and control of noise are extensively discussed. Noise problems of the supersonic transport,

noise from rockets, and space vehicle noise are studied. Numerical and other data on various aspects of aircraft noise are provided by graphs and tables. F.R.L.

A73-27497 # **State and prospects of scientific work in the chemistry of psychotropic preparations (Stan i perspektivi rozvitku naukovikh doslidzhen' u galuzi khimii psikhotropnikh preparativ).** O. V. Bogats'kii. *Akademiia Nauk Ukrains'koi RSR, Visnik,* vol. 37, Feb. 1973, p. 12-21. 27 refs. In Ukrainian.

Review of recent advances of psychopharmacology in psychiatric applications, covering psycholeptic, psychanaleptic and psychodisleptic preparations. Papers dealing with the synthesis and effects of various tranquilizers are surveyed. Further positive developments in this field are anticipated. V.Z.

A73-27499 # **Mechanism of the action of radiation protecting agents - A biochemical shock hypothesis (Mekhanizmi dii radioprotektoriv - Gipoteza biokhimichnogo shoku).** I. M. Gudkov. *Akademiia Nauk Ukrains'koi RSR, Visnik,* vol. 37, Feb. 1973, p. 34-41. 82 refs. In Ukrainian.

Review of papers dealing with the mechanisms of protective action of various agents against radiation damage in man. Special attention is given to a hypothesis according to which a state of biological shock produced by such agents is responsible for their protective action. V.Z.

A73-27645 **Work movement performance of the astronaut in flight.** E. A. Ivanov, V. A. Popov, and L. S. Khachatur'iants. *(Kosmicheskie Issledovaniia,* vol. 10, July-Aug. 1972, p. 604-613.) *Cosmic Research,* vol. 10, no. 4, Jan. 1973, p. 543-550. 14 refs. Translation.

Analysis of the motor activity dynamics of an astronaut performing spacecraft command and control operations. The psychophysiological background of such activities is discussed. Motor activity correlation characteristics of Soviet astronauts Beliaev, Leonov, Nikolaev and Sevastianov are included. The occurrence of changes in the motor-coordination function of the cortex during motor activity in a state of lasting weightlessness is noted. These changes are traced to the psychophysiological strains caused by the necessity of continuous alertness and extrapolation of complex associative reactions. V.Z.

A73-27646 **The use of sampling quantiles for the compression of telemetric transmission and the statistical handling of medical information.** A. M. Litvinov and D. G. Maksimov. *(Kosmicheskie Issledovaniia,* vol. 10, July-Aug. 1972, p. 614-619.) *Cosmic Research,* vol. 10, no. 4, Jan. 1973, p. 551-555. 18 refs. Translation.

A73-27690 **Why the heart beats (Pourquoi le coeur bat).** P. d'Alché (Caen, Université, Caen, France). *La Recherche,* vol. 4, Apr. 1973, p. 327-336. 16 refs. In French.

Following a description of the functioning of the heart, the mechanism involved is discussed. Two masses of cells and a conducting web constitute the anatomical base of cardiac automation. There is a 'starter' whose operation depends on the spontaneous depolarization of sinusoidal cells, as well as a hierarchy between the automation centers which maintain the heart beats. It is by means of calcium ions that the activation potential, an electrical phenomenon, starts the muscular contraction, a mechanical phenomenon. An unanswered question is the cause of spontaneous variations of membranal permeability. F.R.L.

A73-27701 # **Physiological effect of air nitrogen replacement by inert gases under high and low temperature conditions (Fiziologicheskii effekt zameny azota vozdukha inertnymi gazami usloviiakh vysokikh i nizkikh temperatur).** A. G. Dianov, V. V. Isaenko, and G. P. Sviridova. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 3-9. 9 refs. In Russian.

The effects of extreme (lethal) temperature exposures in helium-oxygen and argon-oxygen were studied in 153 experiments on rats. At high or low ambient temperatures, air nitrogen replacement by helium is shown to exert a negative effect in that it shortens the life of the animals. This effect can be attributed to the significantly different heat transfer rate in the helium-oxygen atmosphere which results from the higher heat conductivity of helium as compared to nitrogen. By contrast, the replacement of air nitrogen by argon leads to extreme-temperature effects that are not significantly different from those of air. These two gases hardly differ from each other in regard to heat conductivity. It is concluded that extreme-temperature tolerance for inert gases other than nitrogen depends only on the thermophysical properties of the nitrogen-replacing gas. M.V.E.

A73-27702 # **Effect of antioxidants on the blood deoxygenation rate in animals exposed to altered atmospheres (Vliianie antioksidantov na skorost' deoksigenatsii krovi zhivotnykh, podvergavshikhsia vozdeistviiu izmenennoi gazovoi sredy).** E. Ia. Kaplan, V. I. Shubin, and I. M. Epshtein. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 9-14. 7 refs. In Russian.

The effects of hypoxia and hyperoxia and the influence of antioxidants (mexamine and BH-3) on the rate of blood deoxygenation in mice were studied by means of polarographic coulometry. In response to intraperitoneal injections of antioxidants, the rate of blood deoxygenation increased under all and any conditions, i.e., under normal, hypoxic, and hyperoxic ones. The antioxidant compounds were found to affect the blood directly by penetrating through the erythrocyte membranes. It is suggested that the mechanism of oxyhemoglobin dissociation by the antioxidants is related to the capacity of the latter to alter the hydrogen ion concentration in the plasma within the erythrocytes. M.V.E.

A73-27703 # **Nitrogen metabolite dynamics in the brain during repeated hypothermia and subsequent spontaneous warming (Dinamika azotistykh metabolitov mozga pri mnogokratnoi gipotermii i posleduiushchem samosogrevanii).** E. Z. Emirbekov. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 14-17. 7 refs. In Russian.

Investigation of the contents of ammonia, glutamine, glutamic, gamma-aminobutyric, and aspartic acids in the brain of rats after 1-, 7-, 12-, and 13-times repeated hypothermia down to 20-19 C and during subsequent spontaneous warming to 37-37.5 C. Following repeated hypothermia and spontaneous warming, a new level of nitrogen metabolite concentration was reached in the brain of rats. An elevated content of ammonia persisted for several days after the spontaneous warming. M.V.E.

A73-27704 # **Water and salt metabolism in hypokinesia-subjected animals (Vodno-solevoi obmen u zhivotnykh v usloviiakh ogranicheniia podvizhnosti).** Iu. Iu. Osipov and V. S. Shashkov. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 17-21. 19 refs. In Russian.

Study of the effects of variously long hypokinesia upon water and salt metabolism and on the electrolyte composition in the blood and tissues of animals. During hypokinesia, a significant increase in diuresis and salt elimination was observed. Following return of the animals to normal mobility, the diuresis and elimination of sodium and potassium dropped noticeably. The increased diuresis in the absence of dehydration during hypokinesia suggests that polyuria may develop at the expense of imperceptible fluid losses. M.V.E.

A73-27705 # **High temperature tolerance enhancement in rats by thermal training and medicinal preparations (Povyshenie ustoichivosti krys k vysokoi temperature pod vliianiem teplovoi trenirovki i lekarstvennykh preparatov).** A. Iu. Iunusov, E. S. Makhmudov, and F. M. Islamgalieva. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 21-25. 12 refs. In Russian.

The high temperature tolerance of rats was investigated under normal conditions and after thermal training combined with adaptogenic drug administration. The thermal tolerance of rats was

significantly increased by the administration of glycyrrhetic acid in combination with succinic and ascorbic acids and potassium chloride for 10 days under normal conditions and after thermal training. Possible mechanisms of thermal tolerance enhancement in animals by adaptogenic drugs are discussed. M.V.E.

A73-27706 # Effects of chronic irradiation of dogs with Co-60 gamma rays on the level of auto-antibodies (Vliianie khronicheskogo oblucheniia sobak gamma-luchami Co-60 na uroven' autoantitel). V. A. Zueva. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 25-29. 15 refs. In Russian.

Review of the results of exposures of dogs to chronic irradiation with Co-60 gamma rays over a period of 2.5 years in annual doses of 25 rem (first group) and 150 rem (2nd group), as well as to a combined irradiation at an annual dose of 75 rem supplemented by short-duration exposures at a dose of 50 rem three times yearly (3rd group). The chronic irradiation of the dogs in the second and third groups induced significant changes in immunobiological reactivity. The dogs in the first group showed no difference in this regard from the control group. M.V.E.

A73-27707 # Morphological changes in the liver of dogs induced by chronic gamma irradiation (Morfologicheskie izmeneniia pecheni u sobak pri khronicheskom gamma-obluchenii). E. A. Savina, V. K. Podymov, G. I. Plakhuta-Plakutina, V. I. Iakov'leva, and B. A. Markelov. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 29-34. 14 refs. In Russian.

Review of the results of exposure of thirty dogs to chronic (with doses of 21, 62.5, and 125 rads/year) and combined (chronic exposure at dose of 62.5 rads/year and acute exposure at doses of 58 and 126 rads/year) gamma irradiation over a period of three years. Morphological changes in the liver of the dogs were examined in 210 liver biopsies (150 experimental and 60 control). Irradiation duration and pattern are shown to have determined the developing liver morphology changes. M.V.E.

A73-27708 # Proliferative activity of bone marrow cells in dogs exposed to chronic and repeated acute gamma irradiation (Proliferativnaia aktivnost' kletok kostnogo mozga sobak pri khronicheskom gamma-obluchenii v sochetanii s povtornymi ostrymi vozdeistviiami). T. M. Zukhbaia. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 34-36. 8 refs. In Russian.

A73-27709 # Dynamics of certain characteristics of the evoked potential of the optic cortex in rabbits under conditions of increasing hypoxia (Dinamika nekotorykh kharakteristik vyzvannogo potentsiala zritel'noi oblasti kory golovnogo mozga u krolikov v usloviiakh narastaiushchei gipoksii). I. N. Zakharova. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 36-39. 7 refs. In Russian.

A73-27710 # Peripheral blood composition changes in cosmonauts during 18- and 24-day space flights (Izmeneniia sostava perifericheskoi krovi pri 18- i 24-sutochnykh kosmicheskikh poletakh). V. I. Legen'kov, I. S. Balakhovskii, A. V. Beregovkin, Z. S. Moshkalo, and G. V. Sorokina. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 39-45. 6 refs. In Russian.

Investigation of the morphological composition of the peripheral blood in crew members of the Soyuz-9 and Saliut-1 spacecraft. The results show transient moderate neutrophylic leukocytosis, a relative decrease in the count of lymphocytes and monocytes, a pronounced decrease in the count of eosinophils, and a slight decline in hemoglobin and thrombocytopenia. Other findings include the appearance of C-reactive protein, an acceleration in the E.S.R., and also changes in some protein fractions whose nature is little understood. These changes show some of the effects of space flight on the functional state of the hemopoietic system. The methods and techniques used in the investigation are described, and recommendations are presented about further research. M.V.E.

A73-27711 # Changes in the gas content of blood in man during exposure to high ambient temperatures (Izmenenie soderzhaniia gazov krovi pri vozdeistvii na cheloveka vysokikh temperatur okruzhaiushchei sredy). A. N. Azhaev and V. S. Panchenko. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 45-49. 23 refs. In Russian.

Review of the results of some thermal chamber experiments during which test subjects remained at rest or performed moderate physical exercises while the chamber wall and air temperatures were maintained at 60 and 70 deg, respectively. At a rise in body temperature by 1 deg, no changes in the partial pressures of oxygen and carbon dioxide in the blood were found. A significant decrease in both occurred at a body temperature rise of 2 deg. This decline seems to be attributable to the hemodynamic disturbances resulting from overheating and to consequences of lung hyperventilation. M.V.E.

A73-27712 # Carbon monoxide content in the exhaled air and carboxyhemoglobin in the blood of subjects equipped with an isolating protective garment (Soderzhanie okisi ugleroda v vydykhaemom vozdukhe i karboksigemoglobina v krovi ispytuemykh, nakhodiashchikhsia v usloviiakh izoliruiushchego zashchitnogo snariazheniia). S. M. Gorodinskii, A. V. Sedov, M. I. Vakar, G. E. Mazneva, N. A. Surovtsev, E. E. Sotnikov, and L. I. Kobzeva. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 50-53. 12 refs. In Russian.

A73-27713 # Hemocoagulation and trombocyte state during hypokinesia after highland adaptation (Sostoianie gemokoaguliatsii i trombotsitov pri gipokinezii posle adaptatsii k vysokogornym usloviiam). V. A. Isabaeva and T. A. Ponomareva. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 53-59. 19 refs. In Russian.

Study of the phase changes in hemocoagulation and trombocytes following short-period adaptation of test subjects to an altitude of 3200 m and variously long hypokinesia periods thereafter. The changes induced by the short-period high-altitude adaptation included a relative decrease in the blood-coagulating capacity and a progressive increase in the thrombocyte count. A thereon following 10-day hypokinesia induced no disturbances in the coagulation system. Extension of the hypokinesia to 24 days resulted in a relative hypocoagulation (i.e., decline in the plasma tolerance to heparin and increase in the recalcification time), decrease in the thrombocyte count, and changes in thrombocytograms. It is shown that the preliminary high-altitude adaptation attenuates the abruptness in the hemocoagulation shifts induced by hypokinesia in nonpreadapted test subjects. M.V.E.

A73-27714 # Functional changes in the systemic and regional /intracranial/ circulation during low value accelerations (Funktsional'nye izmeneniia v sistemnom i regionarnom /vnutricherepnom/ krovoobrashchenii pri uskoreniiakh malykh velichin). V. V. Usachev and I. P. Shinkarevskaia. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 59-65. 22 refs. In Russian.

Investigation of the effects of vestibular stresses on systemic and cerebral hemodynamics. The principal types of reactions that show qualitative variations among test subjects as a function of tolerance to low value accelerations (particularly, to Coriolis accelerations) are identified. Obtained data pertaining to the physiological mechanisms of adaptation and of compensation 'disruption,' active during repeated vestibular stimulations, are presented. Directions for further research are suggested. M.V.E.

A73-27715 # Role of social synchronizers in the adaptation to an unusual daily routine (Rol' sotsial'nykh sinkhronizatorov v adaptatsii k neobychnomu sutochnomu rasporiadku). S. I. Stepanova. *Kosmicheskaia Biologiia i Meditsina,* vol. 7, Jan.-Feb. 1973, p. 65-72. 11 refs. In Russian.

Study of the possibility of inverting the diurnal cycles of life

functions in men during the social and physical isolation of space missions where work-rest cycles undergo time shifts close to inverted ones. It is argued that the lack of a habitual system of synchronizers does not by itself rule out an inversion of the diurnal life cycle. Such an inversion, it is felt, can be accomplished with the aid of the social factors available under the circumstances considered and, above all, through punctual observation of established work and rest routines. However, the diurnal cycle changeover during a space mission is for a number of reasons rather difficult, and it should therefore be accomplished in advance of the space flight in accordance with the expected space mission day routine. M.V.E.

A73-27716 # **Bactericide activity of the integument of man at different times of the day (Bakteritsidnaia aktivnost' kozhnogo pokrova cheloveka v razlichnoe vremia sutok).** M. I. Kozar'. *Kosmicheskaia Biologiia i Meditsina*, vol. 7, Jan.-Feb. 1973, p. 72-75. 24 refs. In Russian.

Bacillus coli in a 0.01% saponin solution were applied to wetted areas on the integument of 26 healthy subjects going through their daily work-and-rest routine for a period of up to 30 days. Bacteria counts taken at different times of the day showed that the bactericide action of the integument was generally higher during the morning hours than late in the day. Possible causes of this variation are discussed. V.Z.

A73-27717 # **Photostimulation significance in electroencephalographic examinations of pilots and aviation school applicants (O znachenii fotostimuliatsii pri elektroentsefalograficheskom issledovanii letchikov i kandidatov v lefnye uchilishcha).** Kh. R. Kammel'. *Kosmicheskaia Biologiia i Meditsina*, vol. 7, Jan.-Feb. 1973, p. 75-81. In Russian.

Review of the results of photostimulation-including electroencephalographic examinations administered to aviation-school applicants and students and to pilots for the purpose of determining the advisability of including intermittent light stimulations in flight fitness examinations. The control group consisted of military personnel afflicted by functional disorders of the nervous system. The results indicate that, among aviation students and pilots with flight permits based upon conventional EEG fitness examinations, the photostimulation-including examination reveals photomyoclonic reactions in one out of 200 subjects and pathological photosensitivity or photoepilepsy in one out of 150 subjects. It is concluded that photostimulation makes possible the detection of 'covert' brain injuries and should become a mandatory part of aviation fitness examination procedures. M.V.E.

A73-27718 # **Equivalence of the action of Coriolis accelerations to that of certain angular accelerations in their effects on the receptors of semicircular canals (Ob ekvivalentnosti deistviia uskoreniia koriolisa na retseptory polukruzhnykh kanalov nekotoromu uglovomu uskoreniiu).** I. Iu. Sarkisov and A. A. Shipov. *Kosmicheskaia Biologiia i Meditsina*, vol. 7, Jan.-Feb. 1973, p. 82-84. 9 refs. In Russian.

Theoretical considerations are given for obtaining an angular acceleration which produces cupula displacements identical to those produced by Coriolis accelerations, in all six semicircular canals of the vestibular apparatus. Expressions are proposed for determining angular accelerations showing such equivalence of action. V.Z.

A73-27719 # **Changes in visual functions after the action of weak vestibular stimuli (Izmeneniia zritel'nykh funktsii posle vozdeistviia slabykh vestibuliarnykh rozdrazhenii).** V. I. Kartsev. *Kosmicheskaia Biologiia i Meditsina*, vol. 7, Jan.-Feb. 1973, p. 84, 85. 7 refs. In Russian.

A73-27720 # **Influence of the packing and of certain conditions of usage on the medications in portable emergency medicine stores (Vliianie upakovki i nekotorykh uslovii ekspluatatsii na medikamenty aptechek nosimykh avariinykh zapasov).** V. B. Zubavin and G. Z. Ostrovskaia. *Kosmicheskaia Biologiia i Meditsina*, vol. 7, Jan.-Feb. 1973, p. 85-88. In Russian.

A73-27888 **High-fidelity left ventricular pressure measurements for the assessment of cardiac contractility in man.** H. P. Krayenbuehl, W. Rutishauser, P. Wirz, I. Amende, and H. Mehmel (Zürich, Universität, Zurich, Switzerland). *American Journal of Cardiology*, vol. 31, Apr. 1973, p. 415-427. 45 refs. Research supported by the Schweizerischer Nationalfonds zur Förderung der wissenschaftlichen Forschung.

A73-27889 **Comparison of isometric exercise and angiotensin infusion as stress test for evaluation of left ventricular function.** R. M. Payne, L. D. Horwitz (Texas, University, Dallas, Tex.), and C. B. Mullins. *American Journal of Cardiology*, vol. 31, Apr. 1973, p. 428-433. 14 refs. Research supported by the American Heart Association; Grants No. NIH-HL-05812; No. NIH-HL-06296.

A73-27890 **Exercise-induced ventricular arrhythmias in patients with coronary artery disease - Their relation to angiographic findings.** N. Goldschlager, D. Cake, and K. Cohn (Presbyterian Hospital, San Francisco, Calif.). *American Journal of Cardiology*, vol. 31, Apr. 1973, p. 434-440. 31 refs. Grants No. NIH-HE-05498; No. NIH-HE-06311; No. NIH-FR-02241.

An investigation was conducted to determine if resting and exercise-induced ventricular arrhythmia occurring in patients with symptomatic coronary disease can be correlated with the character and extent of coronary artery disease and with contraction disorders of the left ventricle. The results obtained suggest that documentation of exercise-induced ventricular arrhythmia in patients with symptomatic coronary disease defines a particularly high-risk group with severe occlusive vascular disease often associated with generalized disorders of cardiac contractile pattern. G.R.

A73-27891 **Unreliability of conventional electrocardiographic monitoring for arrhythmia detection in coronary care units.** D. W. Romhilt, S. S. Bloomfield, T.-C. Chou, and N. O. Fowler (Cincinnati General Hospital, Cincinnati, Ohio). *American Journal of Cardiology*, vol. 31, Apr. 1973, p. 457-461. 24 refs. Grants No. PHS-HE-11817; No. PHS-HE-05776; No. PHS-HE-06307.

In the past decade the concept of the coronary care unit has developed in efforts to decrease the mortality following acute myocardial infarction. Two methods of arrhythmia detection are compared with respect to the incidence and time of recognition of arrhythmias following acute myocardial infarction. The investigation shows that current conventional coronary care unit monitoring methods are unreliable for the precise and early detection of arrythmias. Improved results in the recognition of arrhythmias can be obtained by more frequent sampling and closer observation of the monitors by trained personnel. G.R.

A73-27975 * **Serum tryptophan level after carbohydrate ingestion - Selective decline in non-albumin-bound tryptophan coincident with reduction in serum free fatty acids.** D. Lipsett, B. K. Madras, R. J. Wurtman, and H. N. Munro (MIT, Cambridge, Mass.). *Life Sciences, Part II - Biochemistry, General and Molecular Biology*, vol. 12, no. 2, 1973, p. 57-64. 10 refs. Research supported by the John A. Hartford Foundation and NASA; Grants No. PHS-AM-15364; No. PHS-NS-10459.

