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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 115)

MAY 1973

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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NASA SP-7011 (115)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 115)

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 April 1973 in

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

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 324 reports, articles and other documents announced during April 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.

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TABLE OF CONTENTS

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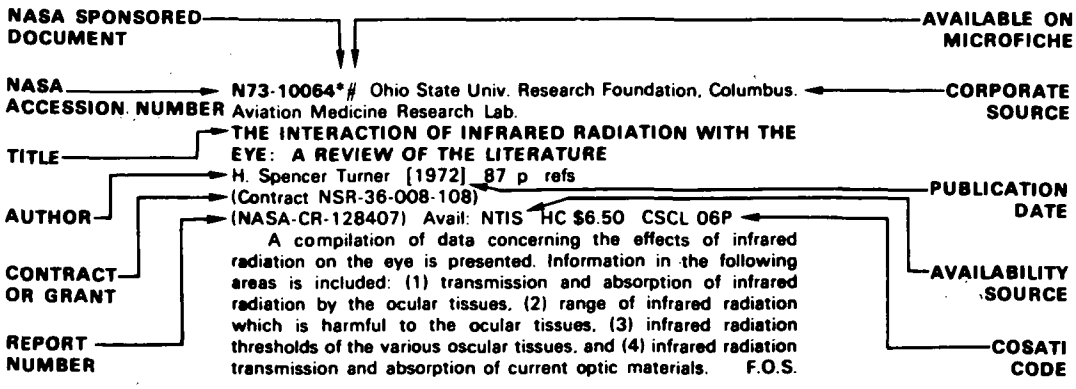

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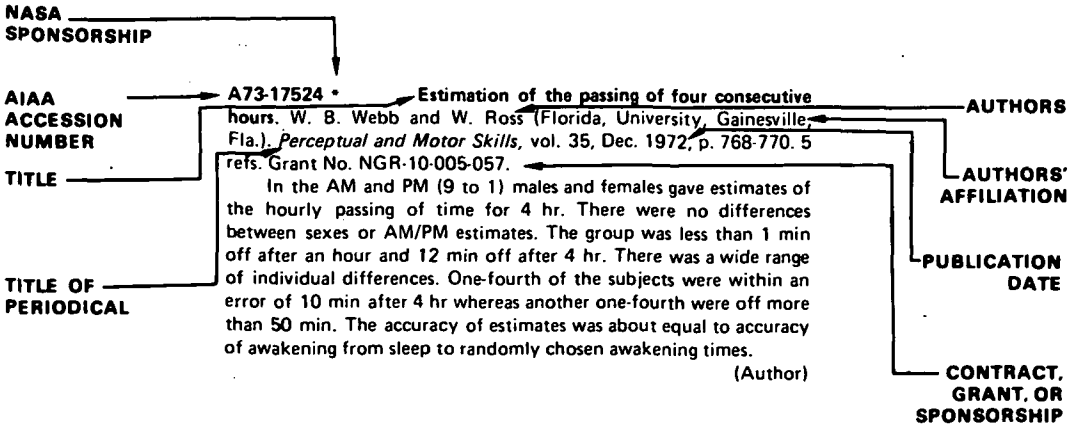

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 115) MAY 1973

IAA ENTRIES

A73-18949 **Protective clothing for fueling personnel (Les vêtements de sécurité pour ergoliers).** R. Maidon (Etudes et Fabrications Aéronautiques, Clichy, Hauts-de-Seine, France). In: French space technology. Volume 1. Paris, Information Propagande Françaises, Editeur; Centre National d'Etudes Spatiales, 1971, p. 571-575. In English and French.

Description of the equipment provided for the protection of rocket-propellant handling personnel at the French Guiana Space Center. The equipment provides protection of the head against shocks, and of the skin and breathing, hearing, and sight organs against contact with propellants and their vapors. It provides also head and body ventilation, and consists of an airtight external suit and head gear, ventilated underwear, and a ventilation-air control unit. M.V.E.

A73-19111 **Survival of micro-organisms on the moon.** P. M. Molton (Maryland, University, College Park, Md.). *Spaceflight*, vol. 15, Feb. 1973, p. 51.

To obtain factual data on how long and under what conditions terrestrial life could survive exposure to vacuum, the entire TV camera and other selected components were removed from the Surveyor 3 spacecraft, sealed and returned to earth, stored for a quarantine period, and then disassembled and examined. Since microbial growth was shown from only a single sample, possibly from only a single microbial cell, the result is in question. Contamination by the investigators is a possibility, despite the careful approach. F.R.L.

A73-19124 **The use of a compartmental hypothesis for the estimation of cardiac output from dye-dilution curves and the analysis of radiocardiograms.** D. W. Hill (Royal College of Surgeons of England, London, England), F. D. Thompson (London, University, London, England), M. E. Valentinuzzi, and T. Pate (Baylor University, Houston, Tex.). *Medical and Biological Engineering*, vol. 11, Jan. 1973, p. 43-54. 37 refs. Grant No. PHS-HE-13114-02.

A73-19125 **Linearity of the horizontal component of the electro-oculogram.** L. A. Geddes, J. D. Bourland (Baylor University, Houston, Tex.), R. Steinberg (Rice University, Houston, Tex.), and G. Wise (Princeton University, Princeton, N.J.). *Medical and Biological Engineering*, vol. 11, Jan. 1973, p. 73-77. 16 refs. U.S. Department of Health, Education, and Welfare Grant No. FB-00044; Grant No. NIH-TI-HE-0512S.

Study of the horizontal component of the human electro-oculogram recorded by means of dry electrodes. An analysis of the voltages obtained for gaze angles up to plus or minus 60 deg indicates that up to about plus or minus 45 deg the linear and sinusoidal relationships of potential to eye position accurately represented the data. For gaze angles greater than plus or minus 45 deg, the sinusoidal relationship provided a slightly better fit for the data. M.V.E.

A73-19151 **Adaptation to high altitude hypoxia as a factor preventing development of myocardial ischemic necrosis.** F. Z. Meerson, O. A. Gomzakov, and M. V. Shimkovich (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *American Journal of Cardiology*, vol. 31, Jan. 1973, p. 30-34. 26 refs.

Adaptation to high altitude hypoxia reduces the mortality rate in rats with a ligated coronary artery by 5 or 6 times and the size of ischemic necrosis by 35 percent. This adaptation also minimizes the disturbances of the heart's contractile function in ischemic myocardial necrosis. The deficit in the contractile force during maximal load on the heart is 4.4 times smaller in rats adapted to hypoxia than in rats not so adapted. The primary factor contributing to the preventive effect of adaptation to high altitude hypoxia in ischemic necrosis is an increased capacity of the oxygen transport and utilization (mitochondrial) systems in the heart muscle of the adapted animals. (Author)

A73-19152 **Intermittent trifascicular block - Different mechanisms of conduction disturbances in the bundle branches.** N. El-Sherif (Cairo University, Cairo, Egypt). *American Journal of Cardiology*, vol. 31, Jan. 1973, p. 71-77. 28 refs.

Analysis of the electrocardiograms of a patient with ischemic heart disease and intermittent trifascicular block. The records revealed the multiplicity of electrophysiological mechanisms that influence impulse conduction in the bundle branch system. The value of deductive analysis in unraveling complex disturbances of the cardiac rhythm is illustrated. M.V.E.

A73-19169 * **Synthesis of reverse osmosis membranes by plasma polymerization of allylamine.** J. R. Hollahan and T. Wydeven (NASA, Ames Research Center, Biotechnology Div., Moffett Field, Calif.). *Science*, vol. 179, Feb. 2, 1973, p. 500, 501. 11 refs.

A73-19209 **Valvular cardiopathies and tolerance to flight (Cardiopathies valvulaires et tolérance au vol).** G. Leguay, J. Ille, and R. Pannier (Hôpital d'Instruction des Armées Dominique Larrey, Versailles, Yvelines, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 3rd Quarter, 1972, p. 133-140. 6 refs. In French.

The aptitude norms for operating aircrew require integrity of the cardiovascular apparatus, verified by clinical, X-ray, and electrocardiographic examination. Consequently, the existence of a valvulopathy can only involve definite unfitness. This unfitness is justified from the point of view of air safety and the effects of flight on the valvulopathy. Case histories of seven valvular cardiopathies discovered in military pilots are reviewed, and an attempt is made to determine their tolerance to flight. F.R.L.

A73-19210 **Solar flares and the terrestrial atmosphere (Eruptions solaires et atmosphère terrestre).** P. Simon (Meudon, Observatoire, Meudon, Hauts-de-Seine, France). *Revue de Médecine Aéronautique et Spatiale*, vol. 11, 3rd Quarter, 1972, p. 141, 142. In French.

Some comments are made on the frequency of the flare phenomenon, on the variety of physical phenomena to which it

corresponds, and on the protective effects of the terrestrial atmosphere. A brief evaluation of the frequency of events which could be of concern to the flights of the Concorde is made. There are positive indications that the next solar cycles will decrease in intensity in the fifty years to come. It can therefore be hoped that strong solar events at the Concorde flight level will be quite exceptional, i.e., that the risk run from solar flares will be less than that of accidents actually happening to subsonic aircraft. F.R.L.

A73-19211 Cosmic radiation and research carried out on board the 001 prototype Concorde (Rayonnements cosmiques et recherches entreprises à bord du prototype 001 Concorde). R. P. Delahaye (Hôpital Bégin, Saint-Mandé, Val-de-Marne, France), R. Kaiser (Commissariat à l'Energie Atomique, Laboratoire de Physique Corpusculaire, Strasbourg, France), A. François, H. Portal (Commissariat à l'Energie Atomique, Service Technique d'Etudes et de Protection, Fontenay-aux-Roses, Hauts-de-Seine, France), and Mr. Durney (Service Mixte de Sécurité Radiologique; Monthléry, Essonne, France). *Revue de Médecine Aéronautique et Spatiale,* vol. 11, 3rd Quarter, 1972, p. 143-150. 6 refs. In French.

A73-19212 The influence of altitude on man (L'influence de l'altitude sur l'homme). A. Hurdato. *(Fondation Jacques Parisot, Conférence, Geneva, Switzerland, May 17, 1972.) Revue de Médecine Aéronautique et Spatiale,* vol. 11, 3rd Quarter, 1972, p. 157-160. In French.

The principal characteristics of the human being born and living at high altitude are briefly enumerated. The study of the influence of altitude on man can contribute to a better understanding of the mechanisms of adaptation, genetic or acquired, which determine and control the tolerance of man to the ambient environment, as well as the physiological characteristics of 20 to 30 million people among whom these mechanisms have been modified by the action of the environment where they were born and where they live. F.R.L.

A73-19218 * Sequence data - Magnitude and implications of some ambiguities. R. Holmquist and T. H. Jukes (California, University, Berkeley, Calif.). *Journal of Molecular Evolution,* vol. 2, Dec. 29, 1972, p. 10-16. 13 refs. Grants No. NGR-05-003-460; No. NIH-HL-11553.

A stochastic model is applied to the divergence of the horse-pig lineage from a common ansestor in terms of the alpha and beta chains of hemoglobin and fibrinopeptides. The results are compared with those based on the minimum mutation distance model of Fitch (1972). Buckwheat and cauliflower cytochrome c sequences are analyzed to demonstrate their ambiguities. A comparative analysis of evolutionary rates for various proteins of horses and pigs shows that errors of considerable magnitude are introduced by Glx and Asx ambiguities into evolutionary conclusions drawn from sequences of incompletely analyzed proteins. V.Z.

A73-19219 De novo origin of periodic proteins. M. Ycas (New York, State University, Syracuse, N.Y.). *Journal of Molecular Evolution,* vol. 2, Dec. 29, 1972, p. 17-27. 39 refs.

Discussion of the properties and genesis of silk fibroin, collagen, glycoproteins, keratin, and protamine. It is suggested that the formation of periodic amino acid sequences in the structures of these proteins is a more plausible type of their genesis than the amino acid replacements and nonperiodic DNA duplications suggested by other hypotheses. Evidence is also given for the formation of these proteins in a single evolutionary event by an iterative de novo synthesis of DNA. V.Z.

A73-19220 Base composition of ribosomal RNA and evolution. P. A. Lava-Sanchez, F. Amaldi, and A. La Posta (CNR, Centro di Studio per gli Acidi Nucleici, Rome, Italy). *Journal of Molecular Evolution,* vol. 2, Dec. 29, 1972, p. 44-55. 29 refs.

Base composition analysis has been carried out for the two major ribosomal RNA components extracted from ribosomes of plants and animals of various taxonomic position. The high degree of change undergone by these molecules during evolution is evident from the results obtained. Moreover, the evolutionary pattern of the rRNA base composition well reflects the phylogenetic relationships of the various taxonomic groups. (Author)

A73-19297 # Emotional stresses during a space flight (Emotsional'noe napriazhenie v kosmicheskom polete). L. Khachatur'iants and L. Grimak. *Aviatsiia i Kosmonavtika,* no. 11, 1972, p. 33, 34. In Russian.

Discussion of the emotional state of Soviet astronauts Leonov, Beliaev, Yeliseev, and Khrunov during the execution of their space assignments. Their professional reactions, heart beat and respiration rates, blood pressure fluctuations, and speech intonation spectral variations are used as the criteria, noting the unavoidability of emotions during space flight activity. V.Z.

A73-19425 # Tissue oxygen in the presence of extremal flight factors (Kislorod tkanei pri ekstremal'nykh faktorakh poleta). E. A. Kovalenko and I. N. Cherniakov. Moscow, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii. Volume 21), 1972. 264 p. 628 refs. In Russian.

Description of experiments designed to study variations in brain-tissue oxygen tension under the action of certain extremal factors characterizing flight in space and in the stratosphere. The factors considered include changes in the composition of the inspired atmosphere, extremely low atmospheric pressures, and the effects of accelerations. Brain-tissue oxygen tension was also used to evaluate the effectiveness of various technical, pharmacological, and physical countermeasures against hypoxia. Mechanisms responsible for the development of hypoxic states resulting from the flight factors are discussed in detail. T.M.

A73-19475 # Adenonucleotides, NAD+, and NADN in skeletal muscles during intensive work and at rest (Adeninnukleotidy, NAD+ i NADN v skeletnykh myshtsakh pri intensivnoi rabote i v period otdykha). N. R. Chagovets (Leningradskii Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Leningrad, USSR). *Akademiia Nauk SSSR, Doklady,* vol. 207, Nov. 21, 1972, p. 739-741. 19 refs. In Russian.

Experimental study on male rats of the changes occurring in NAD+ and NADN content in skeletal muscles during intense activity and in periods of restitution. The obtained results shed light on the nature of the processes determining the NAD system condition in muscle-tissue cells under various functional states of the organism. M.V.E.

A73-19476 Inhibition of the adrenocortical response to hypoxia by dexamethasone. S. F. Marotta, L. J. Malasanos, and U. Boonayathap (Illinois, University, Chicago, Ill.). *Aerospace Medicine,* vol. 44, Jan. 1973, p. 1-4. 29 refs. Navy-supported research. NR Project 101-580.

A73-19477 Predictions of the dynamic response of the lung. G. J. Trezek (California, University, Berkeley, Calif.). *Aerospace Medicine,* vol. 44, Jan. 1973, p. 8-13. 6 refs. Research supported by the University of California; Grant No. PHS-NS-08236-03.

A73-19478 Seat reaction direction in an animal centrifuge. D. J. Shippy and T. R. Robe (Kentucky, University, Lexington, Ky.). *Aerospace Medicine,* vol. 44, Jan. 1973, p. 22-26.

A73-19479 # Human endocrine-metabolic responses to graded oxygen pressures. H. B. Hale, E. W. Williams, and J. P. Ellis, Jr. (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine,* vol. 44, Jan. 1973, p. 33-36. 21 refs.

A73-19480 **Disorienting effects of aircraft catapult launchings.** M. N. Cohen, R. J. Crosbie, and L. H. Blackburn (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *Aerospace Medicine,* vol. 44, Jan. 1973, p. 37-39. 12 refs. Navy-supported research. Navy Project ZR01101-01; Navy Task MF12,524,015.

A73-19481 * **Thermal protective garment using independent regional control of coolant temperature.** A. Shitzer, J. C. Chato, and B. A. Hertig (Illinois, University, Urbana, Ill.). *Aerospace Medicine,* vol. 44, Jan. 1973, p. 49-59. 15 refs. Grant No. NGR-14-005-103.

A73-19482 **Modulated light transmission for electrical isolation in a multichannel physiological monitoring system.** D. G. Forgays, G. McClure, and F. C. Evering, Jr. (Vermont, University, Burlington, Vt.). *Aerospace Medicine,* vol. 44, Jan. 1973, p. 68-70. 8 refs. Contract No. F44620-69-C.

A73-19483 **Sensitivity to oxygen at high pressure of radioresistant and radiosensitive strains of bacteria.** O. R. Brown and D. Peterson (Missouri, University, Columbia, Mo.). *Aerospace Medicine,* vol. 44, Jan. 1973, p. 71-73. 7 refs. Contract No. N00014-67-A-0287-0002.

A73-19484 **Civil aviation medicine in the coming decade.** C. R. Harper (Aviation Insurance Agency, Inc., Atlanta, Ga.). *(International Congress of Aviation and Space Medicine, 19th, Tel Aviv, Israel, Oct. 25-29, 1971.) Aerospace Medicine,* vol. 44, Jan. 1973, p. 74-77. 5 refs.

A73-19485 **Observations on perceived changes in aircraft attitude attending head movements made in a 2-g bank and turn.** R. D. Gilson, F. E. Guedry, Jr., W. C. Hixson, and J. I. Niven (U.S. Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, Fla.). *Aerospace Medicine,* vol. 44, Jan. 1973, p. 90-92. Army-Navy-sponsored research.

A73-19500 * **Studies on acid production during carbohydrate metabolism by extremely halophilic bacteria.** G. A. Tomlinson (Santa Clara, University, Santa Clara, Calif.) and L. I. Hochstein (NASA, Ames Research Center, Moffett Field, Calif.). *Canadian Journal of Microbiology,* vol. 18, no. 12, 1972, p. 1973-1976. 11 refs. NASA Grant No. SCC-101.

A73-19548 **Response strategies with a cross-coupled control system.** P. McLeod (Medical Research Council, Applied Psychology Unit, Cambridge, England). *Journal of Experimental Psychology,* vol. 97, Jan. 1973, p. 64-69. 5 refs.

A cross-coupled control system is one in which there is an angular disparity between the frames of reference of the control and the controlled object. Naval enlisted men performed a pursuit tracking task, with a lagged rate control, in which the cross-coupling (c-c) angle varied sinusoidally with time. Separate groups of six subjects tracked with different combinations of maximum c-c angle and sinusoidal frequency. For some groups the c-c angle was displayed visually. Performance was dependent on maximum c-c angle and independent of rate of change of c-c angle. The results were predicted with an error of less than 5% by a model which assumed that subjects adopted a heuristic response strategy which ignored the value of the c-c angle. The results would not be predicted by any model which assumed that subjects' individual responses are related to the input. A successful model would have to assume that only the sum of responses integrated over time was related to the desired result. (Author)

A73-19549 **Autokinetic movement as a function of the implied movement of target shape.** C. R. Borresen (Wichita State University, Wichita, Kan.). *Journal of Experimental Psychology,* vol. 97, Jan. 1973, p. 89-92. 6 refs.

A range of meaningful target shapes varying from high- to low-implied movement was used in an autokinetic movement task: a rocket, car, face, tree, lamp, and building. Direction of movement and latency of response were the data collected. As predicted, target shapes with high-implied movement in a given direction had a significant number of reported movements in that direction. Target shapes with low-implied movement did not have significantly different directional response frequencies. In addition, response latencies were shorter for high-implied movement target shapes than for low-implied movement target shapes, but not only with respect to the direction of implied movement. (Author)

A73-19643 # **Functional condition changes of biceps brachii in man under the effect of fatiguing physical stress (Izmeneniia funktsional'nogo sostoianiia dvuglavoi myshtsy plecha cheloveka pod vliianiem utomitel'noi fizicheskoi nagruzki).** L. Z. Lautsevichus, M. A. Chobotas, and I. S. Saplinskas (Ministerstvo Zdravookhraneniia Litovskoi SSR, Institut Eksperimental'noi i Klinicheskoi Meditsiny; Vil'niusskii Gosudarstvennyi Universitet, Vilnyus, Lithuanian SSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny,* vol. 74, Dec. 1972, p. 6-9. 11 refs. In Russian.

A73-19644 # **Role of adrenalin and alpha-receptor deactivation in reactions of hemopoietic organs to stress (Rol' adrenalina i vykliucheniia alpha-retseptorov v reaktsiiakh organov krovetvoreniia na stress).** P. D. Gorizontov, O. I. Belousova, and Iu. I. Zimin. *Biulleten' Eksperimental'noi Biologii i Meditsiny,* vol. 74, Dec. 1972, p. 23-26. 15 refs. In Russian.

A73-19645 # **Mediator systems and respiratory function during an acute lethal loss of blood (Mediatornye sistemy i funktsiia dykhaniia pri ostroi smertel'noi krovopotere).** G. Ia. Bazarevich, A. O. Likhtenshtein, M. Kh. Sadekov, G. V. Maslen, and A. K. Kolesnikov (Kazanskii Nauchno-Issledovatel'skii Institut Travmatologii i Ortopedii; Kazanskii Meditsinskii Institut, Kazan, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny,* vol. 74, Dec. 1972, p. 32-35. 13 refs. In Russian.

Respiratory disorders were studied in 54 dogs with lethal losses of blood, in relation to cholinergic activity and blood contents of adrenalin-related substances and serotonin. Respiration was faster and deeper, with symptoms of alkalosis, in dogs showing an increased cholinergic activity and higher serotonin contents in response to a loss of blood, and was faster and sublimis, with symptoms of acidosis, in dogs developing a depression of cholinergic activity and a decrease of serotonin content after a loss of blood. V.Z.

A73-19646 # **Diurnal rhythm oscillations of fat metabolism indices in healthy young men (Ritm sutochnykh kolebanii pokazatelei zhirovogo obmena u zdorovykh molodykh liudei).** R. M. Zaslavskaia and K. Zh. Akhmetov (Aktiubinskii Meditsinskii Institut, Aktyubinsk, Kazakh SSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny,* vol. 74, Dec. 1972, p. 47, 48. 12 refs. In Russian.

A73-19647 # **The effects of bilateral destruction of certain medial-hypothalamus structures on the formation of complement-binding antibodies (Vliianie dvustoronnego razrusheniia nekotorykh struktur medial'nogo gipotalamusa na obrazovanie komplement-sviazyvaiushchikh antitel).** A. D. Ado and M. M. Gol'dshtein (Akademiia Meditsinskikh Nauk SSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny,* vol. 74, Dec. 1972, p. 57-61. 12 refs. In Russian.

A73-19648 # **Search of optimal biological conservation conditions for a heart, using methods of mathematical experiment planning (Poisk optimal'nogo rezhima biologicheskoi konservatsii serdtsa metodami matematicheskogo planirovaniia eksperimenta).** S. M. Chilaia, Ia. I. Gondzhilashvili, Z. A. Bolotashvili, and A. N. Dadiani (Ministerstvo Zdravookhraneniia Gruzinskoi SSR, Institut Eksperimental'noi i Klinicheskoi Khirurgii, Tiflis, Georgian SSR).

Biulleten' Eksperimental'noi Biologii i Meditsiny, vol. 74, Dec. 1972, p. 81-84. 7 refs. In Russian.

A73-19649 # **The effect of temperature on the mitotic activity of human peripheral blood lymphocytes in a culture (Vliianie temperatury na mitoticheskuiu aktivnost' limfotsitov periphericheskoi krovi cheloveka v kul'ture).** P. A. Borodkin (Akademiia Nauk SSSR, Institut Biologii, Syktyvkar, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 74, Dec. 1972, p. 87, 88. In Russian.

A73-19650 # **Synapse localization study by electron microscopy of primary afferent tissues in cochlear nuclei of the brain stem (Elektronnomikroskopicheskoe issledovanie lokalizatsii sinapsov pervichnykh afferentnykh volokon v kokhlearnykh iadrakh stvola golovnogo mozga).** I. L. Lazriev and A. L. Mikeladze (Akademiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tiflis, Georgian SSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 74, Dec. 1972, p. 101-104. 17 refs. In Russian.

A73-19928 # **Assessment of hypoxia in the human heart.** R. Gorlin (Peter Bent Brigham Hospital, Boston, Mass.). *(International Society of Cardiology and World Health Organization, Symposium, Geneva, Switzerland, June 14-17, 1971.) Cardiology*, vol. 57, no. 1-2, 1972, p. 24-34.

Questions of the recognition of myocardial ischemia are discussed, giving particular attention to myocardial ischemia in the human heart. Ischemia exists when the energy supply is inadequate for the energy demand of the system. Metabolic changes with myocardial ischemia are considered together with the effects of electrical pacing on myocardial lactate metabolism, changes in oxygen and lactate metabolism induced by right atrial pacing, and the correlation between glucose extraction and lactate production during myocardial ischemia. G.R.

A73-19929 # **The use of glycolytic metabolism in the assessment of hypoxia in human hearts.** S. Gudbjarnason (University of Iceland, Reykjavik, Iceland). *(International Society of Cardiology and World Health Organization, Symposium, Geneva, Switzerland, June 14-17, 1971.) Cardiology*, vol. 57, no. 1-2, 1972, p. 35-46. 19 refs. Research supported by the American Medical Association.

Three criteria have often been employed to detect the presence of anaerobic metabolism whose development has been used as a sign for myocardial hypoxia and ischemia in the intact heart. The three criteria include the diminution in myocardial lactate extraction, the release of lactate into the coronary sinus blood, and the increase in the lactate/pyruvate ratio of blood perfusing the heart muscle. An attempt is made to illustrate that none of these criteria appears to be adequate to be used as a sole diagnostic tool to demonstrate the presence of myocardial hypoxia. G.R.

A73-19930 # **Orthogonal versus planar vectorelectrocardiography.** P. J. Ioannidis, D. Lekos, and E. J. Ioannidis (Hippocration Hospital, Athens, Greece). *Cardiology*, vol. 57, no. 3, 1972, p. 150-161. 10 refs.

Combinations of projection data from a vector cardiogram and orthogonal EKGs are used to determine the spherical coordinates of instantaneous vectors as a basis for quantitation of the three-dimensional forces generated during an electric cardiac cycle. The various techniques used in the process are compared and a more convenient one is indicated. V.Z.

A73-19931 # **The contractile function of the myocardium in two types of cardiac adaptation to a chronic load.** F. Z. Meerson and V. I. Kapelko (Akademiia Nauk Meditsinskikh Nauk SSSR, Moscow, USSR). *Cardiology*, vol. 57, no. 4, 1972, p. 183-199. 37 refs.