STAR ENTRIES

N73-20053*# Stanford Univ., Palo Alto, Calif. Cardiology Div.
BIOMEDICAL TECHNOLOGY TRANSFER APPLICATIONS OF NASA SCIENCE AND TECHNOLOGY Final Report, 1 Jul. 1971 - 30 Sep. 1972
30 Sep. 1972 169 p
(Contract NASw-2216)
(NASA-CR-131246) Avail: NTIS HC $10.50 CSCL 06B

The identification and solution of research and clinical problems in cardiovascular medicine which were investigated by means of biomedical data transfer are reported. The following are sample areas that were focused upon by the Stanford University Biomedical Technology Transfer Team: electrodes for hemiplegia research; vectorcardiogram computer analysis; respiration and phonation electrodes; radiotelemetry of intracranial pressure; and audiotransformation of the electrocardiographic signal. It is concluded that this biomedical technology transfer is significantly aiding present research in cardiovascular medicine.
J.M.M.

N73-20054*# Scientific Translation Service, Santa Barbara, Calif.
PROBLEMS OF SPACE BIOLOGY. VOLUME 14: RADIOBIOLOGICAL ASPECTS OF THE REACTIVITY OF THE ORGANISM DURING SPACE FLIGHTS
P. P. Saksonov, ed. and B. I. Davydov, ed. Washington NASA Feb. 1973 664 p refs Transl. into ENGLISH of the book "Problemy Kosmicheskoy Biologii. Tom 14. Radiobiologicheskiye Aspekty Reaktivnosti Organizma v Svyazi s Kosmicheskimi Poletami" Nauka Press, Moscow, 1971 664 p
(Contract NASw-2035)
(NASA-TT-F-721) Avail: NTIS HC $9.00 CSCL 06B

The influence of radioprotectors on the ability of animal organisms to withstand acceleration overloads, hypoxia, space flight stress, and radiation injuries is considered.

N73-20055* Scientific Translation Service, Santa Barbara, Calif.
INFLUENCE OF RADIOPROTECTIVE PREPARATIONS FROM THE MERCAPTOALKYLAMINE GROUP (CYSTAMINE, S,BETA-AMINOETHYLISOTHIURONIUM) ON THE RESISTANCE OF ANIMALS TO TRANSVERSELY DIRECTED OVERLOADS
B. I. Davydov and N. A. Gaydamakin *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 1-30 refs

CSCL 06C

Experiments were performed on 1,800 mice and 31 rats. The dose dependence of the influence of cystamine and AET on the resistance of mice to overloads was determined from the change in the frequency of cardiac contraction. Four hours following administration of radioprotectors, the resistance to overloads in the animals had returned to normal. The decrease in time of the depressant effect of cystamine and AET is associated with the elimination of the pharmacological (toxic) effect. One of the possible mechanisms for the decreased resistance of the organism to overloads under the influence of cystamine is the decrease in liver glycogen reserves. Author

N73-20056* Scientific Translation Service, Santa Barbara, Calif.
06c
INFLUENCE OF MONOSODIUM SALT OF BETA-AMINOETHYLTHIOPHOSPHORIC ACID ON THE RESISTANCE OF ANIMALS TO TRANSVERSELY DIRECTED OVERLOADS
B. I. Davydov and V. A. Kozlov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 30-42 refs

The experiments were performed on 760 mice. After 30 minutes, 4 hours, 1, 2 and 5 days following intraperitoneal administration of tsistafos, the animals were subjected to overloads. The resistance of the animals to the overloads 30 minutes following administration of tsistafos is a function of the dose described by the equation of regression. Four hours and 1 to 5 days following administration of tsistafos at a dose of 300 mg/kg, the death of animals following centrifuging did not differ significantly from the death of the control animals. Author

N73-20057* Scientific Translation Service, Santa Barbara, Calif.
INFLUENCE OF RADIOPROTECTORS FROM THE AMINOTHIOL GROUP ON THE CARDIAC FUNCTION OF GUINEA PIGS UNDER THE INFLUENCE OF OVERLOADS
V. A. Kozlov and B. I. Davydov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 43-51 refs

CSCL 06C

Cystamine, mercaptopropylamine and AET reduce the resistance of guinea pigs to overloads. The bradycardia they produce probably is intensified by the similar action of overloads alone and accelerates the exhaustion of the adaptation reserves during their action. AET did not affect the frequency of cardiac contractions, but under the influence of acceleration acute bradycardia and subsequent death of the animals also ensued. The influence of cystamine on heart function may be completely or partially eliminated with the aid of atropine or dimedrol.
Author

N73-20058* Scientific Translation Service, Santa Barbara, Calif.
THE MECHANISM OF REDUCED ABILITY TO WITHSTAND OVERLOADS UNDER THE INFLUENCE OF RADIOPROTECTIVE PHARMACOLOGICAL SUBSTANCES
N. A. Gaydamakin, V. G. Petrukhin, and B. I. Davydov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 52-64 refs

CSCL 06R

Rats were subjected to the action of transverse overloads (30 units, 5 minutes), cystamine (75 mg/kg) or combined effect of these factors. The pathomorphological and histochemical changes in lung, liver, heart, diaphragm and adrenal were studied. The action of overloads or the administration of cystamine created a state of oxygen starvation of the tissues, and rapid consumption and exhaustion of energy reserves in the organisms of the animals. Under the combined influence of cystamine and overloads, the effect of hypoxia was cumulative. Author

N73-20059* Scientific Translation Service, Santa Barbara, Calif.
INFLUENCE OF CERTAIN RADIOPROTECTORS ON THE ABILITY OF WHITE RATS TO WITHSTAND ACUTE HYPOXIA
L. A. Tiunov, V. V. Kustov, G. A. Vasilyev, and A. N. Ukshe *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 65-70 refs

CSCL 06R

The response reactions of white rats protected by means of radioprotectors to the action of acute hypoxia are studied.

Cystamine (250 mg/kg), AET Br (800 and 250 mg/kg), when administered intraperitoneally and orally, create a marked decrease in the resistance of the animals to acute hypoxic hypoxia and hypoxia created by carbon monoxide. The possible pathophysiological mechanisms of this phenomenon are discussed. Author

N73-20060* Scientific Translation Service, Santa Barbara, Calif.
CERTAIN ASPECTS OF THE PRACTICAL UTILIZATION OF MEDICINAL SUBSTANCES UNDER FLIGHT CONDITIONS
P. P. Saksonov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 71-78 refs
CSCL 06E

Ideas concerning the indications and contraindications of certain medicinal substances are reported by the crew of an aircraft during flight. A brief summary of the characteristics of medical illness is presented. Author

N73-20061* Scientific Translation Service, Santa Barbara, Calif.
SENSITIVITY OF MICE TO RADIOPROTECTORS FROM THE AMINOTHIOL AND INDOLYLALKYLAMINE SERIES DURING THE PERIOD OF AFTEREFFECTS FROM TRANSVERSELY DIRECTED OVERLOADS
V. V. Antipov, M. V. Vasin, B. I. Davydov, P. P. Saksonov, and P. V. Smirnova *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 79-85 refs
CSCL 06R

The influence of overloads on the sensitivity of mice to toxic doses of cystamine, AET, tsistafos and 5-MOT is studied. Immediately after centrifuging, a slight increase in the resistance of the organism to aminothiols (cystamine, tsistafos) is observed. After 30 minutes there is a statistically reliable increase in the sensitivity of the mouse to cystamine and AET; after one hour, the reaction of the animal returns to its original level. When 5-MOT is administered over 24 hours following overload increased resistance is observed. The increase in the level of the overload is accompanied by a significant increase in the resistance of the animal to the cystamine. Author

N73-20062* Scientific Translation Service, Santa Barbara, Calif.
INFLUENCE OF CERTAIN RADIOPROTECTIVE PREPARATIONS ON THE MOTOR-EVACUATORY FUNCTION OF THE GASTROINTESTINAL TRACT OF HEALTHY AND IRRADIATED RATS
I. G. Krasnykh and L. A. Tyutin *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 86-98 refs

CSCL 06R

Cystamine, AET, tsistafos and 5-MOT, when administered in optimally protective doses orally, intraperitoneally and into the large intestine, retard the evacuation of contrasting material from the stomach by 4-8, 2, 5-6 and 2-3 times, respectively. Intraperitoneal administration to an animal, prior to irradiation, of cystamine during the first few hours increases the spasms of the pylorus, intensifies disturbance of the evacuatory function of the stomach, and later normalizes the functional state of the gastrointestinal tract. Author

N73-20063* Scientific Translation Service, Santa Barbara, Calif.
CERTAIN CHARACTERISTICS OF THE ACTION OF SYMPATHOMIMETIC AMINES ON THE REFLEX FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM OF IRRADIATED AND SYMPATHECTOMIZED ANIMALS
P. P. Saksonov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 99-115 refs
CSCL 06C

Adrenalin, sympathol, veritol, adrenalone, ephedrine, phenamine and Pervitin preferably inhibit the reflex action of the spinal cord. The intensity and the nature of this effect bears a certain relationship to the chemical structure of the amine and the functional state of the central nervous system. The toxicity of all the amines for irradiated animals was increased by a factor of 2 to 4 in comparison to normal. The degree of inhibition of the spinal cord in irradiated animals was approximately the same as in sympathectomized animals. Author

N73-20064* Scientific Translation Service, Santa Barbara, Calif.
CHARACTERISTICS OF THE ACTION OF MEDICINAL PREPARATIONS UNDER HYPOTHERMIC CONDITIONS
B. G. Volynskiy and S. L. Freydman *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 116-132 refs

CSCL 06E

Caffeine, euphyllin, cordiamin or hypothermy lead to an inhibition of respiration, a drop in the arterial blood pressure, disruption of the bioelectrical activity of the heart and metabolic processes in the organism. There is also a drop in the content of ATP and glycogen in the tissues of the heart, liver, kidneys, and brain. There is a tendency toward an increase in excretion of potassium ions from the organism in the urine. Morphine under conditions of hypothermy does not increase the inhibiting action of low temperature on the heart activity and the state of the metabolic processes in the tissues, while potassium chloride causes a sharp drop in arterial blood pressure. Adrenalin and mesaton retain the nature of their activity in hypothermy. Author

N73-20065* Scientific Translation Service, Santa Barbara, Calif.
CHEMICAL MEANS OF PROPHYLAXIS OF RADIATION SICKNESS
V. S. Shashkov, B. V. Anisimov, and P. P. Saksonov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 133-160 refs

CSCL 06R

The principal results obtained in recent years in the use of chemical substances for prophylaxis of radiation sickness both in experiments and in the clinic are reported. The possible mechanisms of action of radioprotectors are discussed. Author

N73-20066* Scientific Translation Service, Santa Barbara, Calif.
PHARMACOLOGICAL PROPERTIES OF SUBSTANCES FOR MEDICINAL PROPHYLAXIS OF RADIATION DAMAGE
V. S. Shashkov and B. V. Anisimov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 161-194 refs

CSCL 06R

Data on pharmacological properties are presented for the principal and most effective radioprotectors: the aminothiols and the indolylalkylamines. The question of the toxicity of protective substances and the effective doses, behavior and physiological effects of these substances are discussed. Author

N73-20067* Scientific Translation Service, Santa Barbara, Calif.
ANTIRADIATION EFFECTIVENESS OF CYSTAMINE UNDER VARIOUS CONDITIONS OF GAMMA IRRADIATION
M. V. Vasin, P. P. Saksonov, V. V. Antipov, and V. S. Sashkov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 195-212 refs
CSCL 06R

When cystamine is administered intraperitoneally to mice 5 to 10 minutes prior to gamma-irradiation (139 - 159 r/min), there is a linear dependence of the dose reduction factor (DRF) on the cystamine dose. The increase in the administration time of the preparation at 15 mg/kg to 30 minutes prior to irradiation does not have a significant influence on its protective properties. One hour later, the antiradiation activity of the protector decreases sharply. When cystamine was used in doses of 50 to 100 mg/kg, the decrease in the protector protective properties was noticed at earlier stages. With irradiation for 1.5 to 4 hours, the protective activity of cystamine, AET, tsistafos and 5-MOT decreased sharply. Author

N73-20068* Scientific Translation Service, Santa Barbara, Calif.
CHEMICAL PROTECTION AGAINST MIXED GAMMA-NEUTRON RADIATION WITH VARIOUS CONTRIBUTIONS OF NEUTRONS TO THE ABSORBED DOSE
M. V. Vasin, V. A. Kozlov, B. L. Razgovorov, and I. G. Krasnykh *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 213-221 refs
CSCL 06R

Results are presented of studies on antiradiation effectiveness of cystamine, AET, tsistafos and 5-MOT in intraperitoneal administration to mice under conditions of mixed gamma-

neutron irradiation with a neutron contribution to the absorbed dose of approximately 35 or 90%. Under conditions of mixed gamma-neutron irradiation with a neutron contribution to the absorbed dose of about 90%, AET and tsistafos slightly decreased the severity of radiation damage. The survival rate of the mice under these conditions was 24.2 (AET) and 26.8% (tsistafos) at LD90/30. Cystamine and 5-MOT were ineffective. In joint use of AET and tsistafos with 5-MOT, the protective properties of the aminothiols did not increase. With a drop in the contribution of the neutron component to 35%, AET, cystamine and tsistafos produced remarkable antiradiation effects, while 5-MOT did not. Author

N73-20069* Scientific Translation Service, Santa Barbara, Calif.
ELIMINATION OF CYSTAMINE IN THE ORGANISM AND THE PROLONGATION OF ITS RADIOPROTECTIVE EFFECT
B. I. Davydov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 222-257 refs
CSCL 06R

A method is proposed for determining the elimination of the toxic effect of cystamine. In the first approximation, the rate of elimination of this radioprotector in the first three hours amounts to about 25 to 35% per hour. An attempt was made to prolong the radioprotective effect by adding the eliminated dose of cystamine. It was thus possible to maintain the radioprotective level of the first dose up to two hours. Elimination of cystamine through additional multiple administration of small doses with an interval of one hour proceeds with a drop in its rate with each subsequent administration. The decrease in the radioprotective effect of the cystamine proceeds more rapidly than its toxic effect is eliminated. Author

N73-20070* Scientific Translation Service, Santa Barbara, Calif.
INFLUENCE OF GAMMA RADIATION ON THE ELIMINATION OF THE TOXIC EFFECT OF CYSTAMINE
M. V. Vasin, B. I. Davydov, V. V. Antipov, and P. P. Saksonov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 258-266 refs
CSCL 06R

The time of half-elimination (T sub 50) of the toxic effects of cystamine is compared in irradiated and nonirradiated mice. The residual dose of cystamine three hours following administration of the preparation based on the change in the protector LD50 was calculated. With prophylactic use of cystamine, gamma irradiation at a dose of 850 r led to an increase in sub 50 from 1.8 (1.6 - 2.0) hours in intact mice to 2.3 (2.0 2.8) hours in irradiated animals. Three hours after preparation was used, the residual dose of cystamine was 44.2% in the irradiated mice and 24.5% of the original value in the nonirradiated animals. It is suggested that lengthening the elimination time of the toxic effect of cystamine under the influence of radiation is due to the decrease in the protector metabolism intensity under these conditions. Author

N73-20071* Scientific Translation Service, Santa Barbara, Calif.
INFLUENCE OF SHIELDING CERTAIN PARTS OF THE BODY ON RADIATION SICKNESS AND SURVIVAL OF ANIMALS WITH TOTAL GAMMA-NEUTRON IRRADIATION
B. L. Razgovorov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 267-287 refs
CSCL 06R

In experiments on rats subjected to total gamma neutron irradiation with a neutron component of approximately 90%, it was found that with equal masses of protected tissue the effectiveness of shielding the head is much less than the effect of shielding the anterior part of the stomach. The effect of shielding equal masses of tissue of the stomach and head under the influence of fission neutrons with an average energy of approximately 1 MeV is close to the effect of shielding these same regions of the body with irradiation with protons with an energy of 120 MeV and is considerably worse than the effect of shielding for gamma irradiation. With a total gamma-neutron irradiation, the drop in the neutron contribution to the absorbed dose from 90 to 35% leads to a considerable increase in the effectiveness of shielding the head and stomach. Author

N73-20072* Scientific Translation Service, Santa Barbara, Calif.
CHANGE IN REACTIVITY OF ANIMALS TO CERTAIN PHARMACOLOGICAL PREPARATIONS WITH PARTS OF THE BODY SHIELDED DURING TOTAL IRRADIATION
B. L. Razgovorov, P. P. Saksonov, V. V. Antipov, V. S. Shashkov, and V. S. Morozov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 288-306 refs
CSCL 06R

In experiments on rats, cystamine, AET, and 5-methoxytryptamine was studied with shielding of the stomach and head under conditions of general irradiation with proton energies of 120 MeV and gamma rays from Co-60. The effectiveness of these preparations was considerably increased, especially when the substances were used in doses that were reduced relative to the optimum together with slightly effective shieldings, with absolutely lethal doses of radiation on the animals. While in the case of cystamine and AET an increase in the specific effectiveness was the same, both for shielding the head and for the tissue of the stomach, in the case of 5-methoxytryptamine with shielding of the stomach the increase in its effectiveness was much more pronounced than with shielding of the head. Author

N73-20073* Scientific Translation Service, Santa Barbara, Calif.
INFLUENCE OF SHIELDING CERTAIN PARTS OF THE BODY ON THE COURSE OF RADIATION SICKNESS IN DOGS WITH TOTAL GAMMA IRRADIATION
B. L. Razgovorov and N. I. Konnova *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 307-329 refs
CSCL 06R

In an experiment on dogs which were subjected to total gamma irradiation at lethal doses, the influence of shielding the head and the anterior part of the stomach on the clinical course and outcome of radiation sickness was studied. The experiment results supported the basic data obtained in experiments on small laboratory animals and showed the high effectiveness of shielding a part of the body in dogs. In protecting various masses of tissue with shieldings that provided equal attenuation of the radiation and with an equal dose of radiation, shielding of parts of the anterior portion of the stomach was much more effective than shielding the head. Author

N73-20074* Scientific Translation Service, Santa Barbara, Calif.
EFFECT OF SHIELDING THE STOMACH ON THE FREQUENCY OF CHROMOSOMAL ABERRATIONS IN THE CELLS OF THE MARROW OF GUINEA PIGS AND RATS WITH GAMMA-IRRADIATION AT DOSES OF 50-200 r
M. V. Vasin and B. L. Razgovorov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 330-338 refs
CSCL 06R

Twelve and 24 hours after irradiation at doses of 40 to 200 r, the authors failed to find any significant differences in the disruption of the chromosomal complex of the marrow cells in experimental (shielded stomach) and control animals with radiation. However, after three days the frequency of chromosomal aberrations in the marrow of the experimental animals had practically returned to the original level and was statistically reliably lower than in the animals that were irradiated without physical protection. The disruption of the chromosomal complex in the experimental animals was also slightly lower than in the animals that were irradiated with half the dose of radiation, which indicates a decrease in the radiation effect by 2 to 2.5 times. Author

N73-20075* Scientific Translation Service, Santa Barbara, Calif.
AMINOTRANSFERASES OF THE BLOOD SERUM OF DOGS FOLLOWING TOTAL EXPOSURE TO GAMMA RAYS WITH THE STOMACH OR HEAD SHIELDED
B. I. Davydov and Ye. Ye. Simonov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 339-358 refs
CSCL 06R

In the serum of the blood of dogs subjected to a single irradiation with Co-60 at a dose of 600 r (2.9 r/min) with protection of the head or stomach, the activity of glutaminoaspartic

(GAST) and glutaminoalanic (GALT) aminotransferase was investigated. Hyperfermentemia was observed from 40 to 90 days. Exposure to radial acceleration (to the point of disruption of cardiac activity) causes uniform hyperfermentemia in intact dogs and in those irradiated with the stomach shielded and no changes in GALT and GAST activities in dogs with shielding of the head. These differences were explained by the changes in the activity of aminotransferase, and the rate and volume of the reparative processes of different shielding conditions. Author

N73-20076* Scientific Translation Service, Santa Barbara, Calif.
PATHOMORPHOLOGICAL CHANGES IN THE ORGANS OF WHITE RATS FOLLOWING IRRADIATION BY PROTONS WITH AN ENERGY OF 120 MeV AND THE ROLE OR PARTIAL SHIELDING IN THE ATTENUATION OF RADIATION DAMAGE
L. S. Sutulov, N. A. Gaydamakin, B. L. Razgovorov, P. P. Saksonov, V. G. Petrukhin, V. V. Antipov, V. N. Kopyev, N. A. Bogdanova, N. V. Trukhina, Yu. L. Sutulov et al *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 359-379

CSCL 06R

Rats were irradiated with protons having an energy of 120 MeV at a dose of 640 rads with partial shielding of the stomach. A pathomorphological investigation was carried out on the spleen, testes, stomach, intestine, myocardium, central and peripheral nervous system, and retina. In the irradiated animals destructive changes typical for radiation sickness were found, not only in the radiosensitive organs, but also in the so-called radioresistant ones (myocardium, nervous system). Local protection of the stomach reduced the depth and severity of changes in the organs, especially the ones directly covered by the shielding. Author

N73-20077* Scientific Translation Service, Santa Barbara, Calif.
SIGNIFICANCE OF RADIOSENSITIVITY OF INDIVIDUAL PARTS OF THE BODY IN THE DEVELOPMENT OF RADIATION PATHOLOGY
N. A. Gaydamakin *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 380-399 refs
CSCL 06R

Male rats were subjected to total gamma-neutron irradiation at a dose of 300 rads (neutron contribution about 90%) with the head and stomach protected by a shielding. The test data included mortality, frequency of diarrhea, the nature of the pathomorphological changes in the organs and the degree of recovery of the reproductive function in the irradiated males. In the rats subjected to total gamma-neutron radiation the characteristic feature of radiation sickness was earlier damage to the intestine. Placing the screen over the stomach is a more effective means of antiradiation protection than over the region of the head. Author

N73-20078* Scientific Translation Service, Santa Barbara, Calif.
CERTAIN METHODS OF PROPHYLAXIS OF RADIATION SICKNESS
L. A. Tyutin *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 400-409 refs
CSCL 06R