After 15-18 months of experimental coarctation of the aorta, the weight of the rat left ventricle increased by 94%. Papillary muscle strips developed 46% less tension than strips of the same thickness from control hearts. The average rate of tension development was 53% below controls. Strips from hypertrophied hearts featured three characteristics probably associated with impairment of excitation-contraction coupling, namely a decreasing ability to respond to high-stimulation frequency, a decrease in the degree of potentiation by paired pulse stimulation, and an increase in the extent of incomplete relaxation at high-contraction rate as compared to controls. After 6-7 weeks of adaptation to high-altitude hypoxia, the rat papillary muscle strips taken from non-hypertrophied left ventricle developed 30% more tension than strips of the same thickness from control hearts. (Author)

A73-19932 * # **The influence of recording speed on apex-cardiographic timing - A multi-observer study of precision and performance utilizing randomized tracings in multiple subjects.** V. M. Pigott (Lemuel Shattuck Hospital, Boston, Mass.), D. H. Spodick (Lemuel Shattuck Hospital; Boston University, Boston; Tufts University, Medford, Mass.), R. Ryan-Platt, and E. Elber. *Cardiology*, vol. 57, no. 4, 1972, p. 232-239. 11 refs. Grant No. NGR-22-012-006.

A73-20001 # **Evolution of the neuron systems of suprasegmental motor control /Review/ (Evoliutsiia neironnykh sistem nadsegmentarnogo motornogo kontrolia /Obzor/).** A. I. Shapovalov (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR). *Neirofiziologiia*, vol. 4, Sept.-Oct. 1972, p. 453-470. 51 refs. In Russian.

Published studies of supraspinal motor control systems are discussed to demonstrate that a number of key characteristics of reticulomotor neuron projections are preserved through the Cyclostomata-Primates evolution series. The topics also include truncus projections in various vertebrates and cortical motor neuron control in mammals. V.Z.

A73-20002 # **Cortico- and rubrofugal activation of interneurons forming propriospinal paths in the dorsolateral funiculs of the cat spinal cord (Kortiko- i rubrofugal'naia aktivatsiia interneironov, obrazuiushchikh propriospinal'nye puti dorsolateral'nogo kanatika spinnogo mozga koshki).** D. A. Vasilenko, A. I. Kostiukov, and A. I. Piliavskii (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Neirofiziologiia*, vol. 4, Sept.-Oct. 1972, p. 489-500. 41 refs. In Russian.

A73-20003 # **Functional organization of the mechanisms of presynaptic inhibition evoked by stimulation of cutaneous afferents (O funktsional'noi organizatsii mekhanizmov presinapticheskogo tormozheniia, vyzvannogo razdrazheniem kozhnykh afferentov).** P. E. Motsnyi, T. F. Dneprovaia, and V. V. Ogorodnii (Dnepropetrovskii Gosudarstvennyi Universitet, Dnepropetrovsk, Ukrainian SSR). *Neirofiziologiia*, vol. 4, Sept.-Oct. 1972, p. 510-515. 13 refs. In Russian.

A73-20004 # **Changes in the amplitudinal and temporal characteristics of sensomotor-cortex evoked potentials after deactivation of spinocervical tracts in cats (Izmenenie amplitudnykh i vremennykh kharakteristik vyzvannykh potentsialov senso-motornoi kory posle vykliucheniia spino-tservikal'nykh traktov u koshek).** N. I. Nezlina (Akademiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Neirofiziologiia*, vol. 4, Sept.-Oct. 1972, p. 516-523. 11 refs. In Russian.

A73-20005 # **Participation of hippocampal neurons in theta-wave generation (Uchastie neironov gippokampa v generatsii teta-voln).** D. P. Artemenko (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Neirofiziologiia*, vol. 4, Sept.-Oct. 1972, p. 531-539. 26 refs. In Russian.

Temporal relations between hippocampal neuron activity and theta-wave phases were studied by layer-by-layer analysis of cell potentials and extracellular theta waves in nonanesthetized tubo-

curarized rabbits. Most discharges in hippocampal neurons were synchronous with extracellular theta-waves. Most of the more numerous pyramidal cells were excited during a positive theta-wave phase while the less numerous basket cells were activated predominantly during a negative theta-wave phase. It is theorized on the basis of these findings that the IPSPs of pyramidal cells play a key role in the generation of intracellular theta-rhythms. V.Z.

A73-20006 # Physiological mechanisms of evoked-potential habituation in the visual analysor (Fiziologicheskie mekhanizmy 'privykaniia' vyzvannykh potentsialov v zritel'nom analizatore). R. F. Makul'kin and Iu. F. Pedanov (Odesskii Gosudarstvennyi Meditsinskii Institut, Odessa, Ukrainian SSR). *Neirofiziologiia,* vol. 4, Sept.-Oct. 1972, p. 540-544. 28 refs. In Russian.

Experiments on cats with total surgical immobilization of the reticular formation showed inhibition of the habituation of evoked potentials in the primary visual projection zone and in the corpus geniculatum laterale. Habituation of evoked visual potentials was also observed in post-trigeminal preparations. It is theorized that the tonic impedance portion of the reticular formation plays an important role in the development of habituation. V.Z.

A73-20026 * Survival of Arthrobacter crystallopoietes during prolonged periods of extreme desiccation. C. W. Boylen (NASA, Ames Research Center, Exobiology Div., Moffett Field, Calif.). *Journal of Bacteriology,* vol. 113, Jan. 1973, p. 33-37. 16 refs.

A73-20027 * Spin-labeling studies on the membrane of a facultative thermophilic bacillus. M. Chan, Y. P. Virmani, R. H. Himes, and J. M. Akagi (Kansas, University, Lawrence, Kan.). *Journal of Bacteriology,* vol. 113, Jan. 1973, p. 322-328. 18 refs. Grant No. NsG-17-002-042.

A73-20033 Stress recovery of human tendons after relief - Mechanical recovery (Spannungsrückgewinn menschlicher Sehnen nach Entlastung - Mechanische Erholungseigenschaft). W. Worthmann, G. Arnold, and H. Lippert (Hannover, Medizinische Hochschule, Hanover, West Germany). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie,* vol. 31, no. 2, 1973, p. 77-88. 19 refs. In German. Research supported by the Stiftung Volkswagenwerk.

An investigation was conducted to study the relation between stress recovery and load removal rate. The dependence of stress recovery on the magnitude of the previously applied load was also investigated. The investigations were carried out with 127 human tendons. The influence of age was studied with the aid of a linear regression method. The underlying causes for the observed smaller stress recovery in the case of tendons from females are discussed, together with differences of stress recovery of tendons from the right and the left side of the human body. The relaxation characteristics of human tendons were also explored. G.R.

A73-20034 Investigations concerning the coordination of heart rate and respiration rate /pulse-respiration quotient/ during exercise (Untersuchungen zur Koordination von Herzschlag- und Atemfrequenz /Puls-Atem-Quotient/ bei dynamischer Arbeit). D. Bräuer, G. Küchler, and I. Wolburg (Deutsches Zentralinstitut für Arbeitsmedizin, Berlin, East Germany). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie,* vol. 31, no. 2, 1973, p. 89-102. 21 refs. In German.

The investigations take into account differences between males and females, experimental phases, questions of the reproducibility of the mean pulse-respiration quotient, and the stability of the mean pulse-respiration quotient. Some typical variations of the mean pulse-respiration quotient in the case of certain experimental phases are explored. Sequences of the pulse-respiration quotient obtained for one subject during the phases of an experiment are presented in a graph. Data regarding groups and individual subjects are provided. G.R.

A73-20035 A respirometer for the continuous measurement of respiration volume with remote transmission (Ein Respirometer für die kontinuierliche Messung des Atemvolumens mit Fernübertragung). V. Hanusova (Ustav Hygieny Prace a Chorob z Povolani, Prague, Czechoslovakia). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie,* vol. 31, no. 2, 1973, p. 141-150. 17 refs. In German.

Significant features of the new instrument include small physical dimensions, great measurement accuracy, a telemetric transmission of the measured values, and a convenient approach for recording the test data during short-term and long-term tests. The principles of operation for the device are discussed, together with the technical parameters and questions regarding the calibration of the instrument. The respirometer can be used for laboratory studies and for investigations involving persons at their place of work. G.R.

A73-20036 A method for chronocyclographical motion analysis with the aid of an on-line computer (Eine Methode zur chronozyklographischen Bewegungsaufzeichnung mit einem Prozessrechner). V. Güth, F. Abbink, and W. Heinrichs (Orthopädische Universitätsklinik und Poliklinik, Münster, West Germany). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie,* vol. 31, no. 2, 1973, p. 151-162. 6 refs. In German. Research supported by the Bundesministerium für Jugend, Familie und Gesundheit and Deutsche Forschungsgemeinschaft.

Photodiodes are attached to the subject whose motions are to be studied. A light pattern is periodically projected on the subject with the aid of a rotating mirror. The electric pulse pattern obtained as a result of the exposure of the photodiodes to the projected light is analyzed by a computer for an evaluation of the motion made by the subject. The optical system used is discussed together with the electronic equipment, the computer program required, and questions concerning the estimation of the maximum error. G.R.

A73-20047 # Application of the perceptron to the classification of objects according to random features (Zastosuvannia pertseptrona dlia razpodilu ob'ektiv na klasi za vipadkovimi oznakami). O. B. Glaz and L. A. Rastrigin. *Avtomatika,* vol. 17, July-Aug. 1972, p. 19-26. 6 refs. In Ukrainian.

The logical synthesis of an automaton that reacts differently to different classes of objects is examined along with perceptron learning processes in an attempt at comparing these two approaches to the problem of classification according to initially unknown features. The number of associative elements in real perceptrons is always limited, and as a consequence, the characteristics of perceptrons with an initial random structure of relationships prove to be far from optimal. The present work proposes a perceptron with an adaptive structure of relationships between the 'retina' and the associative elements. Due to the multivariable nature of this structure, random search techniques are used for its adaptation in the learning process. T.M.

A73-20048 # An ergatic organism (Ergatichnii organizm). V. V. Pavlov. *Avtomatika,* vol. 17, July-Aug. 1972, p. 42-47. 5 refs. In Ukrainian.

An ergatic organism is defined as a multipurpose non-autonomous system which (under varying ambient conditions) exhibits the property of generalized homeostasis with respect to conservation of all functional operations required to achieve a given goal. The structural features of such a system are analyzed, and the organization of the controller is described on heuristic, conditioned-reflex, unconditioned-reflex, centralized, and decentralized levels. T.M.

A73-20123 Inter-hemispheric transfer of meaningful visual information in normal human subjects. K. M. Kleinman and R. W. Little (Southern Illinois University, Edwardsville, Ill.). *Nature,* vol. 241, Jan. 5, 1973, p. 55-57. 6 refs. Research supported by the Southern Illinois University.

Two studies were conducted to determine whether stimulus association value affects visual recognition under conditions of

successive exposure in the same or opposite visual field. The data obtained indicate that visual information of low association value, when projected to one cerebral hemisphere, does not readily traverse the corpus callosum. Visual information of high association value is apparently more readily transmitted between hemispheres. G.R.

A73-20159 **Feature detectors and vernier acuity.** J. M. Findlay (Durham, University, Durham, England). *Nature,* vol. 241, Jan. 12, 1973, p. 135-137. 18 refs.

Theories regarding the factors related to the accuracy obtainable in a vernier alignment task have concentrated on the problem of locating the position of the retinal image of one of the lines to the requisite accuracy. Two explanations have been proposed. An alternative hypothesis is suggested by some results obtained in recent work on the visual system. In order to test the hypothesis, the effect of a high contrast grating background on a vernier acuity task was determined as the angle between target and background was varied. G.R.

A73-20168 **Time course of pulmonary vascular response to hypoxia in dogs.** A. B. Malik (Hospital of Sick Children, Toronto, Canada) and B. S. L. Kidd (Toronto, University, Toronto, Canada). *American Journal of Physiology,* vol. 224, Jan. 1973, p. 1-6. 22 refs. Research supported by the Medical Research Council of Canada.

The possible role of sympathetic mechanisms in mediating the integrated pulmonary vascular response to hypoxia was investigated by determinations of the time course of the response during alpha- or beta-adrenergic blockade. Adrenergic mechanisms are found to be involved in decreasing the hypoxia-induced rise in pulmonary vascular resistance to control levels during the development of respiratory alkalosis. M.V.E.

A73-20169 * **Hypoxia, an adjunct in helium-cold hypothermia - Sparing effect on hepatic and cardiac metabolites.** G. L. Anderson, G. E. Resch, and X. J. Musacchia (Missouri, University, Columbia, Mo.). *American Journal of Physiology,* vol. 224, Jan. 1973, p. 144-147. 15 refs. Grant No. NGL-26-004-021.

Investigation of the effect of hypoxia on the depletion of metabolites that occurs in helium-aided induction of hypothermia. Hypoxic slowing of the heart of a hamster while exposed to cold helox is demonstrated. An attempt is made to evaluate the relative importance of cardiac slowing and limitation of thermogenesis in determining the effect of hypoxia. In explanation of the results presented, it is suggested that hypoxia limits the energy expenditure by the heart during induction. M.V.E.

A73-20170 * **Effect of low temperature on metabolism of rat liver slices and epididymal fat pads.** L. A. Hillyard and C. Entenman (Institute for Lipid Research, Berkeley, Calif.). *American Journal of Physiology,* vol. 224, Jan. 1973, p. 148-153. 27 refs. Grant No. NGR-05-005-035.

Study of low temperature effects on the metabolism of radioisotope-tagged glucose and palmitate in rat liver slices and epididymal fat pads. The obtained data suggest that the oxidative capacity of rat liver and adipose tissue is maintained at low temperatures to a greater degree than the synthetic capacity. It was concluded that sufficient energy can be produced at 17 C for maintenance of essential tissue functions by these two tissues but that the energy requirements may not be met at 7 C. M.V.E.

A73-20251 **Color naming and hue discrimination in congenital tritanopia and tritanomaly.** D. P. Smith (Melbourne, University, Melbourne, Australia). *Vision Research,* vol. 13, Feb. 1973, p. 209-218. 30 refs.

A73-20252 **Human receptive field characteristics - Probe analysis of stabilized images.** D. R. Brown, M. J. Schmidt, D. D. Fulgham, and M. P. Cosgrove (Purdue University, Lafayette, Ind.). *Vision Research,* vol. 13, Feb. 1973, p. 231-244. 26 refs. Grant No. NIH-HD-00909.

The investigations discussed provide data for a single unit characteristic which has been extensively studied by electrophysiological techniques. Further evidence is provided concerning both orientation and area sensitivity in the case of stabilized image techniques. The data obtained demonstrate clearly that a faded stabilized image creates an adapted area in the visual field. Some of the spatial and temporal characteristics of this adaptation were examined with the aid of a probe detection paradigm. It was found that line length apparently plays a critical role in creating a substantial increase in adaptation strength around the edges of some line stimuli. G.R.

A73-20253 **Dynamic properties of vision. III - Twin flashes, single flashes and flickerfusion.** J. A. J. Roufs (Instituut voor Perceptie Onderzoek, Eindhoven, Netherlands). *Vision Research,* vol. 13, Feb. 1973, p. 309-323. 22 refs.

Threshold determinations for flashes and harmonically modulated light showed that the characteristic values both for sensitivity and for inertia have a close relationship at background levels ranging over 5 decades. The results obtained with short double flushes are discussed. It is found that the shape of the characteristics, representing on a double-logarithmic scale the threshold intensity of two short identical incremental flashes as a function of the interval between them, is practically identical for various background levels. G.R.

A73-20254 **Spatial summation in color-receptive pathways.** I. Rentschler (München, Universität, Munich, West Germany). *Vision Research,* vol. 13, Feb. 1973, p. 325-336. 23 refs. Research supported by the Deutsche Forschungsgemeinschaft.

An experiment was performed to investigate the effect of the stimulus pattern on the interaction of spatial summation units in color-receptive pathways. Aspects of spatial summation were studied by measuring color discrimination with equiluminant bipartite fields. The effect of various parameters on the color discrimination threshold was investigated. These parameters include color, width of the color gradient, retinal illumination, and field size. G.R.

A73-20255 **A theory of the Müller-Lyer illusion.** C. Chiang (Academia Sinica, Institute of Physics, Taipei, Nationalist China). *Vision Research,* vol. 13, Feb. 1973, p. 347-353. 21 refs.

The theory presented provides a mechanism by which aspects of the angle contour give rise to the illusion. The theory may also be used to explain other forms of the Müller-Lyer illusion. A number of variations of the Müller-Lyer illusion are presented in a table. The theory makes use of the concept of the 'field of attention' and the probability distribution of perception to explain the illusion. G.R.

A73-20256 **The masking of apparent motion in random-dot patterns.** O. Braddick (Cambridge University, Cambridge, England). *Vision Research,* vol. 13, Feb. 1973, p. 355-369. 22 refs.

The limiting inter-stimulus interval (ISI) for disappearance of a moving square was determined with the interval dark and also with a uniform bright field exposed throughout the interval. The introduction of the uniform bright field greatly reduces the maximum ISI at which the moving square can be seen. There is a range of ISI's from about 30 to 80 msec for which the movement is clearly visible with a dark ISI but invisible with the bright field. This can be described as a masking of the apparent movement by the bright field. The exposure of a pattern in the ISI is considered together with the relative luminance of patterns and ISI, effects of mean luminance, and the effect of pattern contrast. G.R.

A73-20257 **Brightness and equivalent intensity of intrinsic light.** L. E. Marks (John B. Pierce Foundation, New York, N.Y.; Yale University, New Haven, Conn.). *Vision Research,* vol. 13, Feb. 1973, p. 371-382. 40 refs. Grant No. AF-AFOSR-70-1950.

A major objective of the study conducted was to evaluate directly the brightness of intrinsic light. Subjects gave numerical estimates of the brightness aroused by various intensities of light presented to the foveal and peripheral retina, relative to the

brightness of intrinsic light. Each subject judged the brightness of test stimuli in proportion to the appearance of his visual field in the dark. The results provided a measure of the brightness of intrinsic light with respect to brightnesses produced by various intensities of photopic and scotopic stimuli. G.R.

A73-20258 **In search of the neural channel which codes real light and equivalent backgrounds.** J. T. Danielson (Massachusetts, University, Amherst, Mass.). *Vision Research,* vol. 13, Feb. 1973, p. 383-391. 26 refs. Research supported by the University of Massachusetts; NSF Grant No. GB-28188.

The sensitivity of the visual system to test flashes under bleaching adaptation and field adaptation conditions is determined. Four dutch rabbits with chronically implanted bipolar electrodes were used in the experiments. The increment sensitivity relation obtained for bleaching adaptation states and real light backgrounds is presented in a graph. Most of the recovery of sensitivity due to bleaching dark adaptation is over by 20 min, but even at 20 min the system is not entirely recovered. G.R.

A73-20259 **Two dimensional eye movement recording using a photo-electric matrix method.** R. Jones (Ohio State University, Columbus, Ohio). *Vision Research,* vol. 13, Feb. 1973, p. 425-431. 5 refs. Research supported by the Illuminating Engineering Research Institute.

A73-20260 **The effects of electrical stimulation of the eye upon increment threshold for square-wave gratings.** J. G. May (Louisiana State University, New Orleans, La.). *Vision Research,* vol. 13, Feb. 1973, p. 433-441. 27 refs.

A73-20261 **Chromatic rod vision. IX - A theoretical survey.** B. Stabell and U. Stabell (Oslo, Universitetet, Oslo, Norway). *Vision Research,* vol. 13, Feb. 1973, p. 449-455. 56 refs. Research supported by the Norges Almenvitenskapelige Forskningsrad.

Evidence supporting the hypothesis that rods and cones may interact to produce sensation of hue is considered. There seems to be well-founded evidence in favor of the assumption that scotopic contrast hue results from interaction between cone and rod activities and, therefore, probably originates centrally to the photochemical systems of the receptors. Consequently, the photochemical explanation of scotopic contrast hue may be excluded. Furthermore, the evidence appears to contradict the prevailing hypothesis of independence between rod and cone activities suggested by Hecht (1937) and Westheimer (1970). G.R.

A73-20262 **Monocular and binocular aspects of apparent movement.** A. R. Hill and H. C. Yorke (University of Aston, Birmingham, England). *Vision Research,* vol. 13, Feb. 1973, p. 467-475. 16 refs.

The experiment reported demonstrates clearly the existence of a distinction between the temporal integrational characteristics of the monocular as opposed to binocular visual systems. It is quite possible that, in part, this difference could be accounted for in terms of differential induction effects between the two viewing conditions. The results of an analysis of variance on threshold judgments of apparent movement are presented in a table. G.R.

A73-20263 **Modified rhodopsin in the pigment epithelium.** H. Shichi (National Institutes of Health, Laboratory of Vision Research, Bethesda, Md.). *Vision Research,* vol. 13, Feb. 1973, p. 477-480. 11 refs.

A73-20264 **On the approximation of the optical modulation transfer function /MTF/ by analytical functions.** H. Krueger and E. A. Moser (München, Technische Universität, Munich, West Germany). *Vision Research,* vol. 13, Feb. 1973, p. 493, 494. 7 refs.

A73-20265 **Central component of fusional response - The effect of stimulus parameters.** A. E. Kertesz (California Institute of Technology, Pasadena, Calif.). *Vision Research,* vol. 13, Feb. 1973, p. 495-499. Grants No. NIH-EY-00687; No. NIH-NS-03627.

The effect of various stimulus parameters on cyclofusional amplitude and, thus, on the extent of Panum's fusional areas is explored. The experiments were conducted in a dark room to eliminate any spatial clues in the field of view of the subject that might interfere with his cyclofusional response. The tests were designed to investigate the way in which the fusional mechanism resolves ambiguities, giving particular attention to the operation of the central pairing mechanism in the presence of noise. G.R.

A73-20266 **The role of colour perception and 'pattern' recognition in stereopsis.** V. S. Ramachandran, V. Madhusudhan Rao, S. Sriram, and T. R. Vidyasagar (Madras, University, Madras, India). *Vision Research,* vol. 13, Feb. 1973, p. 505-509. 7 refs.

A73-20267 **Saccadic suppression in the presence of structured background.** L. Mitrani, N. Iakimov, and S. Mateev (B'Igarska Akademiia na Naukite, Institut po Fiziologiia, Sofia, Bulgaria). *Vision Research,* vol. 13, Feb. 1973, p. 517-521.

The results obtained in the experiments described demonstrate clearly that the visual image plays an important role in saccadic suppression. It appears that there exists a special apparatus in the central nervous system which prescribes a given suppression dependent on the visual pattern. The results confirm findings by Mitrani et al. (1971) that the presence of an image as a background for a stimulus leads to elevation of the visual threshold for detection of the stimulus. G.R.

A73-20366 # **Ontogenesis of cerebrospinal reflex activity (Ontogenez reflektornoi deiatel'nosti spinnogo mozga).** N. M. Iakovlev, Iu. Ia. Zakher, and G. A. Vartanian (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Uspekhi Fiziologicheskikh Nauk,* vol. 3, Oct.-Dec. 1972, p. 73-91. 125 refs. In Russian.

Review of published studies on the subject, covering spinal cord morphology, reflex arches, inhibition, intracentral interactions of reflex responses, and post-tetanic potentiation. Emphasis is placed on processes at neuron population levels and in the spinal cord as a whole. Experimental data are assessed in a context of various cerebral ontogenesis concepts. V.Z.

A73-20367 # **Catecholamine exchange in the hormonal and mediator links of the sympathicoadrenal system under stress (Obmen katekholaminov v gormonal'nom i mediatornykh zven'iakh simpatoadrenalovoi sistemy pri stresse).** E. Sh. Matlina (Akademiia Nauk SSSR, Laboratoriia Problem Upravleniia Funktsiami v Organizme Cheloveka i Zhivotnykh, Moscow, USSR). *Uspekhi Fiziologicheskikh Nauk,* vol. 3, Oct.-Dec. 1972, p. 92-130. 216 refs. In Russian.

Studies of catechol amine exchange in the adrenal glands, heart, liver and cerebrum of mammals under dynamic stresses are reviewed. It is concluded that a discharge of noradrenalin from the hypothalamus into blood and its transport into the heart are the immediate reaction to a stress. This reaction is followed by a steadily increasing adrenalin excretion into blood and adrenalin depletion in the adrenal glands, leading to a sharp adrenalin content drop in the adrenal glands, a decrease of adrenalin excretion into blood, a decrease of noradrenalin in the heart, and a decrease of catecholamine precursors in tissues. V.Z.

A73-20368 **Sinus venosus atrial septal defect - Analysis of fifty cases.** J. E. Davia, M. D. Cheitlin, and J. L. Bedynek (Walter Reed General Hospital, Washington, D.C.). *American Heart Journal,* vol. 85, Feb. 1973, p. 177-185. 28 refs.

Review of the results of an analysis of clinical, hemodynamic, and anatomic data from 50 cases of sinus venosus atrial septal defect (SVASD) that underwent surgery. SVASD comprised 12 per cent of ASDs over a 12 year period. At surgery, a persistent left superior vena cava was present in 8 per cent. Anomalous pulmonary venous connection was found in 86 per cent. M.V.E.

A73-20369 **A comparison between the effects of dynamic and isometric exercise as evaluated by the systolic time intervals in normal man.** V. A. Y. Lindquist, R. D. Spangler, and S. G. Blount, Jr. (Colorado, University, Denver, Colo.). *American Heart Journal*, vol. 85, Feb. 1973, p. 227-236. 25 refs. Research supported by the Colorado Heart Association.

A73-20374 # **Information processing in the visual system.** W. von Seelen. *Battelle Information (Frankfurt)*, Nov. 1972, p. 13-19. 6 refs.

An evaluation of the structures of the most complex of all existing information processing systems, the central nervous system of primates, is attempted with the aim of investigating the applicability of these structures to nonbiological processes. The information gained in investigations of information processing by such a sensory subsystem as the visual system is shown to provide detailed information on the function of the whole sensory and motor cortex of the brain. Using the visual system as an example, several features of nervous information processes are discussed. Complete technological simulation of the biological system is certainly impossible, but specific functional principles underlying the biological system might provide solutions to technological problems. M.V.E.

A73-20388 # **Work-physiological investigations for the objectivization of the tracking behavior, the mental load, and its psychopharmacological modulability (Arbeitsphysiologische Untersuchungen zur Objektivierung des Trackingverhaltens und mentaler Beanspruchung sowie deren psychopharmakologischen Modulierbarkeit).** H. Strasser. München, Technische Universität, Fakultät für Maschinenwesen und Elektrotechnik, Dr.-Ing. Dissertation, 1972. 250 p. 278 refs. In German.

Problems connected with the integration of man in the technological environment of today are examined, giving attention to dangers connected with the monotony and the mental stress to which man is subjected during the work process. A theoretical analysis of test-connected relations is conducted, taking into account a cybernetic analysis of the factor 'man,' an analysis of technical factors involved in control and guidance activities, aspect of psychophysical performance and mental load. Approaches and equipment needed for the experimental investigations are discussed together with model concepts concerning physiological changes under mental stress, the effect of stimulants on performance, effects produced by tranquilizers, the influence of alcohol on tracking performance, and tests involving psychopharmacological agents. G.R.

A73-20389 # **The objectivization of the effect of load and stress on an information-reception process of man with the aid of acoustically evoked potentials (Die Objektivierung des Einflusses von Belastung und Beanspruchung auf einen Informationsaufnahmeprozess des Menschen mit Hilfe von akustisch evozierten Potentialen).** K.-P. Klinger. München, Technische Universität, Fakultät für Maschinenwesen und Elektrotechnik, Dr.-Ing. Dissertation, 1972. 166 p. 163 refs. In German.

Questions of the modulation of the measured physiological parameter of the evoked potential in the case of acoustical signals are investigated, taking into account modulation produced by changes in information, load, or degree of vigilance. Spontaneous fluctuations of the electroencephalogram are superposed on the individual response to the stimulus. An averaging procedure is used in order to improve the signal/noise ratio. The results obtained are discussed in connection with problems of information representation, stresses caused by noise signals, and questions concerning the factors which affect the vigilance. Attention is also given to psychomotoric stresses. G.R.

A73-20391 # **Vigilance prognosis with the aid of a computer analysis of the spontaneous electroencephalogram (Wachsamkeitsprognose mittels Computeranalyse des spontanen Elektroenzephalogrammes).** J. Holoch. München, Technische Universität, Fakultät für allgemeine Wissenschaften, Doktor der Naturwissenschaften Dissertation, 1972. 105 p. 109 refs. In German.

The procedure for the determination of vigilance discussed provides an approach for recording human vigilance during long-term investigations. Methods for visualizing consciousness conditions are discussed together with vigilance theories. Four levels of vigilance are considered. The processing of the EEG data is carried out with the aid of a recognition system for spectral patterns in the EEG. The theoretical basis for the recognition system and its practical application has been described by Böttge (1972). A classification is provided of the individual EEG sections which represent directional and reduced vigilance. G.R.

A73-20393 # **The average information transmitted in the case of multidimensional stimuli involving tactile information transmission (Synentropie von mehrdimensionalen Reizen bei taktiler Informationsübertragung).** R. Bäuerle. München, Technische Universität, Fakultät für Maschinenwesen und Elektrotechnik, Dr.-Ing. Dissertation, 1972. 85 p. 38 refs. In German.

The methods employed for measuring information transmission in the case of stimuli affecting human senses are discussed. The informational transmission based on the identification of learned signals is selected for studies of tactile information transmission. The results obtained in experiments regarding the identification of signals associated with four dimensions are presented and analyzed. It is shown that the learned tactile signals employed can be approximately identified on the basis of the sum of the information transmissions for each dimension. The corresponding parameter values are provided. Using results obtained by other investigators, an approach is shown for applying the scheme of the additive information channel also to problems involving absolute judgments in the case of other sensory modalities. G.R.

A73-20399 **Human operators and automatic adaptive controllers - A comparative study on a particular control task.** I. H. Witten and M. J. Corbin (Essex, University, Colchester, Essex, England). *International Journal of Man-Machine Studies*, vol. 5, Jan. 1973, p. 75-104. 34 refs. Research supported by the Medical Research Council.

An intensive comparison of several different types of controller is made, using a well-defined control task. The controllers considered are classed as human operators, automatic controllers with fixed control policies, and automatic adaptive controllers. The main point of interest is the final performance obtainable by different varieties of adaptive controller after a sufficiently long learning period. The fixed controllers were used only to delimit the possible behaviors of the adaptive controllers. A simplification of a learning machine called STeLLA (Andreae, 1964; Gaines and Andreae, 1966) which was proposed to deal with control environments with random components is investigated. F.R.L.

A73-20400 **Random logic nets - Stability and adaptation.** I. Aleksander (Kent, University, Canterbury, Kent, England). *International Journal of Man-Machine Studies*, vol. 5, Jan. 1973, p. 115-131. 9 refs.

Recent work on the behavior of randomly interconnected memory elements is reviewed. A natural tendency for stability in 'adapting' and 'untrained' nets, as previously seem empirically, is analyzed and related to the net elements. This shows that elements with low K can be expected to be more stable than those with high K. However, from a point of view of adaptation, it is shown that the greater the K the greater will be the discrimination of the net. It is concluded that it is the stability of the network which enables it to interact 'intelligently' with its environment. F.R.L.

A73-20453 * **Photosensitized inhibitor formation in isolated, aging chloroplasts.** G. Harnischfeger (Florida State University, Tallahassee, Fla.). *Planta*, vol. 104, 1972, p. 316-328. 17 refs. Research supported by the Bundesministerium für Bildung und Wissenschaft; Grant No. NGR-10-004-018.

A73-20456 * **Mitotic activity in dorsal epidermis of Rana pipiens.** H. Garcia-Arce and S. Mizell (Indiana University,

Bloomington, Ind.). *Comparative Biochemistry and Physiology*, vol. 42A, no. 2, 1972, p. 501-509. 29 refs. Grant No. NGR-15-003-053.

Study of statistically significant rhythms of mitotic division in dorsal epidermis of frogs, Rana pipiens, exposed to a 12:12 light:dark environment for 14 days. The results include the findings that (1) male animals have a primary period of 22 hr in summer and 18 hr in winter, (2) female animals have an 18 hr period, and (3) parapinealectomy and blinding abolish the rhythm. M.V.E.

A73-20577 Digital computer studies of respiratory control. H. T. Milhorn, Jr. and W. J. Reynolds (Mississippi, University, Jackson, Miss.). In: Conference on Decision and Control and Symposium on Adaptive Processes, 11th, New Orleans, La., December 13-15, 1972, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1972, p. 1-4. 12 refs.

For a variety of situations, experimental data are presented that are to be used for verifying the validity of models of the respiratory control system. Following a description of the procedures used in the collection and computer-aided analysis of these data, a brief example is offered of their use in developing a model of ventilatory control. M.V.E.

A73-20578 A model to predict respiration from VCG measurements. R. C. Wang (Johns Hopkins University, Baltimore, Md.) and T. W. Calvert (Simon Fraser University, Burnaby, British Columbia, Canada). In: Conference on Decision and Control and Symposium on Adaptive Processes, 11th, New Orleans, La., December 13-15, 1972, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1972, p. 14-18. 9 refs.

Demonstration of the possibility to predict respiration from vectorcardiogram (VCG) measurements, and substantiation of the hypothesis that the rotation of the intrinsic components of the heart is a measure of the actual rotation of the heart. On this basis, a simple model of the mechanics of the heart, diaphragm, and lungs is presented as a crude first approximation. M.V.E.

A73-20587 Current status of models for the human operator as a controller and decision maker in manned aerospace systems. D. L. Kleinman (Systems Control, Inc., Palo Alto, Calif.) and A. V. Phatak (Systems Control, Inc., Cambridge, Mass.). In: Conference on Decision and Control and Symposium on Adaptive Processes, 11th, New Orleans, La., December 13-15, 1972, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1972, p. 266-271. 23 refs.

In this paper we survey accepted techniques and models for analyzing and predicting human performance in complex multi-control and multidisplay situations commonly found in aerospace systems. The models that we consider have been developed or proposed for the related human functions of information processing, decision making and control. This paper discusses the relative advantages, disadvantages and limitations of each of the modeling schemes. Prospects for mechanizing all or part of the decision functions performed by human operators are considered, specific examples being in the automation of human failure detection and adaption to sudden changes in the system operating conditions. (Author)

A73-20812 Analysis of contrast and assimilation effects on the basis of receptive field models. K. Takahama and Y. Kurioka (Ministry of International Trade and Industries, Amagasaki, Hyogo, Japan). *Electronics and Communications in Japan*, vol. 55, Jan. 1972, p. 118-125. 13 refs. Translation.

Two psychological phenomena, specifically, contrast and assimilation effects, are analyzed on the basis of the function of vertebrate retinas. It is assumed that an 'on' center-'off' surround receptive field generates the line spread function of the human visual system and that the effective lightness of an object perceived is equivalent to the Munsell value, transformed from the convolution product of the line spread function and the spatial distribution of the luminous reflectance. The computed results coincide with the experimental results obtained by Helson and can illustrate those obtained by Yamanaka, et al. (Author)

A73-20976 # Renal component of the antigravitation function of the organism (Pochechnyi komponent antigravitatsionnoi funktsii organizma). G. S. Belkaniia. *Kosmicheskaia Biologiia i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 8-13. 52 refs. In Russian.

A review of published studies concerning the antigravitation function of the organism leads to the conclusion that the aldosterone-antidiuretic hormone-kidney system and the renin-angiotensin-blood circulation system are the basic control systems of the antigravitation-function renal component. The former system is active in leveling the circulating blood volume by activating the antidiuretic and anti-sodium-uretic reflexes and the latter system is active in leveling the hydrostatic effect of gravity, with aldosterone linking the activities of both systems. The two systems are characterized as a single regional functional system incorporated in the overall mechanism of antigravitation of the organism. V.Z.

A73-20977 # Effect of accelerations on the thiamine-S/35/ distribution in the organism of white mice (Vliianie uskorenii na raspredelenie tiamina-S/35/ v organizme belykh myshei). V. N. Totskii and L. M. Rovner. *Kosmicheskaia Biologiia i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 13-19. 8 refs. In Russian.

Blood radioactivity was measured in the brain, heart, liver, kidneys, spleen, intestines, and subcellular liver cell fractions of white mice at different times following S(35) thiamine administration and exposure to accelerations at 5.5 to 6 g. The substantial changes in blood thiamine distribution established after exposures are linked to vitamin metabolism disturbances and to the permeability of cellular and subcellular membranes. V.Z.

A73-20978 # Morphological changes in the juxtaglomerular apparatus of rat kidneys exposed to the action of diversely directed accelerations for many hours (Morfologicheskie izmeneniia iukstaglomeruliarnogo apparata pochek krys pri mnogochasovom deistvii raznonapravlennykh uskorenii). A. S. Pankova. *Kosmicheskaia Biologiia i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 19-23. 10 refs. In Russian.

A73-20979 # Thermoregulatory reactions of rats in a nitrogen and helium-diluted hypoxic atmosphere (Termoreguliatsionnye reaktsii u krys v gipoksicheskoi atmosfere s azotnym i gelievym razbavleniem). G. V. Troshikhin. *Kosmicheskaia Biologiia i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 23-27. 15 refs. In Russian.

A73-20980 # Pathogenesis of some respiration and circulation reactions to barometric pressure gradients (O patogeneze nekotorykh reaktsii dykhaniia i krovoobrashcheniia pri perepadakh barometricheskogo davleniia). G. B. Bogoslovov. *Kosmicheskaia Biologiia i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 27-29. 22 refs. In Russian.

A73-20981 # Morphological changes in the testicles of dogs exposed to chronic and combined gamma-radiation (Morfologicheskie izmeneniia v semennikakh sobak pri kronicheskom i kombinirovannom gamma-obluchenii). G. I. Plakhuta-Plakutina, E. A. Savina, and N. L. Fedorova. *Kosmicheskaia Biologiia i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 29-34. 16 refs. In Russian.

A73-20982 # Effect of some pharmacological preparations on the fall-out nystagmus and Bechterew nystagmus (Vliianie nekotorykh farmakologicheskikh preparatov na nistagm vypadeniia i Bekhterevskii nistagm). E. L. Epshtein. *Kosmicheskaia Biologiia i Meditsina*, vol. 6, Nov.-Dec. 1972, p. 34-38. 19 refs. In Russian.

The fall-out nystagmus and Bechterev nystagmus were studied in guinea pigs with monolateral and bilateral labyrinthectomy after

injection of (1) placebo, (2) scopolamine, (3) armine, (4) diphenidol, (5) pediphene, (6) metamisine, and (7) marezine. Preparations (2), (6) and (7) substantially reduced the Bechterew nystagmus frequency in guinea pigs with bilateral labyrithectomy, and preparations (4) and (7) substantially reduced the fall-out nystagmus frequency in guinea pigs with monolateral labyrinthectomy. V.Z.

A73-20983 # **Effect of lasting hypodynamia on rat biology (O vliianii dlitel'noi gipodinamii na biologiiu krys).** E. A. Stroganova. *Kosmicheskaia Biologiia i Meditsina,* vol. 6, Nov.-Dec. 1972, p. 38-44. 6 refs. In Russian.

Thirty six young albino rats with motion constraints in small cages were smaller and gained less weight than control rats after a 62-day confinement. Experimental female rats showed more sexual desire than their control counterparts. The offspring of the experimental group grew and developed slower than their control counterparts, the difference leveling off in a month and later. V.Z.

A73-20984 # **Radiation-induced oxidation of impurities in the water obtained from human moisture-containing bioactivity products (Radiatsionnoe okislenie primesei vody vlagosoderzhashchikh produktov zhiznedeiatel'nosti cheloveka).** N. V. Bychkov, A. N. Kasperovich, V. V. Krasnoshchekov, V. P. Plotnikova, Iu. E. Siniak, V. F. Stolbov, S. V. Chizhov, and M. I. Shikina. *Kosmicheskaia Biologiia i Meditsina,* vol. 6, Nov.-Dec. 1972, p. 44-47. 5 refs. In Russian.

Description of water recycling experiments, using gamma radiation for purification of condensates from human wastes, perspiration, wash water and atmospheric moisture, for water retrieval in a life support system. Gamma radiation was applied for oxidation of impurities in the presence of hydrogen peroxide. The oxidative efficiency of different gamma doses is evaluated. Toxicological evaluation of the recycled water is also included. V.Z.

A73-20985 # **Vertical posture control after Soiuz 6, 7 and 8 flights and 120-day hypokinesia (Reguliatsiia vertikal'noi pozy posle poleta na korabliakh 'Soiuz-6'-'Soiuz-8' i 120-sutochnoi gipokinezii).** Iu. N. Purakhin, L. I. Kakurin, V. S. Georgievskii, B. N. Petukhov, and V. M. Mikhailov. *Kosmicheskaia Biologiia i Meditsina,* vol. 6, Nov.-Dec. 1972, p. 47-53. 22 refs. In Russian.

Study of erect posture control in 7 crew members of the Soiuz 6, 7 and 8 spacecraft following their flights and in 10 subjects after 120-day bed rest. Stabilographic measurements and neurological and blood circulation tests were made before and after exposures, showing the occurrence of coordination disturbances during flight and bed rest. Increased heart beat rates and a higher blood pressure were recorded in the astronauts. Also vegetative nervous system reactions, more pronounced in bed rest experiments, were recorded. V.Z.

A73-20986 # **Respiration mechanics during weightlessness simulation in an immersion medium (Mekhanika dykhaniia pri imitatsii nevesomosti v immersionnoi srede).** M. A. Tikhonov. *Kosmicheskaia Biologiia i Meditsina,* vol. 6, Nov.-Dec. 1972, p. 53-56. 12 refs. In Russian.

Pulmonary volume, respiratory tract resistance and expansion of the lungs were measured in 6 healthy subjects during 18-hr immersion in water in a supine position at comfortable temperature. The residual lung capacity of the subjects was decreased by about 7% during the whole immersion time; their respiratory tract resistance increased by 65 to 80% at the beginning of immersion and then tended to level off, as did the expansion of their lungs after an initial reduction by about 20%. Internal pressure shifts and blood circulation volume redistribution are discussed as possible causes of the observed changes in the respiratory and pulmonary characteristics of the subjects. V.Z.

A73-20987 # **Analysis of some mechanisms of human stability to decompression of the lower portion of the body (Analiz nekotorykh mekhanizmov ustoichivosti cheloveka k dekompressii nizhnei poloviny tela).** P. M. Suvorov and R. V. Beleda. *Kosmicheskaia Biologiia i Meditsina,* vol. 6, Nov.-Dec. 1972, p. 56-59. 8 refs. In Russian.

Heart beat and respiration rates, blood pressure, systolic and minute blood volumes, peripheral resistance, and urine adrenalin, noradrenalin, and 17-oxycorticosteroids were determined in 40 pilots and 14 other subjects whose lower body portion was under decompression at 50 and 70 torr for up to and above 9 min and 5 min 18 sec, respectively. Decompression reduced the function of the sympathicoadrenal system and steroid hormone secretion from the adrenal cortex, leading to some cardiovascular disorders. V.Z.

A73-20988 # **Influence of an oxygen and carbon dioxide rich gas mixture on the human orthostatic stability (Vliianie gazovoi smesi s povyshennym soderzhaniem kisloroda i uglekisloty na ortostaticheskuiu ustoichivost' cheloveka).** V. I. Korol'kov, A. A. Savilov, and I. Ia. Lunev. *Kosmicheskaia Biologiia i Meditsina,* vol. 6, Nov.-Dec. 1972, p. 60-64. 24 refs. In Russian.

A73-20989 # **Diurnal psychic working capacity dynamics under conditions of continuous 72-hr wakefulness (Sutochnaia dinamika psikhicheskoi rabotosposobnosti v usloviiakh 72-chasovogo nepreryvnogo bodrstvovaniia).** A. L. Narinskaia. *Kosmicheskaia Biologiia i Meditsina,* vol. 6, Nov.-Dec. 1972, p. 64-69. In Russian.

Five mental performance test programs were conducted on ten healthy male subjects who were kept wakeful for 72 hr after a 3-day preparation period with tests. The performance tests included memorization of a text, ciphering assignments, proofreading assignments, and addition of combinations of numbers with shifts. The performance was adversely affected by wakefulness in nine of the subjects. The fluctuations of performance during the day were more rhythmic in four subjects than in the other six subjects. V.Z.

A73-20990 # **Use of sodium hydrocarbonate for medication and prophylaxis of motion sickness (O primenenii gidrokarbonata natriia v kachestve sredstva lecheniia i profilaktiki bolezni dvizheniia).** V. N. Barnatskii, I. I. Brianov, R. M. Volosevich, D. P. Komarova, A. G. Kuznetsov, A. T. Poleshchuk, and I. G. Tazetdinov. *Kosmicheskaia Biologiia i Meditsina,* vol. 6, Nov.-Dec. 1972, p. 70-75. 13 refs. In Russian.

A73-20991 # **Effects of high mountain climbing on the human organism (Osobennosti vliianiia zaniatii vysotnym al'pinizmom na organizm cheloveka).** G. R. Rung. *Kosmicheskaia Biologiia i Meditsina,* vol. 6, Nov.-Dec. 1972, p. 76-82. 24 refs. In Russian.

Summary of the effects of mountain climbing on the human organism as observed over a six year period on 70 experienced members of six expeditions to altitudes up to 7.500 m in the Caucasus, Tien Shan, and Pamir. The adaptation characteristics of the mountain climbers are discussed, with recommendations for more effective adaptation and ascent. V.Z.

A73-21015 **Role of the sympathetic nervous system in supporting cardiac function in essential arterial hypertension.** M. Guazzi, F. Magrini, C. Fiorentini, and A. Polese (Milano, Università, Milan, Italy). *British Heart Journal,* vol. 35, Jan. 1973, p. 55-64. 14 refs.

A73-21135 # **Application of the method of polarizational ultraviolet fluorescence microscopy to study giant muscle fibers Balanus rostratus Hock (Primenenie metoda poliarizatsionnoi ul'trafioletovoi fluorestsentnoi mikroskopii dlia izucheniia gigantskikh myshechnykh volokon Balanus rostratus Hock).** N. A. Chernogriadskaia, I. Ia. Barskii, M. S. Shudel', Iu. M. Rozanov, and Iu. S. Borovikov (Akademiia Nauk SSSR, Institut Tsitologii, Leningrad, USSR). *Akademiia Nauk SSSR, Doklady,* vol. 207, Nov. 11, 1972, p. 445-448. 5 refs. In Russian.

A73-21136 # **Transglucosidase activity of heart-muscle perglucohydrolase (Transgliukozidaznaia aktivnost' nad-gliukogidrolazy myshtsy serdtsa).** G. M. Boriskina and L. A. Tseitlin (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Akademiia Nauk SSSR, Doklady,* vol. 207, Nov. 11, 1972, p. 464, 465. 10 refs. In Russian.

A73-21199 **Effect of ultrafiltration and plasma osmolarity upon the flow properties of blood - A possible mechanism for control of blood flow in the renal medullary Vasa recta.** H. Schmid-Schönbein (München, Universität, Munich, West Germany), R. E. Wells (Peter Bent Brigham Hospital, Boston, Mass.), and J. Goldstone (Harvard University, Boston, Mass.). *Pflügers Archiv,* vol. 338, no. 2, 1973, p. 93-114. 48 refs. Research supported by the Max Kade Foundation, John A. Hartford Foundation, and Deutsche Forschungsgemeinschaft; Grant No. PHS-5P01-HE-11306.

A73-21200 **Action of a serum protein on muscular contraction.** A. A. Hakim (Illinois, University, Chicago, Ill.). *Pflügers Archiv,* vol. 338, no. 2, 1973, p. 133-157. 41 refs. Grant No. PHS-NIGMS-18846-01.

Study of the action of human serum protein on (1) glycerol-treated rabbit muscle fiber, (2) a purified human actomyosin preparation, (3) rat heart muscle preparations, and (4) human and canine papillary heart muscle preparations. The serum protein enhanced the ATP-induced tension in (1), increased tension characteristics in response to electrical stimulation in (2), (3) and (4), increased contraction in (3), and promoted actomyosin precipitation in (2). V.Z.

A73-21214 **Pattern of blood flow within the heart - A stable system.** D. E. M. Taylor and J. D. Wade (Edinburgh, University, Edinburgh, Scotland). *Cardiovascular Research,* vol. 7, Jan. 1973, p. 14-21. 25 refs. Research supported by the Scottish Hospitals Endowment Research Trust and British Heart Foundation.

Experiments were conducted on dogs and sheep to determine the type of flow patterns occurring in the heart. A technique of flow visualization by fine stream indicator injection was employed. Recording methods based on cineangiography or endoscopic intracardiac cinephotography were used. It was only possible to determine whether or not flow patterns were stable or unstable. High frequency response velocity estimations would be required in addition to determine whether or not turbulence was present. G.R.

A73-21215 **Morphometric and histochemical investigation on human right atrial and mitral papillary muscle.** P. G. I. Stovin and J. P. Reed (Papworth Hospital, Papworth Everard, Cambs., England). *Cardiovascular Research,* vol. 7, Jan. 1973, p. 39-46. 24 refs. Research supported by the East Anglian Regional Hospital Board.

A73-21216 **Analysis of indicator distribution in the determination of cardiac output by thermal dilution.** A. C. A. P. Vliers, K. R. Visser, and W. G. Zijlstra (Groningen, Rijksuniversiteit, Groningen, Netherlands). *Cardiovascular Research,* vol. 7, Jan. 1973, p. 125-132. 20 refs. Research supported by the Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek.

A73-21217 **Choice of detection site for the determination of cardiac output by thermal dilution - The injection-thermistor-catheter.** A. C. A. P. Vliers, B. Oeseburg, K. R. Visser, and W. G. Zijlstra (Groningen, Rijksuniversiteit, Groningen, Netherlands). *Cardiovascular Research,* vol. 7, Jan. 1973, p. 133-138. 13 refs. Research supported by the Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek.

A73-21218 * **Method for measuring the contractions of small hearts in organ culture.** K. Wildenthal, D. R. Harrison, G. H. Templeton, and W. C. Reardon (Texas, University, Dallas, Tex.; NASA, Ames Research Center, Moffett Field, Calif.). *Cardiovascular Research,* vol. 7, Jan. 1973, p. 139-144. Research supported by the American Heart Association; Grant No. NIH-HE-14706.

An instrument that was originally designed to detect microvibrations of aircraft wings has been adapted for use in measuring the amplitude, rate, and time-course of contraction of isolated foetal mouse hearts. The device is capacitance-sensitive and responds to small displacements of objects in its electrical field. The beating of a heart positioned near the probe produces such displacements. The effects of noradrenaline, acetylcholine, calcium, and temperature as detected by the probe are similar to their effects on cardiac muscle shortening as measured by conventional techniques. The method has the advantage of not requiring physical attachment of transducers directly to the tissue, which can seriously damage the contractile ability of small, fragile hearts. (Author)

A73-21225 **Evoked potential correlates of expected stimulus intensity.** H. Begleiter, B. Porjesz, C. Yerre, and B. Kissin (Downstate Medical Center, Brooklyn, N.Y.). *Science,* vol. 179, Feb. 23, 1973, p. 814-816. 14 refs. Grants No. NIH-MH-13145; No. NIH-MH-16477.

Different wave shapes were obtained experimentally for potentials evoked by visual stimuli of constant intensity, whose perceived intensities were modified by psychological set. All data were derived from monopolar scalp recordings of human subjects. The visual stimuli were flashes transmitted through three different neutral density filters, which were used to reduce the light intensity of the photostimulator by a definite ratio. The electrophysiological responses to a flash of medium intensity have different wave shapes in trials in which the occurrence of bright or dim stimuli is expected. When a bright or dim stimulus is signaled, the potentials evoked by the medium stimulus resemble the responses evoked by a real bright or dim flash. F.R.L.

A73-21248 # **The consequences of partial inanition in hot climates (Les conséquences de l'inanition partielle dans les climats torrides).** H. Ducros. *Revue des Corps de Santé des Armées,* vol. 13, Dec. 1972, p. 669-691. 28 refs. In French.

An attempt is made to show the influence of the thermal factor on protidic and lipidic catabolisms, as well as dehydration, when subjecting young men to partial food deprivation for three- to six-day periods. Knowledge of hydrous and mineral energy stores, as well as nitrogenous and electrolytic eliminations, made it possible to make a study in depth of metabolic balances. If the metabolic perturbations arising only from the deficiency of energy stores cease after three or four days of normal diet, it is not the same when the dehydration values set the pace for other catabolisms. F.R.L.

A73-21319 # **Relation between the frequency-amplitude characteristics of cerebral electrical activity and gonadotropic hormone excretion levels at various stages of ontogenesis (Sootnoshenie chastotno-amplitudnykh pokazatelei elektricheskoi aktivnosti mozga i urovnia ekskretsii gonadotropnykh gormonov na raznykh etapakh individual'nogo razvitiia).** N. M. Tkachenko (Ministerstvo Zdravookhraneniia SSSR, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Akusherstva i Ginekologii, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR,* vol. 58, Nov. 1972, p. 1686-1694. 33 refs. In Russian.

A73-21320 # **The interaction between muscle groups in a complex motor act in humans (Vzaimodeistvie myshechnykh grupp v slozhnom dvigatel'nom akte cheloveka).** M. A. Alekseev and A. V. Naidel' (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR,* vol. 58, Nov. 1972, p. 1721-1730. 17 refs. In Russian.