Administration of 0.6 g of cystamine hydrochloride to a patient who had undergone radiation treatment prior to each exposure reduces by two to three times the frequency of development of various symptoms of radiation sickness. The prescription of a complex of B vitamins and vitamin C during radiation therapy has a favorble effect on the total condition of the patients, reduces some symptoms of intoxication, but does not have a noticeable influence on the white blood picture. Author

N73-20079* Scientific Translation Service, Santa Barbara, Calif.
REACTIVITY OF IRRADIATED ANIMALS SHIELDED BY MERCAPTO-(CYSTAMINE AND TSISTAFOS) AND INDOLYLALKYLAMINES (5-MOT AND SEROTONIN) TO TRANSVERSELY DIRECTED OVERLOADS
B. I. Davydov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 410-437 refs
CSCL 06R

In experiments on 2610 mice, the reaction (death) to overloads (44 units) at various periods of radiation sickness at gamma radiation doses from 500 to 4,000 r was studied. Equations of regression were computed for the tolerance of overloads by irradiated animals with the use of radioprotectors. Author

N73-20080* Scientific Translation Service, Santa Barbara, Calif.
RATE OF RECOVERY OF RADIORESISTANCE WITH THE COMBINED APPLICATION OF IONIZING RADIATION AND DYNAMIC FLIGHT FACTORS ON THE ORGANISM
N. N. Dobrov, V. A. Kozlov, V. S. Parshin, and P. P. Saksonov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 438-461 refs
CSCL 06R

In experiments on mice, radioresistance recovery rate was studied with combined exposure to radiation and dynamic factors (vibration, acceleration), based on criteria for the change of LD50/30 and AD50/4 (the dose causing a drop in the weight of the spleen by 50% in four days after the test irradiation). A lengthening of the half-recovery period of radioresistance was observed in mice that were subjected to the combined action of radiation and dynamic factors (acceleration, vibration) in comparison to those that were simply irradiated. Author

N73-20081* Scientific Translation Service, Santa Barbara, Calif.
INFLUENCE OF CYSTAMINE COMBINED WITH SYMPATHOMIMETIC AMINES ON REPARATIVE PROCESSES FOLLOWING THE ACTION OF RADIATION AND OVERLOADS
N. N. Dobrov, V. A. Kozlov, V. S. Parshin, and P. P. Saksonov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 462-467

CSCL 06R

The experiments were performed on 2410 white mice. Before and after irradiation, the animals were subjected to overloads. As the protector, cystamine was used mixed with adrenalin and phenamine. As a criterion for evaluating the protective effect, the reparation rate of the reversible portion of radiation damage was used, determined by the half-recovery period of radioresistance in the animals. It was found that, with combined radiation, cystamine has a protective effect of approximately the same degree as with a single irradiation. Author

N73-20082* Scientific Translation Service, Santa Barbara, Calif.
MAGNITUDE OF THE IRREVERSIBLE PORTION OF RADIATION DAMAGE WITH THE COMBINED ACTION OF RADIATION AND ACCELERATION
N. N. Dobrov, V. A. Kozlov, V. S. Parshin, and N. I. Yezepchuk *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 468-475 refs
CSCL 06R

In experiments on 430 white mice, studies were carried out involving a quantitative determination of the relative value of the irreversible component of radiation damage under the combined action of gamma radiation and acceleration. After preliminary irradiation in sublethal doses up to a total dose of 800 r, or the combined action of radiation in the same doses and acceleration, changes remained in the organism that reduced its radioresistance and resistance to the combined action of radiation and acceleration. Under conditions of combined radiation and acceleration, the value of the irreversible part of the radiation damage increases by 3.5 - 9%. Author

N73-20083* Scientific Translation Service, Santa Barbara, Calif.
REACTION OF THE PERIPHERAL BLOOD IN DOGS UNDER THE COMPLEX ACTION OF TRANSVERSE OVERLOADS AND GAMMA IRRADIATION
N. I. Konnova *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 476-495 refs
CSCL 06R

In experiments on 31 dogs, the influence exerted on the blood system was studied by the complex action of single preliminary transverse overloads and gamma radiation at a dose of 100 or 200 r with intervals between exposures of two hours or 24 hours. With an interval of two hours and a radiation dose of 100 r, the changes in the peripheral blood during the first

hours and days were caused by the overload and consisted of neutrophilic leucocytosis, lympho-, eosino- and thrombocytopenia. With an increase of the dose to 200 r, this effect became less pronounced. With an interval between the influences of several days and a dose of 100 and 200 r, a more rapid and complete restoration of the peripheral blood composition was found.
Author

N73-20084* Scientific Translation Service, Santa Barbara, Calif.
EVALUATING THE INFLUENCE OF VIBRATION ON THE RADIATION REACTION IN DOGS WITH THE AID OF CERTAIN CLINICAL-HEMATOLOGICAL INDICES
T. S. Lvova *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 496-511 refs
CSCL 06R

The experiments were performed on 33 mongrel male dogs. The animals were vibrated (70 Hz, 0.4 cm amplitude) for a single period prior to irradiation with an interval between exposures of 2 or 24 hours. It was shown that the vibration changes the reaction of the peripheral blood to irradiation. The effect of vibration was most clearly evidenced in the group with the two-hour interval between the exposures on the first day of observation. The increase in the radiation dose to 200 r slightly reduced the effect of vibration. The increase of the interval between exposures to 24 hours both at the 100 r and 200 r doses led to the disappearance of the vibration effect. Author

N73-20085* Scientific Translation Service, Santa Barbara, Calif.
INFLUENCE OF PRELIMINARY ADMINISTRATION OF THE RADIOPROTECTOR FINAM ON THE REACTIVITY OF THE TISSUES OF IRRADIATED ANIMALS UNDER VARIOUS EXPERIMENTAL CONDITIONS
L. S. Sutulov, P. P. Saksonov, M. N. Volkov, V. A. Kozlov, Yu. L. Sutulov, A. P. Kuzmina, N. N. Dobrov, A. G. Krasnolobov, V. N. Ananina, L. V. TruKhina et al *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 511-546 refs

CSCL 06R

The role of the radioprotector, finam, which belongs to the aminothiols, is studied reducing the degree of morphological change in the internal organs of irradiated animals. The influence of the radioprotector on the tissue structure of the myocardium during the first 1.5 months of radiation sickness was analyzed. The course of the regenerative process in the sciatic nerve of the irradiated animals, the processes of recovery and morphological adjustment in various tissues and organs at remote periods following double gamma irradiation, and combined exposure to overloads and radiation are also considered. Author

N73-20086* Scientific Translation Service, Santa Barbara, Calif.
INFLUENCE OF PHARMACOCHEMICAL SUBSTANCES ON THE REACTIVITY OF THE ORGANISM TO THE COMBINED ACTION OF GAMMA RADIATION AND TRANSVERSE OVERLOADS
N. A. Gaydamakin, S. G. Kulkin, B. I. Davydov, and V. S. Shashkov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 547-569 refs
CSCL 06R

Under the combined exposure of mice to gamma radiation from Co-60 in doses of 350 and 700 r and transverse overloads (10 units, 30 minutes), the effectiveness of cystamine and AET in amounts of 75 mg/kg each was studied. The effect of overloads 24 hours prior to irradiation reduces the radiation damage of hemopoietic organs. In mice that were subjected to the action of overloads 24 hours after irradiation, there was an insignificant increase in the radiation damage to the spleen and marrow and an increase in the destructive changes in the peripheral nervous system. Cystamine combined with AET has an antiradiation protective effect. Author

N73-20087* Scientific Translation Service, Santa Barbara, Calif.
THE PROBLEM OF THE RESISTANCE OF EXPERIMENTAL ANIMALS TO ACUTE HYPOXIA AT VARIOUS STAGES OF RADIATION SICKNESS
G. A. Vasilyev, L. A. Tiunov, Yu. A. Medvedev, V. V. Kustov, and A. N. Ukshe *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 570-578 refs
CSCL 06R

In experiments on white rats, the influence of X-radiation on the resistance of the animals to anoxic, anemic and histotoxic hypoxia was studied. At the same time, the histophysiological state of the adrenal cortex was considered. Increased resistance of the irradiated rats to hypoxia was caused by the nonspecific reaction of the organism to the stress effect, realized through the adrenal cortex. Author

N73-20088* Scientific Translation Service, Santa Barbara, Calif.
STATE OF THE PERIPHERAL BLOOD OF IRRADIATED ANIMALS UNDER PROLONGED CONDITIONS OF REDUCED BAROMETRIC PRESSURE
N. I. Yezepchuk and N. N. Dobrov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 579-590 refs

CSCL 06S

Radiation reactions (450 r) of rats kept at reduced barometric pressure (198 mm Hg, altitude 10,000 m, partial pressure of oxygen close to that on the ground were studied). The conditions of reduced barometric pressure had a negative effect on the survival rate of the irradiated rats. The preliminary acclimatization of the animals to the altitude slightly modified the effect of radiation sickness. There were no significant differences in the blood indices in the acclimatized and nonacclimatized rats that were irradiated. Author

N73-20090* Scientific Translation Service, Santa Barbara, Calif.
METHOD OF COMBINED TISSUE BLOCKS FOR COMPARATIVE PATHOMORPHOLOGICAL STUDY OF RADIATION PATHOLOGY
V. G. Petrukhin and N. A. Gaydamakin *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 602-615 refs

CSCL 06R

An organ removed from an animal of one group is attached to filter paper together with a similar organ, removed from an animal from another group. The combined tissue block is frozen in dry ice, and combined sections are then prepared in a cryostat for histochemical study. The same blocks, without preliminary freezing, are placed in corresponding fixers (solutions of formalin, Carnot, susa, etc.), dehydrated and sealed with media providing preparations for analysis by ordinary histological methods.
Author

N73-20091* Scientific Translation Service, Santa Barbara, Calif.
PROBLEM OF RELATIVE BIOLOGICAL EFFECTIVENESS OF FAST NEUTRONS
B. L. Razgovorov *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 616-643 refs
CSCL 06R

Experiments carried out on animals showed that if the contribution of gamma radiation to the total radiation dose is not more than 10 - 15%, the level of the gamma background of the RBE of the neutrons may be disregarded. With a higher contribution of gamma radiation to the total radiation dose, the error in determining the RBE coefficient increases significantly and may noticeably distort the results of the study. A table of total doses of gamma-neutron irradiation for two values of the gamma background is included, which facilitates the determination of the neutron RBE coefficient with allowance for gamma radiation. Author

N73-20092* Scientific Translation Service, Santa Barbara, Calif.
EXCRETION OF FREE AMINO ACIDS WITH THE URINE AS A TEST FOR EARLY DIAGNOSIS OF RADIATION DAMAGE
L. A. Tyutin *In its* Probl. of Space Biol., Vol. 14 Feb. 1973 p 644-653 refs
CSCL 06R

In the case of 30 individuals who were subjected to combined radiation therapy for treatment of cancer of the uterus, the excretion of free amino acids with the urine and the change in

their level in the blood were studied. The increase in amount of several free amino acids in the urine is an early and sensitive indicator of radiation action on the human organism. Author

N73-20093*# Scripta Technica, Inc., Washington, D.C.
CHANGES OF CELL ENZYMES, GLUCOSE, CHOLESTEROL AND 17-HYDROXYCORTICOSTEROIDS IN BLOOD DURING PHYSICAL EXERCISE AS A FUNCTION OF THE PHYSICAL TRAINING STATUS
G. Brockkoetter NASA Apr. 1973 32 p refs Transl. into ENGLISH "Das Verhalten von Zellenzymen, glucose, cholesterin and 17-hydroxy-Corticosteroiden im Blut unterkorperlicher Arbeit in Abhangigkeit vom Trainingzustand", West German report DLR-FB-72-48, Porz-Wahn, 1972 52 p
(Contract NASw-2036)
(NASA-TT-F-14826; DLR-FB-72-48) Avail: NTIS HC $3.75 CSCL 06S

In 11 untrained and 11 highly trained subjects, the alterations of cell enzymes, glucose, cholesterol and 17-OH-corticosteroids were studied in response to physical exercise and as a function of the physical status. The training status was quantified by measuring the maximum oxygen uptake. The two groups of subjects showed differences in their responses to physical exercise with respect to aldolase, glucose and 17-OH-corticosteroids. There was no evidence for a close relationship between the status of physical fitness and the extent of the observed alterations. However, a significant coefficient (r = 0.628) was found for the correlation between the maximum oxygen uptake and the plasma aldolase values at rest. Author

N73-20094# Joint Publications Research Service, Arlington, Va.
SPACE BIOLOGY AND MEDICINE, NO. 1, 1973
2 Apr. 1973 144 p refs Transl. into ENGLISH of Kosm. Biol. Med. (USSR), no. 1, 1973
(JPRS-58620) Avail: NTIS HC $9.25

Articles are presented concerning the selection and training of cosmonauts; evaluation and analysis of accumulated data to facilitate the on-going transition from orbital to interplanetary flights; research for guaranteeing safety on long flights, and reliability of the human components of the man-spaceship system; space psychology and physiology; environmental problems and control (spacecraft habitability, effects of radiation and weightlessness, etc.) and telemetry.

N73-20095 Joint Publications Research Service, Arlington, Va.
PHYSIOLOGICAL EFFECT OF THE REPLACEMENT OF ATMOSPHERIC NITROGEN BY INERT GASES AT HIGH AND LOW TEMPERATURE
A. G. Dianov, V. V. Isayenko, and G. P. Sviridova *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 1-10 refs

The effect of extreme (death causing) temperature exposures in helium-oxygen or argon-oxygen atmospheres was studied in 153 experiments on rats. At high and low ambient temperatures the replacement of nitrogen with helium produced a negative effect, shortening the lifetime of the animals. This effect can be attributed to a substantial change in heat transfer in the helium-oxygen atmosphere which occurs due to the higher heat conductivity of helium in comparison with nitrogen. At high and low ambient temperatures the replacement of nitrogen with argon caused no significant changes; the heat conductivity of nitrogen and argon is similar. It is concluded that human tolerance of extreme temperature effects in atmosphere in which nitrogen is replaced by inert gases is dependent only on their thermophysical properties. Author

N73-20096 Joint Publications Research Service, Arlington, Va.
EFFECT OF ANTIOXIDANTS ON THE RATE OF DEOXYGENATION OF BLOOD IN ANIMALS EXPOSED TO A MODIFIED ATMOSPHERE
Ye. Ya. Kaplan, V. I. Shubin, and I. M. Epshteyn *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 11-19 refs

By means of polarographic coulombmetry, the effect of hypoxia and hyperoxia on the rate of blood deoxygenation and the influence of antioxidants (mexamine and BH-3) in mice were studied. The rate of blood deoxygenation increased in response to intraperitoneal injections of antioxidants under normal, hypoxic and hyperoxic conditions. These drugs were found to affect the blood directly, penetrating through the red blood cell membranes. It is postulated that the mechanism of action of antioxidants on the dissociation of oxyhemoglobin is related to their capacity to change the hydrogen ion concentration in the plasma and within red blood cells. Author

N73-20097 Joint Publications Research Service, Arlington, Va.
DYNAMICS OF NITROGENOUS CEREBRAL METABOLITES ACCOMPANYING MULTIPLE HYPOTHERMIA AND SUBSEQUENT SELF HEATING
E. Z. Emirbekov *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 20-24 refs

The content of ammonia, glutamine, glutamic, gamma aminobutyric and aspartic acids in the brain of rats was studied after 1-, 7-, 12- and 13-fold hypothermia to 20-19 C and subsequent self-heating to 37-37.5 C. Following repeated hypothermia and self-heating, a new level of the concentration of nitrogen metabolites was reached in the brain of rats. An increased ammonia content persisted for several days after self-heating. The concentration of glutamine, glutamic and aspartic acids decreased by 18.8, 16.5 and 11.5 percent respectively in comparison with the control data. Author

N73-20098 Joint Publications Research Service, Arlington, Va.
WATER MINERAL METABOLISM IN ANIMALS SUBJECTED TO RESTRICTED MOBILITY
Yu. Yu. Osipov and V. S. Shashkov *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 25-31 refs

The effect of hypokinesis of varying duration on fluid-electrolyte metabolism and composition in the blood and tissues of animals was studied. The exposure caused a significant increase in diuresis and mineral excretion but induced no changes in blood electrolyte composition. After the exposure, diuresis and sodium and potassium excretion decreased substantially. The fact of increased diuresis in the absence of dehydration symptoms may give evidence that it develops due to latent fluid losses. This change in fluid excretion may be related to motor-renal reflexes or disturbances in protein metabolism, particularly accelerated excretion of protein metabolites. Author

N73-20099 Joint Publications Research Service, Arlington, Va.
INCREASE IN THE TOLERANCE OF RATS TO A HIGH TEMPERATURE UNDER THE INFLUENCE OF THERMAL CONDITIONING AND DRUGS
A. Yu. Yunusov, E. S. Makhmudov, and F. M. Islamgaliyeva *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 32-37 refs

The high temperature tolerance of rats was studied under normal conditions and after thermal conditioning, combined with adaptogenic drug administration. The thermal tolerance of rats was significantly increased by administration of glycyrrhetic acid (1 mg) in combination with succinic and ascorbic acids and potassium chloride (1 mg of each) for 10 days under normal conditions and after thermal conditioning. By the time of death the experimental animals exhibited an increase in adrenal weight, rectal temperature and urine excretion of potassium and (especially) sodium, induced by thermal conditioning. Possible mechanisms for increasing the thermal tolerance of animals under the influence of adaptogenic drugs are discussed. Author

N73-20100 Joint Publications Research Service, Arlington, Va.
EFFECT OF CHRONIC IRRADIATION OF DOGS BY Co60 GAMMA RAYS ON THE LEVEL OF AUTOANTIBODIES
V. A. Zuyeva *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 38-44 refs

Dogs were exposed to chronic irradiation with Co-60 gamma rays during 2.5 years with doses of 25 rem (first group) and

150 rem (second group) and combined irradiation with a dose of 75 rem per year supplemented with short-term exposure with a dose of 50 rem three times a year (third group). Chronic irradiation of dogs in the second and third groups induced the following changes in immunobiologic reactivity: an increase in the titers of incomplete (the direct Coumb's method) and complement-fixing (the complement consumption reaction) autoantibodies. The dogs in the first group exhibited no differences in these indices in comparison with the controls. Author

N73-20101 Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL CHANGES IN THE LIVER IN DOGS ACCOMPANYING CHRONIC GAMMA RADIATION
Ye. A. Savina, V. K. Podymov, G. I. Plakhuta-Plakutina, V. I. Yakovleva, and B. A. Markelov *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 45-51 refs

Thirty dogs were exposed to chronic doses of 21, 62.5 and 125 rad/year and combined chronic exposure with a dose of 62.5 rad/year, and acute exposure with doses of 58 and 126 rad/year gamma irradiation over a three-year period. Morphological changes in the liver of these dogs were detected in a study of 210 liver biopsies (150 experimental and 60 control animals). The changes developed in relation to the duration and pattern of irradiation. Author

N73-20102 Joint Publications Research Service, Arlington, Va.
PROLIFERATIVE ACTIVITY OF BONE MARROW CELLS IN DOGS DURING CHRONIC GAMMA IRRADIATION IN COMBINATION WITH REPEATED ACUTE EXPOSURES
T. M. Zukhbaya *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 52-56 refs

The proliferative activity of bone marrow cells of dogs exposed to three-year chronic gamma irradiation (dose rate of 63 rad per year), in combination with repeated acute irradiation (with a dose of 42 rad for 20 hours each), was examined. The total mean tissue dose was 570 rad. The proliferative activity of the erythroblasts remained undisturbed. Leukoblasts exhibited an inhibition of regenerative processes. At the end of the experiment an increased mitotic activity of myeloid elements was observed together with a significant decline in a number of myeloid cells in the bone marrow and a decrease in the number of leukocytes in the peripheral blood. Author

N73-20103 Joint Publications Research Service, Arlington, Va.
DYNAMICS OF SOME CHARACTERISTICS OF INDUCED POTENTIAL OF THE OPTICAL REGION IN THE CEREBRAL CORTEX IN RABBITS UNDER CONDITIONS OF INCREASING HYPOXIA
I. N. Zakharova *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 57-61 refs

When taken to an altitude of 5,000-7,000 m at a rate of 25 m/sec, rabbits exhibited a significant shortening of the latent period and the amplitude of the primary response of the induced potential to light flashes. When taken to an altitude of over 8,000-9,000 m they exhibited an increase in these parameters. The data obtained give evidence that during the first of the hypoxic stages the excitation process prevails, whereas during the second stage an inhibition process develops in brain structures. Author

N73-20104 Joint Publications Research Service, Arlington, Va.
CHANGES IN COMPOSITION OF THE PERIPHERAL BLOOD DURING 18- AND 24-DAY SPACE FLIGHTS
V. I. Legenkov, I. S. Balskhovskiy, A. V. Beregovkin, Z. S. Moshkalo, and G. V. Sorokina *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 62-69 refs

The morphological composition of the peripheral blood of crew members of the Soyuz-9 spacecraft and Salyut-1 space station was studied. The investigations revealed transient moderate neutrophilic leukocytosis, a relative decrease in the count of lymphocytes and monocytes, a pronounced decrease in the count of eosinophils, and a slight decline in hemoglobin and thrombocytopenia that was distinct after the long-term flight. Changes were revealed in the protein fractions whose nature was unclear, appearance of the C-reactive protein, and acceleration of the erythrosedimentation rate. These changes indicate the effect of space flight factors on the functional state of the blood-forming system. Methods for making such studies and recommendations on their continuation are presented. Author

N73-20105 Joint Publications Research Service, Arlington, Va.
CHANGE IN BLOOD CONTENT OF GASES WHEN MAN IS EXPOSED TO HIGH AMBIENT TEMPERATURES
A. N. Azhayev and V. S. Panchenko *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 70-77 refs

During experiments in an altitude chamber the test subjects remained at rest or performed moderate physical exercises, the temperature of the air and walls being 60 and 70 C. Within an increase in body temperature by 1 deg no changes in the partial pressure of oxygen and carbon dioxide in the blood were found. When there was considerable hyperthermia (an increase in body temperature by 2 deg) the partial pressures of oxygen and carbon dioxide decreased significantly. This dropoff was evidently induced by hemodynamic disturbances during overheating and the consequences of pulmonary hyperventilation. Author

N73-20106 Joint Publications Research Service, Arlington, Va.
CARBON MONOXIDE CONTENT IN EXHALED AIR AND BLOOD CARBOXYHEMOGLOBIN IN SUBJECTS CONFINED TO INSULATING PROTECTIVE GEAR
C. M. Gorodinskiy, A. V. Sedov, M. I. Vakar, G. Ye. Mazneva, N. A. Surovtsev, Ye. Ye. Sotnikov, and L. I. Kobzeva *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 78-83 refs

The content of carbon monoxide in the exhaled air and carboxyhemoglobin in the blood was measured in test subjects who performed heavy physical work for six hours in a pure oxygen atmosphere at a reduced pressure. The carbon monoxide content was found to decrease. A distinct correlation was established between the carbon monoxide concentration in the exhaled air and the carboxyhemoglobin content in the blood. Author

N73-20107 Joint Publications Research Service, Arlington, Va.
STATE OF HEMOCOAGULATION AND THROMBOCYTES DURING HYPOKINESIA AFTER ADAPTATION TO HIGH MOUNTAIN CONDITIONS
V. A. Isabayeva and T. A. Ponomareva *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 84-91 refs

Short-term adaptation of test subjects to an elevation of 3,200 m produced phasic changes in hemocoagulation and thrombocytes which included a relative decrease in blood-coagulating capacity and a progressive increase in the thrombocyte count. Further 10-day hypokinesia of test subjects preadapted to high altitude induced no disturbances in their coagulation system. Prolonged 24-day hypokinesia resulted in relative hypocoagulation (dropoff in plasma tolerance to heparin, increase in recalcification time), and decrease in the thrombocytogram. It was demonstrated that preliminary adaptation to high elevations can smooth marked shifts in hemocoagulation brought about by hypokinesia in untrained people. Author

N73-20108* Joint Publications Research Service, Arlington, Va.
FUNCTIONAL CHANGES IN SYSTEMIC AND REGIONAL (INTRACRANIAL) CIRCULATION ACCOMPANYING LOW ACCELERATIONS
V. V. Usachev and I. P. Shinkarevskaya *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 92-101 refs

Functional changes in systemic and cerebral hemodynamics were studied with respect to vestibular stresses. The main types of responses, differing qualitatively with respect to the tolerance of test subjects to low accelerations (particularly to Coriolis accelerations), were established. This is of practical importance in the selection of aircraft and space pilots. The data presented

sheds light on the physiological mechanisms of adaptation and disturbed compensation during vestibular stimulation. Further studies in this important field of aerospace medicine are outlined. Author

N73-20109 Joint Publications Research Service, Arlington, Va.
ROLE OF SOCIAL SYNCHRONIZERS IN ADAPTATION TO UNUSUAL DAILY SCHEDULES c05
S. I. Stepanova *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 102-111 refs

A series of experiments was conducted with inversion of the diurnal sleep and wakefulness regime of subjects under isolation conditions. Adaptation of the subjects to the inverted schedule was attained using different social synchronizers, the most important of which was the work and rest schedule. In addition to the work and rest regime, other social synchronizers used included radio transmissions recorded on magnetic tape and relayed into the isolation chamber. The time of day given by the announcer at the beginning of each transmission coincided with the subjective time of the subjects. The results of the experiments show that a knowledge of the true time of day does not preclude adaptation of subjects isolated in a chamber to the inverted diurnal rhythm, although it can be speculated that it makes such adaptation difficult. D.L.G.

N73-20110 Joint Publications Research Service, Arlington, Va.
BACTERICIDAL ACTIVITY OF THE HUMAN SKIN AT DIFFERENT TIMES OF DAY
M. I. Kozar *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 112-117 refs

The bactericidal activity was investigated of the human skin at different times of day in the case of a normal diurnal work and rest regime. The bactericidal activity was determined in the middle third of the forearm and palm one to two hours after eating and not sooner than two hours after ordinary hygienic processing of skin on the arms. The results indicate the following: (1) Skin bactericidal activity on the forearm is greater in the morning hours; in the evening hours it is depressed. (2) The differences in bactericidal activity on forearm skin, determined at different times of day, are reliable. (3) Skin bactericidal activity on the palm is usually higher in the morning hours. (4) During the evening hours the capacity of the skin to inactivate an applied suspension of enteric bacilli is reduced. D.L.G.

N73-20111 Joint Publications Research Service, Arlington, Va.
IMPORTANCE OF PHOTOSTIMULATION IN THE ELECTRO-ENCEPHALOGRAPHIC STUDY OF FLIERS AND CANDIDATES AT FLIGHT SCHOOLS
H. R. Kammel *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 118-125

In order to determine the importance of photostimulation in a study of readiness for flight service, systematic electroencephalographic investigations were carried out using intermittent light stimuli. The subjects used in the investigations included candidates for flight schools, students at flight schools, and flight personnel. A control group consisted of military personnel with functional disorders of the nervous system. The results show that pathological changes on the EEG during photostimulation were recorded in 1.73 percent of the subjects. A comparative evaluation of the results indicates that when conducting electroencephalography without photostimulation, 25 percent of the pathological cerebral reactions remain undetected. It is concluded that in the practice of military flight examinations the photostimulation method should be a mandatory technique for activating bioelectric activity in the brain. D.L.G.

N73-20112 Joint Publications Research Service, Arlington, Va.
EQUIVALENCE OF THE EFFECT OF CORIOLIS ACCELERATION ON RECEPTORS OF THE SEMICIRCULAR CANALS AT SOME ANGULAR ACCELERATION c05
I. Yu. Sarkisov and A. A. Shipov *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 126-129 refs

A method is presented for determining angular acceleration in which movements of the cupulae in all six semicircular canals would be identical to those caused by exposure to coriolis accelerations. Differential equations of motion of the cupulae with allowance for external perturbing factors are given, and an example of determination of the angular acceleration equivalent to the stipulated coriolis acceleration is cited. D.L.G.

N73-20113 Joint Publications Research Service, Arlington, Va.
CHANGES IN VISUAL FUNCTIONS AFTER EXPOSURE TO WEAK VESTIBULAR IRRITATIONS
V. I. Kartsev *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 130-132 refs

The functional state of the human visual analyzer was investigated after exposure to weak vestibular irritations not causing motion sickness symptoms. A total of 78 experiments, 29 of which served as the control, were conducted. After 20 minutes of adaptation by the subjects to darkness an adaptometer was used in determining visual acuity when there was twilight illumination. Upon completion of irritation of the vestibular apparatus, the state of visual functions was again evaluated. In the control investigations there was no vestibular stimulus. It was established that the rate of adaptation of central vision, after stimulation of the semicircular canals, increased by 13 to 20 percent in comparison with the control investigations. However, the rate of adaptation after stimulation of the otolithic apparatus did not differ reliably from the control studies, although there was an obvious tendency to decrease. D.L.G.

N73-20114 Joint Publications Research Service, Arlington, Va.
EFFECT OF PACKAGING AND SOME USE CONDITIONS FOR DRUGS IN PHARMACIES CARRYING EMERGENCY RESERVES
V. B. Zubavin and G. Z. Ostravskaya *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 133-136 refs

An investigation was conducted to determine the possibility of using Soviet produced polyethylene film as packaging for drugs in tablet form, to compare this packaging with that already in use, and to ascertain the sensitivity of drugs to spacecraft environments. The investigation resulted from a need to overcome the deficiencies of the present packaging used for drugs carried as emergency reserves by pilots and cosmonauts. Experience with the present packaging, metal containers with screw-on covers, has shown that such packaging does not always safeguard the drugs from the unfavorable effect of mechanical factors such as vibration, shock, and overloads. Environmental tests with the polyethylene film packaging indicate no adverse effect on the drugs from the mechanical factors mentioned. D.L.G.

N73-20115 Joint Publications Research Service, Arlington, Va.
REVIEW: BIOMEDICAL PROBLEMS IN SPACE FLIGHTS. INDEX OF SOVIET AND FOREIGN LITERATURE
Ye. M. Yuganov *In its* Space Biol. and Med., No. 1, 1973 2 Apr. 1973 p 137-199 ref

A bibliographic index of world literature on space biology and medicine is reviewed. The method of compilation, arrangement of information, and the scope of the material are discussed. D.L.G.

N73-20116*# Kanner (Leo) Associates, Redwood City, Calif.
METABOLISM OF DRUGS. 77: IN VITRO METABOLISM OF ANTIPYRINE
H. Shimeno and H. Yoshimura Washington NASA Apr. 1973 12 p refs Transl. into ENGLISH from Yakugaku Zasshi (Tokyo), v. 92, no. 11, 1972 p 1376-1379
(Contract NASw-2481)
(NASA-TT-F-14868) Avail: NTIS HC $3.00 CSCL 06O

In connection with previous in vivo work which stated that antipyrine was mainly metabolized to 4-hydroxyantipyrine and 3-hydroxymethyl-2-methyl-1-phenyl-3-pyrazolin-5 one (An-CH2OH), the in vitro metabolism of this drug was investigated by use of 9000 x g supernatant fraction of rat liver. It was found that antipyrine was oxidized to 4-hydroxyantipyrine and AN-CH2OH by the 9000 x g supernatant of the liver. These

metabolites were detected by means of thin-layer and gas chromatographies, and by ultraviolet absorption spectral analysis. Author

N73-20117*# Linguistic Systems, Inc., Cambridge, Mass.
THE CAROTENOIDS OF SOME BASIDIOMYCETES: A CHEMIOTAXIONOMIC SURVEY
J. L. Fiasson Washington NASA Apr. 1973 103 p refs Transl. into ENGLISH of "Les Carotenoides des Basidiomycetes: Survol Chimiotaxinomique", Lyon Univ. thesis, Jul. 1968 p 84
(Contract NASw-2482)
(NASA-TT-F-14858) Avail: NTIS HC $7.25 CSCL 06A

Carotenoid pigments were investigated in about fifty species of Basidiomycetes belonging to the most diverse groups. About 20 of them were shown to possess this type of pigment, and these were analyzed in as detailed a manner as possible. Of this number, 12 had not previously been analyzed and supplementary information is offered on six species already studied. In addition, a new molecule was isolated and characterized and a structural hypothesis with its justification is proposed. The general conclusions which may be applied to fungus carotenogenesis as a whole show initial pigmentation seems to include beta-carotene, lycopene, and perhaps torulene. Author

N73-20118*# Linguistic Systems, Inc., Cambridge, Mass.
ADENIN-NUCLEOTIDES NAD (PLUS) AND NADN IN SKELETAL MUSCLES DURING INTENSIVE WORK AND AT REST
N. R. Chagovets Washington NASA Apr. 1973 6 p refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 207, no. 3, 1972 p 739-741
(Contract NASw-2482)
(NASA-TT-F-14856) Avail: NTIS HC $3.00 CSCL 06S

The dynamics of the adenin-nucleotide NAD(+) and NAD content in skeletal muscles was studied in rats, during intensive activity and rest periods. It was found that after the cessation of work, the degree of regeneration of muscular NAD normalizes after 15 minutes of rest, while the ATP/ADP ratio in the muscles still shows some decrease 30 minutes after work. F.O.S.

N73-20119*# Kanner (Leo) Associates, Redwood City, Calif.
RESISTANCE OF ANIMALS IMMERSED IN WATER TO HIGH ACCELERATION
R. Margaria, T. Gualtierotti, and D. Spinelli Washington NASA Feb. 1973 8 p ref Transl. into ENGLISH from Atti Accad. Naz. Lincei, Classe Sci. Fis. Mat. Nat. (Rome), v. 22, no. 6, 1957 p 703-706
(Contract NASw-2481)
(NASA-TT-F-14828) Avail: NTIS HC $3.00 CSCL 06S

The nullification of the forces of acceleration by immersion in water were tested experimentally. Fish and frogs were subjected to acceleration in a centrifuge in a column of water of varying depth. Rats were placed in a steel tank and allowed to fall to the floor. Under the conditions of the experiment, fishes and frogs manifested permanent damage to the otolitic system as well as temporary damage such as ischemia and hyperemia. Rats, while not exhibiting otolitic changes, succumbed to hemorrhagic pulmonary lesions due to a difference in specific weight between the lung tissue and the rest of the body. The height of the column of water above the animal is an important factor since resistance to acceleration diminishes as the depth of water increases. An animal immersed in water can withstand acceleration ten times greater than when it is in air. Author

N73-20120*# Linguistic Systems, Inc., Cambridge, Mass.
RADIATION STERILIZATION WITH A VAN DE GRAAFF ACCELERATOR
W. Jahn and M. Schinkmann Washington NASA Mar. 1973 10 p refs Transl. into ENGLISH from Atomwirtschaft (Duesseldorf), v. 17, Sep./Oct. 1972 p 527-529
(Contract NASw-2482)
(NASA-TT-F-14821) Avail: NTIS HC $3.00 CSCL 06M

Radiation sterilization of medical disposable articles is discussed as one of the few areas of application for current industrial use of an energetic electron and gamma radiation. The sterilization process occurs according to statistical laws. This results in certain aspects which must be taken into consideration during application of radiation sterilization. Several technical and economic aspects of the procedure are detailed for an electron beam sterilization installation. Author

N73-20121# Bureau of Sport Fisheries and Wildlife, Washington, D.C. Western Fish Disease Lab.
EFFECT OF SONIC BOOM ON FISH Final Report
Robert S. Rucker Feb. 1973 71 p refs
(Contract DOT-FA72WAI-238)
(FAA-RD-73-29) Avail: NTIS HC $5.75

A program was initiated to study the effect of sonic boom on fish and fish eggs during critical stages of development. During the development of fish eggs they reach a critical period where they become sensitive to vibration or disturbance. This program was designed to determine if the disturbances caused by sonic booms could have a detrimental effect during this period. It consisted of both field and laboratory tests conducted at several National Fish Hatcheries. Fish eggs from both trout and salmon were reared in the normal manner, except that when they were in their most critical phase of development they were exposed to sonic booms produced by military airplanes. Egg and fish fry mortalities from exposed groups of eggs were compared to those for control groups of eggs spawned at the same time. These comparisons indicated that the sonic boom exposure caused no increase in mortality. Author

N73-20122*# Linguistic Systems, Inc., Cambridge, Mass.
HUMAN ADAPTATION TO HYPOXIA AND TOLERANCE OF HIGH ENVIRONMENTAL TEMPERATURES
A. N. Azhayev Washington NASA Apr. 1973 10 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 54, no. 9, 1968 p 1073-1076
(Contract NASw-2482)
(NASA-TT-F-14860) Avail: NTIS HC $3.00 CSCL 06S

Regular exposure to hypoxic hypoxia combined with physical load conditions of altitude chamber has favored an increased endurance. An increased endurance of high temperatures by human subjects was achieved with varying levels of hypoxic hypoxia and physical loads, which is in accordance with the fundamentals of training elaborated for sport medicine. Author

N73-20123*# Linguistic Systems, Inc., Cambridge, Mass.
CHANGES IN THE RESISTANCE OF THE ORGANISM TO EXTREME EFFECTS DURING PROLONGED ACCLIMATIZATION TO HYPOXIA
N. A. Agadzhanyn Washington NASA Apr. 1973 14 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 54, no. 4, 1968 p 496-501
(Contract NASw-2482)
(NASA-TT-F-14861) Avail: NTIS HC $3.00 CSCL 06S

White rats and rabbits were studied at an altitude of 3200 m and in a simulated altitude of 12,000 m to determine the periods of acclimatization to hypoxia and the changes in the resistance of the organisms to extreme effects. The results showed that acclimatization up to 45 days leads to increased tolerance of the organism to the effects of acute hypoxia, to the combined effect of hypoxia and high temperature, and to the effects of acceleration. Increased tolerance to extreme temperatures was observed as early as the 15th day of the stay at high altitudes and its maximum value was achieved by the 30th day of acclimatization. The morphological changes in acclimatized animals at a simulated altitude of 12,000 m were expressed in abrupt hemodynamic disorders and a prevalent effect on the blood vessels of the brain. Author

N73-20124*# Scientific Translation Service, Santa Barbara, Calif.
CONTRIBUTION TO THE CHEMICAL TAXONOMY OF THE AGARICALES PIGMENTS OF BOLETUS AND CORTINARIA
M. Gabriel Washington NASA Apr. 1973 86 p refs Transl. into ENGLISH of "Contribution a la Chimiotaxinomie des Agaricales Pigments des Bolets et des Cortinaires" Lyon Univ. Ph.D. Thesis, 1965 72 p
(Contract NASw-2483)
(NASA-TT-F-14865) Avail: NTIS HC $6.50 CSCL 06B

The pigments of the Boletus and the Cortinaria are studied. Almost all of the Boletaceae, Gomphidiaceae and Paxillaceae in the French flora and a certain number of Cortinaria were used in the study. The chemical characteristics of the pigments are presented, and the systematic interests of these pigments are discussed. Author

N73-20125*# Scientific Translation Service, Santa Barbara, Calif.
SOLVENT EFFECT OF ESR SPECTRA OF NITROXIDE FREE RADICALS
J. A. Soriaruiz Washington NASA Apr. 1973 13 p refs Transl. into ENGLISH from An. Quim. (Spain), v. 68, 1972 p 1189-1194
(Contract NASw-2483)
(NASA-TT-F-14866) Avail: NTIS HC $3.00 CSCL 06A

The use of nitroxide free radicals as spin labels in biochemical systems is extended. The nitroxides have a high sensitivity to the local environment, and all parameters are solvent dependent. The variation of these parameters when the nitroxide is in solution with several polar and nonpolar solvents is studied. An effective radius of r approximately equal to 3 A is calculated for the nitroxide molecules. Author

N73-20126*# Exotech Systems, Inc., Falls Church, Va.
SCIENTIFIC AND TECHNICAL SERVICES IN THE DEVELOPMENT OF PLANETARY QUARANTINE MEASURES FOR AUTOMATED SPACECRAFT Final Report, 1 Apr. 1972 - 31 Mar. 1973
Mar. 1973 41 p refs
(Contract NASw-2372)
(NASA-CR-131291; TR73-F) Avail: NTIS HC $4.25 CSCL 06M

Primary goals of the Planetary Quarantine Program are defined and used to provide a basis for planning and source allocation toward the development of planetary quarantine measures for the following automated spacecrafts: Viking 1975, Pioneer F and G, and Mariner Venus-Mercury 1973. G.G.