Study of the nature of the relations between the responses of agonists and leg muscles involved in posture maintenance in the case of voluntary dorsal or plantar flexion of the foot. It is shown that the leg muscles are activated earlier than the agonists, thus providing a preventive correction of posture in anticipation of its derangement

by voluntary movement. A retroactive effect of voluntary contraction of the agonist on the amplitude, duration, and rate of activation of the posture muscles is established. The reverse effect is practically absent. The observed properties of posture responses impart to them the features of an avoidance reaction and impart to their relations with the agonists features of conditioned reflex connections. A.B.K.

A73-21321 # Effect of heparin on blood platelet aggregation and trombosis under the action of direct electric current (Vliianie geparina na agregatsiiu krovianykh plastinok i tromboobrazovanie pod deistviem postoiannogo elektricheskogo toka). V. I. Mishchenko (Chitinskii Meditsinskii Institut; Chitinskii Pedagogicheskii Institut, Chita, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, Nov. 1972, p. 1744-1748. 12 refs. In Russian.

A73-21322 # Mathematical analysis of the responses of the human respiratory system to hypoxia and hypercapnia (Matematischeskii analiz reaktsii dykhatel'noi sistemy cheloveka na gipoksiiu i giperkapniiu). I. S. Breslav, A. G. Zhironkin, V. N. Salazkin, and A. M. Shmeleva (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, Nov. 1972, p. 1749-1755. 14 refs. In Russian.

Results of a mathematical treatment of the ventilatory responses of humans to the inhalation of hypoxic and hypercapnic mixtures by the method of multiple correlation and regression analysis. Equations are obtained which characterize the quantitative relations between the minute respiratory volume and the parameters of the gas composition of the inner and ambient media. The relations derived make it possible to estimate the relative weights of the hypoxic and hypercapnic stimuli in the regulation of human respiration. A.B.K.

A73-21323 # Contributions of quick and slow muscle fibers to changes in the electrical activity of skeletal muscles in rats under acute and chronic effects of cold (Uchastie bystrykh i medlennykh myshechnykh volokon v izmeneniiakh elektricheskoi aktivnosti skeletnykh myshts krys pri ostrom i khronicheskom deistvii kholoda). N. M. Tumakova (Akademiia Nauk SSSR, Institut Fiziologii, Novosibirsk, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, Nov. 1972, p. 1765-1768. 14 refs. In Russian.

A73-21324 # A method for electrocardiogram recording in Rhesus monkeys (O metodike zapisi elektrokardiogrammy u obez'ian porody makak rezusov). S. A. Gulieva (Azerbaidzhanskii Gosudarstvennyi Institut Vsovershenstvovaniia Vrachei; Ministerstvo Zdravookhraneniia Azerbaidzhanskoi SSR, Nauchno-Issledovatel'skaia Problemnaia Naftalanovaia Laboratoriia, Baku, Azerbaidzhan SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, Nov. 1972, p. 1779-1781. 15 refs. In Russian.

A73-21325 # Devices for dynamic recording of volumetric blood flow rates lower than 1 ml per minute (Pribory dlia dinamicheskoi registratsii ob'emnoi skorosti krovotoka pri velichinakh, men'shikh 1 ml. v minutu). E. L. Meshcherskii, N. K. Loginova, V. M. Khaiutin, and A. I. Bartyzel' (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 58, Nov. 1972, p. 1781-1785. In Russian.

A73-21375 # Liquid flow in a pipe with a deformable wall and valves (Techenie zhidkosti v trubke s deformiruiushcheisia stenkoi pri nalichii klapanov). I. M. Skobeleva (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Mekhanika Polimerov*, Sept.-Oct. 1972, p. 903-908. In Russian.

Discussion of the function of a 'muscle pump' represented by an elastically deformable pipe with valves, simulating a blood vessel. Expressions are derived and solved to describe the passage of a viscous liquid in a finite-length pipe terminated by valves, assuming that the elastic properties of the pipe wall vary periodically with time. V.Z.

A73-21425 Language and brain - Principles, system theories, and their boundaries (Sprache und Gehirn - Grundlagen, Systemtheorien und ihre Grenzen). A. E. Adams (Köln, Neurologische Klinik; Max-Planck-Institut für Hirnforschung, Cologne, West Germany). *Naturwissenschaftliche Rundschau*, vol. 26, Feb. 1973, p. 57-65. 114 refs. In German.

The detection of linguistic disturbances in the case of cerebral lesions shows that ordered mental activities and meaningful speech are not necessarily connected. The patients suffering from aphasia are unable to speak, but are capable to understand, write, and read their language. Questions of the localization of functions are discussed together with primary locality-specific and secondary pattern-specific cerebral functions, lesions of the cortex, and interhemispheric functions. Linguistic structures and semantic aspects are considered, giving attention to phonetic structures, the order of words according to the frequency of their occurrence, and an approach proposed by Zipf (1935, 1945, 1949). G.R.

A73-21464 * The effects of Dalmane /flurazepam hydrochloride/ on human EEG characteristics. J. D. Frost, Jr., J. R. G. Carrie, R. P. Borda, and P. Kellaway (Methodist Hospital; Baylor University, Houston, Tex.). *Electroencephalography and Clinical Neurophysiology*, vol. 34, Feb. 1973, p. 171-175. 17 refs. Contract No. NAS9-11120; Grants No. NIH-RR-259; No. NIH-HE-05435.

Evaluation of the changes in the waking EEGs of six healthy male subjects who received 30 mg daily oral doses of flurazepam hydrochloride for two weeks. A placebo was then substituted for flurazepam for another two weeks. An increase in beta activity with a maximum in fronto-central leads was observed during the test period. A small increase in the mean wavelength of the alpha and theta activities in the central-occipital derivations was also apparent in the subjects during the period. V.Z.

A73-21465 Non-Gaussian properties of the EEG during sleep. M. S. Weiss (Washington State University, Pullman, Wash.). *Electroencephalography and Clinical Neurophysiology*, vol. 34, Feb. 1973, p. 200-202. 5 refs.

EEG data from a sleeping experiment on a 21-year old female subject are used for a tentative qualitative assessment of the relationship between the non-Gaussian activity and the spectral properties of the EEG. A spectral and amplitude EEG analyses showed that the low frequency activity during sleep was positively correlated in time with the non-Gaussian behavior of the EEG. The amount of non-Gaussian activity was lower during a non-slow wave sleep. V.Z.

A73-21475 # A mathematical model to assess changes in the baroreceptor reflex. B. B. Kent (Mount Sinai School of Medicine, New York, N.Y.), J. W. Drane (Texas, University, Dallas, Tex.), B. Blumenstein, and J. W. Manning (Emory University, Atlanta, Ga.). *Cardiology*, vol. 57, no. 5, 1972, p. 295-310. 31 refs. Research supported by the Georgia Heart Association; Grant No. NIH-NS-02645.

A mathematical model is proposed to explain the relation between carotid sinus pressure and systemic arterial pressure. The parameters of the model are (1) the total range of systemic arterial pressure control, (2) the carotid sinus pressure, (3) the sensitivity of reflex response, and (4) the lower systemic arterial pressure limit at maximum carotid sinus simulation. The merits and technical limitations of the model are evaluated by experiments on cats. V.Z.

A73-21501 Effects of lung volume and disease on the lung nitrogen decay curve. K. Prowse and G. Cumming (Birmingham, University, Birmingham, England). *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 23-33. 56 refs.

A73-21502 A model for the elastic properties of the lung and their effect on expiratory flow. R. K. Lambert and T. A. Wilson (Minnesota, University, Minneapolis, Minn.). *Journal of Applied Physiology*, vol. 34, Jan. 1973, p. 34-48. 19 refs. PHS-supported research.

The lung parenchyma is pictured as a number of interconnected, randomly oriented, plane, elastic membranes. The elastic properties which the membranes must have in order for the membrane network to match the average pressure-volume behavior of the lung are found to be qualitatively similar to the elastic properties which have been observed for other biological membranes. The relations between the average stresses in the membrane array and the displacement field for the array is shown to be the same as the constitutive relations for an elastic continuum, and the two elastic moduli which appear in these equations are evaluated. These constitutive equations are used as a mathematical model for the parenchyma. (Author)

A73-21503 Effects of an hyperoxic hypobaric environment on renin-aldosterone in normal man. M. Epstein and T. Saruta (USAF, School of Aerospace Medicine, Brooks AFB; Texas, University, Dallas, Tex.; Miami, University; U.S. Veterans Administration Hospital, Miami, Fla.). *Journal of Applied Physiology,* vol. 34, Jan. 1973, p. 49-52. 30 refs.

A73-21504 Cardiovascular changes in middle-aged men during two years of training. F. W. Kasch, W. H. Phillips, J. E. L. Carter, and J. L. Boyer (San Diego State College, San Diego, Calif.). *Journal of Applied Physiology,* vol. 34, Jan. 1973, p. 53-57. 30 refs. Research supported by the San Diego State College Foundation; Grant No. PHS-CD-00140.

Fifteen sedentary middle-aged men (39-60 years, mean 47) were divided into exercise (n = 9) and nonexercise (n = 6) groups for a comparison of the effects of 2 years physical training. Exercise consisted of 60-min sessions, principally running, three times per week. Evaluations were made at 6-month intervals. Mean maximum aerobic capacity improved 17% over the 2-year period from 2.589 to 3.036 1/min in the trained group. Maximum pulmonary ventilation increased 7% from 115 to 123 1/min BTPS. Maximum heart rate decreased 6 beats to 174. (Author)

A73-21505 Effects of anesthesia and muscle paralysis on respiratory mechanics in normal man. P. R. Westbrook, S. E. Stubbs, A. D. Sessler, K. Rehder, and R. E. Hyatt (Mayo Clinic and Mayo Foundation, Rochester, Minn.). *Journal of Applied Physiology,* vol. 34, Jan. 1973, p. 81-86. 31 refs. Research supported by the Minnesota Respiratory Health Association; Grants No. NIH-HL-12229; No. NIH-RR-585; No. NIH-HL-12090.

A73-21506 Central, femoral, and brachial circulation during exercise in hypoxia. L. H. Hartley, J. A. Vogel, and M. Landowne (U.S. Army, Research Institute of Environmental Medicine, Natick, Mass.). *Journal of Applied Physiology,* vol. 34, Jan. 1973, p. 87-90. 13 refs.

This study was performed to determine the response of the central and peripheral circulation to hypoxia. Cardiac output (dye dilution) and peripheral venous and arterial blood gases were examined during work in seven normal males. Observations were made in normoxia and hypobaric hypoxia. Although submaximal O2 uptake at each work load was unchanged in hypoxia, the maximal O2 uptake was decreased to 75% of the normoxia value. The oxygen transport in the presence of the reduced arterial O2 content (75% of sea-level values) was supplied by greater cardiac output and more femoral flow as judged by the narrower femoral arteriovenous O2 content differences. Also, lower values of femoral venous oxygen pressure were achieved in hypoxia (mean 15 mm Hg) compared to normoxia (20 mm Hg). (Author)

A73-21507 * Changes in total plasma content of electrolytes and proteins with maximal exercise. W. van Beaumont, J. C. Strand, J. S. Petrofsky, S. G. Hipskind, and J. E. Greenleaf (St. Louis, University, St. Louis, Mo.; NASA, Ames Research Center, Laboratory of Human Environmental Physiology, Moffett Field, Calif.). *Journal of Applied Physiology,* vol. 34, Jan. 1973, p. 102-106. 27 refs. Grant No. NGR-26-006-039.

To determine to what extent the increases in concentration of plasma proteins and electrolytes with short maximal work were a result of hemoconcentration, the changes in plasma volume and total content of the plasma constituents were simultaneously evaluated. The results obtained from six human subjects indicated that in comparison to preexercise values there was a net decrease in total content of plasma protein, sodium, and chloride in the first 2 min of the postexercise period, due primarily to a significant loss (13-15%) of plasma fluid. The total plasma potassium content was increased immediately after exercise but was significantly below the preexercise plasma content after 2 min of recovery. (Author)

A73-21508 Effect of training on enzyme activity and fiber composition of human skeletal muscle. P. D. Gollnick, B. Saltin, C. W. Saubert, W. L. Sembrowich, R. E. Shepherd (Washington State University, Pullman, Wash.), and R. B. Armstrong. *Journal of Applied Physiology,* vol. 34, Jan. 1973, p. 107-111. 30 refs.

A73-21509 Heated Fleisch pneumotachometer - A calibration procedure. S. Z. Turney and W. Blumenfeld (Maryland, University, Baltimore, Md.). *Journal of Applied Physiology,* vol. 34, Jan. 1973, p. 117-121. 9 refs. Grant No. NIH-GM-15700.

A calibration procedure for the heated Fleisch pneumotachometer (PTM) is presented. Taken into account are the influence of gas viscosity and PTM case temperature on resistance to gas flow through the PTM according to Poiseuille's-law. In addition, a temperature change coefficient has been empirically determined for a number-1 Fleisch PTM which permits estimating average gas temperature within the PTM from knowledge of gas temperature entering the PTM, PTM case temperature, and uncorrected estimate of flow. This permits correcting viscosity estimates for temperature at the point where flow is being measured. (Author)

A73-21510 An implantable glass electrode used for pH measurement in working skeletal muscle. G. Gebert and S. M. Friedman (British Columbia, University, Vancouver, Canada). *Journal of Applied Physiology,* vol. 34, Jan. 1973, p. 122-124. 5 refs. Research supported by the Medical Research Council of Canada.

Metal-connected pH glass electrodes of Corning 0150 glass were made by coating the intraluminal surface of capillaries with silver (Rochelle salt method). The electrodes were inserted into the gastrocnemius muscle of anesthetized rats. When the muscle was stimulated via the sciatic nerve, interstitial pH decreased only at stimulation frequencies above 1 cycle/sec. With lower frequencies, a slight interstitial alkalosis was observed. We conclude that pH shifts are not important for the regulation of functional hyperemia in response to low-frequency stimulation. (Author)

A73-21511 On-line computer analysis and breath-by-breath graphical display of exercise function tests. W. L. Beaver (Varian Associates, Palo Alto, Calif.), K. Wasserman (Harbor General Hospital, Torrance, Calif.), and B. J. Whipp (California, University, Los Angeles, Calif.). *Journal of Applied Physiology,* vol. 34, Jan. 1973, p. 128-132. 8 refs. Research supported by Varian Associates; Grant No. PHS-HE-11907.

The problem of making continuous calculations of respiratory variables over the duration of extended physiological studies is so difficult that observations of the breath-by-breath variations of derived quantities such as minute ventilation, oxygen consumption, and gas exchange ratio have not been possible until the recent advent of suitable computers. This paper describes a method for obtaining breath-by-breath measurements of gas exchange using a minicomputer system for the on-line calculation of continuously measured respiratory and metabolic variables. These data are graphically displayed and/or stored on magnetic tape for future display for more extensive calculations. (Author)

A73-21536 Renal lithiasis among civil operating aircrew (Lithiase rénale chez le personnel navigant de l'aviation civile). G. Bellanger (Compagnie Nationale Air France, Paris, France). *Revue de*

Médecine Aéronautique et Spatiale, vol. 11, 4th Quarter, 1972, p. 171-175. 9 refs. In French.

A statistical study of renal lithiasis among technical and commercial civil aircrew is made, with attention to the incidence of nephritic colic as well. It appears that the frequency of nephritic colic increases with age, and that females are two to three times less susceptible than males. It is considered that symptoms of renal lithiasis are somewhat more frequent in aircrew than ground personnel, and that treatment of diuresis during and between flights to correct water loss is the best method of prevention. F.R.L.

A73-21537 Renal lithiasis among military operating aircrew (Lithiase rénale dans le personnel navigant de l'aviation militaire). R. Pannier and G. Leguay (Hôpital d'Instruction des Armées Dominique Larrey, Versailles, France). *Revue de Médecine Aéronautique et Spatiale,* vol. 11, 4th Quarter, 1972, p. 176-179. In French.

A search was made for factors in aeronautical activity which could favor renal lithiasis, and an attempt was made to answer other questions concerning flight safety and the procedure to follow for medical assessment. Some surveys of the frequency of renal lithiasis among aircrew are evaluated, and the etiopathogenesis of renal lithiasis in aeronautical activity is discussed. Attention is given to the relationship between renal lithiasis and fitness for flight. F.R.L.

A73-21538 Proteinuria and civil aviation aircrew (Proteinuries et personnel navigant de l'aviation civile). H. Pequignot. *Revue de Médecine Aéronautique et Spatiale,* vol. 11, 4th Quarter, 1972, p. 180-182. 8 refs. In French.

The problem of proteinuria is discussed, dealing with the single problem of isolated proteinurias. Only orthostatic proteinuria poses frequent problems. It is considered that demonstrated orthostatic proteinuria is not necessarily an illness. Subjects with proteinuria can lead normal lives and can be inoculated. Various studies are reviewed. F.R.L.

A73-21539 Proteinuria and military aircrew (Proteinuries et personnel navigant de l'aviation militaire). G. Leguay and R. Pannier (Hôpital d'Instruction des Armées Dominique Larrey, Versailles, France). *Revue de Médecine Aéronautique et Spatiale,* vol. 11, 4th Quarter, 1972, p. 183-189. In French.

Proteinuria poses two major problems: that of fitness for inoculations, and that of tolerance for flight. Experiments on the relationship between flight and proteinuria were carried out on 22 candidates and 38 qualified aircrewmen of various categories. The detection, study, and classification of proteinuria are discussed. Proteinurias are either transitory, intermittent, or permanent, the intermittent type being the most frequent, and posing most of the problems. The factors of flight affecting proteinuria are hypoxia, accelerations, vibrations, and pressure variations. Criteria for determining fitness are discussed. F.R.L.

A73-21540 Application of the numerical study of random time series to the analysis of the electroencephalogram of the normal infant (Application de l'étude numérique des séries de temps aléatoires à l'analyse de l'électroencephalogramme de l'enfant normal). P. Laget, L. Court, D. Dufour, M. H. Bassant, G. Rouif, P. Hillion, C. Lechevallier, and B. Warme-Janville (Paris VI, Université; Ministère des Armées, Service de Santé des Armées; Commissariat à l'Energie Atomique; Délégation Ministérielle pour l'Armement, Paris, France). *Revue de Médecine Aéronautique et Spatiale,* vol. 11, 4th Quarter, 1972, p. 195-205. 8 refs. In French.

A73-21541 Antidiabetic medications and aircrew (Les médicaments antidiabétiques et personnel navigant). R. Pannier (Hôpital d'Instruction des Armées Dominique Larrey, Versailles, France). *Revue de Médecine Aéronautique et Spatiale,* vol. 11, 4th Quarter, 1972, p. 206-209. In French.

There are two types of antidiabetic medications: insulins and oral antidiabetics. The latter are suitable only for Type 1 diabetes, which generally occurs after the age of 35. The hypoglycemiant sulfamides and the biguanides are evaluated. Insulin-dependent diabetes makes unfitness obligatory when it affects aircrew because this type of diabetic is subject to acidocetosis, a rigorous diet is required, and because insulin can lead to hypoglycemia. F.R.L.

A73-21542 Is performance a sufficient index to estimate the effects of stresses on the central nervous system (La performance est-elle un indice suffisant pour apprécier les effets des contraintes sur le système nerveux central). R. Angiboust (Ministère des Armées, Centre de Recherches de Médecine Aéronautique, Paris, France). *Revue de Médecine Aéronautique et Spatiale,* vol. 11, 4th Quarter, 1972, p. 210-216. 12 refs. In French.

An attempt is made to show from laboratory experiments what the study of ocular positioning can bring to the knowledge of psychological processes. Displacements of the optical axis occur in two distinct ways: slow movements, and spasmodic movements. An analysis is made of the psychological processes set in motion in an encoding experiment. The importance of knowledge of operative modes to establish a learning criterion is considered. It appears that performance tests cannot in any case be considered as measurement instruments. F.R.L.

A73-21543 An instrument panel on an image tube in color (Un tableau de bord sur un tube à image en couleur). G. Raynaud (Hôpitaux des Armées, Paris, France). *Revue de Médecine Aéronautique et Spatiale,* vol. 11, 4th Quarter, 1972, p. 217-219. In French.

The electronic attitude director indicator (EADI), which consists of an instrument panel element using a cathode screen upon which the principal flight parameters are presented, is described. The characteristics of the image are quite special, and show a very distinct advantage over television in contrast and sharpness. Measurements were carried out on a prototype which has since been improved by addition of filters and antireflective treatments. Attention is given to problems of line definition and readability. F.R.L.

A73-21562 Meridional amblyopia - Evidence for modification of the human visual system by early visual experience. D. E. Mitchell (Dalhousie University, Halifax, Nova Scotia, Canada), R. D. Freeman, G. Haegerstrom (California, University, Berkeley, Calif.), and M. Millodot (Montréal, Université, Montreal, Canada). *Vision Research,* vol. 13, Mar. 1973, p. 535-558. 47 refs. National Research Council of Canada Grant No. APA-7660; Grant No. NIH-FR-7006.

Animal studies have convincingly demonstrated that in response to an abnormal visual input imposed during the first few months, an abnormal visual system is developed. An investigation was, therefore, conducted to examine the possibility that the human visual system is influenced by its early visual input. The studies involved a measurement of the orientation differences in grating acuity for a large number of optically corrected astigmats. The data were compared with results obtained from normal eyes. It is suggested that as a result of astigmatism the visual system is deprived of sharp images of contours of certain orientations. G.R.

A73-21563 Size-selective adaptation - Psychophysical evidence for size-tuning and the effects of stimulus contour and adapting flux. F. M. Bagrash (U.S. Navy, Naval Ammunition Depot, Crane, Ind.). *Vision Research,* vol. 13, Mar. 1973, p. 575-598. 26 refs. Grant No. PHS-EY-00360.

Theoretical considerations are discussed, giving attention to the basis of the size selective adaptation effect and to the areal summation function and size-tuning. Three psychophysical experiments are described. It was found that the visibility of a stimulus at threshold increased with the size of the stimulus. The results also suggest that selective adaptation experiments alone cannot be used to distinguish between multiple mechanism and edge-modified single-channel models of spatial integration. It appears that the size-selective adaptation effect, taken by itself, has only limited usefulness for developing quantitative description of spatial integration. G.R.

A73-21564 **Acuities for spatial arrangement in line figures - Human and ideal observers compared.** D. P. Andrews, A. K. Butcher, and B. R. Buckley (Keele, University, Keele, Staffs., England). *Vision Research,* vol. 13, Mar. 1973, p. 599-620. 22 refs. Medical Research Council Grant No. G-969/423/B.

The investigation discussed is concerned with spatial integration of positional information on a small scale. Experiments were conducted regarding acuities for spatial arrangement in line figures. The subject responded according to the spatial relationship of two lines, or the shape defined by the parts of a single line. A calculation is presented concerning the best possible perceptual performance that could result from pattern information which enters the visual system. Aspects of high efficiency coding are discussed together with questions of information loss in long lines and information loss in parallelism processing. G.R.

A73-21565 **The brightness of coloured flashes on backgrounds of various colours and luminances.** P. Whittle (Cambridge University, Cambridge, England). *Vision Research,* vol. 13, Mar. 1973, p. 621-638. 15 refs. Research supported by the Medical Research Council.

Experiments conducted by Whittle and Challands (1969) are extended to different colors of flash and background. It is found that superthreshold experiments analogous to two-color threshold studies reported by Wyszecki and Stiles (1967) but using matching to a standard brightness rather than threshold visibility as the subjective criterion, yield results very similar to the threshold measurements. It is shown that the ratio of the red/green field sensitivities of the lower branches of the constant-brightness curves 1, 2 and 3 log units above threshold is the same as for the corresponding threshold branch. G.R.

A73-21566 **Analysis of transient visual sensations above the flicker fusion frequency.** J. F. Bird and G. H. Mowbray (Johns Hopkins University, Silver Spring, Md.). *Vision Research,* vol. 13, Mar. 1973, p. 673-687. 24 refs. Grant No. PHS-NS-07226.

An investigation has been conducted of the basic theoretical significance of a transient visual response which has been observed at intermittencies too rapid for visible flicker. Particular attention has been given to the study of the visual transient response produced by an abrupt shift in the period of oscillation of a luminance. An abstract analysis leads to concrete results for these visual transient responses. A simple approximation for the transients is derived. The stimulus waveform parameters and visual system parameters in this approximation are segregated into separate factors. The equisensation laws obtained facilitate the analysis of experimental data. It is found that the visual transient is elemental in character. The transient is a sensitive response, as reflected by the precision of the psychophysical data. G.R.

A73-21567 **Visual sensitivity in the presence of alternating monochromatic fields of light.** R. A. Glass and C. E. Sternheim (Maryland, University, College Park, Md.). *Vision Research,* vol. 13, Mar. 1973, p. 689-699. 10 refs. Grant No. NIH-EY-00539.

The increment threshold was determined at the time of transition between two background fields of monochromatic light which differed in dominant wavelength, but were of equal brightness. The experiment conducted involved the measurement of changes in sensitivity at the time of rapid change in wavelengths of a background field by determining the threshold luminance of a superimposed test field. Threshold luminance is considered a psychophysical indicator of the magnitude of neural activity in response to the change in wavelength. G.R.

A73-21568 **Single cell analysis of saturation discrimination in the macaque.** R. L. De Valois and R. T. Marrocco (California, University, Berkeley, Calif.). *Vision Research,* vol. 13, Mar. 1973, p. 701-711. 10 refs. Grants No. PHS-NB-02274; No. PHS-EY-00014.

The results obtained in the analysis show that a mechanism for the discrimination of color purity is present in the lateral geniculate nucleus (LGN) of the macaque. It appears that the opponent system alone is sufficient to account for the organism's behavior. The responses of spectrally opponent LGN cells vary systematically with the stimulus purity. The spectrally nonopponent cells, on the other hand, showed little or no responses to a shift from white light to any other light of any purity level. G.R.

A73-21569 * **Training the visual accommodation system.** T. N. Cornsweet (Acuity Systems, McLean, Va.) and H. D. Crane (Stanford Research Institute, Menlo Park, Calif.). *Vision Research,* vol. 13, Mar. 1973, p. 713-715. Contract No. NAS2-5097; Grant No. PHS-1-RO1-NB-08322-01.

The experiment described demonstrates that any perceptible cue which reveals the direction of motion of the target is sufficient to permit the subject to make correct responses. No single cue or particular combination of cues is necessary. In the training procedures described, changes in the subjects' accommodation level have virtually no effect on the blur of the retinal image, and the feedback about accommodation is in that sense entirely artificial. G.R.

A73-21575 **Influence of high ambient temperatures on the performance and some physiological parameters in a tracking problem and an optical vigilance problem (Einfluss hoher Umgebungstemperaturen auf die Leistung und einige physiologische Grössen bei einer Tracking- und einer optischen Vigilanz-Aufgabe).** J. Rutenfranz, H. G. Wenzel, R. Singer, R. Mocellin, and W. Hawel (Max-Planck-Institut für Arbeitsphysiologie, Dortmund, West Germany). *Nordrhein-Westfalen, Forschungsberichte,* no. 2200, 1971, 36 p. 44 refs. In German.