N73-20127*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MICROBIOLOGICAL SURVEILLANCE OF FOOD HANDLING AT NASA-MSFC
F. J. Beyerle 23 Feb. 1973 38 p ref
(NASA-TM-X-64734) Avail: NTIS HC $4.00 CSCL 06I

A microbiological surveillance program of cafeterias and snack bars was conducted to supplement the inspections by NASA Medical Center personnel and to gather information for cafeteria management to pinpoint areas of possible contamination. The work conducted under the program from its inception in January, 1972, to its termination on September 15, 1972 is summarized. Ten food handling facilities were included in the surveillance at NASA-MSFC. Author

N73-20128*# Techtran Corp., Glen Burnie, Md.
PROBLEMS OF SPACE BIOLOGY. VOLUME 12: THE GRAVITY RECEPTOR: EVOLUTION OF THE STRUCTURAL, CYTOCHEMICAL AND FUNCTIONAL ORGANIZATION
Ya. A. Vinnikov, O. G. Gazenko, L. K. Titova, A. A. Bronshteyn, T. P. Tsirulis, R. A. Pevzner, V. I. Govardovskiy, F. G. Gribakin, V. P. Ivanov, M. Z. Aronova et al Washington NASA Mar. 1973 600 p refs Transl. into ENGLISH of the book "Probl. Kosmich. Biol., Tom 12, Retseptor Gravitatsii. Evolyutsiya Strukt., Tsitokhim. i Funkts. Organizatsii" Leningrad, Nauka Press, 1971
(Contract NASw-2037)
(NASA-TT-F-720) Avail: NTIS HC $6.00 CSCL 06C

Data are presented which were obtained by cytochemical, cytophysiological, and electron-microscopic methods, and pertain to the evolution of structural, cytochemical and functional organization of gravity receptors in invertebrates (statocysts) and vertebrates (vestibular apparatus). The functional mechanism of the gravity receptor is considered on the cellular, subcellular and molecular levels. Author

N73-20129*# California Univ., Los Angeles. Space Biology Lab.
PHYSIOLOGY OF CHIMPANZEES IN ORBIT. PART 1: SCIENTIFIC REPORT Final Report, 8 Jul. 1968 - 28 Feb. 1971
Allen Firstenberg and James McNew 10 Apr. 1972 210 p
(Contract NSR-05-007-158)
(NASA-CR-131374; POCO-04-071-006-Pt-1) Avail: NTIS HC $12.50 CSCL 06C

Major achievements and accomplishments are reported for the Physiology of Chimpanzees in Orbit Program. Scientific studies relate to behavior and physiology, and engineering studies cover telemetry, behavioral training, systems tests, life support subsystems, and program plan. Author

N73-20130*# California Univ., Los Angeles. Space Biology Lab.
PHYSIOLOGY OF CHIMPANZEES IN ORBIT. PART 2: INTERFACE DOCUMENT Final Report, 8 Jul. 1968 - 28 Feb. 1971
Allen Firstenberg 10 Apr. 1972 244 p
(Contract NSR-05-007-158)
(NASA-CR-131397; POCO-04-071-006-Pt-2) Avail: NTIS HC $14.25 CSCL 06C

Interface requirements are presented for the design and development of an earth orbiting experiment to be known as POCO, Physiology of Chimpanzees in Orbit. The POCO experiment may be designed to operate within an orbiting space station (provided artificial gravity measures are not employed), a Saturn 4-B workshop, an Apollo command module or service module, a Saturn-1B spacecraft LM adapter, or aboard one of the presently conceived appendages connected by an umbilical to a space station. This document sets forth the experiment definition and requirements and describes the hardware under development to accomplish these objectives. Author

N73-20131# Monsanto Research Corp., Dayton, Ohio.
RESEARCH PROGRAM ON BERYLLIUM OXIDE ANALYSIS AND TOXICITY Final Technical Report, Jun. 1971 - Jun. 1972
William G. Scribner Wright-Patterson AFB, Ohio AMRL Sep. 1972 50 p refs
(Contract F33615-71-C-1794; AF Proj. 6302)
(AD-754936; MRC-DA-340; AMRL-TR-72-72) Avail: NTIS CSCL 06/20

The carcinogenic activity of BeO has been shown to be a function of the temperature to which the beryllium has been exposed. Examination of the toxicological properties of various rocket exhaust products indicate that some products resemble high-fired BeO in their lack of carcinogenic activity, while others contain considerable quantities of water soluble beryllium and vary in toxicity. In analyzing blood samples it is necessary to obtain the total Be concentration although as mentioned some forms are not as reactive as others. Thus the research involved devising reaction conditions for the conversion of low-fired BeO and high-fired BeO such that the reaction mixture was in a form suitable for the gas chromatographic measurement of beryllium. Also discussed is the applicability of the technique for the conversion of the oxides in blood and tissue matrices. GRA

N73-20132# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
VESTIBULAR REACTIONS METHODS OF STUDY AND THE EFFECTS ON VARIOUS ENVIRONMENTAL FACTORS
Yu. G. Grigorev, Yu. V. Farber, and N. A. Volokhova 15 Sep. 1972 232 p refs Transl. into ENGLISH of the publ. "Vestibulyarnyye Reaktsii" Moscow, Meditsina, 1970 p 1-196
(AD-753511; FTD-MT-24-1913-71) Avail: NTIS CSCL 06/19

The monograph gives information on the quantitative characteristics and reactivity of the vestibular analyzer and describes the nature of the functional connection between the intensity of vestibular reactions and the values of various parameters of the adequate stimulus (force, duration) for the nonauditory portion of the labyrinth. A special section contains data on the nature of the organism's reactions, adaptation peculiarities and change in the sensitivity and reactivity of the vestibular analyzer during a prolonged (up to 15 days) periodically occurring effect of the Coriolis forces. Analyzed is the symptom complex of motion

sickness occurring after a man spends a certain time in a rotating room. The essence of this study, in addition to the overall physiological value, lies in the prospect of creating artificial gravitation onboard spacecraft. Examined are materials on the effect of a series of other factors of environment and, primarily, the ionizing radiation on the vestibular analyzer. Author (GRA)

N73-20133# National Academy of Sciences-National Research Council, Washington, D.C.
VISUAL SEARCH: A SYMPOSIUM CONDUCTED AT THE SPRING MEETING, 1970
1973 156 p refs
(AD-754327) Avail: NTIS MF $0.95; HC National Academy of Sciences, 2101 Constitution Ave., N. W., Washington, D. C. $5.95 CSCL 06/16

Contents: Experiments in visual search; Visual aspects of air collision; Dynamic visual search patterns; Detection of peripheral stimuli under psychological and physiological stress; Studies of extrafoveal discrimination; Modulation transfer function area as a measure of image quality; Visual scanning behavior; Visual information storage. GRA

N73-20134# Dayton Univ. Research Inst., Ohio. Research Inst.
BONE STRENGTH AND IN-FLIGHT MECHANICAL STRESSES Annual Report
G. A. Graves, P. K. Bajpai, E. E. McCullum, H. G. Stein (Aerospace Med. Res. Lab.), and F. Noyes (Aerospace Med. Res. Lab.) 15 Jul. 1972 66 p refs
(Contract F44620-71-C-0083; AF Proj. 9777)
(AD-754982; AFOSR-73-0027TR; AR-1) Avail: NTIS CSCL 06/12

Twelve rhesus monkeys, in four groups of three each, were implanted with resorbable calcium aluminate ceramic femur sections. Each group contained a ceramic of different chemical composition and crystallographic structure. Four other rhesus monkeys underwent surgery for the removal and immediate replacement of a segment of their femur and were used as controls. One animal in each group was sacrificed after 60, 120, and 180 days. Radiographic observations and biochemical serum and urine analysis was performed throughout the implant periods. Scanning electron microscopy, reflected light microscopy, microradiography, histology, and electron-microprobe analysis were performed on ceramic-bone samples after sacrifice. These observations are compared with the microstructural analysis of the four different types of ceramics prior to implanting. A detailed comparison of the four different ceramics relative to one another and to the control samples is also given. It was concluded that: (a) The ceramics used possessed adequate mechanical strength for use as femur sections in rhesus monkeys for up to 180 days when used in combination with an intermedullary fixation device; (2) The chemical composition of the implant definitely affects the type of organic tissue that forms. Author (GRA)

N73-20135# School of Aerospace Medicine, Brooks AFB, Tex.
RETINAL EFFECTS OF MULTIPLE PULSE GALLIUM ARSENIDE LASER Final Report, 1971
Robert W. Ebbers Nov. 1972 17 p refs
(AD-753419; SAM-TR-72-25) Avail: NTIS CSCL 06/16

The eyes of 38 anesthetized rhesus monkeys were exposed to near-infrared laser radiation from a repetitive pulse gallium arsenide laser. Pulse repetition frequencies of 40 pps and 1,000 pps were utilized with a 20 nsec. pulse width at the wavelength of 905 nm. Lesions for threshold determination were placed in the temporal paramacular area and could be produced only by varying exposure duration with fixed energy output. Therefore, the resultant 50% probability of damage values (ED-50) were expressed as total exposure duration rather than energy per pulse. The ED-50 value of 0.72 sec. for the 1,000 pps exposure is significantly lower than the 22.3 sec. for the 40 pps exposure and demonstrates a cumulative effect. Author (GRA)

N73-20136# National Academy of Sciences-National Research Council, Washington, D.C. Committee on Vision.
COLOR VISION: A SYMPOSIUM CONDUCTED AT THE SPRING MEETING, 1971
1973 129 p refs Conf. held at Washington, D. C., 1971
(Contract N00014-67-A-0244-0211)
(AD-754328; ISB-0-309-02105-7) Avail: NTIS; National Academy of Sciences, 2101 Constitution Ave., N. W., Washington, D. C. HC $4.95 CSCL 06/16

Contents: Color vision deficiencies; Comparison of color vision tests used by the armed forces; Color in visual signaling; Comparative photointerpretation from panchromatic, color, and ektachrome infrared photography; Color, pattern, and related visual influences in architecture; Color in architecture. GRA

N73-20137* General Electric Co., Philadelphia, Pa.
AIR CONDITIONED SUIT Patent
George R. Carl, inventor (to NASA) Issued 30 Jan. 1973 6 p Filed 27 Oct. 1970 Supersedes N72-20106 (10 - 11, p 1433) Sponsored by NASA
(NASA-Case-LAR-10076-1; US-Patent-3,713,480; US-Patent-Appl-SN-84290; US-Patent-Class-165-46; US-Patent-Class-312-1; US-Patent-Class-62-259) Avail: US Patent Office CSCL 06K

An environmentally controlled suit is described consisting of an airtight outergarment attached by an airtight bellows to the wall of a sterile chamber, an undergarment providing for circulation of air near the skin of the wearer, and a circulation system comprised of air supply and distribution to the extremities of the undegarment and central collection and exhaust of air from the midsection of the undergarment. A workman wearing the undergarment and attached circulation system enters the outer garment through a tunnel in the chamber wall and the attached bellows to work in the chamber without any danger of spreading bacteria. Official Gazette of U.S. Patent Office

N73-20138*# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
STUDY OF DESIGN AND CONTROL OF REMOTE MANIPULATORS. PART 2: VIBRATION CONSIDERATIONS IN MANIPULATOR DESIGN Final Report
Wayne J. Book 15 Feb. 1973 38 p ref
(Contract NAS8-28055)
(NASA-CR-124189; DSR-73784-2-Pt-2) Avail: NTIS HC $4.00 CSCL 05H

An investigation is reported involving a mathematical procedure using 4 x 4 transformation matrices for analyzing the vibrations of flexible manipulators. Previous studies with the procedure are summarized and the method is extended to include flexible joints as well as links, and to account for the effects of various power transmission schemes. A systematic study of the allocation of structural material and the placement of components such as motors and gearboxes was undertaken using the analytical tools developed. As one step in this direction the variables which relate the vibration parameters of the arm to the task and environment of the arm were isolated and nondimensionalized. The 4 x 4 transformation matrices were also used to develop analytical expressions for the terms of the complete 6 x 6 compliance matrix for the case of two flexible links joined by a rotating joint, flexible about its axis of rotation. Author

N73-20139*# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
STUDY OF DESIGN AND CONTROL OF REMOTE MANIPULATORS. PART 4: EXPERIMENTS IN VIDEO CAMERA POSITIONING WITH REGARD TO REMOTE MANIPULATION Final Report
Jay Mackro 15 Feb. 1973 22 p
(Contract NAS8-28055)
(NASA-CR-124190; DSR-73784-2-Pt-4) Avail: NTIS HC $3.25 CSCL 05H

The results are presented of a study involving closed circuit television as the means of providing the necessary task-to-operator feedback for efficient performance of the remote manipulation system. Experiments were performed to determine the remote video configuration that will result in the best overall system. Two categories of tests were conducted which include: those which involved remote control position (rate) of just the video system, and those in which closed circuit TV was used along with manipulation of the objects themselves. Author

N73-20140# Civil Aeromedical Inst., Oklahoma City, Okla.
ATTRITION-RETENTION RATES OF AIR TRAFFIC CONTROL TRAINEES RECRUITED DURING 1960 - 1963 AND 1968 - 1970
Bart B. Cobb, John J. Mathews, and Peter L. Nelson Nov. 1972 32 p refs
(FAA-AM-72-33) Avail: NTIS HC $3.75

This study involved a total of 6,367 subjects in three ATCS options. Of these, 2,000 entered FAA Academy training during 1960 to 1963, before an ATC aptitude test battery became operational in the screening of most applicants. The remaining 4,367 subjects, the vast majority of whom were selected from among aptitude-screened applicants, entered the Academy's basic training courses during October 1968 through March 1970. Percentages reflecting Academy elimination rates for entrants of the earlier and later time periods, respectively were: 20.9 and 19.3 for terminal area traffic control (TATC) personnel, 32.0 and 17.9 for air route traffic control center (ARTCC) trainees, and 18.5 and 12.8 for the flight service station (FSS) option recent time period. It was determined that the post-Academy attrition rates for the TATC, ARTCC, and FSS entrants of 1960-1963 were 16.0, 22.8, and 18.1 percent, respectively (averaging 19.6), whereas corresponding rates for those recruited only 20 to 38 months prior to the follow-up date were 10.1, 20.3, and 5.9 (averaging 17.2 percent). Author

N73-20141*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
REDUCED GRAVITY FECAL COLLECTOR SEAT AND URINAL Patent Application
Jeri Wexler Brown, inventor (to NASA) Filed 15 Mar. 1973 12 p
(NASA-Case-MFS-22102-1; US-Patent-Appl-SN-341621) Avail: NTIS HC $3.00 CSCL 06I

A waste collection system is described for use in reduced gravity. The seat has an opening centrally located, with a pair of opposed depressed valleys on opposite sides of the opening for accommodating the ischial tuberosities of a user. The seat has contoured surfaces for providing support of the user's body and includes a prominent ridge towards the rear, which provides forward-aft positioning cue to the user. A curved recess is provided adjacent to the forward portion of the seat for accommodating a tubular urinal having an enlarged open mouth. NASA

N73-20142*# Chemtric, Inc., Rosemont, Ill.
UPGRADING AND EXTENDED TESTING OF THE MSC INTEGRATED WATER AND WASTE MANAGEMENT HARDWARE Final Report
R. A. Bambenek, P. P. Nuccio, T. L. Hurley, and W. J. Jasionowski May 1972 260 p refs
(Contract NAS9-9191)
(NASA-CR-128878; CHEMTRIC-FR-3084) Avail: NTIS HC $15.00 CSCL 06I

The results are presented of upgrading and testing an integrated water and waste management system, which uses the compression distillation, reverse osmosis, adsorption filtration and ion-exchange processes to recover potable water from urine, flush water and used wash water. Also included is the development of techniques for extending the useful biological life of biological filters, activated carbon filters and ion-exchange resins to at least 30 days, and presterilizing ion-exchange resins so that sterile water can be recovered from waste water. A wide variety of reverse osmosis materials, surfactants and germicides were experimentally evaluated to determine the best combination for a wash water subsystem. Full-scale module tests with real wash water demonstrated that surface fouling is a major problem.
Author

N73-20143*# Versar, Inc., Springfield, Va.
EVALUATION OF PROPOSED SKYLAB AND SSP SOAP PRODUCTS Final Report
Frank C. Whitmore, Robert L. Durfee, and Jack M. Spurlock 30 Jan. 1973 63 p ref
(Contract NAS9-12672)
(NASA-CR-128880) Avail: NTIS HC $5.25 CSCL 06I

Three personal hygiene cleansing agents and one laundry detergent (sodium dodecyl benzene sulfonate), which are all candidates for use on long-duration space missions, were evaluated in terms of dermatological effects on human subjects and effects on microbiological species. None of the four materials exhibited adverse dermatological effects from either skin patch tests of two weeks duration or a simulated Skylab personal hygiene regimen of up to four weeks duration. No significant alterations in skin microflora during the use regimen were found. None of the four materials were found to serve as microbiological support media for the species tested, but a species of air-borne mold was observed to grow rapidly in a neutralized aqueous solution. None of the candidate agents was found to be strongly biocidal. Author

N73-20144*# Aerojet Medical and Biological Systems, El Monte, Calif.
DEVELOPMENT OF A LABORATORY PROTOTYPE WATER QUALITY MONITORING SYSTEM SUITABLE FOR USE IN ZERO GRAVITY
John E. Misselhorn, Samual Witz, and Walter H. Hartung Jan. 1973 207 p refs
(Contract NAS1-10382)
(NASA-CR-112267) Avail: NTIS HC $12.50 CSCL 06I

The development of a laboratory prototype water quality monitoring system for use in the evaluation of candidate water recovery systems and for study of techniques for measuring potability parameters is reported. Sensing techniques for monitoring of the most desirable parameters are reviewed in terms of their sensitivities and complexities, and their recommendations for sensing techniques are presented. Rationale for selection of those parameters to be monitored (pH, specific conductivity, Cr(+6), I2, total carbon, and bacteria) in a next generation water monitor is presented along with an estimate of flight system specifications. A master water monitor development schedule is included. Author

N73-20145# Joint Publications Research Service, Arlington, Va.
CONSERVATION OF NATURAL RESOURCES AND WILD LIFE
9 Mar. 1973 28 p refs Transl. into ENGLISH from Priroda (Moscow), no. 1, 1973 p 78-87
(JPRS-58429) Avail: NTIS HC $3.50

Selected articles consider the conservation and rational use of natural resources through international protection measures to preserve the natural environment. Considered are the psychological aspects of the problem, man's effect on the natural landscape, improvements of natural resources by intelligent planning of scientific and technological developments, and farming of sea animals. G.G.

N73-20146# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
VERY LOW ALTITUDE DETECTION OF SMALL STATIONARY TARGETS AT VERY SLOW SPEEDS: A SIMULATION STUDY USING STRIP PHOTOGRAPHY Final Report
Herschel C. Self Aug. 1972 41 p
(AF Proj. 7184)
(AD-754928; AMRL-TR-72-7) Avail: NTIS CSCL 05/10

The target-seeking behavior of observers was examined at four different image motion rates using strip photography film taken at a 497-foot altitude. Targets imaged at a scale of 1:274 on a 14 by 14-inch display screen showing a 320 by 320-foot ground area were garbage cans and manhole covers in a residential suburb. Film moved through the projector at 3, 6, 9, or 15 inches/minute representing conditions of either rapid (flash) reporting or screening, or else aerial search for small targets with a 2.2X stabilized periscope at very slow helicopter speeds. Thirty-eight subjects were dividied into four groups. Each group was tested at a different speed: 2.1, 4.2, 6.3, and 10.5 knots respectively. Conclusions are drawn about rapid film screening and about periscopic search for small targets at very slow speeds. Author (GRA)

N73-20147# Perceptronics, Inc., Encino, Calif.
MAN/MACHINE INTERACTION IN ADAPTIVE COMPUTER

AIDED CONTROL INITIAL STUDY
Amos Freedy, Randall Steeb, and Gershon Weltman 15 Nov. 1972 73 p refs
(Contract N00014-72-C-0093; NR Proj. 196-118)
(AD-754835; TR-72-10) Avail: NTIS CSCL 05/8

Maintenance of continuous decision and control actions places a severe load on the operators of many advanced Navy systems. Adaptive computer-aided control offers a promising means of improving overall system performance by relieving the operator of routine control tasks and allowing him to concentrate on his most effective roles as initiator, supervisor and emergency monitor. The present research program is directed toward developing human factors criteria for the application of adaptive computer aiding in a broad variety of complex man/machine systems. The report presents the initial year's progress. Included are: (1) a rationale for the adaptive aiding approach and a review of related research; (2) a description of the adaptive aiding computer program and the two-dimensional control task simulation developed for the pilot experimental study; (3) the experimental design, procedure, and measurement techniques along with a discussion of the results; and (4) the development of a preliminary mathematical model for the man/machine interaction in adaptive aiding. Author (GRA)

N73-20148# Bunker-Ramo Corp., Westlake Village, Calif. Electronic Systems Div.
HUMAN ENGINEERING FOR THE AIR FORCE CONTROL DISPLAY PROGRAM Final Report, 25 Jun. 1969 - 24 Jun. 1972
Thomas A. Snyder and A. C. McTee Wright-Patterson AFB, Ohio AFFDL Jun. 1972 60 p refs
(Contract F33615-69-C-1716; AF Proj. 6190)
(AD-754916; SA-72-1; AFFDL-TR-72-109) Avail: NTIS CSCL 01/3

A research program which addresses each of two interface problems to be considered in the conduct of advanced control-display research within the system context, namely, the manager/information systems interface and the pilot/aircraft interface. Activities included an investigation to explore the potential of an on-line terminal with a CRT and printer. The Control-Display Information Program is directed toward developing a properly designed search and retrieval system utilizing the computer to its fullest potential, in addition to maintaining the day-to-day operation of satisfying the technical information requirements of control-display researchers. Author (GRA)

N73-20149# Army Medical Research Lab., Fort Knox, Ky.
A VERSATILE, INEXPENSIVE GENERATOR OF PERIODIC VISUAL STIMULI Progress Report
James N. Cronholm and Isaac Behar 17 Nov. 1972 14 p refs
(DA Proj. 3A0-61102-B-71R)
(AD-754562; USAMRL-1010) Avail: NTIS CSCL 06/2

The report describes a light modulator which consists of two parts: (1) an aperture and rotating disc of varying radius and (2) an optical integrating bar with opal diffusers at each end. With the aperture (typically a slit) uniformly illuminated, the amount of light transmitted is determined by the area of the aperture which is unoccluded by the rotating opaque disc. The radius of the disc varies as the desired modulating function of time or angular position. Light from the aperture then passes through the optical integrating bar with its two opal diffusers. Together, these elements convert the fluctuations in size and location of the incident beam into periodic variations in luminous intensity over the whole area of the output opal diffusing surface.