A73-21612 **Ventilation measured by body plethysmography in hibernating mammals and in poikilotherms.** A. Malan (CNRS, Laboratoire de Physiologie Respiratoire, Strasbourg, France). *Respiration Physiology,* vol. 17, Jan. 1973, p. 32-44. 12 refs.

A73-21613 **Pulmonary respiration and acid-base state in hibernating marmots and hamsters.** A. Malan, H. Arens, and A. Waechter (CNRS, Laboratoire de Physiologie Respiratoire, Strasbourg, France). *Respiration Physiology,* vol. 17, Jan. 1973, p. 45-61. 44 refs.

A73-21614 **Significance of the Bohr and Haldane effects in the pulmonary capillary.** M. P. Hlastala (Washington, University, Seattle, Wash.). *Respiration Physiology,* vol. 17, Jan. 1973, p. 81-92. 22 refs. Grants No. PHS-HE-12174; No. PHS-HE-05819.

A mathematical model was developed to assess the significance of the Bohr and Haldane shifts on determination of partial pressure profiles in the pulmonary capillary. Digital computer calculations showed that these shifts have a marked effect on the partial pressure profiles for both oxygen and carbon dioxide during both hypoxia and normoxia. An effective red cell diffusion capacity for CO2 was calculated as 1.0 ml per ml per min per min Hg. The half-time of the 'intracellular Bohr-shift' was 25 msec. These values are used to calculate carbon dioxide profiles. Carbon dioxide is not completely equilibrated by the time that blood has traveled through the pulmonary capillary. There is a marked indirect interaction between CO2 and O2 diffusion mediated through the Bohr and Haldane effects. (Author)

A73-21615 **A model of time-varying gas exchange in the human lung during a respiratory cycle at rest.** K. H. Lin and G. Cumming (Queen Elizabeth Hospital, Birmingham, England). *Respiration Physiology,* vol. 17, Jan. 1973, p. 93-112. 13 refs. Research supported by the United Birmingham Hospitals Endowment Research Fund.

Examination of the fluctuations of alveolar gas tension and of the flow of blood through the capillaries in a model which represents

many of the variables encountered in a human lung during quiet breathing. In addition to studying the alveolar gas tension, studies are also made of the pulmonary capillary gas tension both in time and distance along the capillary and of the oxygen uptake and carbon dioxide output during a breathing cycle. The variations in alveolar oxygen tension during a cycle are calculated to be 4.0 mm Hg, while those of carbon dioxide are 3.6 mm Hg. Equilibration between blood and gas is achieved after 40% of the capillary transit time in the case of oxygen and 20% of this time in the case of carbon dioxide. The rate of oxygen uptake is relatively constant at 250 ml/min, but carbon dioxide output varies between 175 and 265 ml/min during a cycle, resulting in a respiratory exchange coefficient ranging between 0.7 and 1.06. A.B.K.

A73-21667 Comparison of human operator critical tracking task performance with aural and visual displays. E. T. Pitkin (Connecticut, University, Storrs, Conn.) and E. W. Vinje (United Aircraft Research Laboratories, East Hartford, Conn.). *IEEE Transactions on Systems, Man, and Cybernetics,* vol. SMC-3, Mar. 1973, p. 184-187. 6 refs. NSF Grant No. GJ-9.

The effects of aural, visual, and combined displays on human tracking performance were evaluated by means of the critical tracking task which employs an unstable controlled element. Four visual displays and an aural display were used in this study. Values of the critical root or maximum degree of instability were developed for each display alone and also for the visual displays used in combination with the aural presentation. Tracking performance, as measured by the critical root, was consistently better for combined visual and aural presentations than for either type of display used alone. This trend was exhibited for each of the four visual displays and for both experienced and inexperienced trackers. These results suggested that combined displays supply greater net usable information to the human's central processor, allowing a significant reduction in estimation errors by the human operator. (Author)

A73-21685 * Variable photosynthetic units, energy transfer and light-induced evolution of hydrogen in algae and bacteria. H. Gaffron (Florida State University, Tallahassee, Fla.). In: European Biophysics Congress, 1st, Baden, Austria, September 14-17, 1971, Proceedings. Vienna, Wiener Medizinische Akademie, 1971, p. 19-22. NSF Grant No. GB-345; Contract No. AT(40-1)-2687; Grant No. NGR-10-004-018.

The present state of knowledge regarding the truly photochemical reactions in photosynthesis is considered. Nine-tenths of the available knowledge is of a biochemical nature. Questions regarding the activities of the chlorophyll system are examined. The simplest photochemical response observed in living hydrogen-adapted algal cells is the release of molecular hydrogen, which continues even after all other known natural reactions have been eliminated either by heating or the action of poisons. G.R.

A73-21801 Left ventricular performance after myocardial infarction assessed by radioisotope angiocardiography. W. J. Kostuk, A. A. Ehsani, J. S. Karliner, W. L. Ashburn, K. L. Peterson, J. Ross, Jr., and B. E. Sobel (California, University, La Jolla, Calif.). *Circulation,* vol. 47, Feb. 1973, p. 242-249. 23 refs. Research supported by the Ontario Heart Foundation; Grants No. PHS-PH-43-68-NHLI-1332; No. PHS-HL-14197.

A73-21802 Inability of the submaximal treadmill stress test to predict the location of coronary disease. M. A. Kaplan, C. N. Harris, W. S. Aronow, D. P. Parker, and M. H. Ellestad (U.S. Veterans Administration Hospital; Long Beach, Memorial Hospital Medical Center, Long Beach; California, University, Irvine; Anaheim Memorial Hospital, Anaheim, Calif.). *Circulation,* vol. 47, Feb. 1973, p. 250-256. 21 refs.

Two hundred patients had submaximal treadmill stress tests (STSTs) and selective coronary arteriography performed within 2 months of each other. An attempt was made to assess the predictability of disease isolated to any given coronary vessel by performance on the treadmill. It is concluded that (1) a positive STST is more likely to be associated with increased severity and extent of coronary artery disease; (2) a negative STST is more likely to be found in disease limited to a single vessel; and (3) within the latter group, the STST is of no value in predicting the specific coronary artery involved. (Author)

A73-21803 Thirty-month follow-up of maximal treadmill stress test and double Master's test in normal subjects. W. S. Aronow (U.S. Veterans Administration Hospital, Long Beach; California, University, Irvine, Calif.). *Circulation,* vol. 47, Feb. 1973, p. 287-290. 14 refs.

One hundred normal subjects who had a double Master's test and a maximal treadmill stress test (MTST) were clinically evaluated 30 months later. Ninety-nine of these 100 subjects (99%) had a follow-up treadmill test at 30 months. One of four subjects with initially an abnormal double Master's test developed coronary heart disease within 30 months. Three of 96 subjects with initially a normal double Master's test developed coronary heart disease within 30 months. Three of 13 subjects with initially an abnormal MTST developed coronary heart disease within 30 months. One of 87 subjects with initially a normal MTST developed coronary heart disease within 30 months. The MTST correlated better than the double Master's test in predicting subsequent coronary heart disease. (Author)

A73-21804 Ventriculographic patterns and hemodynamics in primary myocardial disease. T. H. Kreulen, R. Gorlin, and M. V. Herman (Peter Bent Brigham Hospital; Harvard University, Boston, Mass.). *Circulation,* vol. 47, Feb. 1973, p. 299-308. 43 refs. Grants No. PHS-HL-05679; No. PHS-5-P01-HL-11306-05.

Thirty-four patients with primary myocardial disease were studied and classified into three distinct types based on their left ventriculogram. Each had unique ventriculographic characteristics and findings. Type I are patients with a normal contraction pattern and an elevated left ventricular end-diastolic pressure. Type II A are patients with a hypertrophic pattern without obstruction to outflow while type II B patients have outflow obstruction. Type III A are patients with generalized hypokinesis. Type III B have a similar contraction pattern but in addition show asynergy. Analysis of the right ventriculogram in seven patients showed changes paralleling those seen in the left ventricle, including asynergic patterns of contraction. (Author)

A73-21805 Intravascular platelet aggregation in the heart induced by stress. J. I. Haft (U.S. Veterans Administration Hospital, Bronx, N.Y.) and K. Fani (Mount Sinai School of Medicine, Bronx, N.Y.). *Circulation,* vol. 47, Feb. 1973, p. 353-358. 32 refs.

Sixteen rats, stressed by immersion in ice-cold water for 25-45 min, were found to have platelet aggregates in myocardial small vessels on electron microscopic study. None of six similar nonstressed control rats had platelets in myocardial vessels. It is concluded that stress, probably via catecholamine secretion that enhances platelet stickiness, can induce intravascular platelet aggregation. It is possible that this mechanism plays a part in the relationship between stress and acute clinical myocardial infarction. (Author)

A73-21806 Order and disorder in the rhythm of the heart /Fifth Annual George C. Griffith Lecture/. T. N. James (Alabama, University, Birmingham, Ala.). *Circulation,* vol. 47, Feb. 1973, p. 362-386. 94 refs. Grants No. NIH-HE-11310; No. NIH-PH-4367-1441.

The structure and function of the conduction system of the heart are described, along with the factors important to its normal stability and control. Following a review of myocardial cell classification, some of the ontogeny and phylogeny aspects, and the role of collagen in the conduction system, a discussion is presented about such topics as the sinus node viewed as a servomechanism, baroreflexes and chemoreflexes, and norepinephrine and acetyl-

choline. A survey of the circumstances associated with the occurrence of electrical instability of the heart and an assessment of the possibility to formulate a comprehensive set of 'laws of the heart' conclude the lecture. M.V.E.

A73-21807 Relation of electrolyte disturbances to cardiac arrhythmias. C. Fisch (Indiana University; Krannert Institute of Cardiology; Marion County General Hospital, Indianapolis, Ind.). *Circulation*, vol. 47, Feb. 1973, p. 408-419. 49 refs. Research supported by the Herman C. Krannert Fund and Indiana Heart Association; Grants No. PHS-HE-6308; No. PHS-HE-5363; No. PHS-HE-5749.

While a number of electrolytes play a role in the genesis of the transmembrane action potential (AP), the changes in the action potential most clearly related to arrhythmias are dependent to a large extent on K+. Potassium gradient is a major determinant of the magnitude of transmembrane resting potential (TRP), and secondarily the rate of rise (dV/dt) of phase 0, and consequently the speed of conduction. The cell membrane conductance for K+, or a decrease therein, is most likely the major determinant of spontaneous slow depolarization during phase 4. Thus K+ has a pronounced effect on both conduction and automaticity. (Author)

A73-21828 * Cinemicrographic study of the development of subsurface colonies of Staphylococcus aureus in soft agar. J. R. Wilkins, W. L. Darnell, and E. H. Boykin (NASA, Langley Research Center. Northrop Services, Inc., Hampton, Va.). *Applied Microbiology*, vol. 24, Nov. 1972, p. 786-797. 5 refs.

STAR ENTRIES

N73-16038*# Missouri Univ., Columbia. Space Sciences Research Lab.
THE ROLE OF DEPRESSED METABOLISM IN INCREASED RADIO RESISTANCE Semiannual Status Report
X. J. Musacchia 14 Sep. 1972 81 p refs
(Grant NGL-26-004-021)
(NASA-CR-130381) Avail: NTIS HC $6.25 CSCL 06C

Studies are presented of the physiology of depressed metabolism, radio-resistance in depressed metabolic states, comparative aspects of depressed metabolism, and gastrointestinal responses to ionizing radiation. Specific data cover helium-cold induced hypothermia in white rats and hamsters, and radiation responses and intestinal absorption in the gerbil. Author

N73-16039*# Wisconsin Univ., Madison. Dept. of Electrical Engineering.
NONINVASIVE MEASUREMENT OF CENTRAL VENOUS PRESSURE Semiannual Status Report, 1 May - 31 Oct. 1972
John G. Webster and S. Martin Mastenbrook, Jr. Nov. 1972 21 p refs
(Grant NGR-50-002-204)
(NASA-CR-130348) Avail: NTIS HC $3.25 CSCL 06E

A technique for the noninvasive measurement of CVP in man was developed. The method involves monitoring venous velocity at a point in the periphery with a transcutaneous Doppler ultrasonic velocity meter while the patient performs a forced expiratory maneuver. The idea is the CVP is related to the value of pressure measured at the mouth which just stops the flow in the vein. Two improvements were made over the original procedure. First, the site of venous velocity measurement was shifted from a vein at the antecubital fossa (elbow) to the right external jugular vein in the neck. This allows for sensing more readily events occurring in the central veins. Secondly, and perhaps most significantly, a procedure for obtaining a curve of relative mean venous velocity vs mouth pressure was developed. Author

N73-16040*# George Washington Univ., Washington, D.C. Dept. of Medical and Public Affairs.
A BIBLIOGRAPHY OF WILDLIFE MOVEMENTS AND TRACKING SYSTEMS
Morton Werber Sep. 1970 78 p refs
(Grant NSR-09-010-027)
(NASA-CR-130380) Avail: NTIS HC $6.00 CSCL 06C

A bibliography is presented consisting of 1,005 references concerned with animal orientation, homing, navigation, migration, and home range movements, and the various methods of tracking and monitoring such behavior through biotelemetry, radar, and various banding and tagging techniques. A majority of the publications appeared between 1950 and 1970, although the most intensive search was made of the 1965-1970 period. A small number of older articles and books were included because they appeared to have some special or unusual value. The references have been organized in two ways. First, they are grouped in primary categories on the basis of the behavior involved such as orientation, homing, etc., and the methods of tracking. Second, within each of the resulting major areas, the items are arranged in terms of the species of animal. This sequence is maintained throughout the bibliography and in many cases represents a rank order according to the number of publications found. Author

N73-16041# Joint Publications Research Service, Arlington, Va.
SPACE BIOLOGY AND MEDICINE, VOLUME 6, NO. 6, 1972
18 Jan. 1973 140 p refs Transl. into ENGLISH from Kosm. Biol. Med. (USSR), v. 6, no. 6, Nov.-Dec. 1972 p 1-82
(JPRS-58010) Avail: NTIS HC $9.00

Articles are presented on space biology and medicine which include: research aimed at guaranteeing safety on long flights and reliability of the human component of the man-spaceship system; space psychology and physiology; spacecraft habitability; and effects of radiation and weightlessness.

N73-16043 Joint Publications Research Service, Arlington, Va.
RENAL COMPONENT OF THE ANTIGRAVITATIONAL FUNCTION IN THE BODY
G. S. Belkaniya *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 7-16 refs

Numerous experiments are cited in which the results indicate that it is possible to define two principal relatively independent regulation systems in the renal component of the antigravitational function. The first system (aldosterone, antidiuretic hormone, kidneys) smooths the blood circulating volume by means of the activation of the antidiuretic and (antinatriuretic) reflexes. The second system (renin, angiotensin, circulation) alters the tone of the smooth muscles of vessels and levels out the gravity hydrostatic effect. These two relatively independent systems are linked through aldosterone because its secretion is also stimulated by angiotensin. The close interaction of the systems, including all their interconnections, makes it possible to define them as the regional functional system in the general antigravity mechanism. Author

N73-16044 Joint Publications Research Service, Arlington, Va.
EFFECT OF ACCELERATIONS ON THIAMINE-S-35 DISTRIBUTION IN THE BODIES OF WHITE MICE
V. N. Totskiy and L. M. Rovner *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 17-25 refs

The radioactivity of the blood (plasma and formed elements), organs (brain, heart, liver, kidneys, small intestine, spleen) and the subcellular fraction of liver cells of white mice was examined at different intervals following thiamine S-35 injections (1 mg/kg) in normal animals and animals pre-exposed to accelerations (5.5-6 g). Considerable changes in thiamine S-35 distribution within organs, cells and subcellular structures were observed after the exposure. These changes may be caused by disturbances in vitamin metabolism, as well as shifts in the permeability of histohematic barriers, cellular and subcellular membranes.
Author

N73-16045 Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL CHANGES IN THE JUXTAGLOMERULAR APPARATUS IN THE KIDNEYS OF RATS DURING MULTIHOUR EXPOSURE TO ACCELERATIONS IN DIFFERENT DIRECTIONS
A. S. Pankova *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 26-30 refs

The modified Bovi method was used in estimating the juxtaglomerular index, the dynamics of change in the content of granules in juxtaglomerular cells in the kidneys, using 76 male rats exposed to longitudinal and transverse accelerations of 4 g for 3, 8, 16 and 24 hours. Morphological indications of juxtaglomerular apparatus secretory activity were detected. They were more distinct upon exposure to longitudinal accelerations. The part played by the juxtaglomerular apparatus in the control of hemodynamics and the fluid-electrolyte balance during accelerations is discussed. Author

N73-16046 Joint Publications Research Service, Arlington, Va.
HEAT REGULATION REACTIONS IN RATS IN A HYPOXIC ATMOSPHERE WITH NITROGEN AND HELIUM DILUTION
G. V. Troshikhin *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 31-37 refs

Thermoregulation reactions (gas exchange, thermoregulation activity of muscles and rectal temperature) of 60 rats exposed for one hour to nitrogen and helium atmospheres containing 20.9, 11.4 and 7.4% oxygen were investigated at 5 = 25 C. In comparison with the controls (breathing air) the test animals exposed in the helium-oxygen (21%) atmosphere exhibited an increase in gas exchange and thermoregulation activity of muscles and a decrease in rectal temperature, thus indicating a cooling effect of helium. Exposure of rats to a hypoxic helium-oxygen (11.4%) atmosphere, as compared with a similar nitrogen-oxygen gas mixture, brought about a less distinct decline in gas exchange and a more marked decrease in body temperature, the thermoregulation tone varying insignificantly and tending to increase in the helium-oxygen atmosphere. Exposure of rats to a hypoxic helium-oxygen (7.4%) atmosphere, as compared with a similar nitrogen-oxygen gas mixture, induced a more noticeable decrease in gas exchange and body temperature, the thermoregulation activity of the muscles changing insignificantly and tending to decrease in the nitrogen-oxygen atmosphere. Author

N73-16047 Joint Publications Research Service, Arlington, Va.
PATHOGENESIS OF SOME RESPIRATORY AND CIRCULATORY REACTIONS ACCOMPANYING DROPS IN BAROMETRIC PRESSURE
G. B. Bogoslovov *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 38-42 refs

Decompression disease continues to remain a timely problem in high-altitude and space flights. In 44 experiments on dogs the reactions of respiration, blood circulation, gas composition of the blood, and a number of other indices were studied in response to embolism in the pulmonary artery induced by different quantities of nitrogen introduced at different rates (as a model of a decompression gas embolism). Some of the animals were first intravenously injected with Novocaine. A satisfactory tolerance of the animals to a gas embolism was established. In the reactions to gas injection it is not so much the quantity which is of importance as the rate of entry into the lesser circulatory system. The deactivation of vascular interceptors by Novocaine depresses the adaptive compensatory reactions of respiration and circulation developing after injection of the gas and leads to a predominance of symptoms of mechanical impairment of pulmonary circulation. Author

N73-16048 Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL CHANGES IN THE TESTES OF DOGS ACCOMPANYING CHRONIC AND COMBINED GAMMA IRRADIATION
G. I. Plakhuta-Plakutina, Ye. A. Savina, and N. L. Fedorova *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 43-51 refs

A study was made of the state of spermatogenesis and sperm production in 36 dogs exposed to chronic (in doses of 21, 62.5 and 125 rad/year) and combined (constant irradiation of 62.5 rad/year and acute radiation in doses of 58 and 126 rad/year) gamma irradiation during the course of the year. The dynamics are described of qualitative and quantitative indices of sperm production during the course of the year and morphological changes in the testicles of dogs in dependence on dose intensity and the nature of irradiation. Suppression and impairment of the spermatogenesis process, combined with a decrease in sperm production indices, was expressed to the greatest degree with combined exposure to chronic and acute irradiation in a dose of 188.5 rad/year; evidence of an increase in the radiosensitivity of tissues in the testes in response to an additional radiation load. Author

N73-16049 Joint Publications Research Service, Arlington, Va.
EFFECT OF SOME DRUGS ON FALL-OUT AND BEKHTEREV NYSTAGMUS
Ye. L. Epshteyn *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 52-58 refs

Guinea pigs were used in studying the effect of intramuscular injections of drugs on fall-out and Bekhterev nystagmus occurring after unilateral and bilateral labyrinthectomies. In unilaterally labyrinthectomized animals marezine and diphenydole decreased substantially the frequency of fall-out nystagmus, this being more distinct than in the case of scopolamine. In bilaterally labyrinthectomized animals scopolamine, marezine and metamysil considerably reduced the incidence of nystagmus, this being more significant than in the case of diphenydole and pediphen. A stage-by-stage investigation of the drug effect on unilateral and bilateral labyrinthectomy models makes it possible to determine specifically the peripheral and central components of each drug. Author

N73-16050 Joint Publications Research Service, Arlington, Va.
EFFECT OF PROLONGED HYPODYNAMIA ON RAT BIOLOGY
Ye. A. Stroganova *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 59-67 refs

The effect of hypodynamia on the growth and development of offspring was studied in experiments on 36 rats. The test animals were housed in small cages for 62 days before mating. During this period the test animals lagged greatly behind the controls in their weight gain. Following exposure to hypodynamia the test animals changed their sexual behavior. During the first two days in the mating period the females were very aggressive toward the males. This accounted for the fact that the test females littered two or three days later than the controls.
Author

N73-16051 Joint Publications Research Service, Arlington, Va.
RADIATION OXIDATION OF WATER IMPURITIES IN MOISTURE-CONTAINING PRODUCTS OF MAN'S VITAL FUNCTIONS
N. V. Bychkov, A. N. Kasperovich, V. V. Krasnoshchekov, V. P. Plotnikova, Yu. Ye. Sinyak, V. F. Stolbov, S. V. Chizhov, and M. I. Shikina *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 68-73 refs

A radiation method for purifying human wastes from organic impurities in the presence of hydrogen peroxide has been developed. The effect of radiation doses on the oxidation of organic impurities was studied. A toxicological evaluation of regenerated water was made. Author

N73-16052 Joint Publications Research Service, Arlington, Va.
REGULATION OF VERTICAL POSTURE AFTER FLIGHT ON THE SOYUZ-6 - SOYUZ-8 SHIPS AND 120 DAY HYPOKINESIA c05
Yu. N. Purakhin, L. I. Kakurin, V. S. Georgiyevskiy, B. N. Petukhov, and V. M. Mikhaylov *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 74-82 refs

Control of erect posture was studied before and after the Soyuz-6 through Soyuz-8 flights (seven cosmonauts) and a 120-day bedrest experiment (ten test subjects). The study was

performed using stabilographic methods and neurological tests; circulation reactions in cosmonauts were also examined. Coordination disturbances were revealed during flight and bedrest experiments. After the flight and experiment they increased and changes in statics and gait appeared. Stabilographic measurements revealed an increase in the amplitude and frequency (especially in the test subjects) of fluctuations of the general body center of mass. The cosmonauts exhibited an increase in pulse rate and arterial pressure. The test subjects also exhibited a pronounced automonic reaction. These changes were more distinct in the test subjects after the bedrest experiment. Author

N73-16053 Joint Publications Research Service, Arlington, Va.
MECHANICS OF RESPIRATION DURING SIMULATION OF WEIGHTLESSNESS IN AN IMMERSION MEDIUM
M. A. Tikhonov *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 83-87 refs

Changes in lung capacity, air passage resistance and dynamic compliance during water immersion were investigated in six healthy male test subjects. At the beginning of the immersion experiment the functional residual capacity of the lungs decreased by an average of 7% and remained at that level until the end of the experiment. At the onset of the experiment lung compliance also decreased by an average of 20% but tended to recover by the end of immersion. At the beginning of the experiment air passage resistance increased by 65-80% and decreased slightly by the end of immersion. These changes may be caused by shifts in intrathoracic pressure and redistribution of the circulating blood volume. Author

N73-16054 Joint Publications Research Service, Arlington, Va.
ANALYSIS OF SOME MECHANISMS OF MAN'S TOLERANCE TO LOWER BODY DECOMPRESSION
P. M. Suvorov and R. V. Beleda *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 88-93 refs

The objective of the study was to reveal mechanisms underlying individual tolerance of human subjects to lower body negative pressure. Experiments were performed on 40 pilots and 14 test subjects. It was found that the different levels of human tolerance to LBNP of -50 or -77 mm Hg were related mainly to variability of the functional capacity of the human body to maintain arterial tone adequately. A study of catecholamines, their precursors and 17-hydroxycorticosteroids revealed a decline in functional activity of the sympathico-adrenal system and a decrease in adrenal cortex secretion of steroid hormones in subjects exhibiting low LBNP tolerance. These changes seemed to produce a rapid development of their cardiovascular dysfunction during LBNP. Author

N73-16055 Joint Publications Research Service, Arlington, Va.
EFFECT OF A GAS MIXTURE WITH AN INCREASED OXYGEN AND CARBON DIOXIDE CONTENT ON MAN'S ORTHOSTATIC TOLERANCE
V. I. Korolkov, A. A. Savilov, and I. Ya. Lunev *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 94-100 refs

The test subjects were exposed to 10-day bedrest which resulted in a dropoff of orthostatic tolerance. Their exposure to a 95% O2 - 5% CO2 atmosphere during a 30-minute tilt test improved orthostatic tolerance, as indicated by hemodynamic parameters, gas composition and blood acid-base equilibrium. Author

N73-16056 Joint Publications Research Service, Arlington, Va.
DIURNAL DYNAMICS OF PSYCHIC PERFORMANCE DURING 72 HOUR CONTINUOUS WAKEFULNESS
A. L. Narinskaya *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 101-108 refs

The results are given of studying variations in the mental performance of ten healthy male test subjects exposed to 72-hour continuous wakefulness. With respect to the different pattern of diurnal variations in mental performance two groups were distinguished: more rhythmic (four persons) and less rhythmic (six subjects). Author

N73-16057 Joint Publications Research Service, Arlington, Va.
USE OF SODIUM HYDROCARBONATE AS A MEANS FOR TREATING AND PREVENTING MOTION SICKNESS
V. N. Barnatskiy, I. I. Bryanov, R. M. Volosevich, D. P. Komarova, A. G. Kuznetsov, A. T. Poleshchuk, and I. G. Tazetdinov *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 109-117 refs

The effectiveness of intravenous injections of sodium hydrocarbonate as a drug to prevent and treat motion sickness was tested in the laboratory, in clinics and under stormy weather conditions on the high seas. A positive effect of the drug was noted a few days after the injection and it persisted for several months. No pathological symptoms were observed after drug injection. The mechanism of the action of sodium hydrocarbonate during motion sickness still remains obscure and further studies are needed. Author

N73-16058 Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF THE EFFECT OF HIGH MOUNTAIN ALPINISM EXERCISES ON THE HUMAN BODY
G. R. Rung *In its* Space Biol. and Med., vol. 6, no. 6, 1972 18 Jan. 1973 p 118-128 refs