This report also describes the implementation of several waveforms, including sinusoidal modulation of intensity and brightness, square, triangular, cogwheel, and spike waves, as well as a form of dynamic color mixing. Author (GRA)

N73-20150# Illinois Univ., Savoy. Aviation Research Lab.
ASSESSMENT OF PILOTAGE ERROR IN AIRBORNE AREA NAVIGATION PROCEDURES
Stanley N. Roscoe Oct. 1972 16 p refs
(Contract F44620-70-C-0105; AF Proj. 9778)
(AD-754214; ARL-72-24/AFOSR-72-13; AFOSR-72-2467TR) Avail: NTIS CSCL 05/5

In 1969, by specifically including pilotage error in the error budget for area navigation system certification, the Federal Aviation Administration legally attached economic premiums and penalties to human as well as equipment performance in man-machine system design. To establish the accuracy of use and freedom from pilot blunders associated with systems employing various configurations of displays and controls requires both simulator and flight experimentation. An automatically adaptive cockpit side task provides a saturing level of pilot workload and allows the sensitive, orderly, and statistically reliable measurement of a pilot's residual attention as a common metric for area navigation system assessment. Author (GRA)

N73-20151# Michigan Univ., Ann Arbor. Highway Safety Research Inst.
LINK SYSTEM OF THE HUMAN TORSO Final Technical Report, Jun. 1970 - Jul. 1971
Richard G. Snyder, Don B. Chaffin, and Rodney K. Schutz Aug. 1972 317 p refs
(Contract F33615-70-C-1777; AF Proj. 7184)
(AD-754924; HSRI-71-112; AMRL-TR-71-88) Avail: NTIS CSCL 05/5

The objective of the study was to develop a quantitative description of the mobility of the human torso. This was accomplished by a systematic multi-disciplinary investigation involving techniques of cadaver dissection, anthropometry, radiography and cinefluoroscopy, photogrammetric, and computer analysis. Seventy-two anthropometric dimensions were obtained on 28 male volunteers, including bone lengths of the extremities and vertebral landmarks. These subjects were statistically matched for both stature and weight to a 1967 USAF anthropometric survey of 2385 adult males. Both radiographs and photographs from different viewing angles were then taken of the subjects while they performed specific reach motions. Statistical regressions were obtained which describe how specific surface markers and bone reference points move in relation to the elbow position for both seated and standing subjects. The major results of the study are, prediction equations and graphs for a large range of body positions and specific anthropometric variables; prediction equations and graphs describing how the base of the spine reference point moves in relation to defined seated and standing reference points for given reaches; a statistical tabulation with illustrations of 72 anthropometric dimensions. Author (GRA)

N73-20152# Stanford Univ., Calif. Dept. of Computer Science.
REPRESENTATION AND DESCRIPTION OF CURVED OBJECTS
Gerald Jacob Agin Oct. 1972 140 p refs
(Contract ARPA SD-183; ARPA Order-457)
(AD-755139; STAN-CS-72-305; AIM-173) Avail: NTIS CSCL 06/4

Three dimensional images, similar to depth maps, are obtained with a triangulation system using a television camera, and a deflectable laser beam diverged into a plane by a cylindrical lens. Complex objects are represented as structures joining parts called generalized cylinders. These primitives are formalized in a volume representation by an arbitrary cross section varying along a space curve axis. Several types of joint structures are discussed. Experimental results are shown for the description (building of internal computer models) of a handful of complex objects, beginning with laser range data from actual objects. Our programs have generated complete descriptions of rings, cones, and snake-like objects, all of which may be described by a single primitive. Complex objects, such as dolls, have been segmented into parts, most of which are well described by programs which implement generalized cylinder descriptions. Author (GRA)

N73-20153# Federal Aviation Administration, Washington, D.C. Office of Management Systems.
THE 1971 US CIVIL AIRMEN STATISTICS
Sep. 1972 42 p refs
(AD-754271) Avail: NTIS CSCL 05/9

The collection and dissemination of expanded aircraft data have created a need for more compatible airmen statistics. This information is required to establish more valid relationships between aircraft and airmen and to furnish more realistic bench marks for measuring trends in the civil airmen counts and their overall effect on the various segments of aviation. Statistics pertaining to airmen, both pilot and nonpilot, were obtained from the official airman certification records maintained by the Data Services Division, of the FAA Aeronautical Center, at Oklahoma City, Oklahoma, indicating active pilot and active nonpilot certificates held and airman certificates issued. Author (GRA)

N73-20154# Naval Medical Research Inst., Bethesda, Md.
A DIVER MONITORING SYSTEM FOR PHYSIOLOGIC STUDIES IN ALL HYPERBARIC ENVIRONMENTS Medical Research Progress Report No. 3
William E. Moritz 18 Oct. 1972 28 p refs
(M4306041023B)
(AD-754399) Avail: NTIS CSCL 06/2

A package of instrumentation has been assembled that can monitor the following parameters on divers; electrocardiogram, respiratory gas flow, core temperature, up to 8 skin or gas temperatures, environmental temperature and ambient pressure. The signal conditioners are carried on the diver in a stainless steel cylinder capable of operation at 1700 feet of sea water. The output of each signal conditioner is fed to a 15 channel multiplex data handling system for transmission to the surface monitoring station. All sensor inputs, power and the multiplex output are made through underwater connectors to increase the versatility of the system. The unit has been used extensively in wet and dry hyperbaric chambers as well as deep water tanks and the open sea. The data can be displayed on a strip chart recorder or analyzed on a computer based data analysis system. Author (GRA)

N73-20155# National Highway Traffic Safety Administration, Washington, D.C.
ANALYSIS OF DECELERATOR, ACCELERATOR AND SHOCK CORD PROPELLED REBOUND SLEDS FOR EVALUATING AIR BAG RESTRAINTS Final Report
Arnold K. Johnson Aug. 1972 33 p
(PB-212706; DOT-HS-820-220) Avail: NTIS HC $3.00 CSCL 14B

In contrast to a decelerator sled which comes to rest, thereby maintaining a constant velocity (zero) post impact, accelerator and shock cord propelled, impact-with-rebound sleds may decelerate immediately post-impact. The deceleration of the accelerator sled post-impact is due to frictional forces, and that of the shock cord propelled, rebound sled is due to frictional forces plus forces exerted on the sled by the shock cord. The analysis of the effect of deceleration immediately post-impact for a subject restrained only by an air bag establishes that the distance the subject translates forward in the seat is less, and that his rebound velocity against the seat is greater, than if he had been riding a decelerator sled for the same impact conditions. Author (GRA)

N73-20156*# Chicago Univ., Ill.
HIERARCHICAL HYBRID CONTROL OF MANIPULATORS: ARTIFICIAL INTELLIGENCE IN LARGE SCALE INTEGRATED CIRCUITS Final Report
Peter H. Greene 31 Aug. 1972 38 p refs
(Grant NGR-14-001-199; Contract N00014-67-A-0285-0012)
(NASA-CR-131403; AD-754676) Avail: NTIS HC $4.00 CSCL 06/4

Both in practical engineering and in control of muscular systems, low level subsystems automatically provide crude approximations to the proper response. Through low level tuning of these approximations, the proper response variant can emerge from standardized high level commands. Such systems are expressly suited to emerging large scale integrated circuit technology. A computer, using symbolic descriptions of subsystem responses, can select and shape responses of low level digital or analog microcircuits. A mathematical theory that reveals significant informational units in this style of control and software for realizing such information structures are formulated. GRA

N73-20157# Kansas State Univ., Manhattan. Inst. for Environmental Research.
PERFORMANCE AND LIFE SUPPORT IN ALTERED ENVIRONMENTS Final Report, 15 Sep. 1967 - 31 Aug. 1972
J. E. Kipp and Ralph G. Nevins 31 Oct. 1972 51 p refs
(Contract F44620-68-C-0020)
(AD-754216; AFOSR-72-2464TR) Avail: NTIS CSCL 06/11

Multidisciplinary studies of performance and life support in altered environments have been carried out. A summary of these investigations, including goals, personnel, and bibliographical data, is provided. Final phase progress reports as well as an over view of the results of this study when viewed as a single integrated study are also included. Author (GRA)

N73-21088*# California Univ., Davis. Dept. of Human Physiology.
CIRCADIAN PHASE RELATIONSHIPS IN MONKEYS
R. El. Smith and D. R. Wekstein [1973] 12 p Prepared in cooperation with Kentucky Univ., Lexington
(Grants NGR-05-004-038; NGR-05-004-053)
(NASA-CR-131514)
Avail: NTIS HC $3.00 CSCL 06P

Two adult male pigtail monkeys were placed in an isolated, soundproofed chamber (entered for cleaning only) for a period of six months, during which time their deep body temperatures (T sub DB, telemetered from transmitters implanted in the abdominal cavity), fluid intake, urinary output (UV), urinary sodium and potassium were continuously monitored. During the first 3 1/2 months, lights (L) were turned on at 0000 hours, off at 1200 hours. Photoperiod phase was then delayed (light span prolonged) 6 hours to a new schedule: L on at 0600 hours, off at 1800 hours. Six weeks later, photoperiod phase was advanced 6 hours to return to the original schedule. Prior to shift, T sub DB typically began a steep rise 0-5 hours prior to L on, a steep fall 3-4 hours prior to L off, relative plateaus in between. Urinary Na typically peaks 2 hours prior to L off, has a minimum 2-4 hours prior to L on; K tends both to peak and show a minimum 2-8 hours earlier than Na; in contrast, UV peaks at L on, has a minimum 2-6 hours after L off. Upon delaying photoperiod phase, T sub DB shift was completed in 8 days. UV shifted more rapidly but tended to overshoot the new phase. Within 5 days, UV and K completed their shifts, although Na did not fully resynchronize within the 6-week period monitored. Author

N73-21089# Joint Publications Research Service, Arlington, Va.
MEDICAL, OTHER PROBLEMS OF SPACE FLIGHT
6 Apr. 1973 11 p refs Transl. into ENGLISH from Aviat. Kosmonavt. (Moscow), no. 1, 1973 p 28-29 and 32-33
(JPRS-58678) Avail: NTIS HC $3.00

Medical, biological and other problems of space flight are studied including the flight testing of cosmonaut safety equipment.

N73-21090 Joint Publications Research Service, Arlington, Va.
FIRST THE TESTERS FLY c05
E. Anisimov *In its* Med., Other Probl. of Space Flight 6 Apr. 1973 p 1-6

Problems in simulating weightlessness in aircraft are discussed for the tester and the cosmonaut. F.O.S.

N73-21091 Joint Publications Research Service, Arlington, Va.
MEDICAL AND BIOLOGICAL PROBLEMS OF SPACE FLIGHT

L. Khachaturyants and Ye. Khrunov *In its* Med., Other Probl. of Space Flight 6 Apr. 1973 p 7-9 refs

A bibliography is briefly reviewed of Soviet and foreign journals devoted to medical and biological research conducted during space flights. F.O.S.

N73-21092# Advisory Group for Aerospace Research and Development, Paris (France).
PREDICTABILITY OF MOTION SICKNESS IN THE ELECTION OF PILOTS
M. P. Lansberg, ed. Feb. 1973 69 p refs Partly in ENGLISH; partly in FRENCH Proc. of Aerospace Med. Panel Specialist Meeting, Glasgow, 7 Sep. 1972
(AGARD-CP-109) Avail: NTIS HC $5.50

Susceptibility and factors contributing to motion sickness are examined. The Air Force and Navy tests for motion sickness predictions are described. Drugs that counteract the air sickness are considered. Blind fish responses to gravitational changes during parabolic flight are also studied.

N73-21093 Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).
MEASUREMENT OF SUSCEPTIBILITY TO MOTION SICKNESS
K. E. Money *In* AGARD Predictability of Motion Sickness in the Selection of Pilots Feb. 1973 4 p refs

Three different bases were suggested for predicting susceptibility to motion sickness in a specific vehicle. These are (1) history of motion sickness, (2) susceptibility to motion sickness in a laboratory device, and (3) laboratory vestibular and other tests. These techniques were reviewed, and their usefulness was assessed. It was concluded that the laboratory vestibular and other tests are without practical value. Susceptibility to motion sickness laboratory devices and history of motion sickness were used and have significant predictive value. Consideration of these techniques for selection of aircrew candidates includes a comparison of the economic and other advantages of elimination of most air sickness problems and the disadvantages of the testing expense and the loss of some candidates who would not actually have had difficulty with motion sickness. Author

N73-21094 Centre d'Etudes et de Recherches de Medecine Aeronautique, Paris (France).
POSSIBILITY OF PREDICTING PREDISPOSITION OF MOTION SICKNESS IN THE SELECTION OF PILOTS [POSSIBILITE DE PREVOIR LA PREDISPOSITION AU MAL DES TRANSPORTS LORS DE LA SELECTION DES PILOTES]
G. Leguay, J. C. Hadni, M. Gouars, R. Gelly, and A. P. Gibert *In* AGARD Predictability of Motion Sickness in the Selection of Pilots Feb. 1973 9 p In FRENCH

The medico-aeronautical basis of selecting pilot personnel in relation to motion sickness is outlined. Human factors, aeronautical factors, and natural evolution of motion sickness in the pilots are described in detail. Selection techniques cover neuromuscular, neurovegetative, and psychological examinations, and flight experience. Transl. by E.H.W.

N73-21095 Leicester Univ. (England). Dept. of Psychology
FACTORS CONTRIBUTING TO MOTION SICKNESS SUSCEPTIBILITY: ADAPTABILITY AND RECEPTIVITY
James Reason (Naval Aerospace Med. Res. Lab., Pensacola, Fla.) and Ashton Graybiel *In* AGARD Predictability of Motion Sickness in the Selection of Pilots Feb. 1973 15 p refs

Evidence is presented to show that two perceptual factors, receptivity and adaptability, contribute to variation in motion sickness susceptibility. An attempt is made to integrate these two sources of variation into a neural mismatch theory of motion sickness. Two original studies are briefly reported. In the first, positive and significant relationships were obtained between measures of adaptability and (1) a personal history measure of susceptibility, (2) loss of well-being during exposure to cross-coupled angular accelerations, and (3) a questionnaire measure of introversion. It was also found that adaptability and receptivity are unrelated factors, and that, of the two, adaptability exerted the most potent influence upon susceptibility. Yet, among slow adapters only, there was some evidence to show that receptivity contributed to individual differences in proneness. The second study was concerned with the long-term retention of protective adaptation. Author

N73-21096 Naval Aerospace Medical Research Lab., Pensacola, Fla.
ASSESSMENT OF REACTIONS TO VESTIBULAR DISORIENTATION STRESS FOR PURPOSES OF AIRCREW SELECTION
Fred E. Guedry and Rosalie K. Ambler *In* AGARD Predictability of Motion Sickness in the Selection of Pilots Feb. 1973 8 p refs

Several tests were described which are useful for predicting individuals who will separate from air training because of airsickness and/or disabling anxiety toward flight. These tests are based on measures of immediate reactions to disorientation stress. It is desirable to have a futher diagnostic assessment of individuals to determine the underlying causes of differences in reactivity to disorientation stress and also to estimate the individual's likelihood of success in the light of other predictor variables. The disorientation stress tests significantly augment other aviator predictor variables, and they appear to be significantly correlated to several personality measures. A particular visual display and task were used that produced significantly more sickness than did other tasks during comparable vestibular stimulation. The test procedure was changed and a procedure was developed which appears practical for assessing individual differences in accommodation to intersensory conflict between the visual and vestibular systems. The changed procedure did not produce sickness, and the results indicate that a 57 percent mean improvement in visual performance during vestibular stimulation can occur after only a 10-minute habituation schedule. At least part of the improvement in visual performance appears attributable to increased visual control over vestibular reflex control of the eyes. Author

N73-21097 Naval Aerospace Medical Research Lab., Pensacola, Fla.
MOTION SICKNESS QUESTIONNAIRE AND FIELD INDEPENDENCE SCORES AS PREDICTORS OF SUCCESS IN NAVAL AVIATION TRAINING c05
Robert S. Kennedy *In* AGARD Predictability of Motion Sickness in the Selection of Pilots Feb. 1973 5 p refs

The usefulness of two paper and pencil tests in predicting the likelihood of success in Naval aviation training is reported. Several years experience with a motion sickness questionnaire is reviewed; literature and theories related to motion sickness are surveyed; and a group-administered personality test is reported. The motion sickness questionnaire (MSQ) was empirically validated against an experimental procedure for producing motion sickness symptomatology (N = 100), and in a larger group (N = 802) scores on the questionnaire were statistically related to the likelihood of aviation training success. Refinements in the scoring improved the predictive ability of the MSQ (N = 660) and cross-validated successfully (N = 550). Author

N73-21098 School of Aerospace Medicine, Brooks AFB, Tex. Biodynamics Branch.
THE USAFSAM SELECTION, TEST, AND REHABILITATION PROGRAM OF MOTION SICK PILOTS c05
Patrick J. Dowd *In* AGARD Predictability of Motion Sickness in the Selection of Pilots Feb. 1972 10 p refs

The USAF School of Aerospace Medicine biaxial stimulator was used to impose standardized Coriolis stimuli for the purpose of determining a subject's tolerance of this very disturbing stimulus. This test differentiates the nonsick (NS) individuals from the sick (S) ones within each peer group (navigators, pilots, and airman trainees) and is a valuable indicator of the level of resistance an individual has to Coriolis accelerations and as a selection

tool for an individual's resistance to motion sickness. The results of this type of test (pilots: NS-299, S-51; navigators: NS-60, S-34; airman trainees: NS-91, S-19; pentathlon athletes: NS-14, S-0) can greatly assist in the overall selection of personnel in preflight, postflight, and in-training programs. Author

N73-21099 Centre de Medecine Aeronautique, Brussels (Belgium).
THE SELECTION AND SURVEILLANCE OF STUDENT PILOTS WITH MOTION SICKNESS IN THE BELGIAN ARMED FORCES [LA SELECTION ET LA SURVEILLANCE DU POINT DE VUE MAL DE L'AIR DES ELEVES-PILOTES DES FORCES ARMEES BELGES] **c05**
S. Tribel *In* AGARD Predictability of Motion Sickness in the Selection of Pilots Feb. 1972 3 p In FRENCH

A method of selecting and observing student pilots of the Belgian Air Force is given. Based on this method, 1500 students were admitted to pilot school in 1960 and 1972. Of this number only 7 were eliminated for established cases of motion sickness. Transl. by E.H.W.

N73-21100 Institute of Aviation Medicine, Fuerstenfeldbruck (West Germany).
TEST RESULTS ABOUT THE EFFECTIVENESS OF METIXENUM APPLIED AGAINST MOTION SICKNESS **c05**
Christian Henning *In* AGARD Predictability of Motion Sickness in the Selection of Pilots Feb. 1973 4 p refs

Thirty healthy subjects were tested in a spatial disorientation demonstrator (SDD) in order to compare the effectiveness of Metixenum and Meclocin under double blind comparison test conditions against motion sickness with statistical evaluation. Metixenum reduced all subjective symptoms significantly. Its efficacy was higher than that of Meclocin. Simultaneously recorded objective symptoms (post-rotatory vertigo sensation, heart rate, results of a walking balance test) were not significantly influenced. Author

N73-21101* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
RESPONSES OF BLIND FISH TO GRAVITATIONAL CHANGES AS ACHIEVED IN PARABOLIC FLIGHT
R. J. VonBaumgarten (Mich. Univ., Ann Arbor), G. L. Shillinger, Jr., and G. Baldright (Mich. Univ., Ann Arbor) *In* AGARD Predictability of Motion Sickness in the Selection of Pilots Feb. 1972 4 p refs

Blind fish, during parabolic flight, display a measurable and consistent behavior. The most spectacular new behavioral response is the forward looping of blind fish in or near weightlessness. This response shows no measurable adaptation during the entire period of weightlessness of about 30 sec. During the entrance and exit of weightless parabolas (pushover and pullout) respectively, the fish assumes a forward tilted diving position. Parabolic flight with negative g in the range between 0 g and -1 g causes similar diving responses of the fish with the only difference being that the dive is directed toward the top of the fish tank. When the response to a g value less than 1 g is compared to the response to increased g load on the ground (escape of darting response) an essential difference is seen: higher horizontal acceleration or jerk on the ground causes fish to swim, or even dart, against the direction of inertial force; fish during weightless parabolas move into the direction of the inertial or gravitational force. Since the vestibular system of fish is homologous to that of man, the observed behavior of fish in weightless flight could help to better understand human performance and sensations in comparable situations. Author

N73-21102# Advisory Group for Aerospace Research and Development, Paris (France).
THE USE OF MEDICATION AND DRUGS IN FLYING PERSONNEL
Heinz S. Fuchs, ed. Feb. 1973 154 p refs Partly in ENGLISH; partly in FRENCH Proc. of Aerospace Med. Panel Specialist Meeting, Glasgow, 5-6 Sep. 1972 (AGARD-CP-108) Avail: NTIS HC $9.75

Drug effects on flight fitness and the evaluation, detection, and identification of drugs and alcohol in flying personnel are discussed.

N73-21103 Advisory Group for Aerospace Research and Development, Paris (France).
TECHNICAL EVALUATION REPORT, CONCLUSION, RECOMMENDATIONS
Heinz S. Fuchs *In its* The Use of Medication and Drugs in Flying Personnel Feb. 1973 13 p refs

Inasmuch as flying effectiveness depends on an optimum degree of psychosomatic fitness, it is axiomatic that the need in a flyer for drugs should raise serious doubts as to his fitness to fly. Increasing age of the flying population is the major contributing factor since there is an increased incidence of disease commonly associated with aging. Improved diagnostic techniques and augmented information about normals and early disease have also had a significant influence upon both the types of problems evaluated and their disposition. The flight surgeon must keep well informed on all drugs, particularly newly accepted ones, so that no medication will be prescribed which might compromise flight safety. Individual susceptibility and hypersensitivity to drugs in general must always be considered. In certain situations drug therapy is warranted to prevent complications and to effect an improvement in long term prognosis. Another problem is acute illness, wherein drug therapy is warranted either to treat primarily the etiology of the disease or more frequently merely to control the symptoms in a self-limited condition. Author

N73-21104 Federal Aviation Administration, Washington, D.C. Office of Aviation Medicine.
THE CURRENT STATUS OF DRUG USE IN CIVIL AVIATION PERSONNEL
Peter V. Siegel and Stanley R. Mohler *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 4 p

Screening data concerning U.S. civil airmen while being medically certified during the period July 1971 - April 1972 are reported. In the sample studied, two percent of pilots and three percent of ground control personnel had positive urines. The positives included barbiturates, amphetamines, codeine, morphine, and methadone. Author

N73-21105 Royal Air Force Hospital, Ely (England).
MEDICATION AND DRUGS IN AIRCREW
H. B. Kelly *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 4 p refs

The attitudes adopted by the Royal Air Force and British civil aviation toward medication and drugs taken by their aircrew are discussed and recommendations made. Author

N73-21106 Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
USE OF HYPNOTICS BY AIRCREW. 1: OPERATIONAL CONSIDERATIONS AND EXPERIMENTAL STUDIES
A. N. Nicholson and Catherine M. Wright *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 5 p refs

The residual effects of hypnotic drugs for normalizing aircrew sleeping patterns on human nervous function and performance are studied. Delayed matching-to-sample tests on monkeys show that barbiturates do not affect matching-to-stimuli time; but some benzodiazepines increase response times up to 6 hrs after administration. G.G.