The results are summarized of a study of 70 alpinists during their high-elevation ascents during 1965-1969. In studies with correction tables for the latent period of the oculomotor reaction, tremometry, strength and static endurance of the hands, and the functional state of the cardiovascular and respiratory systems an insignificant dropoff in these indices was detected during the early stages of high-elevation acclimatization, accompanied by an increase in general tolerance of the human body after a two-month stay in the mountains. Author

N73-16059*# Hardin-Simmons Univ., Abilene, Tex. Dept. of Biology.
A STUDY OF PSYCHROPHILIC ORGANISMS ISOLATED FROM THE MANUFACTURE AND ASSEMBLY AREAS OF SPACECRAFT TO BE USED IN THE VIKING MISSION Preliminary Report of Planetary Quarantine Activities, 1 Oct. - 31 Dec. 1972
Terry L. Foster and Luther Winans, Jr. Jan. 1973 30 p refs Presented at the Semiann. NASA Spacecraft Sterilization Technol. Seminar, New Orleans, 30-31 Jan. 1973
(Grant NGR-44-095-001)
(NASA-CR-130009) Avail: NTIS HC $3.50 CSCL 06M

The sampling of soils from the manufacture and assembly areas of the Viking spacecraft is reported and the methodology employed in the analysis of these samples for psychrophilic microorganisms, and temperature studies on these organisms is outlined. Results showing the major types of organisms and the percentage of obligate psychrophiles in each sample are given and discussed. Emphasis in all areas is toward application of these results to the objectives of the planetary quarantine program. Author

N73-16060*# West Florida Univ., Pensacola.
THE USE OF REMOTE SENSORS TO RELATE BIOLOGICAL AND PHYSICAL INDICATORS TO ENVIRONMENTAL AND PUBLIC HEALTH PROBLEMS
Sep. 1972 182 p refs
(Contract NAS9-11872)
(NASA-CR-128727) Avail: NTIS HC $11.25 CSCL 14B

Relationships between biological, ecological and botanical structures, and disease organisms and their vectors which might be detected and measured by remote sensing are determined. In addition to the use of trees as indicators of disease or potential disease, an attempt is made to identify environmental factors such as soil moisture and soil and water temperatures as they relate to disease or health problems and may be detected by remote sensing. The following three diseases and one major health problem are examined: Malaria, Rocky Mountain spotted

fever, Encephalitis and Red Tide. It is shown that no single species of vascular plant nor any one environmental factor can be used as the indicator of disease or health problems. Entire vegetation types, successional stages and combinations of factors must be used. Author

N73-16061*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
APPARATUS FOR MICROBIOLOGICAL SAMPLING Patent Application
Judd R. Wilkins and Stacey M. Mills, inventors (to NASA) Filed 24 Jan. 1973 14 p
(NASA-Case-LAR-11069-1; US-Patent-Appl-SN-326198) Avail: NTIS HC $3.00 CSCL 06M

An automatic apparatus for microbiologically sampling surfaces using a cotton swab is reported which eliminates human error normally associated with this process. The apparatus includes a self powered transport device, such as a motor driven wheeled cart, which mounts a swabbing motor drive for a crank arm which supports a swab in the free end thereof. The swabbing motor is pivotally mounted and an actuator rod movable responsive to the cart traveling a predetermined distance provides lifting of the swab from the surface being sampled and reversal of the direction of travel of the cart. NASA

N73-16062*# Kanner (Leo) Associates, Redwood City, Calif.
ANALYSIS OF ELECTROCARDIOGRAMS OF RHESUS MONKEYS (MACACA MULATTA)
Y. Mu-Chen and S. Chia-Kiang Washington NASA Jan. 1973 21 p refs Transl. into ENGLISH from Sheng Li Hsueh Pao (Peking), v. 27, no. 2, Jun. 1964 p 189-198
(Contract NASw-2481)
(NASA-TT-F-14675) Avail: NTIS HC $3.25 CSCL 06C

Electrocardiograms were recorded for 107 normal Macaca mulatta monkeys of different age groups and both sexes. Standard, augmented unipolar, and unipolar precordial leads were used with all the animals unanesthetized and in the supine position. Results are as follows: heart rates range from 150 to 273 beats per minute, averaging 215 + or - 6 beats per minute. Conduction speed from pace-marker to ventricle in the monkey heart decreases linearly with increase in heart rate. Most electrical positions of monkey hearts were vertical or semi-vertical. The mean durations of P, QRS, and T waves taken with limb leads are 0.037 + or - 0.014, 0.037 + or - 0.014, and 0.07 + or - 0.004 sec, respectively. A shift of the ST strength was commonly found in the monkeys and appears to be related to their rapid heart rates. Author

N73-16063*# Linguistic Systems, Inc., Cambridge, Mass.
ON TABLE SALT FEVER
H. Freund Washington NASA Jan. 1973 21 p refs Transl. into ENGLISH from Arch. Exp. Pathol. Pharm. (Leipzig), v. 65, 1913 p 225-338
(Contract NASw-2482)
(NASA-TT-F-14677) Avail: NTIS HC $3.25 CSCL 06C

Table salt was administered intravenously to rabbits. Using as fever criteria a 0.8 C temperature rise, fever occured in 88% of the subjects. No immunity to this reaction developed. The fever can be suppressed by Ringer's solution, certain dietary factors, and narcotics. Adrenalin was found to produce analogous effects. Author

N73-16064*# National Aeronautics and Space Administration, Washington, D.C.
RESULTS OF THE 1971 CORN BLIGHT WATCH EXPERIMENT
Robert B. MacDonald, Richard D. Allen (Dept. of Agr.), Marvin E. Bauer (Purdue Univ.), Joseph W. Clifton (Dept. of Agr.), Jon D. Frickson (Mich. Univ.), and David A. Landgrebe (Purdue Univ.) Lafayette, Ind. Purdue Univ. [1972] 34 p refs Presented at 8th Intern. Symp. on Remote Sensing of Environment, Ann Arbor, Mich., 26 Oct. 1972 Prepared in cooperation with Purdue Univ., Lab. for Applications of Remote Sensing
(Grant NGL-15-005-112)
(NASA-TM-X-69055; LARS-Print-100272) Avail: NTIS HC $3.75 CSCL 02C

Advanced remote sensing techniques are used to: (1)Detect development and spread of corn leaf blight during the growing season; (2) assess the extent and severity of blight infection; (3) assess the impact of blight on corn production; and (4) estimate the applicability of these techniques to similar situations occurring in the future. Author

N73-16065*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
SPECTRAL CHARACTERISTICS OF NORMAL AND NUTRIENT-DEFICIENT MAIZE LEAVES
A. H. Al-Abbas, R. Barr, J. D. Hall, F. L. Crane, and M. F. Baumgardner Aug. 1972 22 p refs
(Grant NGL-15-005-112; Contract DA-12-14-100-10292(20); Grants NSF GB-5701; GM-K6-21839; GM-01392)
(NASA-CR-130032; LARS-Print-111472; J-Paper-4839) Avail: NTIS HC $3.25 CSCL 06F

Reflectance, transmittance and absorbence spectra of normal and six types of mineral-deficient (N,P,K,S,Mg and Ca) maize (Zea mays L.) leaves were analyzed at 30 selected wavelengths along the electromagnetic spectrum from 500 to 2600 nm. Chlorophyll content and percent leaf moisture were also determined. Leaf thermograms were obtained for normal, N- and S- deficient leaves. The results of the analysis of variance showed significant differences in reflectance, transmittance and absorbence in the visible wavelengths among leaf numbers 3, 4, and 5, among the seven nutrient treatments, and among the interactions of leaves and treatments. In the reflective infrared wavelengths only treatments produced significant differences. The chlorophyll content of leaves was reduced in all deficiencies in comparison to controls. Percent moisture was increased in S-, Mg- and N-deficiencies. Positive correlation (r = 0.707) between moisture *content and percent absorption at both 1450 and 1930 nm* were obtained. Polynomial regression analysis of leaf thickness and leaf moisture content showed that these two variables were significantly and directly related (r = 0.894). Author

N73-16066*# Union Carbide Research Inst., Tarrytown, N.Y. Environmental Physiology Lab.
PREDICTIVE MODELING OF ALTITUDE DECOMPRESSION SICKNESS IN HUMANS Final Report
David J. Kenyon, Robert W. Hamilton, Jr., Ian A. Colley, and Heinz R. Schreiner 19 Dec. 1972 39 p refs
(Contract NAS2-6697)
(NASA-CR-114550) Avail: NTIS HC $4.00 CSCL 06S

The coding of data on 2,565 individual human altitude chamber tests is reported as part of a selection procedure designed to eliminate individuals who are highly susceptible to decompression sickness, individual aircrew members were exposed to the pressure equivalent of 37,000 feet and observed for one hour. Many entries refer to subjects who have been tested two or three times. This data contains a substantial body of statistical information important to the understanding of the mechanisms of altitude decompression sickness and for the computation of improved high altitude operating procedures. Appropriate computer formats and encoding procedures were developed and all 2,565 entries have been converted to these formats and stored on magnetic tape. A gas loading file was produced. Author

N73-16067*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A HIGH YIELD NEUTRON TARGET FOR CANCER THERAPY
Donald L. Alger and Robert Steinberg 1972 9 p refs Presented at Conf. on Nucl. Instrumentation for Res. and Develop., Miami Beach, Fla., 6-8 Dec. 1972
(NASA-TM-X-68179; E-7271) Avail: NTIS HC $3.00 CSCL 06E

A rotating target was developed that has the potential for providing an initial yield of 10 to the 13th power neutrons per second by the T(d,n)He-4 reaction, and a useable lifetime in excess of 600 hours. This yield and lifetime are indicated for a 300 Kv and 30 mA deuteron accelerator and a 30 microns

thick titanium tritide film formed of the stoichiometric compound TiT2. The potential for extended lifetime is made possible by incorporating a sputtering electrode that permits use of titanium tritide thicknesses much greater than the deuteron range. The electrode is used to remove in situ depleted titanium layers to expose fresh tritide beneath. The utilization of the rotating target as a source of fast neutrons for cancer therapy is discussed. Author

N73-16068# Joint Publications Research Service, Arlington, Va.

RHYTHM OF SLEEP AND WAKEFULNESS IN CREWS OF THE SPACESHIPS SOYUZ 3-9 BEFORE, DURING AND AFTER EXPOSURE TO SPACEFLIGHT

A. N. Litsov 7 Feb. 1973 17 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Ser. Biol. (USSR), no. 6, 1972 p 836-845

(JPRS-58173) Avail: NTIS HC $3.00 CSCL 06P

Data on the work and rest regimes of crew members of the Soyuz 3 to 9 spaceships in the course of preparations for and implementation of space flight are presented. Author

N73-16069# Battelle Memorial Inst., Richland, Wash. Pacific Northwest Labs.

ANNUAL REPORT FOR 1971 TO THE USAEC DIVISION OF BIOLOGY AND MEDICINE. VOLUME 2: PHYSICAL SCIENCES. PART 2: RADIOLOGICAL SCIENCES

J. M. Nielsen May 1972 117 p refs

(Contract AT(45-1)-1830)

(BNWL-1651-Vol-2-Pt-2) Avail: NTIS

Brief summaries are presented of work done in the fields of environmental and radiological chemistry, radiation instrumentation, radiation dosimetry, and radiation and health physics. Eighteen separate abstracts were prepared. NSA

N73-16070# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany). Inst. fuer Flugmedizin.

THE EFFECTS OF HYPOXIA AND ACCELERATION ON ENZYME ACTIVITIES IN ERYTHROCYTES AND PLASMA Ph.D. Thesis - Bonn Univ. [DIE AUSWIRKUNG VON SAUERSTOFFMANGEL UND BESCHLEUNIGUNG AUF EINIGE ENZYMAKTIVITAETEN IM ERYTHROZYTEN UND IM PLASMA]

Ingo Carl Sep. 1972 45 p refs In GERMAN; ENGLISH summary

(DLR-FB-72-71) Avail: NTIS HC $4.25; DFVLR Porz-Wahn: 13,80 DM

Eleven male subjects were exposed to hypoxia corresponding to an altitude of 6,900 meters and to acceleration of 2.5 + G sub z. Prior to stress and at certain intervals during and after it the number of erythrocytes, hematocrit, and plasma protein concentration were determined. Erythrocytes, hematocrit, and plasma protein increased under both conditions. Under hypoxia the activities of MDH and GOT increased significantly. Under acceleration only the activity of GOT. With the exception of the G-6-PHD activity, which showed a considerable increase under hypoxia, no significant changes could be observed in enzyme activities in erythrocytes under both stresses. Since there is no congruent reaction in the enzyme activities in erythrocytes and plasma, erythrocytes cannot be considered to be a main enzyme source for the plasma level in the ubiquitary cell enzymes. The different responses of the measured blood parameters to both stresses indicate a specific reaction which is dependent on the type of stress. Author (ESRO)

N73-16071# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

NMR SPECTROSCOPIC AND CALORIMETRIC INVESTIGATION OF RIBONUCLEASE A AND T1 [KMR-SPEKTROSKOPISCHE UND KALORIMETRISCHE UNTERSUCHUNG DER RIBONUKLEASE A UND DER RIBONUKLEASE T1]

H. Rueterjans Bonn Bundeswehramt 1972 160 p refs In GERMAN; ENGLISH summary Sponsored in part by Bundesmin. fuer Verteidigung, und Deut. Forschungsgemeinschaft

(BMVg-FBWT-72-7) Avail: NTIS HC $10.00; Bundeswehramt 25 DM

High resolution nuclear magnetic resonance spectroscopy and calorimetry was applied to ion interaction studies, inhibitors, and substrate analogics with two ribonucleases. The analyses of the functions of histidine residues in the active sites of ribonucleases was found to be relatively easy, since the resonances of the C-2 protons of imidazole rings occur at a downfield range, well separated from all other signals. The chemical shifts of the C-2 proton resonance signals change as the imidazole ring is protonated or deprotonated, so that the pK values of the histidine residues can be measured in a direct manner. Author (ESRO)

N73-16072# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

ANTIDOTES FOR ALKYL PHOSPHATE POISONING: STRUCTURE-EFFECT RELATIONS IN VIVO AND IN VITRO [ANTIDOTE GEGEN ALKYLPHOSPHATVERGIFTUNGEN: STRUKTUR-WIRKUNGS-BEZIEHUNGEN IN VIVO UND IN VITRO]

H. Oldiges and K. Schoene Bonn Bundeswehramt 1972 47 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Verteidigung

(BMVg-FBWT-72-8) Avail: NTIS HC $4.50; Bundeswehramt 25 DM

The protective effects of pyridinium salts were studied for Tabun and Sarin poisoning. The most suitable reactivator for antidote treatment of an alkyl phosphate poisoning is selected. Aging tests were conducted in vitro, with the result of an aging delay in vivo effective substances. The titration of acetyl cholinesterase with Soman is described. The reactivation/rephosphorylation equilibrium and the decay of the phosphyOrloximes were kinetically analyzed. Author (ESRO)

N73-16073# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

CALORIMETRIC INVESTIGATION OF ENZYMES. THERMODYNAMIC PARAMETER DETERMINATION OF THE INTERACTION BETWEEN RIBONUCLEASE T1 INHIBITORS AND SUBSTRATES [KALORIMETRISCHE UNTERSUCHUNGEN AN ENZYMEN. DIE BESTIMMUNG THERMODYNAMISCHER PARAMETER DER WECHSELWIRKUNG VON RIBONUKLEASE T1 MIT INHIBITOREN UND SUBSTRATEN]

W. Maurer, W. Haar, and H. Rueterjans Bonn Bundeswehramt 1972 35 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Verteidigung

(FMVg-FBWT-72-12) Avail: NTIS HC $3.75; Bundeswehramt 25 DM

The enthalpy values were measured for the reaction of several retarding mononucleotides with ribonuclease T1. The thermodynamic parameters for enzyme-inhibitor interactions were obtained from direct calorimetric measurements. The nucleotides were joined to substrates and the order of the retarding effect is described. The thermodynamic parameters were determined for several ph values. Author (ESRO)

N73-16074# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

NUCLEAR RESONANCE INVESTIGATION OF ENZYMES. PMR SPECTRA OF RIBONUCLEASE INHIBITOR COMPLEXES [KERNRESONANZUNTERSUCHUNGEN AN ENZYMEN. PMR-SPEKTREN VON RIBONUKLEASE-INHIBITOR-KOMPLEXEN]

W. Maurer, W. Haar, and H. Rueterjans Bonn Bundeswehramt 1972 46 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Verteidigung

(BMVg-FBWT-72-13) Avail: NTIS HC $4.50; Bundeswehramt 25 DM

N73-16075

The proton magnetic resonance spectra of ribonuclease A enzyme-inhibitor complexes with nucleotides were studied. From the observed changes in the chemical shifts of histidine and base protons, it was possible to evaluate some aspects of the spatial arrangement of the amino acid side chains, and the conformation of the inhibitors in the active site. The results are discussed with regard to catalytic action. Author (ESRO)

N73-16075# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

PHARMACOLOGICAL INVESTIGATION OF THE PARASYMPATHOLYTICAL EFFECT OF MONO AND BISQUATERNARY PYRIDINIUM COMPOUNDS ON THE ISOLATED GUINEA PIG ILEUM [PHARMAKOLOGISCHE UNTERSUCHUNGEN UEBER DEN MECHANISMUS DER PARASYMPATHOLYTISCHEN WIRKUNG MONO- UND BISQUARTAERER PYRIDINIUMVERBIDUNGEN AUF DAS ISOLIERTE ILEUM DES MEERSCHWEINCHENS]

D. Kuhnen-Clausen Bonn Bundeswehramt 1972 43 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Verteidigung

(BMVg-FBWT-72-14) Avail: NTIS HC $4.25; Bundeswehramt 25 DM

The antagonistic effects were investigated in mono- and bisquaternary pyridium compounds on muscarinic agonists of the isolated guinea pig ileum. The influence of the experimental technique, the incubation time, and the receptor reserve were analyzed. The compounds have parasympatholytic, antimuscarinic effects. The affinity to the receptor is greater in presence of 4 pyridinium aldoxime-substituted than that of unsubstituted, 2-isomer or nicotinamide compounds. The molecular pharmacological mechanism of the antagonistic action of the compounds is discussed. Author (ESRO)

N73-16076# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

SKIN PROTECTION AGAINST HIGH TOXIC PHOSPHORIC ACID ESTERS [UNTERSUCHUNGEN ZU EINEM HAUTSCHUTZ GEGENUEBER HOCHTOXISCHEN PHOSPHORSAEURE-ESTERN]

G. Schreiber Bonn Bundeswehramt 1972 55 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Verteidigung

(BMVg-FBWT-72-15) Avail: NTIS HC $4.75; Bundeswehramt 25 DM

The penetration of a highly toxic alkyl phosphate (diisopropyl fluoro phosphate), DFP, 10% w/v in n-tripropyl phosphate through unprotected and coated pig skin (with 23 barrier creams) was investigated in a penetration chamber. The drug was detected enzymatically (cholinesterase inhibition). The comparative study showed inhibited skin penetration of the drug for 14 of the barrier creams and increased penetration for 9. Materials, methods, and results are discussed. Further development of an improved barrier cream against highly toxic alkyl phosphates is suggested. Author (ESRO)

N73-16077# Fraunhofer-Gesellschaft zur Forderung der Angewandten Forschung e. V., Grafschaft (West Germany). Inst. fuer Aerobiologie.

BIOLOGICAL EFFECTS OF FAST NEUTRONS. MORTALITY AND CHANGES IN BLOOD CELL COUNT OF MICE AFTER COMPLETE EXPOSURE TO FAST NEUTRONS AND X-RAYS [BIOLOGISCHE WIRKUNG SCHNELLER NEUTRONEN. MORTALITAET UND VERAENDERUNGEN IM BLUTBILD VON MAEUSEN NACH GANSKOERPERBESTRAHLUNG MIT SCHNELLEN NEUTRONEN UND ROENTGENSTRAHLEN]

F. J. Otto Bonn Bundeswehramt 1972 34 p refs In GERMAN; ENGLISH summary Sponsored by Bundesmin. fuer Verteidigung

(BMVg-FBWT-72-16) Avail: NTIS HC $3.75; Bundeswehramt 25 DM

The biological effects of fast neutrons in the energy range 2 to 6 MeV were studied in mice and compared with the effects of X-rays. The total mortality after 30 days, the mortality patterns, and the changes in blood cell count were examined. After neutron irradiation death occurs earlier and the variations in death time are greater than after X-irradiation. The decrease of lymphocyte number 48 hours after irradiation shows a linear relation to dose logarithm. Lymphocyte number as a measure of radiation damage is found to be reliable and useful over a wide dose range. The relative biological effectiveness of neutrons in lymphocyte decrease is 2.0 after low doses and 1.4 after high doses. The number of reticulocytes decreases 48 hours after neutron irradiation. ESRO

N73-16078# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

THE ACUTE TOXICITY OF CHLORINE PENTAFLUORIDE

Kenneth I Darmer, Jr. Dec. 1971 12 p refs Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by the SysteMed Corp., Dayton, Ohio

(AF Proj. 6302)

(AD-751452; AMRL-TR-71-120-Paper-21) Avail: NTIS CSCL 06/20

The present study was undertaken to obtain symptomatic and pathological information resulting from acute exposure to ClF5 gas, and to determine the LC(50) values for exposure of rats, mice, dogs, and monkeys for 15, 30, and 60 minutes. GRA

N73-16079# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

THE TOXICOLOGY OF SOME COMMERCIAL FLUOROCARBONS

Richard S. Waritz Dec. 1971 17 p refs Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.

(AF Proj. 6302)

(AD-751429; AMRL-TR-71-120-Paper-7) Avail: NTIS CSCL 06/2

The field of fluorocarbon toxicology is a very fascinating toxicological area. Except for the field of natural products such as amino acids and carbohydrates, it contains some of the best examples of extreme variations of biological activity accompanying seemingly minor structural variations. The report discusses these variations and the toxicology of various compounds. GRA

N73-16080# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

THE TOXICITY OF PYROLYSIS PRODUCTS FROM A CHLOROTRIFLUOROETYHYLENE-ETHYLENE COPOLYMER (HALAR RESIN)

Lester D. Scheel (PHS, Cincinnati), A. B. Robertson (Allied Chem. Corp., Morristown, N. J.), Richard E. Kupel (PHS, Cincinnati), Charles V. Cooper (PHS, Cincinnati), William P. Tolos (PHS, Cincinnati), Louis Vignati (PHS, Cincinnati), and Donald E. Richards (PHS, Cincinnati) Dec. 1971 27 p refs Presented at Ann. Conf. on Environ. Toxicol. (2d), Fairborn, Ohio, 31 Aug. and 1-2 Sep. 1971; sponsored by SysteMed Corp.

(AD-751436; AMRL-TR-71-120-Paper-14) Avail: NTIS CSCL 06/20

Halar (Trademark of the Allied Chemical Corporation), a new copolymer of chlorotrifluoroethylene (CTFE) and ethylene having a 50/50 mole ratio and a high degree of one-to-one alternation, offers an attractive combination of properties. The structure elucidation of poly CTFE-E is described. The products formed when poly CTFE-E undergoes the inhalation of those pyrolysis products have also been studied. GRA

N73-16081# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

DICHLOROMETHANE HEPATOTOXICITY IN MICE WITH CONTINUOUS AND INTERMITTENT INHALATION EXPOSURES

Ronald S. Weinstein, Dale D. Boyd, and Kenneth C. Back Dec.

1971 40 p refs Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF Proj. 6302)
(AD-751434; AMRL-TR-71-120-Paper-12) Avail: NTIS CSCL 06/20

Few guidelines exist for establishing acceptable exposure levels for continuous exposures to toxic substances on the basis of data obtained from single or intermittent exposure experiments. In this study, the effects of continuous inhalation of CH2Cl2 on mice were examined in detail with respect to liver changes. The effects of continuous CH2Cl2 exposures are of particular interest since CH2Cl2 is present in space cabin construction materials and may be present in trace amounts in the atmosphere of space cabins. A comparison of the effects produced by continuous exposure with those of intermittent exposures should help in extrapolating and predicting effects and results of continuous exposures from data on intermittent exposures.
GRA

N73-16082# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
EFFECTS OF METHYLENE CHLORIDE EXPOSURE ON THE SPONTANEOUS ACTIVITY OF MICE
Anthony A. Thomas, Mildred K. Pinkerton, and James A. Warden Dec. 1971 7 p ref Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF Proj. 6302)
(AD-751435; AMRL-TR-71-120-Paper-13) Avail: NTIS CSCL 06/20

The experiments described were conducted during continuous exposure of mice to methylene chloride (dichloromethane). The group exposed to 5000 ppm methylene chloride was severely affected and by the seventh day 50% of the mice died. The 1000 ppm exposed group survived the entire four weeks and the spontaneous activity findings are presented. Results indicate that there is a definite trend toward lower activity during exposure, and when one compares the first two-week exposure period with the second two-week exposure period, activity seems to be stabilized at a considerably lower level. GRA

N73-16083# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
PATHOLOGICAL LESIONS CAUSED BY METHYLISOBUTYLKETONE
William F. MacKenzie Dec. 1971 14 p refs Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF Proj. 6302)
(AD-751444; AMRL-TR-71-120-Paper-23) Avail: NTIS CSCL 06/20

The lesions caused by methylisobutylketone (MIBK) were interesting in that they were found only in one species, the rat, and in that species were limited to a specific part on one organ - the first and second sections of the proximal convoluted tubule of the nephron of the kidney. This lesion was designated hyaline droplet toxic tubular nephrosis, although in some respects it differed from the classic concept of hyaline droplet formation. The lesion was present at 14 days of exposure and continued with a variable decrease in severity throughout the exposure. In those rats removed for serial sacrifice at weekly intervals from the second week to the end of the exposure, the lesion completely reversed between the third and fourth weeks postexposure.
GRA

N73-16084# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
GUIDES FOR SHORT-TERM EXPOSURES OF THE PUBLIC TO AIR POLLUTANTS
Frank G. Favorite, Lawrence M. Roslinski, and Ralph C. Wands Dec. 1971 7 p ref Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF-6302)
(AD-751438; AMRL-TR-71-120-Paper-16) Avail: NTIS CSCL 13/2

The short-term exposure limits for three air pollutants - nitrogen oxides, hydrogen chloride, and hydrogen fluoride - as determined by the National Academy of Sciences, are presented.
GRA

N73-16085# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
THE ACUTE TOXICITY OF BRIEF EXPOSURES TO HYDROGEN FLUORIDE, HYRDROGEN CHLORIDE, NITROGEN DIOXIDE, AND HYDROGEN CYANIDE SINGLY AND IN COMBINATION WITH CARBON MONOXIDE
L. C. DiPasquale and H. V. Davis (Standard Oil of Ill., Chicago) Dec. 1971 14 p refs Presented at the 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp., Dayton, Ohio
(AD-751442; AMRL-TR-71-120-Paper-20) Avail: NTIS CSCL 06/20

Many of the common plastic and rubber formulations in widespread use as aircraft cabin materials represent potential hazards in the event of fire aboard an aircraft. For example, polyurethane foams contain diisocyanate, fluorinated and chlorinated hydrocarbons, in addition to various aliphatic amines. When subjected to the high temperatures of combustion, the pyro-decomposition products formed would include hydrogen chloride (HCl), hydrogen fluoride (HF), hydrogen cyanide (HCN), and nitrogen dioxide (NO2) gases. Because of the inadequacy of available information regarding toxicity of these gases under very brief exposure conditions, animal experiments were conducted using these compounds, both singly and in combination with carbon monoxide (CO), to determine five-minute LC(50) values. It was important to see just what, if any, effect the (CO) would have on the toxicity of these several compounds.
GRA

N73-16086# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
ANIMAL PATHOLOGY RESULTING FROM LONG TERM EXPOSURE TO LOW LEVELS OF MONOMETHYLHYDRAZINE
D. J. Kroe Dec. 1971 10 p refs Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF Proj. 6302)
(AD-751441; AMRL-TR-71-120-Paper-19) Avail: NTIS CSCL 06/20

The present experiments were designed to pursue investigation of the toxic effects of intermittent or continuous chronic exposure of monkeys, dogs, rats, and mice to lower levels of environmental MMH. These experiments demonstrated that continuous exposure of monkeys or rats at a concentration of 0.2 ppm MMH does not induce histopathological lesions at the light microscopic level. The same exposure levels and exposure periods do induce pathological lesions in livers and kidneys of dogs and livers, kidneys, and spleens of mice. Mice show hepatic, splenic, and renal tubular hemosiderosis under all conditions of exposure to MMH; however, the degree of hemosiderosis shows a dose related pattern. The fact that the MMH exposure conditions of these experiments induce histopathological changes in dogs and mice but not in monkeys and rats is most probably explained by species susceptibility to MMH induced hemolysis and species capability for clearing the products of hemolysis. Lymphoid hyperplasia was noted in some exposed dogs; however, the limited sampling precludes definitive interpretation of this observation. The present experiments do not indicate a zero-toxicity MMH exposure level for dogs and mice. The experiments do demonstrate a striking difference in species susceptibility to MMH toxicity, and indicate tissue zero-toxicity levels for monkeys and rats as evaluated by light microscopy.
GRA

N73-16087# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
CHRONIC EXPOSURE STUDIES WITH MONO-

METHYLHYDRAZINE
J. D. MacEwen and C. C. Haun Dec. 1971 18 p refs Presented at the 2nd Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971, sponsored by SysteMed Corp.
(AD-751440; AMRL-TR-71-120-Paper-18) Avail: NTIS CSCL 06/20

The manufacture and use of monomethylhydrazine (MMH) as a rocket fuel has increased over the past 10 years. The acute health hazards from handling this highly reactive compound are well defined, but although its usage is increasing little is known about its chronic exposure effects. The current industrial threshold limit value (TLV) of 0.2 ppm was established by analogy with hydrazine and unsymmetrical dimethylhydrazine. A series of 6-month MMH chronic exposures to four animal species was undertaken to evaluate the safety factor and appropriateness of the current TLV for health of workmen. The results of these experiments showed that MMH produces a dose-related hemolytic anemia with Heinz body formation for which there appears to be no threshold effect level. The anemia is reversible with removal from further exposure at least up to a level of 5 ppm intermittent exposure. For use in establishing continuous exposure limits for confined spaces such as missile silos, consideration should be given to variations in concentration which could considerably shift the exposed people down the effect curve. Consideration should also be given to the effect of MMH on people with preexisting blood dyscrasias or hemolytic traits. GRA

N73-16088# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
BASIS FOR ESTABLISHING GUIDES FOR SHORT TERM EXPOSURE OF THE PUBLIC TO AIR POLLUTANTS
Ralph C. Wands, Frank G. Favorite, and Lawrence M. Roslinski Dec. 1971 8 p refs Presented at the 2nd Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug., 2 Sep. 1971; sponsored by SysteMed Corp., Dayton Ohio
(AD-751437; AMRL-TR-71-120-Paper-15) Avail: NTIS CSCL 13/2

The report describes the work of the Committee on Toxicology of the National Research Council in setting up short term exposure limits for air pollutants. GRA

N73-16089# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
CARDIOPULMONARY EFFECTS OF FLUOROCARBON COMPOUNDS
Domingo M. Aviado Dec. 1971 11 p refs Presented at 2d Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF Proj. 6302)
(AD-751426; AMRL-TR-71-120-Paper-4) Avail: NTIS CSCL 06/20

The present investigation was designed to examine the hypothesis that the cardiopulmonary toxicity of the propellants is related to the irritation of sensory receptors in the respiratory passages. The anesthetized dog was used to allow measurement of pulmonary resistance and compliance, when propellants were confined to the upper respiratory tract or were administered intratracheally, bypassing the upper respiratory tract. Additional procedures to determine whether propellants influence the bronchial smooth muscle, pulmonary blood vessels and the heart are reported. Three propellants commonly used in aerosol units containing bronchodilators were investigated. They are trichlorofluoromethane (propellant 11), dichlorodifluoromethane (propellant 12), and 1,2-dichloro-1,1,2,2-tetrafluoroethane (propellant 114). GRA

N73-16090# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
CARDIAC TOXICITY OF AEROSOL PROPELLANTS
Willard S. Harris Dec. 1971 10 p refs Presented at 2d Ann. Conf. Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF Proj. 6302)
(AD-751425; AMRL-TR-71-120-Paper-3) Avail: NTIS CSCL 06/20

The fluoroalkane gases used to propel aerosols sensitize the hearts of mice to asphyxia-induced sinus bradycardia, atrioventricular block and T-wave depression, quickly enter the blood of monkeys, cats and dogs after inhalation and, despite adequate oxygenation, have a spectrum of cardiovascular toxic effects; for example, directly depressing contractility in rat, cat, dog and human myocardium and rapidly inducing ventricular arrhythmias in awake or anesthetized monkeys. The relevance of these findings to sudden unexpected death in young people who deliberately inhale these gases, to the widespread use of household and cosmetic aerosols, which most commonly discharge as propellants, Freons 12, 11 and 114, and perhaps, to the increasing uses of other Freons (e.g., the solvent, Freon 113), makes deeper study of this toxicity mandatory. Author (GRA)

N73-16091# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
CARDIOVASCULAR EFFECTS OF FLUOROCARBON EXPOSURE
Alex Azar (Du Pont de Nemours (E. I.) and Co., Wilmington, Del.) Dec. 1971 31 p refs Presented at 2nd Ann. Conf. on Environ. Toxicol., Fairborn, Ohio, 31 Aug. - 2 Sep. 1971; sponsored by SysteMed Corp.
(AF Proj. 6302)
(AD-751427; AMRL-TR-71-120-Paper-5) Avail: NTIS CSCL 06/20

The report reviews studies which have shown that certain fluorinated hydrocarbon compounds are capable of sensitizing the mammalian heart to epinephrine resulting in serious cardiac arrhythmias. This phenomenon is referred to as cardiac sensitization. GRA

N73-16092# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
EFFECTS OF MONOMETHYLHYDRAZINE ON BLOOD AND CEREBROSPINAL FLUID GLUCOSE IN ANESTHETIZED MONKEYS
Bennett A. Shaywitz, William T. Gormley, Marilyn E. George, and Kenneth C. Back Jun. 1972 18 p refs
(AF Proj. 6302)
(AD-751232; AMRL-TR-71-122) Avail: NTIS CSCL 06/20

Plasma and CSF glucose was investigated in fasted, pentobarital anesthetized rhesus monkeys given monomethylhydrazine (MMH) 25 mg/kg i.v. Glucose was determined by the glucose oxidase method. Fasting blood glucose and CSF glucose in mg % averaged 48.8 plus or minus 2.5 (S.E.) and 45.1 plus or minus 2.9 (S.E.) respectively. The CSF/blood ratio of 0.923 is similar to that reported for dogs but differs from the ratio of 0.6 for humans. Following MMH, both blood and CSF glucose increased to 90.6 plus or minus 8.0 and 63.8 plus or minus 5.5 mg % respectively and the CSF/blood ratio decreased to 0.704. Formation of CSF averaged 0.028 and 0.035 ml/min before and after MMH respectively. Convulsions occurred in half the monkeys 120 minutes after MMH, a time when both blood and CSF glucose were elevated. Author (GRA)

N73-16093*# Southwest Research Inst., San Antonio, Tex. Biomedical Applications Team.
SOUTHWEST RESEARCH INSTITUTE ASSISTANCE TO NASA IN BIOMEDICAL AREAS OF THE TECHNOLOGY UTILIZATION PROGRAM Monthly Report, 1-31 Dec. 1972
31 Dec. 1972 84 p refs
(Contract NASw-1867; SwRI Proj. 13-2538)
(NASA-CR-130022) Avail: NTIS HC $6.25 CSCL 06B

The problem statements presented relate mostly to research on prosthetic equipment and means of attaching biomedical and electronic devices to the human body. A patent application for a reliable switching element in a patient assist control unit is also described. G.G.

N73-16094*# AiResearch Mfg. Co., Los Angeles, Calif.
TEKTITE 2 HABITABILITY RESEARCH PROGRAM: DAY-TO-DAY LIFE IN THE HABITAT
D. P. Nowlis 30 Mar. 1972 130 p
(Contract NAS8-25100)

(NASA-CR-130034; Rept-71-6192-2) Avail: NTIS HC $8.50 CSCL 05E

Because it is widely agreed that the field of environmental psychology is quite young, it was determined that a sample of recorded observations from a representative mission should be included in the report on Tektite to give the professional reader a better feeling of normal day-to-day life in the isolated habitat. Names of the crew members have been replaced with numbers and some off-color words have been replaced by more acceptable slang; some remarks have been omitted that might lead to easy identification of the subjects. Otherwise, the following pages are exactly as transcribed during the late afternoons and the evenings of the mission. Author

N73-16095*# Geoscience, Ltd., Solana Beach, Calif.
A URINE VOLUME MEASUREMENT SYSTEM Final Report, 29 Apr. 1971 - 31 Dec. 1972
H. F. Poppendiek, G. Mouritzen, and C. M. Sabin Dec. 1972 47 p refs
(Contract NAS9-11612)
(NASA-CR-128726; GLR-113) Avail: NTIS HC $4.50 CSCL 06B

An improved urine volume measurement system for use in the unusual environment of manned space flight is reported. The system utilizes a low time-constant thermal flowmeter. The time integral of the transient response of the flowmeter gives the urine volume during a void as it occurs. In addition, the two phase flows through the flowmeter present no problem. Developments of the thermal flowmeter and a verification of the predicted performance characteristics are summarized. Author

N73-16096*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AUTOMATIC INOCULATING APPARATUS Patent Application
Judd R. Wilkins and Stacey M. Mills, inventors (to NASA) Filed 24 Jan. 1973 19 p
(NASA-Case-LAR-11074-1; US-Patent-Appl-SN-326364) Avail: NTIS HC $3.00 CSCL 06B

An automatic inoculating apparatus for agar trays is reported that uses a simple inoculating element such as a cotton swab or inoculating loop. The apparatus includes a movable carriage for supporting the tray to be inoculated, a drive motor for moving the tray along a trackway and a swabbing motor for automatically swabbing the tray during movement. An actuator motor controls lowering and lifting of the inoculating element. An electrical control system including limit microswitches enables automatic control of the actuator motor and return of the carriage to the initial position after inoculating is completed. NASA

N73-16097*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A METHOD FOR DEFINING DOWN-WIND EVACUATION AREAS FOR TRANSPORTATION ACCIDENTS INVOLVING TOXIC PROPELLANT SPILLS
R. D. Siewert 1972 15 p refs Presented at 1972 Joint Army Navy NASA AF (JANNAF) Prop. Meeting, New Orleans, La., 27-29 Nov. 1972
(NASA-TM-X-68188; E-7320) Avail: NTIS HC $3.00 CSCL 13B

Evacuation areas for accidental spills of toxic propellants along rail and highway shipping routes are defined to help local authorities reduce risks to people from excessive vapor concentrations. These criteria along with other emergency information are shown in propellant spill cards. The evacuation areas are based on current best estimates of propellant evaporation rates from various areas of spill puddles. These rates are used together with a continuous point-source, bi-normal model of plume dispersion. The rate at which the toxic plume disperses is based on a neutral atmospheric condition. This condition, which results in slow plume dispersion, represents the widest range of weather parameters which could occur during the day and nighttime periods. Evacuation areas are defined by the ground level boundaries of the plume within which the concentrations exceed the toxic Threshold Limit Value (TLV) or in some cases the Emergency Exposure Limit (EEL). Author

N73-16098# Royal Aircraft Establishment, Farnborough (England).
THE EFFECT OF HANDEDNESS ON A TRACKING TASK
R. V. Wilson Aug. 1972 26 p refs
(RAE-TR-72117; BR-31173) Avail: NTIS HC $3.50

Eight male right-handed subjects performed a total of twelve 3-minute runs on a compensatory tracking task. The subjects were divided into two groups matched for handedness. One group performed the first six runs with the preferred (right) hand while the other group used the non-preferred (left) hand. For the remaining six runs the two groups used their other hand. No significant differences were found between performance with the two hands. Performance with the hand utilized in the second half of the experiment was significantly better than that used in the first half. The results of the experiment are further examined in terms of the learning phenomena normally associated with the acquisition of psychomotor skills. The absence of both unilateral and bilateral reminiscence effects is discussed. Author (ESRO)

N73-16099# Royal Aircraft Establishment, Farnborough (England).
A PROJECTED GRID METHOD FOR RECORDING THE SHAPE OF THE HUMAN FACE
J. Cobb Mar. 1972 33 p refs
(RAE-TR-71184; BR-28791) Avail: NTIS HC $3.75

The work carried out to design equipment is described which would quickly and cheaply record the shapes of a large number of human faces. It is intended for use in an anthropometric survey with a view to providing data for a project aimed at improving the fit and comfort of oxygen masks for service use. The data is examined to discover a parameter of the human face which can be used to determine which mask size is best suited to any individual. A simple, quick, and adequately accurate equipment for recording one side of the face was developed from an earlier design and includes several refinements to simplify the analysis. The survey will assume that the mean aircrew face is symmetrical although it is realized that individual faces are not. The accuracy of the equipment was measured and is within the required one millimeter. Author (ESRO)

N73-16100# Southampton Univ. (England). Inst. of Sound and Vibration Research.
THE TRANSMISSION OF TRIAXIAL VIBRATION TO PILOTS IN THE SCOUT AH Mk1 HELICOPTER
M. J. Griffin Aug. 1972 82 p refs
(ISVR-TR-58) Avail: NTIS HC $6.25

Three experiments designed to determine the triaxial vibration experienced by pilots in the P-531 (Scout) helicopter are described. In the first experiment, eight Scout helicopters were flown by the same pilot in seven different flight conditions. In each condition, the mean and range of floor vibration were determined at frequencies of maximum vibration for each of three perpendicular axes. In the other two experiments, eight pilots flew in a single Scout helicopter with known floor vibration characteristics. The spectra of triaxial head vibration during four flight conditions were determined from trial two. In trial three, vertical vibration at the heads and at the interface between their bodies and the seat cushion were determined during the hover. The vibration data obtained from the three experiments are presented together with detailed consideration of the differences in vibration level associated with the different flight conditions, vibration axes, helicopters, and pilots. Author (ESRO)

N73-16101# Bunker-Ramo Corp., Westlake Village, Calif. Electronic Systems Div.
TRAINING EFFECTIVENESS EVALUATION OF NAVAL TRAINING DEVICES. PART 1: A STUDY OF THE EFFECTIVENESS OF A CARRIER AIR TRAFFIC CONTROL CENTER TRAINING DEVICE Final Report, Jun. 1970 - Apr. 1971

Dorothy L. Finley, Thomas W. Rheinlander, Ernest A. Thompson, and Dennis J. Sullivan Aug. 1972 116 p refs
(Contract N61339-70-C-0258)
(AD-751556; NAVTRADEVCEN-70-C-0258-1-Pt-1) Avail: NTIS CSCL 05/9

The study evaluated the effectiveness of the Carrier Air Traffic Control Center (CATCC) training device in training teams to safely and efficiently control aircraft recoveries and to effectively maintain communications necessary to implement this control function. The results indicate the device is quite effective in that team, subteam, and individual performances generally improve during training, that student capability to deal with recovery contingencies and emergencies improves, that students generally perform acceptably in the operational job setting, that empirical evidence supports (but does not prove due to the study design) the transfer of training hypothesis, and that students gave the device moderate to high ratings on realism and effectiveness characteristics. It was concluded that device effectiveness could be further improved and that recommendations were worth consideration due to the considerable impact CATCC has on the efficiency and safety of carrier recovery operations.
Author (GRA)

N73-16102# School of Aerospace Medicine, Brooks AFB, Tex.
HUMAN FACTORS EVALUATION OF LASER PROTECTIVE VISORS Final Report, May 1971 - May 1972
William R. Thursby, Jr., Robert G. Braun, and Albert V. Alder Sep. 1972 16 p refs
(AD-751470; SAM-TR-72-23) Avail: NTIS CSCL 06/17

Three laser protective visors and a spectacle-goggle were evaluated by over 100 experienced, rated aircrew members under flight and simulated flight conditons to determine if use of such protective filters would unduly degrade performance of flying duties. Two of the visors and the spectacle-goggle were multiwavelength protective devices. The orange and blue visors provided multiwavelength protection for complementary parts of the near ultraviolet, visible, and the near infrared portions of the electromagnetic spectrum, and the spectacle-goggle essentially combined the protective capability of these visors into one unit. The yellow visor afforded protection specifically against neodymium laser light.
Author (GRA)

N73-16103# Air Force Human Resources Lab., Brooks AFB, Tex. Advanced Systems Div.
EVALUATION OF A DEVICE TO TRAIN FORWARD AIR CONTROLLERS TO COMMUNICATE TARGET LOCATIONS Final Report, 1 Aug. 1971 - 15 Mar. 1972
Horace H. Valverde, William J. Woods (Air Ground Operations School, Hurlburt Field, Fla.), and Ned H. Kearns (Systems Res. Labs., Inc., Dayton, Ohio) May 1972 56 p refs
(AF Proj. 1710)
(AD-751292; AFHRL-TR-72-12) Avail: NTIS CSCL 05/9

The report describes the development and evaluation of a forward air controller (FAC) and tactical strike pilot (TAC) trainer. The trainer was designed to permit a FAC and a TAC to practice the tasks of communicating the location of targets. A previous analysis of communications between FAC and TAC personnel during actual combat had revealed that the task of verbalizing imagery (describing what one is seeing) was especially difficult and important to the success of the FAC/TAC mission. Subjects for the evaluation consisted of 35 Air Force pilots selected to be trained as forward air controllers at Hurlburt Field, Florida.
Author (GRA)

N73-16104# Army Missile Command, Redstone Arsenal, Ala. Guidance and Control Directorate.
THE DESIGN OF ANALYSIS OF A HUMAN BODY MOTION MEASUREMENT SYSTEM
L. Jack Little Sep. 1972 94 p refs
(DA-Proj. 1X2-22251-D-231)
(AD-751134; RG-TR-72-19) Avail: NTIS CSCL 05/5

No adequate systems were found in a literature search that would permit direct measurement of human body segments' angular acceleration and muscle forces related to these accelerations which would allow application of analytic mechanics to the human motion problem. Therefore, a new system was designed and analyzed to provide accurate measurement of the body segments' motion directly by use of angular accelerometers. The basic elements of the system are the accelerometers, all electromyogram sensors, and a proportional bandwidth telemetry system that allows the human performer to move about freely. Verification of the system was accomplished by measurement of angular accelerations of the arm and leg links during kip-up maneuvers. Alignment of the accelerometers was achieved by an optical laser technique. The acceleration signals, stored on magnetic tape, were subsequently integrated to get rate and position in an inertial reference frame. These position data, obtained through integration, proved to be insufficiently accurate when compared with synchronized position data obtained from high speed motion picture film data.
Author (GRA)

N73-16105# Florida Univ., Gainesville. Dept. of Electrical Engineering.
QUANTITATIVE ANALYSIS OF THE PHYSIOLOGICAL CONDITION AND LEVEL OF ALERTNESS OF MAN IN AN ISOLATED ENVIRONMENT Annual Report
Jack R. Smith 2 Nov. 1972 6 p
(Grant AF-AFOSR-2171-72; AF Proj. 9777)
(AD-751272; AFOSR-72-2058TR) Avail: NTIS CSCL 05/10

The report discusses the design and fabrication of the electronic detectors necessary for analyzing an animal EEG and the software for computer processing of the data. Although analysis of human EEG's is not completed, it has been noted that monitoring the high frequencies present in the frontal channels provides a good indicator of whether or not the subject is awake. The activity appears to provide a more sensitive indicator of alertness than does alpha activity.
Author (GRA)

N73-16396* Geological Survey, Washington, D.C.
APPLICATION OF REMOTE SENSING TECHNIQUES FOR APPRAISING CHANGES IN WILDLIFE HABITAT
Harvey K. Nelson (Northern Prairie Wildlife Res. Center), A. T. Klett (Northern Prairie Wildlife Res. Center), and John E. Johnston *In* NASA, Washington Intern. Workshop on Earth Resources Surv. Systems, Vol. 2 1971 p 260-288 refs

CSCL 02E

N73-17010 Royal Aircraft Establishment, Farnborough (England). Human Engineering Div.
PILOT WORKLOAD: A CONCEPTUAL MODEL
R. G. Thorne *In* AGARD Stability and Control Nov. 1972 6 p

N73-17047*# Research Triangle Inst., Research Triangle Park, N.C.
APPLICATIONS OF AEROSPACE TECHNOLOGY IN BIOLOGY AND MEDICINE Final Report, Sep. 1971 - Aug. 1972
F. T. Wooten 31 Aug. 1972 124 p
(Contract NASw-2273)
(NASA-CR-130544) Avail: NTIS HC $8.25 CSCL 06E

The results are presented of the medically related activities of the NASA Application Team Program at the Research Triangle Institute. The accomplishments of the Research Triangle Institute Application Team during the reporting period are as follows: The team has identified 44 new problems for investigation, has accomplished 8 technology applications and 8 potential technology applications, has closed 88 old problems, and reactivated 3 old problems, and on August 31, 1972, has a total of 57 problems under active investigation.
Author

N73-17048*# National Aeronautics and Space Administration, Washington, D.C.
PROCEEDINGS OF THE ANNUAL CONFERENCE OF NASA CLINIC DIRECTORS, ENVIRONMENTAL HEALTH OFFICIALS AND MEDICAL PROGRAM ADVISORS
1969 169 p refs Conf. held at New Orleans, 21-23 Oct. 1969
(NASA-TM-X-69072) Avail: NTIS HC $10.50 CSCL 06E

The current status of the NASA Occupational Medicine and Environmental Health Program is discussed with emphasis on periodic physical examinations and continuous updating of medical history questionnaires for preventing health and emotional problems.

N73-17049* Radio Corp. of America, Camden, N.J.
APOLLO 11 IMPACT ON THE OCCUPATIONAL MEDICINE PROGRAM, NASA MANNED SPACECRAFT CENTER
Paul E. Wright *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 1-3
(Contract NAS9-6568)
CSCL 06I

Requirements and development of standards for occupational medicine support of personnel in the Lunar Receiving Laboratory (LRL) are outlined. Considered are proper personnel performance and exclusion of people prone to develop a serious illness within the quarantine area. Occupational medicine report for the LRL consists of examination procedures covering laboratory work, periodic examinations, immunizations, health maintenance, preventive practices, medical standards, and waiver authority. G.G.

N73-17050* National Aeronautics and Space Administration, Washington, D.C.
MEDICAL EXAMINATIONS FOR RADIATION WORKERS
R. E. Alexander *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 4-9 refs
CSCL 04R

The NASA radiological protection policy allows an employee to be assigned work in a radiologically controlled area only if all of the following conditions are met: (1) The area must be radiologically safe for the intended operations; (2) the employee must be medically fit; (3) the employee must be properly trained; (4) appropriate radiation protection procedures must be prepared; (5) appropriate dosimetric, survey, surveillance and reporting procedures must be implemented; and (6) adequate controls and records must be established. Author

N73-17051* Cox Coronary Heart Inst., Dayton, Ohio.
EXPERIENCES WITH PHYSICAL CONDITIONING PROGRAMS IN MIDDLE-AGED MEN
Benjamin Schuster and Edwin Stanley *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 10-15

CSCL 06P

Long term effects of physical exercise and conditioning in the prevention and treatment of coronary heart disease are studied. Some aspects of the problem are outlined and difficulties encountered in a group of middle aged business executives using a carefully prescribed, but non-regimented and loosely supervised conditioning program employing commonly used forms of exercise (bicycling and jogging), are described. Author

N73-17052* National Aeronautics and Space Administration, Washington, D.C.
EXPERIENCE FACTORS IN PERFORMING PERIODIC PHYSICAL EVALUATIONS
Archie A. Hoffman *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 16-22 refs
CSCL 06P

The lack of scientific basis in the so-called periodic health examinations on military personnel inclusive of the Executive Health Program is outlined. This latter program can well represent a management tool of the company involved in addition to being a status symbol. A multiphasic screening technique is proposed in conjunction with an automated medical history questionnaire for preventive occupational medicine methodology. The need to collate early sickness consultation or clinic visit histories with screening techniques is emphasized. Author

N73-17053* Texas Univ., San Antonio. Medical School.
STABILITY OF HUMAN SERA COLLECTED FOR CLINICAL CHEMISTRY DETERMINATIONS
Frank M. Townsend *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 23-25

CSCL 06P

Problems in collecting and shipping human sera for clinical chemical analyses affect their stability and require proper preservation methods. It is shown that glutamic pyruvate transaminase is very unstable and serum cannot be shipped unless the shipping time is carefully controlled and is less than two days under refrigeration. A limit of four days handling time and avoidance of light exposure are required in bilirubin testing of specimens. Addition of 11 mg of a 10 to 1 mixture of finely powdered sodium fluoride and thymol per ml of blood to preserve specimen stability en route to a central laboratory prevents glycolysis. A citrate buffer at pH 6.2 in serum to be tested for alkaline phosphatase lessens decline at room temperature. G.G.

N73-17054* Michigan Univ., Ann Arbor. Inst. for Social Research.
PSYCHOSOCIAL FACTORS IN CORONARY HEART DISEASE
John R. P. French, Jr. and Robert D. Chaplan *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 26-72 refs
CSCL 06E

The relationship between job satisfaction and coronary heart disease is explored for blue and white collar groups, different personalities and physiological risk factors. Differences found among administrators, engineers and scientists with regard to variables associated with heart disease are in terms of physiology, personality, reported job stress, and smoking. G.G.