N73-21107 Air Corporations Joint Medical Service (BEA/BOAC), London (England).
ASPECTS OF SLEEP REGULATION IN AIRLINE PILOTS
F. S. Preston *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 8 p refs

Probably the greatest problem facing long haul civil airlines

is the need to ensure that pilots are given adequate time while on a tour of duty to ensure sufficient sleep and so enable them to cope successfully with the ensuing period of work. The problem on long haul routes is greatly compounded by the effect of time zone changes, night flights and changes of a climatic nature which all affect the individual's ability to achieve sleep on arrival. There is definite evidence of cumulative sleep loss on longer trans-meridian routes. As a result, the individual pilot may be tempted to use hypnotics which he can purchase freely over the counter in some parts of the world without medical supervision. In addition, he may use alcohol for its hypnotic action or combined with other hypnotics which may affect not only his fitness to fly on the next day, but have addictive and cumulative effects. The problems are discussed for a long haul airline and some suggestions are made for controlling the situation from both the medical and executive standpoints. Author

N73-21108 Royal Air Force Central Medical Establishment, London (England).
AVMED POLICY ON SLEEP IN AIRCREW
P. J. OConnor *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 2 p

The role of the aviation medical practitioner in relation to aircrew sleep is to instruct the crews in how to anticipate sleep requirements and the best physiological ways of encouraging adequate sleep. Hypnotics should not be used by crews to get sleep as they cause decrement in performance during the subsequent day. Author

N73-21109 Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
USE OF HYPNOTICS BY AIRCREW: ADAPTIVE TRACKING AS A TECHNIQUE FOR THE EVALUATION OF PERFORMANCE DECREMENTS RELATED TO THE FLYING TASK
R. C. Borland and A. N. Nicholson *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 5 p refs

The mean performance of 6 subjects tested following the oral administration of secobarbitone at a dose of 3.3 mg/kg of body weight in an adaptive tracking task provides a reasonable approach to evaluating drug after-effects of possible significance to the flying task. Nevertheless, training of personnel and the experimental procedures involved demand considerable effort on the part of subjects and experimenters. Author

N73-21110 Centre d'Essais en Vol, Bretigny-sur-Orge (France).
MODIFICATIONS OF PERFORMANCE UNDER CERTAIN MEDICATIONS: PROPOSED MEASURING METHOD [MODIFICATIONS DE LA PERFORMANCE SOUS L'INFLUENCE DE CERTAINS MEDICAMENTS: A PROPOS D'UNE METHODE DE MESURE]
R. Auffret, R. Angiboust, and J. Demange *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 5 p refs In FRENCH

The influence of tranquilizers, hypnotic drugs, and barbiturates on the performance of navigation personnel is investigated. Reaction time, personnel efficiency during complex tasks, and psychological factors were measured. It was determined that some drugs— Fluphenazine, Trifluopiperazine, and Prenylamine— do not affect performance, while hypnotic drugs and tranquilizers show some definite performance decrement. Transl. by E.H.W.

N73-21111 Army Aeromedical Research Lab., Fort Rucker, Ala.
THE EFFECTS OF INH CHEMOPROPHYLAXIS ON AVIATOR PERFORMANCE
Mark A. Hofmann *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 8 p refs

A group of tuberculin positive, healthy aviators taking INH prophylactically at dosages of 300 mg. daily for one year were maintained on flying status while simultaneously participating in a study to determine the effects of this drug therapy. This investigation measured performance on a number of laboratory tasks to include pursuit tracking, mental multiplication, digit span, reaction time and combinations of the above. No decrements in performance were observed in this performance as a function of drug treatment. Additionally, these aviators' physical state was assessed by measuring a host of physiological parameters during their year of therapy. There was no evidence of severe drug reactions. It was recommended that aviators be allowed to continue flying duties while taking INH at these dosage levels, but in the interest of safety, a regular program of careful clinical observation and periodic measurements of transaminase levels be conducted. Author

N73-21112 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany). Inst. fuer Flugmedizin.
THE PREDICTION OF FLIGHT SAFETY HAZARDS FROM DRUG INDUCED PERFORMANCE DECREMENTS WITH ALCOHOL AS REFERENCE SUBSTANCE
Karl E. Klein *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 12 p refs

A modification of CNS activity resulting in a decrement of performance is the most unwanted side effect of drugs in active flying personnel. A procedure is described where hazard prediction is accomplished with ethanol as reference substance through the following steps: (1) Evaluation of dose-effect-relationship for ethanol with the performance test to be applied in toxicological drug studies, and (2) Examination of drug with the alcohol calibrated test method; estimation of the alcohol intoxication level equipotential in its performance decrement to the drug dose studied; definition of the operational significance of the drug induced performance changes by reference to the intoxication-hazard-relationship established for alcohol; prediction of the critical drug dose through extrapolation. Results with sedative, neuroleptic, tranquilizing and stimulating drugs are demonstrated and the advantage and limitations of the reference procedure discussed. Author

N73-21113 Ohio State Univ., Columbus. Aviation Medicine Research Lab.
ETHYL ALCOHOL AND PILOT PERFORMANCE: MILITARY IMPLICATIONS OF IN-FLIGHT STUDIES
C. E. Billings, R. L. Wick, Jr., R. J. Gerke, and R. C. Chase *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 11 p refs

Sixteen instrument-rated civil pilots flew 501 instrument landing system approaches in a light airplane at night under simulated instrument flight conditions while sober and while under the influence of .04, .08 and 12 G% blood ethyl alcohol concentrations. Data included continuous measurement of deviations from localizer and glide path centerline; note was made of all procedural errors. While the highly experienced pilots maintained better tracking performance than the less experienced subjects, particularly at high blood alcohol levels, both groups demonstrated progressive increases in the number and seriousness of procedural errors with each increase in alcohol level. These results indicate that alcohol-induced performance degradation may occur first in secondary tasks rather than in the primary flying task. They also indicate that there is potentially dangerous deterioration in the performance of even highly skilled aviators at blood alcohol levels as low as .04%. Author

N73-21114 Caen Univ. (France). Faculte de Medecine et de Pharmacologie.
THE OPTIMIZATION OF FORM [L'OPTIMISATION DE LA FORME]
Robert N. Lemaire *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 3 p In FRENCH

Sports medicine, in relation to the effects of drugs on physical and psychological performance, is discussed. Three points were established for good physical form during competitive activities. They are: (1) maintenance of electrolytic equilibrium, (2) supplementation of normal vitamin levels, and (3) regulation of acid overloads. Transl. by E.H.W.

N73-21115 Mainz Univ. (West Germany). Inst. of Forensic Medicine.
DRUG USE AND PERFORMANCE
J. G. Gostomzyk, P. Parade, and H. Gewecke *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 5 p refs

Psychological and physiological effects of acute cannabis intoxication are considered. It is shown that hashish smoking does not affect oxygen consumption in man. However, performance requirements in driving a car under the influence of the drug appear to be felt as stress which demands a response from a psychologically stimulated high energy level. Reduced performance capability manifests itself if actual stress situations are superimposed upon the normal task. It is concluded that hashish impairs the ability to drive safely. G.G.

N73-21116 BioTechnology, Inc., Falls Church, Va.
USE OF SPECTRAL ANALYSIS PROCEDURES FOR THE EVALUATION OF DRUG EFFECTS
James F. Parker, Jr. and Thomas W. Frazier (Walter Reed Army Inst. of Res., Washington, D. C.) *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 9 p refs

The use of spectral analysis procedures in the study of drug effects is described in an attempt to develop a more sensitive and meaningful index of performance change. Spectral analysis procedures use time series data in which basic biorhythmicities in performance are identified and studied as the subject is exposed to a stress condition (drug administration). Oscillatory performance profiles are transformed from the time domain to power spectra. These spectra then are examined by means of statistical coherence estimates. Changes in the coherence of these biorhythms provide a measure of the extent to which the organization of a complex performance has been disrupted by the stress condition. Subjects were administered a tranquilizing drug (chlordiazepoxide) under double-blind conditions. A significant loss of coherence was found for the performance of a vigilance task. No change was found in the accompanying physiological measures, heart rate and rectal temperature. These results clearly show a drug induced desynchronization of performance in a human data processing activity. It is concluded that spectral analysis techniques may be of value as one tool in the complete evaluation of drug effects. Author

N73-21117 School of Aerospace Medicine, Brooks AFB, Tex.
DRUG ABUSE DETECTION EFFORTS
George D. Lathrop, Harold L. Kaplan, and Jack E. Wallace *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 4 p refs

Operational efforts to detect drug abuse by mass-screening urinalysis are summarized. Particular emphasis is given to the current analytical methods used to detect opiates, barbiturates, and amphetamines. Advantages and disadvantages of available methodology are presented to provide rationale guidelines for establishing an accurate and forensically reliable toxicology laboratory. Methods of thin layer chromatography and gas-liquid chromatography offer unparalled detection accuracy for drugs of abuse, as well as a capability to analyze therapeutic levels of certain psychotropic drugs (tranquilizers, antihistamines) of specific concern in flying populations. Tandem research efforts to improve current methodology for the diethylamide of lysergic acid (LSD), tetrahydrocannibinols (THC), and methadone, and to develop new tests based on individual enzymatic changes, are briefly presented. Author

N73-21118 Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
USE OF HYPNOTICS BY AIRCREW: CONSIDERATIONS OF METABOLISM AND EXCRETION
J. M. Clifford and J. H. Cookson *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 6 p refs

The metabolism of secobarbitone, heptabarbitone and the nonbarbiturate hypnotic methaqualone have been studied in man using the technique of gas liquid chromatography. A polarographic technique for plasma levels of nitrazepam has also been investigated. Author

N73-21119 Institute of Aviation Medicine, Fuerstenfeldbruck (West Germany).
THE IMPACT OF DIURNAL RHYTHM ON DRUG DOSING AND DRUG EVALUATION
H. W. Kirchhoff *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 4 p

The well known fact that the functional behavior of the human organism is subjected to a rhythmically occurring daily process is still being disregarded in clinical practice and pharmacology. Drug dosing, instead of sticking to the stereotyped pattern of 3 x 1 tablet/day, requires full consideration of the diurnal variations which occur in the human body involving mainly cardiovascular parameters. Drug evaluation, on the other hand, should also include careful studies in diurnal rhythm in order to obtain precise data on the duration and onset of drug action as well as on specific influence emerging in the course of the day; all the more since any approach of this kind will contribute to the elimination of untoward side effects and other hazardous influences which may be attributed to a drug. Author

N73-21120 Hopital d'Instruction des Armees, Versailles (France).
ANTIDIABETIC MEDICATIONS AND NAVIGATION PERSONNEL [MEDICAMENTS ANTIDIABETIQUES ET PERSONNEL NAVIGANT]
Roger Pannier and Gerard Leguay *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 6 p In FRENCH

The use of antidiabetic drugs and the fitness of such people as navigation personnel are examined. It was determined that the insulin-dependent sugar diabetic is unfit for such jobs because he is subject to keto-acidosic accidents, hypoglycemia, and regimented diets unsuited for his job. In non-insulin dependent diabetics who are maintained by oral drugs, it was determined that those who use sulphenylureas are also unsuited for flying duties since this drug sometimes causes hypoglycemia. Diabetics taking biguanide, it was determined, may under exceptional circumstances become or continue to be flying personnel. These drugs do not produce hypoglycemia as do the other medicants studied. Transl. by E.H.W.

N73-21121 Royal Air Force Hospital, Ely (England).
OCULAR SIDE EFFECTS OF DRUGS IN AVIATION MEDICINE
G. W. T. Smith *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 2 p

Many drugs which may be prescribed for aircrew or used by aircrew in self medication have known reported ocular side effects which can affect visual performance. Reviewed are some of the main groups of these drugs, drawing attention to these side effects. Author

N73-21122 Advisory Group for Aerospace Research and Development, Paris (France).
OPHTALMOLOGIC SURVEILLANCE OF ABSORBED ANTIMALARIA DRUGS IN SYSTEMS OF NAVIGATION PERSONNEL [SURVEILLANCE OPHTALMOLOGIQUE DU PERSONNEL NAVIGANT ABSORBANT DES ANTIPALUDEENS DE SYNTHESE]
J. P. Chevaleraud (CPEMPN, Paris) *In its* The Use of Medication and Drugs in Flying Personnel Feb. 1973 5 p In FRENCH

Observations of synthetic antimalarials, through opthalmological methods, in the systems of navigation personnel were made. Risks to test subjects and toxic side effects are discussed. Transl. by E.H.W.

N73-21123 Flugzeugfuehrerschule, Klein Heidorn (West Germany).
TRANQUILIZERS AND AVIATION
Heinrich Schulte-Wintrop *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 4 p refs

The use of tranquilizers during periods of flying duty is still

infrequent and no direct effects on flight safety have so far been positively observed; there is, however, a danger of such effects in case of excess dosage and use of ataractics such as diazepam. A potentiating effect by alcohol has been described in some cases, but the influence of alcohol alone appears to be the crucial factor in these cases. It is shown that ataractics like chlordiazepoxide fail to alleviate stress reactions in student pilots, but that the application of certain tranquilizers in treating different types of kinetosis seems promising. The prescription of tranquilizers should be avoided until the effects these medicaments have in combination with the varied strains encountered in avaiation have been fully surveyed. Author

N73-21124 Fighter Bomber Wing (31st), Kerpen/Erft (West Germany).
USE OF MEDICATION AND DRUGS, ESPECIALLY ALCOHOL, BY FLYING PERSONNEL
Hugo Hembach *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 5 p refs

Alcohol is the most common and most dangerous drug used by pilots. Three simple methods are described by which the blood alcohol can be determined: (1) By means of two tables pilots are able to determine the approximate level of blood alcohol concentration after the consumption of a known amount of alcoholic beverage over a given period of time; (2) the detection of the gross post-rotational nystagmus which is found whenever the central nervous system has been affected by alcohol; and (3) a semi-quantitative method of breath analysis for alcohol detection in the blood. These three methods make it possible to single out pilots who have alcohol in their blood and to prevent them from flying. Author

N73-21125 Centre d'Essais en Vol, Bretigny-sur-Orge (France).
EFFECT OF ALTITUDE ON CEREBRAL BLOOD FLOW PATTERNS IN THE SMOKER AND NONSMOKER [ACTION DE L'ALTITUDE, CHEZ LE FUMEUR ET LE NON FUMEUR, SUR LES VARIATIONS DU DEBIT SANGUIN CEREBRAL]
J. Demange and R. Auffret *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 5 p refs In FRENCH

Variations in the cerebral blood circulation of smokers and nonsmokers as a function of altitude are measured rheographically. Also measured were the effects of vasometric drugs, altitude tolerance, chronic hypoxia, and performance as influence by blood flow. Transl. by E.H.W.

N73-21126 Institute of Pharmacology, Oslo (Norway).
COMPARISON OF MENTAL AND PSYCHOMOTOR EFFECTS OF DIAZEPAM AND ETHANOL
J. F. W. Haffner et al *In* AGARD The Use of Medication and Drugs in Flying Personnel Feb. 1973 10 p refs

Whether and to what extent a single, large therapeutic dose of diazepam affects mental and psychomotor functions in man was determined. The effects of diazepam in dosages of 10 and 20 mg/70 kg body weight have been compared with those of alcohol in amounts which were designed to produce blood levels of approximately 0.1%. Serum concentrations of diazepam were estimated in order to see whether it was possible to establish a correlation between dosages, serum concentrations and effects. It was shown that diazepam has a negative influence on the results of a series of tests with relevance to performance. In none of the tests was there any improvement in mean score after diazepam compared with placebo. However, a comparison of the test results reveals some differences between the effects of alcohol and diazepam. Author

N73-21127*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MICROBIOLOGICAL ASSAY OF THE MARSHALL SPACE FLIGHT CENTER NEUTRAL BUOYANCY SIMULATOR
F. J. Beyerle 16 Feb. 1973 57 p refs
(NASA-TM-X-64736) Avail: NTIS HC $5.00 CSCL 06M

A neutral buoyancy simulator tank system is described in terms of microbiological and medical safety for astronauts. The system was designed to simulate a gravity-free state for evaluation of orbital operations in a microorganism-free environment. Methods for the identification and elimination of specific microorganisms are dealt with as measures for a pure system of space environment simulation. J.M.M.

N73-21128*# Scientific Translation Service, Santa Barbara, Calif.
EXPERIENCE WITH THE METHOD OF GRABECKI AND COWORKERS FOR THE DETERMINATION OF URINE DELTA-AMINOLEVULINIC ACID IN THE PREVENTION OF LEAD POISONING
W. Mueller and G. Holzapfel Washington NASA Apr. 1973 9 p refs Transl. into ENGLISH from Int. Arch. Gewerbepathol. Gewerbehyg. (Berlin), v. 25, 1969 p 287-291
(Contract NASw-2483)
(NASA-TT-F-14864) Avail: NTIS HC $3.00 CSCL 06P

A method for the rapid determination of delta-ALA in urine given by Grabecki and coworkers is described. This method is less expensive than the method of Mauzerall and Granick and therefore available in screening of lead-exposed workers. According to this method proposals are made in order to establish the normal values and the acceptable limit values of delta-ALA excretion in urine. Author

N73-21129*# Scientific Translation Service, Santa Barbara, Calif.
PSYCHOLOGICAL CHARACTERISTICS OF THE ACTIVITY OF COSMONAUTS
A. A. Leonov and V. I. Lebedev Washington NASA Mar. 1973 391 p refs Transl. into ENGLISH of the book "Psikhozogicheskiye Osobennosti Deyatelnosti Kosmonavtov" Moscow, Nauka Press, 1971
(Contract NASw-2035)
(NASA-TT-F-727) Avail: NTIS HC $6.00 CSCL 05J

The role of the cosmonaut in the man-spacecraft system is discussed along with the importance of crew teamwork in controlling multiplace spacecraft, and the psychological aspects of training cosmonauts as operators. The changes in the environmental conditions and the associated psychophysiological mechanisms of space and time perception away from the earth as man goes into outer space are shown. The influences of weightlessness, extended isolation in cramped quarters, emotional stress, and other space factors on man are explained. Man's motor activity under weightless conditions is analyzed. The possible gains from integrating man and machine and orientation training for cosmonauts, and from organizing work and rest periods for long space flights are emphasized. Author

N73-21130# Defence Research Information Centre, Orpington (England).
THE EFFECT OF SOME RADIOPROTECTIVE PREPARATIONS ON THE MOTOR AND EVACUATOR FUNCTION OF THE GASTROINTESTINAL TRACT OF HEALTHY AND IRRADIATED RATS
N. G. Krashnykh, L. A. Tyutin et al Dec. 1972 11 p refs Transl. into ENGLISH from Probl. Kosmich. Biol., v. 14, 1971 p 57-65
(DRIC-Trans-2962; BR-30326) Avail: NTIS HC $3.00

The experimental findings of a comparative study of the action of some of the more effective antiradiation drugs, cystamine, beta-ammoethylisothiuonium (AET), monosodiumbeta-ammoethyl thiophosphate (crystafos) and 5-methoxytryptamine (5-MOT), on the motor and evacuator functions of the gastrointestinal tract in healthy and irradiated white rats are presented. The preparations studied were administered orally, intraperitoneally, and rectally and it was found the substances slowed up evacuation of the contrast medium from the stomach. They also produced prolonged spasm of the pylonis and prephlonic part of the stomach as well as phasic disturbances of tone and penstalsis. The oral administration of the substances leads as a rule to a reduction in their protective properties. ESRO

N73-21131*# California Univ., Berkeley. Dept. of Statistics.
PROCEEDINGS OF THE 6TH BERKELEY SYMPOSIUM ON MATHEMATICAL STATISITICS AND PROBABILITY. VOLUME 5: DARWINIAN, NEO-DARWINIAN, AND NON-DARWINIAN EVOLUTION

Lucien M. LeCam, ed., Jerzy Neyman, ed., and Elizabeth L. Scott, ed. 1972 385 p refs Symp. held at Berkeley, Calif., 9-12 Apr. 1971 Sponsored in part by NSF, NIH, Army, and Navy
(Grants NGR-05-003-020; AF-AFOSR-1951-70; AF Proj. 9769)
(NASA-CR-131508; LC-49-8189; AD-754709; AFOSR-73-0116TR; ISBN-0-520-02188-6-Vol-5) Avail: NTIS HC $21.25 CSCL 06/3

Contents: Darwinian and non-Darwinian evolution theory; DNA, RNA, amino acid sequences; Population studies and evolution; Role of theory in evolutionary studies. GRA

N73-21132*# Naval Aerospace Medical Research Lab., Pensacola, Fla.
DOSIMETRIC CHARACTERISTICS OF HZE PARTICLES IN SPACE
Herman J. Schaefer 15 Nov. 1972 31 p refs
(NASA Order W-13280)
(NASA-CR-131467; Rept-47; AD-754427; NAMRL-1172) Avail: NTIS HC $3.75 CSCL 06/18

HZE particles, i.e., galactic heavy primaries with very high values of Linear Energy Transfer (LET) pose a special radiation hazard on manned space missions. While cellular destruction by single hits has been demonstrated, more general data on dose/effect relationships are not available since conventional concepts and units of radiation dosimetry are not applicable. The report summarizes existing knowledge on the energy spectrum of galactic heavy primaries and analyzes the microdosimetric pattern of energy dissipation in tissue. It is shown that the LET distribution shows a steep negative slope with the frequency of events decreasing steeply with increasing LET down to less than one event per cc tissue per day at 4000 kev/micron tissue. Assessing the HZE particle hazard requires new approaches in both radiobiological experimentation and dosimetric instrumentation. Author (GRA)

N73-21133# California Univ., Davis. Dept. of Human Physiology.
SYSTEMS ANALYSIS OF PHYSIOLOGICAL PERFORMANCE RELATED TO STRESSES SUCH AS THOSE EXPERIENCED IN HIGH PERFORMANCE AIR CRAFT Summary Report, 1 Oct. 1971 - 30 Sep. 1972
Richard F. Walters 30 Sep. 1972 39 p refs
(Contract F44620-72-C-0011; AF Proj. 9777)
(AD-754970; AFOSR-73-0026TR) Avail: NTIS CSCL 06/19

Areas of USAF interest discussed in the report are: Continued refinement of a predictive model of human performance; Maintenance of indexed bibliographies of performance, peripheral circulation and energy exchange for distribution to interested researchers in other Air Force related research centers; Collection of exercise performance data on normal and athletic subjects, as well as initiating data collecting on certain types of patients with specific problems such as pulmonary or circulatory diseases; Development of a comprehensive data support system for research in human physiology; Development of a joint investigation of acceleration (in conjunction with investigators at the School of Aerospace Medicine, Brooks Air Force Base, San Antonio, Texas); Installation of programs developed at this center in other Air Force research centers, including the U.S. Air Force Academy and an Air Force supported research project at the University of Kentucky; Data analysis and interpretation, using tools developed at Davis, for other research units; Joint research with the Air Academy. Author (GRA)

N73-21134# Naval Aerospace Medical Research Lab., Pensacola, Fla.
OPERANT BEHAVIOR OF RHESUS MONKEYS IN THE PRESENCE OF EXTREMELY LOW FREQUENCY LOW INTENSITY MAGNETIC AND ELECTRIC FIELDS, EXPERIMENT 1
John De Lorge 1 Nov. 1972 22 p refs
(MF1524015)
(AD-754058; NAMRL-1155) Avail: NTIS CSCL 06/18

The present study was one of several designed to measure specific operant behaviors and discover effects of exposure of animals to extremely low frequency magnetic and electric fields of low intensity in support of the U.S. Navy's attempt to scientifically explore the biological effects of these fields. Measurements of immediate memory, operant responding, and reaction time were obtained on two rhesus monkeys. No significant changes could be related to the exposure of these animals to a magnetic field of 10 gauss at 75 Hz or to the magnetic field combined with an electric field of 4 V/m at 75 Hz. The results provide supportive evidence that these specific electromagnetic fields have no general behavioral influence on nonhuman primates. Author (GRA)

N73-21135 California Univ., Los Angeles.
STUDY OF ELECTROCUTANEOUS PARAMETERS RELEVANT TO DYNAMIC TACTUAL COMMUNICATION SYSTEMS Ph.D. Thesis
Ronald Edwin Prior 1972 241 p
Avail: Univ. Microfilms Order No. 72-20469

Data are presented on fundamental knowledge about relevant parameters in an electrocutaneous communication system, and applied knowledge related to the design and development of dynamic tactual communication systems, especially those for the reception of speech of visual images. Basic terms are defined and several applications of the dynamic system are presented. Electrode configurations and the resulting fields in the skin, skin preparation and electrode mounting procedures, polarization, spontaneous local breakdown, and the electrocutaneous stimulation amplifier are discussed in detail. Dissert. Abstr.

N73-21136*# Tennessee Univ., Tullahoma. Space Inst.
CYBERNETIC INTEGRATION OF EXPERIMENTS INTO THE CVT SYSTEM Final Report
T. C. Helvey 31 Oct. 1972 40 p refs
(Contract NGR-43-001-117)
(NASA-CR-124150) Avail: NTIS HC $4.00 CSCL 05E

The research to develop a cybernetic model which is a static aggregate of the existing interaction in the CVT is reported. The experiments involving man considered necessary for cybernetic integration are listed. Topics discussed include: the modeling dynamic interactions for two competing systems; aspects of man-man integration in the CVT; and establishment of optimum number of research crew for the CVT. F.O.S.

N73-21137*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
COST ANALYSIS OF OXYGEN RECOVERY SYSTEMS
M. M. Yakut 28 Feb. 1973 57 p
(Contract NAS8-28377)
(NASA-CR-124175; MDC-G4128) Avail: NTIS HC $5.00 CSCL 06K

Report is made of the cost analysis of four leading oxygen recovery subsystems which include two carbon dioxide reduction subsystems and two water electrolysis subsystems, namely, the solid polymer electrolyte and the circulating KOH electrolyte. The four oxygen recovery systems were quantitatively evaluated. System characteristics, including process flows, performance, and physical characteristics were also analyzed. Additionally, the status of development of each of the systems considered and the required advance technology efforts required to bring conceptual and/or pre-prototype hardware to an operational prototype status were defined. Intimate knowledge of the operations, development status, and capabilities of the systems to meet space mission requirements were found to be essential in establishing the cost estimating relationships for advanced life support systems. Author

N73-21138*# ABT Associates, Inc., Cambridge, Mass.
NASA'S CONTRIBUTIONS TO PATIENT MONITORING, APPENDIX
Donald M. Murray and Warren D. Siemens 1971 122 p refs Sponsored by NASA
(NASA-CR-131538) Avail: NTIS HC $8.25 CSCL 06B

Health care problems and markets for patient monitoring equipment are discussed along with contributions to all phases of patient monitoring, and technology transfer to nonaerospace problems. Health care medical requirements, and NASA achievements in patient monitoring are described, and a summary of the technology transfer is included. F.O.S.

N73-21139*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE 1972 SUMMER INSTITUTE FOR BIOMEDICAL ENGINEERING Final Report, 19 Jun. - 25 Aug. 1972
Eugene M. DeLoatch (Howard Univ.) Feb. 1973 184 p refs Prepared in cooperation with Howard Univ., Washington, D. C.
(Contract NASw-2386)
(NASA-TM-X-66214; X-207-73-73) Avail: NTIS HC $11.25
CSCL 06B

Biomedical engineering and design work is reported for hemoglobin tester, flow ventilation systems, hematological viscometer, isotope safe handling system, and strain gage blood pressure measuring device.

N73-21140* Federal City College, Washington, D.C.
DESIGN MODIFICATION OF ELECTROPHORETIC EQUIPMENT
Judy M. Reddick and Irvin Hirsch (City Coll. of the City of New York) *In* NASA. Goddard Space Flight Center The 1972 Summer Inst. for Biomed. Eng. Feb. 1973 p 9-39 refs Prepared in cooperation with City Coll. of the City of New York

CSCL 06B

The improved design of a zone electrophoretic sampler is reported that can be used in mass screening for hemoglobin S, the cause of sickle cell anemia. Considered is a high voltage multicell cellulose acetate device that requires 5 to 6 minutes electrophoresis periods; cells may be activated individually or simultaneously. A multisample hemoglobin applicator standardizes the amount of sample applied and transfers the homolysate to the electrical wires. G.G.

N73-21141* Lehigh Univ., Bethlehem, Pa.
OPERATING ROOM ENVIRONMENT CONTROL. PART A: A VALVE CANNISTER SYSTEM FOR ANESTHETIC GAS ADSORPTION. PART B: A STATE-OF-THE-ART SURVEY OF LAMINAR FLOW OPERATING ROOMS. PART C: THREE LAMINAR FLOW EXPERIMENTS
Joseph S. Meyer and Judy Kosovich (Wis. Univ., Madison) *In* NASA. Goddard Space Flight Center The 1972 Summer Inst. for Biomed. Eng. Feb. 1973 p 41-104 refs Prepared in cooperation with Wis. Univ., Madison

CSCL 06B

An anesthetic gas flow pop-off valve canister is described that is airtight and permits the patient to breath freely. Once its release mechanism is activated, the exhaust gases are collected at a hose adapter and passed through activated coal for adsorption. A survey of laminar air flow clean rooms is presented and the installation of laminar cross flow air systems in operating rooms is recommended. Laminar flow ventilation experiments determine drying period evaporation rates for chicken intestines, sponges, and sections of pig stomach. G.G.

N73-21142* Howard Univ., Washington, D.C.
HEMATOLOGICAL VISCOMETRY
Delma R. West and Charles H. Smoot, III (Purdue Univ.) *In* NASA. Goddard Space Flight Center The 1972 Summer Inst. for Biomed. Eng. Feb. 1973 p 105-140 ref Prepared in cooperation with Purdue Univ., Lafayette, Ind.

CSCL 06B

Concepts and defining equations for the design of a relative velocity blood viscometer are reported. The device consists of two cone and plate chambers, a variable speed drive, and rotational velocity detectors. Two cone-plate systems are directly coupled with one system driving the other through the viscous drag transmitted in the test fluid. Angular velocity measurements are processed electronically. A brief description of current viscometer designs is included. G.G.

N73-21143* Rose-Hulman Inst., Terra Haute, Ind.
HANDLING SYSTEM FOR IRIDIUM-192 SEEDS
Walter Carpenter and David Wodicka *In* NASA. Goddard Space Flight Center The 1972 Summer Inst. for Biomed. Eng. Feb. 1973 p 141-171 refs
CSCL 06R

A complete system is proposed for safe handling of iridium-192 seeds used to internally irradiate malignant growths. A vibratory hopper feeds the seeds onto a transport system for deposit in a magazine or storage area. A circular magazine consisting of segmented plastic tubing with holes in the walls to accommodate the seeds seems feasible. The magazine is indexed to stop and release a seed for calibration and deposition. G.G.

N73-21144* Rensselaer Polytechnic Inst., Troy, N.Y.
INDIRECT BLOOD PRESSURE MEASURING DEVICE
Larry Hum and Clifton E. Cole (Howard Univ.) *In* NASA. Goddard Space Flight Center The 1972 Summer Inst. for Biomed. Eng. Feb. 1973 p 173-186 refs Prepared in cooperation with Howard Univ., Washington, D. C.

CSCL 06B

Design and performance of a blood pressure recording device for pediatric use are reported. A strain gage transducer with a copper-beryllium strip as force sensing element is used to monitor skin movements and to convert them into electrical signals proportional to those displacements. Experimental tests with this device in recording of force developed above the left femoral artery of a dog accurately produced a blood pressure curve. G.G.

N73-21145# Control Data Corp., St. Paul, Minn.
AIR-TO-AIR VISUAL DETECTION DATA Interim Report
Apr. 1973 38 p refs
(Contract DOT-FA70WA-2263)
(FAA-RD-73-40) Avail: NTIS HC $4.00

Tests were conducted to determine ability of pilots to visually detect other aircraft in an air-to-air situation. The tests were based on the requirement to detect potentially hazardous intruders in the pilot warning instrument (PWI) concept. It was concluded that there is a high likelihood of seeing the intruder aircraft in sufficient time to take evasive action under visual flight rule conditions if the pilot is given accurate information on the location of the aircraft.

N73-21146 Federal Aviation Administration, Washington, D.C.
SUMMARY OF AIR-TO-AIR VISUAL DETECTION DATA, PART 1
A. Millhollon *In* Control Data Corp. Air-to-Air Visual Detection Data Apr. 1973 8 p

An analysis of tests conducted to determine the ability of pilots to visually identify aircraft in an air-to-air situation in time to take evasive action and avoid collisions is presented. Specific cases of near collisions are cited to show the feasibility of collision avoidance by visual perception. Tentative conclusions concerning the potential performance of pilots aided by a pilot warning indicator are discussed. Author

N73-21147 Control Data Corp., St. Paul, Minn. Advance Systems Lab.
SUMMARY OF VISUAL DETECTION DATA, PART 2
J. Lyons *In its* Air-to-Air Visual Detection Data Apr. 1973 19 p ref
(CDC-JL-5)

Flights were conducted in which two aircraft set out on collision or near-miss courses in order to provide photographic data for use in a simulator. In addition to photography in each run, data on the time and range of first visual detection of each aircraft by the crew of the other aircraft were recorded. The data provide a basis for determining the feasibility of midair collision avoidance based on the capability of pilots to visually perceive other aircraft. The run condition and data obtained are summarized in tabular form. Author

N73-21148 Control Data Corp., St. Paul, Minn. Advanced Studies Lab.
SUMMARY OF VISUAL DETECTION DATA TAKEN DURING THE ATA/CAS FLIGHT TESTS

W. Graham *In its* Air-to-Air Visual Detection Data Apr. 1973 10 p refs

Flight tests were conducted to obtain data concerning the range of visual detection in air-to-air situations. Details of the equipment used and a summary of each flight are given. The geometrical aspects of the flights are analyzed numerically. The data are presented in the form of tables and graphs. Author

N73-21149# Joint Publications Research Service, Arlington, Va.

SPACEFLIGHT SAFETY

Yu. Tyurin and A. Rudev 18 Apr. 1973 7 p Transl. into ENGLISH from Aviat. Kosmonavt. (Moscow), no. 2, 1973 p 38-39

(JPRS-58781) Avail: NTIS HC $3.00

A review is presented of the safety problems facing man during space flight including radiation danger, contamination of space and rescue spaceships. Author

N73-21150*# Translation Consultants, Ltd., Arlington, Va.

ERGONOMICS PRINCIPLES AND RECOMMENDATIONS, NO. 2

G. M. Zarakovskiy, ed., V. M. Medjedev, and V. M. Munipov Washington NASA Apr. 1973 226 p refs Transl. into ENGLISH of the book "Ergonomika: Printsipy i Rekomendatsii, vyp. 2" Moscow, 1971 224 p

(Contract NASw-2038)

(NASA-TT-F-14888) Avail: NTIS HC $13.50 CSCL 05E

The psychophysiological analysis of man's job performance was studied to improve the ergonomic culture of artist-designers, and technical specialists. Topics discussed include: principles of the ergonomic descriptions of operator performance; methods of ergonomic analysis of performance under production conditions; selection, education, and training of operators for the man/machine system; objective monitoring of the level of training of operators in the man/machine system; and psychological stress of space flight. F.O.S.

N73-21151*# Texas Technological Univ., Lubbock.

INSULATED ELECTROCARDIOGRAPHIC ELECTRODES Patent Application

Robert M. David and William M. Portnoy, inventors (to NASA) Filed 4 Apr. 1973 22 p Sponsored by NASA

(NASA-Case-MSC-14339-1; US-Patent-Appl-SN-347953) Avail: NTIS HC $3.25 CSCL 06B

An insulated, capacitively coupled electrode for sensing bioelectric potentials or signals is reported. The electrode can be employed without a paste electrolyte to the body for extended usage without producing skin reactions. Its integrated system includes an impedance performer for the acquisition of electrocardiographic data that is encapsulated by a thin layer of non-toxic dielectric material. NASA

N73-21152*# Kanner (Leo) Associates, Redwood City, Calif.

SOME CONSTRUCTION PRINCIPLES FOR REMOTE CONTROL IMITATIVE MANIPULATORS

A. Ye. Bor-Ramenskiy, V. S. Kuleshov, N. A. Lakota, and V. I. Lobachev Washington NASA Apr. 1973 17 p refs Transl. into ENGLISH from Mekh. Mashin (USSR), no. 1/8, 1967 p 33-42

(Contract NASw-2481)

(NASA-TT-F-14889) Avail: NTIS HC $3.00 CSCL 05H

Some basic mechanical requirements for the construction of manipulators designed to perform a wide range of complex tasks at a distance from the operator are reviewed. The kinematics and dynamics of the human arm and hand are outlined, and relevant construction principles are abstracted. These principles are then, rather effectively, applied to imitative remote control manipulators with both action and passive feedback. Author

N73-21153# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Physik der Atmosphaere.

RESEARCH AT THE DFVLR IN THE FIELD OF ENVIRONMENTAL PROTECTION. PART 2: NOISE ABATEMENT, WATER AND LANDSCAPE, TECHNOLOGY [FORSCHUNGSARBEITEN IN DER DFVLR AUF DEM GEBIET DES UMWELTSCHUTZES. TEIL 2: LAERMBEKAEMPFUNG, GEWAESSERSCHUTZ, NATUR UND LANDSCHAFT, UMWELTFREUNDLICHE TECHNIK]

Dieter Paffrath Dec. 1972 84 p refs In GERMAN; ENGLISH summary

(DLR-Mitt-72-15) Avail: NTIS HC $6.25; DFVLR, Porz, West Ger: 21,90 DM

Research work is reported in the fields of abatement of noise from aircraft engines and exhaust jets; formation and propagation of the supersonic boom; measurement of noise emission from aircraft; and noise reduction by constructive means, airport location planning, and layout of flight patterns. Remote sensing instrumentation and techniques were developed for the detection and monitoring of water pollution, and for surveying the change of state at the earth's surface. ESRO

N73-21154# Naval Air Development Center, Warminster, Pa. Crew Systems Dept.

EFFECTS OF FACIAL HAIR IN OXYGEN MASKS Final Report

David G. Naber 29 Dec. 1972 36 p refs

(AD-754075; NADC-72211-CS) Avail: NTIS CSCL 06/11

The objective of this study is to determine whether or not hazards are associated with facial hair on Naval aircrewmen using oxygen breathing equipment. The study showed that undesirable conditions do exist because of facial hair, but there is no evidence of serious injury or fire occuring in aircraft because of hair growth. Indications are that hair segments could become lodged in a valve mechanism causing breathing difficulty and noisy communications. Also, face seal integrity is hard to maintain on facial hair. Each set of test results shows instability of breathing conditions that could be hazardous to the crewman. Therefore, it appears that wearing facial hair should be considered a potential hazard that could affect the safety and efficient operation of the aircraft. Author (GRA)

N73-21761* Johann-Wolfgang-Goethe-Universitaet, Frankfurt am Main (West Germany).

BIOMEDICAL EXPERIMENTS. PART A: BIOSTACK EXPERIMENT c04

Horst Buecker, G. Horneck, E. Reinholz (Max Planck Inst. fuer Biophys., Frankfurt), W. Scheuermann (Tech. Hochschule, Hanover), W. Ruether (Marburg Univ.), E. H. Graul (Marburg Univ.), H. Planel (Toulouse Univ.), J. P. Soleilhavoup (Toulouse Univ.), P. Cuer (Strasbourg Univ.), R. Kaiser (Strasbourg Univ.) et al *In* NASA. Lyndon B. Johnson Space Center Apollo 16 Prelim. Sci. Rept. 1972 10 p refs

CSCL 06B

The biostack experiment is described which was designed to study the biologic effects of individual heavy nuclei of galactic cosmic radiation during space flight outside the magnetosphere of the earth. Specifically, the biostack experiment was designed to promote research on the effects of high energy/high Z particles of galactic cosmic radiation on a broad spectrum of biologic systems, from the molecular to the highly organized and developed forms of life. The experiment was considered unique and scientifically meritorious because of its potential yield of information—currently unavailable on earth—on the interaction of biologic systems with the heavy particles of galactic cosmic radiation. Author

N73-21762* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

MICROBIAL RESPONSE TO SPACE ENVIRONMENT, PART B c04

G. R. Taylor, C. E. Chassay, W. L. Ellis (Northrop Serv., Inc.), B. G. Foster (Tex. A&M Univ.), P. A. Volz (Eastern Mich. Univ.), J. Spizizen (Scripps Clinic and Res. Found.), H. Buecker (Frankfurt Univ.), R. T. Wrenn (Northrop Serv., Inc.), R. C. Simmonds, R. A. Long (Northrop Serv., Inc.) et al *In its* Apollo 16 Prelim. Sci. Rept. 1972 6 p

CSCL 06M

The performance of the microbial response to space environment experiment is considered excellent by all investigators.

For most microbial systems, only preliminary survival data are available at this time. None of the available data indicate space flight-mediated changes in cell viability or recovery. One quite important observation has been made at this early date, however. The eggs produced after mice had been infected with N. dubius larvae demonstrated a significant decrease in hatchability when compared to identical ground controls. Except for the fact that the Apollo 16 flight larvae had been on board the command module, treatment of the flown larvae and ground control larvae was the same; neither had been exposed to UV irradiation. The significance and implications of this finding are currently being studied. Author

N73-21763* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
VISUAL LIGHT FLASH PHENOMENON, PART C **c04**
Richard E. Benson and Lawrence S. Pinsky *In its* Apollo 16 Prelim. Sci. Rept. 1972 4 p refs

CSCL 06P

The Apollo 16 mission provided the opportunity to obtain additional data on the characteristics and frequency of the light flashes and also provided the first opportunity to obtain a direct physical record of incident cosmic ray particles with the Apollo light-flash moving emulsion detector (ALFMED). The ALFMED is an electromechanical device that is worn on the head like a helmet and supports cosmic radiation-sensitive emulsions around the head of the test subject. Two light-flash observation sessions were conducted during the mission: one during translunar coast and the second during transearth coast. Characteristics of the light flashes observed and reported by the Apollo crew members were generally similar to those reported on previous missions. Analyses of the ALFMED emulsion plates are proceeding as scheduled, although results are not yet available. The ALFMED results should provide conclusive evidence establishing the correlation, if any, between the incident cosmic ray particles and the perception of light flashes as reported by Apollo crew members. A.L.

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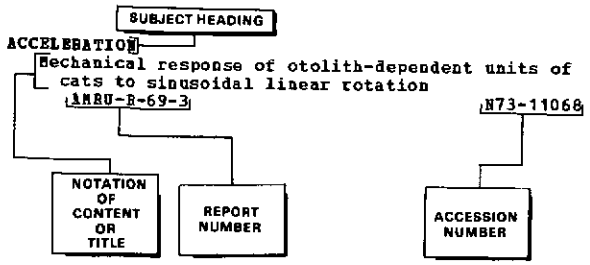

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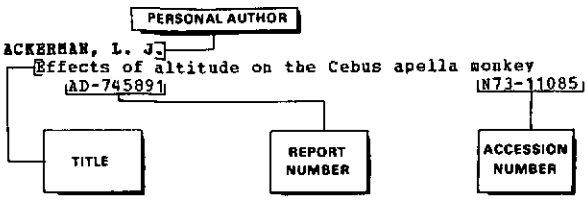

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