N73-17055* National Aeronautics and Space Administration, Washington, D.C.
LEAVE TAKING AND OVERTIME BEHAVIOR AS RELATED TO DEMOGRAPHIC, HEALTH, AND JOB VARIABLES
Louis B. Arnoldi and John C. Townsend *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 73-94

CSCL 06P

An intra-installation model is formulated that correlates demographic, health and job related variables to the various types and amounts of leave and overtime taking behavior of employees. Statistical comparison of composite health ratings assigned to subjects based upon clinical criteria and bio-statistical data show that those employees who take the most annual leave as well as sick leave are the ones that have the poorest health ratings; employees who put in the most overtime have also the poorest health records. Stress effects of peak activity periods increase use of sick leave immediately after peak activity but not the use of annual leave. G.G.

N73-17056* National Aeronautics and Space Administration, Washington, D.C.
ENVIRONMENTAL HEALTH PROGRAM IN NASA
Rudolph M. Marrazzo *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 95-106
CSCL 06P

The NASA policy on environmental health uses medical and environmental concepts to: (1) Determine the health status of employees; (2) prevent illness and promote good health among employees; and (3) identify and control factors that affect the health of personnel and quality of environment. Evaluation and control of physical, chemical, radiological and biological factors surrounding personnel and which represent physiological and psychological stresses and impairment are considered. G.G.

N73-17057* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

N73-17058

ENVIRONMENTAL HEALTH PROGRAM ACTIVITIES
Charles P. Bergtholdt *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 107-110
CSCL 06P

Activities reported include studies on toxic air contaminants, excessive noise, poor lighting, food sanitation, water pollution, and exposure to nonionizing radiation as health hazards. Formulations for a radiological health manual provide guidance to personnel in the procurement and safe handling of radiation producing equipment and Apollo mission planning. A literature search and development of a water analysis laboratory are outlined to obtain information regarding microbiological problems involving potable water, waste management, and personal hygiene. G.G.

N73-17058* National Academy of Sciences-National Research Council, Washington, D.C.
THE RELATIONSHIP OF NASA OCCUPATIONAL MEDICINE AND ENVIRONMENTAL HEALTH WITH THE ADVISORY CENTER ON TOXICOLOGY
Ralph C. Wands *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 111-116

CSCL 06T

Preventive measures of occupational medicine and industrial hygiene are coordinated to identify toxicities of industrial products and safety standards in manned space flight applications. Emphasized is the off-gassing of construction materials in spacecraft with the resulting contamination of the cabin atmosphere and the establishment of criteria for the quality of drinking water for astronauts during Gemini and Apollo programs. G.G.

N73-17059* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MACHINING OF LOW PERCENTAGE BERYLLIUM COPPER ALLOYS
John G. Habermeyer *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 117-120
CSCL 06T

Airborne beryllium sampling during machining of low percentage beryllium-copper alloys shows that normal dry machining creates 45.2 microgram/cu m of airborne beryllium in the casting operators breathing zone and 2.3 microgram/cu m in an adjacent machine working area. A small vacuum system placed over the tool effectively removes airborne beryllium in the breathing zone sample to 0.2 microgram/cu m. G.G.

N73-17060* National Aeronautics and Space Administration. Electronics Research Center, Cambridge, Mass.
PRELIMINARY REPORT ON USE OF LAHEY CLINIC AUTOMATED HISTORY IN AN INDUSTRIAL COMPLEX

B. O. Leonardson *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 121-123
CSCL 05B

A questionnaire has been developed and used extensively as an aid to the appointment office in determining what department a patient should be referred to and what time for special consultations should be reserved. It has helped to maintain a balanced case load and informs the physician in advance about the patients he will see. By coordinating appointments so that the patient can visit two or more of the specialty departments in one day rather than having to return a number of times to see different doctors, it has increased efficiency. The questionnaire screens for important symptoms or trouble spots to which the computer is programmed to assign scoring values which in turn point out the clinic division or section to which the patient should initially be referred. Author

N73-17061* National Aeronautics and Space Administration. Wallops Station, Wallops Island, Va.
REVIEW OF A SERIES OF PROCTOSIGMOIDOSCOPIES DONE AT WALLOPS STATION, VIRGINIA
Edward White *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 124-126
CSCL 06E

Routine proctosigmoidoscopic examinations for incidence of polyps in NASA installation asymptomatic personnel establish the value of this method in detecting cancer without invasion beyond the stalk and resulting in curative operation at greater survival rates than in later detections. G.G.

N73-17062* University of Southern Calif., Los Angeles.
SENSITIVITY TO EMOTIONAL ILL HEALTH
Jean Spencer Felton *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 127-156 refs

CSCL 05J

The services of mental specialists, such as psychologists, psychiatrists, or psychiatric social workers are required to assure maximum human performance in Government facilities. Contemporary mental health programming covers emotionally generated problems at operational sites to complete disclaiming of the existence of such difficulties among workers. Frequent taking of sick leave or annual leave when work seems demanding or when a promotion does not materialize, chronic or repeated tardiness, requests for frequent transfers, work over-loading, accidental injuries, and alcoholism are all forms of stress responses and indicate a need for emotional counselling. G.G.

N73-17063* Massachusetts Inst. of Tech., Cambridge.
LABORATORY HOOD DESIGN
Richard I. Chamberlin *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1969 p 157-165

CSCL 06Q

A supply air hood is described that provides a curtain of clean air just outside of the hood surface for protection of the operator. The design consists of an overhead plenum which extends out from the hood with tapered sides extending from the plenum to the bench, a slotted baffle plate and two perforated plates with offset holes, dust filters, and a special deflector plate. The latter introduces less than 4 cubic feet flow per minute through the special perforated area so that a sweeping effort is almost always maintained at bench level. Performance tests indicate that even under adverse exhaust conditions some of the supply air may be lost to the room, but none of the air within the hood that represents contaminated flow is entrained or displayed so that it enters the work area. This hood operates with an efficiency of about 90% exhaust for supplied air. G.G.

N73-17064*# National Aeronautics and Space Administration, Washington, D.C.
PROCEEDINGS OF THE ANNUAL CONFERENCE OF NASA CLINIC DIRECTORS, ENVIRONMENTAL HEALTH OFFICIALS AND MEDICAL PROGRAM ADVISORS
1970 184 p refs Conf. held at Cambridge, Mass., 13-15 Oct. 1970
(NASA-TM-X-69073) Avail: NTIS HC $11.25 CSCL 06E

Medical problems common to NASA and aviation industry facilities are discussed. The focus centers on preventive counselling, environmental control, and physical and mental health measures. For individual titles,

N73-17065* National Aeronautics and Space Administration, Washington, D.C.
DYNAMIC EKG STUDY
Robert L. Fleck *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1970 p 1-4
CSCL 06E

The use of the dynamic EKG study as a part of periodic health examination is considered to be a valuable complement to other forms of stress testing with its ability to detect abnormal heart responses to stress stimuli. It is believed that statistical correlations of dynamic EKG findings with physical examination results contribute greatly to the understanding of cardiac abnormalities. Author

N73-17066* National Aeronautics and Space Administration, Washington, D.C.
NORMALLY EXPECTED ABERRATIONS IN THE 8-HOUR DYNAMIC EKG
Robert L. Fleck, Louis B. Arnoldi, John C. Townsend, and Xenia Tonesk *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1970 p 5-17
CSCL 06E

The establishment of norms for interpreting long term dynamic electrocardiograms is attempted by correlating a completely disease-symptom- and cardiac risk factor-free sample with a non-pure sample in the direction of normality on various variables. Out of a population of 362 subjects exposed to dynamic electrocardiogram testing, a discrimination between normals and abnormals in terms of traditional risk factors was observed. The two groups differed significantly on the following variables: cholesterol, smoking, systolic blood pressure, white blood count, fasting blood sugar, uric acid, resting EKG, year of birth, and coronary insufficiency. G.G.

N73-17067* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
AN EXERCISE PRESCRIPTION INTERVENTION PROGRAM WITH PERIODIC ERGOMETRIC GRADING
Cannon A. Owen and Earl F. Beard *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1970 p 18-38 refs

CSCL 06E

A long term exercise prescription type of physical conditioning program has been available to executive personnel of the NASA Manned Spacecraft Center for the past two years. Periodic ergometric testing with a heart rate controlled, automatically programmed, bicycle ergometer is used to follow the individual's progress and appropriately alter his exercise prescription from time to time. Such a program appears feasible, and acceptance is excellent, dropout rates small and periodic testing participation good. Subjects training diligently can maintain satisfactory levels of conditioning. Author

N73-17068* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MEDICAL AUTOMATION SYSTEM AT THE MARSHALL SPACE FLIGHT CENTER
James H. Spraul *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1970 p 39-51
CSCL 06E

A computer system is reported for scheduling and coordinating physical examinations for groups of people who work with chemicals, lasers, X-rays, isotopic sources, toxic fuels, adhesives, and exotic metals. Complete medical data on the examined population are continuously updated for a broad medical master file Statistical methods are employed to project progressive changes in the health status of these employees for possible clinical interventions. G.G.

N73-17069* Public Health Service, Washington, D.C.
PERSONAL BENEFITS OF A HEALTH EVALUATION AND ENHANCEMENT PROGRAM
Fred Heinzelmann and Donald C. Durbeck *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1970 p 52-79 refs

CSCL 06E

A study was made of the benefits reported by participants in a health evaluation and enhancement program dealing with physical activity. Program benefits were identified and defined in regard to three major areas: program effects on work; program effects on health; and program effects on habits and behavior. A strong positive and consistent relationship was found between reported benefits in each of these areas and measures of improvement in cardiovascular functioning based on treadmill performance. Significant differences in these measures of improvement were also found between participants who reported program benefits and those persons who did not. These findings provide a meaningful profile of the pattern of benefits generated by this kind of health program. Author

N73-17071* Army Environmental Hygiene Agency, Edgewood Arsenal, Md. Laser-Microwave Div.
HAZARDS FROM HIGH INTENSITY LAMPS AND ARCS
David H. Sliney *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1970 p 83-95 refs

CSCL 06R

The principal occupational health problem generally associated with high intensity arc lamps results from exposure of the eye and skin to ultraviolet radiation. Occasionally, the chorioretinal burns are of concern. The eye is generally more susceptible than the skin to injury from high intensity optical radiation sources whether ultraviolet, visible or infrared. Recent developments in technology have shown that some high intensity optical radiation sources which have output parameters greatly different from those encountered in the natural environment present a serious chorioretinal burn hazard. Author

N73-17072* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE VALUE OF CONTINUED FOLLOWUP IN A PREVENTIVE MEDICINE PROGRAM
Carlos Villafana and Jean Mockbee *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1970 p 96-119

CSCL 06E

Continued monitoring of hypertension and cholesterol levels in NASA employees by regularly scheduled medical examinations prevents an increase in employee disability and cardiovascular mortality rates. Adequate therapeutic control for younger hypertensive employees is demonstrated by records on mortality and heart diseases over a period of 28 months. It confirmed the importance of systolic blood pressure as diagnostic tool for the inherent risk factor. The prevalence of additional coronary risk factors among employees with hypercholesterolemia is considerably less than in employees with hypertension. G.G.

N73-17073* San Antonio State Tuberculosis Hospital, Tex.
LABORATORY ASPECTS OF BLOOD LIPIDS
Frank M. Townsend *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1970 p 120-130 refs

CSCL 06E

Classification of blood hyperlipemias by electrophoresis or ultracentrifugation according to density fraction is described and therapeutic measures for humans with hyperlipoproteinemia are outlined. The statistically significant relationship between high serum cholesterol levels and incidence of coronary disease prescribes restricted caloric intake or physical exercise to burn excess calories as preventive measures. G.G.

N73-17074* Harvard School of Public Health, Boston, Mass. Dept. of Physiology.
PROGRAMMED MULTIPHASIC HEALTH TESTING
Philip I. Hershberg *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1970 p 131-143 refs

(Grant NGR-22-007-203)
CSCL 06E

Multiphase health screening procedures are advocated for detection and prevention of disease at an early stage through risk factor analysis. The use of an automated medical history questionnaire together with scheduled physical examination data provides a scanning input for computer printout. This system makes it possible to process laboratory results from 1,000 to 2,000 patients for biochemical determinations on an economically feasible base. G.G.

N73-17076* Trans World Airlines, Inc., Kansas City, Mo. Medical Service.
FLIGHT CREW HEALTH MAINTENANCE
Charles C. Gullett *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1970 p 172-177

CSCL 06E

The health maintenance program for commercial flight crew personnel includes diet, weight control, and exercise to prevent heart disease development and disability grounding. The very high correlation between hypertension and overweight in cardiovascular diseases significantly influences the prognosis for a coronary prone individual and results in a high rejection rate of active military pilots applying for civilian jobs. In addition to physical fitness the major items stressed in pilot selection are: emotional maturity, glucose tolerance, and family health history. G.G.

N73-17077* Boeing Co., Seattle, Wash.
OCCUPATIONAL MEDICAL TRENDS IN THE 70'S FROM INDUSTRIAL VIEW
Sherman M. Williamson *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1970 p 178-180

CSCL 06E

Industrial health measures to ensure worker productivity constitute physical examinations as well as environmental control systems. Considered are automatic record keeping facilities for case histories, preventive medical and mental counselling, development of safety standards, and health insurance and disability benefit plans. Cooperation of industry health programs with community health aspects is required to eliminate the loss of manpower capability through alcoholism or mental disease. G.G.

N73-17078*# National Aeronautics and Space Administration, Washington, D.C.
PROCEEDINGS OF THE ANNUAL CONFERENCE OF NASA CLINIC DIRECTORS, ENVIRONMENTAL HEALTH OFFICIALS AND MEDICAL PROGRAM ADVISORS
1971 274 p refs Conf. held at Charleston, S. C., 12-14 Oct. 1971
(NASA-TM-X-69074) Avail: NTIS HC $15.75 CSCL 06E

Data covering techniques and types of services provided to NASA employees in occupational medicine and environmental health are outlined. Specific summaries are given for coronary disease, chronic disease, and occupation induced disorders. Numerous other topics, procedures, and medical equipment are also discussed.

N73-17079* National Aeronautics and Space Administration, Washington, D.C.
THE MANAGEMENT OF NASA EMPLOYEE HEALTH PROBLEM; STATUS 1971
Louis B. Arnoldi *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 1-16
CSCL 06E

A system for assessing employee health problems is introduced. The automated billing system is based on an input format including cost of medical services by user and measures in dollars, that portion of resources spent on preventive techniques versus therapeutic techniques. The system is capable of printing long term medical histories of any employee. E.H.W.

N73-17080* National Aeronautics and Space Administration, Washington, D.C.
CORONARY RISK FACTOR SCORING AS A GUIDE FOR COUNSELING
Robert L. Fleck *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 17-28
CSCL 06E

A risk factor scoring system for early detection, possible prediction, and counseling to coronary heart disease patients is discussed. Scoring data include dynamic EKG, cholesterol levels, triglycerine content, total lipid level, total phospolipid levels, and electrophoretic patterns. Results indicate such a system is effective in identifying high risk subjects, but that the ability to predict exceeds the ability to prevent heart disease or its complications. E.H.W.

N73-17081* Catholic Univ. of America, Washington, D.C.
THE MOTIVATING INFLUENCE OF RETEST AND REPEATED DIETARY COUNSELING ON CHOLESTEROL REDUCTION
Paul Taylor, John C. Townsend, Carlos Villafana, and Louis B. Arnoldi *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 29-49 refs

CSCL 06E

An analysis was made of retest and followup counselling effects on the reduction of hypercholesterolemia levels in NASA employees. Criteria used to measure such control include motivation, age of patient, personality of patient, job stress, and physical exercise. E.H.W.

N73-17082* Pan American World Airways, Inc., Cocoa Beach, Fla.
STRESS STUDIES AT KENNEDY SPACE CENTER: A BACKWARD AND FORWARD LOOK
A. I. Decker *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 50-72

CSCL 06S

Possible relationships between occupational and other stresses on ischemic heart disease are explored. Three procedures were used: (1) double master 2-step test, (2) dynamic ECG technique using avionics equipment, and (3) submaximal stress testing with Marco bicycle ergometer. E.H.W.

N73-17083* Harvard Univ., Boston, Mass.
LONG TERM CLINICAL RELATIONSHIPS OF THE VENTRICULAR PREMATURE BEAT
Philip I. Hershberg, D. Desai (Lahey Clinic Foundation), and Sidney S. Alexander (Lahey Clinic Foundation) *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 73-85 refs

CSCL 06E

A study of the relationship between ventricular premature beats, mortality, and acute myocardial infarction in a clinic population is reported. Statistical results are presented in tables. Author

N73-17084* Kettering Memorial Hospital, Dayton, Ohio.
THE CORONARY PATIENT IN INDUSTRY
Benjamin Schuster *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 86-99

CSCL 06E

The coronary patient, as he pertains to industry particularly NASA, is discussed. Concepts of precoronary care, acute attacks

which may develop while on the job, and the return of the cardiac patient to work are covered. Major emphasis was on the prevention of sudden death due to coronary disease. Author

N73-17085* National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
INFRASOUND
F. G. Pierce *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 100-107 refs

CSCL 06S

Infrasound, sound frequencies from 2 to 20 cpc, is defined and its effects on the human body are analyzed. Subjective symptoms of infrasound include fatigue, irritability, insomnia, headache, lack of ability to concentrate, and loss of equilibrium. No conclusive results were reported. E.H.W.

N73-17086* SysteMed Corp., Dayton, Ohio.
THE MANAGEMENT OF CHRONIC DISEASE: A STUDY OF EMPLOYEE MORBIDITY AND MORTALITY AT THE NASA, GODDARD SPACE FLIGHT CENTER, 1966 - 1971
Carlos Villafana and Jean Mockbee *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 108-134

CSCL 06E

Several approaches to studying chronic disease patterns in the employee population at Goddard Space Flight Center from 1966 to 1970 are presented. Attempts were made to summarize preliminary data for 1971 and relate this data to specific programs and events which may have had some causative influence. Investigative data for the study cover records of periodic and return to work examinations, injury and illness visit reports, mortality data, and health trends with and without external influences. E.H.W.

N73-17087* Brunswick Naval Air Station, Me.
AUTOMATION OF THE PROBLEM ORIENTED MEDICAL RECORD
D. W. Schall *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 135-144

CSCL 05B

An improved ambulatory care delivery system developed for the Navy is examined. The system is centered around the concepts of problem oriented medical records and expanded use of paramedical personnel. E.H.W.

N73-17088* National Aeronautics and Space Administration. Wallops Station, Wallops Island, Va.
A CASE OF NEAR FATAL AMMONIA GAS POISONING
Edward White *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 145-150
CSCL 06T

A report is given of the near fatal effects of anhydrous ammonia poisoning to a repairman working on a compression room cooling system. The repairman was exposed for approximately 5 minutes to an environment of nearly 100% ammonia gas. Descriptions are given of body burns, breathing problems, and eye burns suffered by the worker. E.H.W.

N73-17089* San Antonio State Tuberculosis Hospital, Tex.
SOME PITFALLS OF URINE ANALYSIS
Frank M. Townsend *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 151-161 refs

CSCL 06E

Possible failures or erroneous findings during routine urine analysis are surveyed. Data cover tablet, tape, and stick type analysis techniques. E.H.W.

N73-17090* National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
BACTERIAL IDENTIFICATION USING LIGHT SCATTERING MEASUREMENTS: A PRELIMINARY REPORT
Judd R. Wilkins *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 162-172 refs
CSCL 06M

The light scattering properties of single bacterial cells were examined as a possible means of identification. Three species were studied with streptococcus faecalis exhibiting a unique pattern; the light-scattering traces for staphylococcus aureus and escherichia coli were quite similar although differences existed. Based on preliminary investigations, the light scattering approach appeared promising with additional research needed to include a wide variety of bacterial species, computer capability to handle and analyze data, and expansion of light scattering theory to include bacterial cells. Author

N73-17091* Public Health Service, Rockville, Md.
THE NASA-USPHS HEALTH EVALUATION AND ENHANCEMENT PROGRAM
D. C. Durbeck, F. Heinzelmann, R. T. Moxley, III, J. Schacther, G. H. Payne, D. D. Limoncelli, S. M. Fox, III, and Louis B. Arnoldi *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1972 p 173-195 refs

CSCL 06E

An exercise program was initiated to assess the feasibility of an on the job health evaluation and enhancement program, as well as to identify the factors which influenced volunteering, adherence, and effectiveness of the program. The program was utilized by 237 of the 998 eligible Federal employees, with a mean attendance of 1.3 days per week. Those who volunteered perceived a need for increased physical activity, felt they had sufficient time to participate, and derived subjective as well as objective benefits. Significant improvements were found in heart rate response to the standard exercise test, body weight, skinfold measurements, and triglycerides. A consistent relationship was found between subjectively reported effects of the program on work, health habits, and behavior, and improvement in cardiovascular function, based on treadmill performance. Numerous personal and programmatic factors influencing volunteering and participation were identified. Author

N73-17092* National Health Service, Inc., New York.
IMPACT OF NASA STRESS LABORATORY PROGRAM ON US COLLEGES
S. P. DeLisser *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 196-203

CSCL 06S

A programmatic narrative of the effects of NASA stress lab program on physical education in U.S. schools and colleges is presented. Individual non-structured programs were set up where students participate during his or her free time. The program is also in accordance with the medical history of the student. Preliminary results indicate more student interest and participation in the program and that students are generally more physically fit than in previous structured programs. E.H.W.

N73-17093* National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.
AN OPERATING ENVIRONMENTAL HEALTH PROGRAM
Jose G. Lipana, Richard L. Masters (Lovelace Found. for Med. Educ. and Res.), and William R. Winter *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 204-223

CSCL 06E

Some concepts of an operational program for medical and environmental health are outlined. Medical services of this program

are primarily concerned with emergency care, laboratory examinations, advice to private physicians with patient permission, medical monitoring activities, and suggestions for treatment or control of the malfunction. E.H.W.

N73-17094* Army Environmental Hygiene Agency, Edgewood Arsenal, Md.
NEW STANDARDS FOR ULTRAVIOLET RADIATION
David H. Sliney *In* NASA, Washington Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 224-240 refs

CSCL 06R

Guidelines covering safe levels for exposure to ultraviolet radiation in an occupational environment are reported. The guidelines clarify the spectral radiant exposure doses and relative spectral effectiveness of ultraviolet radiation required to elicit adverse biologic effects. E.H.W.

N73-17097* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LEAD PENCILS
Leven B. Gray *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic. and Med. Program Advisors 1971 p 260-264
CSCL 06T

A study, undertaken to determine the lead content of paint on various pencils in the Goddard supply system, is reported. The survey found that lead content varied from .04 mg per pencil for carmine colored pencils to approximately 43 mg per pencil for yellow colored pencils. Results also show that yellow pencils had higher lead content than other colors analyzed. More detailed results are given in tabular form. E.H.W.

N73-17098# Advisory Group for Aerospace Research and Development, Paris (France).
AEROMEDICAL ASPECTS OF VIBRATION AND NOISE
J. C. Guignard and P. F. King Nov. 1972 280 p refs
(AGARDograph-151; AGARD-AG-151) Avail: NTIS HC $16.00

Effects of aerospace vibration and noise on man are considered. The special aeromedical problems of auditory perception and noise injuries in aircrew and ground support personnel are emphasized.

N73-17099 Wright State Univ., Dayton, Ohio. Dept. of Engineering.
VIBRATION
J. C. Guignard *In* AGARD Aeromed. Aspects of Vibration and Noise Nov. 1972 p 1-113 refs

The nature of structure-borne vibration and its occurrence in aerospace operations are considered by mechanical and biological actions upon man, and by the criteria and principles of protecting man from its adverse effects. Author

N73-17100 Wright State Univ., Dayton, Ohio.
NOISE
J. C. Guignard *In* AGARD Aeromed. Aspects of Vibration and Noise Nov. 1972 p 114-203 refs

Nature, measurement and occurrence of airborne noise in aerospace operations are considered by the biological effects on man. General criteria and principles of the protection of man from the adverse effects of noise on human well being and working efficiency are outlined. Author

N73-17101 Royal Air Force Central Medical Establishment, London (England).
HEARING CONSERVATION IN AIRCREW AND GROUND SUPPORT PERSONNEL
P. F. King *In* AGARD Aeromed. Aspects of Vibration and Noise Nov. 1972 p 204-257 refs

The effects of noise on human hearing, both temporary and permanently, are reviewed and related to the working situations of members of aircrews and ground support personnel. Measures to be taken to prevent noise damage in the peripheral parts of the human hearing mechanism and to conserve hearing in personnel exposed to hazardous noise levels are outlined. Author

N73-17102*# American Inst. for Research, Washington, D.C.
DEVELOPMENT OF A STANDARDIZED BATTERY OF PERFORMANCE TESTS FOR THE ASSESSMENT OF NOISE STRESS EFFECTS
George C. Theologus, George R. Wheaton, Angelo Mirabella, and Rae E. Brahlek NASA Jan. 1973 125 p refs
(Contract NAS1-9854)
(NASA-CR-2149) Avail: NTIS HC $3.00 CSCL 06S

A set of 36 relatively independent categories of human performance were identified. These categories encompass human performance in the cognitive, perceptual, and psychomotor areas, and include diagnostic measures and sensitive performance metrics. Then a prototype standardized test battery was constructed, and research was conducted to obtain information on the sensitivity of the tests to stress, the sensitivity of selected categories of performance degradation, the time course of stress effects on each of the selected tests, and the learning curves associated with each test. A research project utilizing a three factor partially repeated analysis of covariance design was conducted in which 60 male subjects were exposed to variations in noise level and quality during performance testing. Effects of randomly intermittent noise on performance of the reaction time tests were observed, but most of the other performance tests showed consistent stability. The results of 14 analyses of covariance of the data taken from the performance of the 60 subjects on the prototype standardized test battery provided information which will enable the final development and test of a standardized test battery and the associated development of differential sensitivity metrics and diagnostic classificatory system. Author

N73-17103*# Stanford Research Inst., Menlo Park, Calif.
THE PROBABILISTIC STRUCTURE OF PLANETARY CONTAMINATION MODELS
J. Michael Harrison and Warner D. North 30 Jan. 1973 33 p refs Presented at Semian. NASA Spacecraft Sterilization Technol. Seminar, New Orleans
(Contract NASw-2451; SRI Proj. 2274)
(NASA-CR-130558; Proj-Memo-1) Avail: NTIS HC $3.75 CSCL 06M

The analytical basis for planetary quarantine standards and procedures is presented. The heirarchy of planetary quarantine decisions is explained and emphasis is placed on the determination of mission specifications to include sterilization. The influence of the Sagan-Coleman probabilistic model of planetary contamination on current standards and procedures is analyzed. A classical problem in probability theory which provides a close conceptual parallel to the type of dependence present in the contamination problem is presented. Author

N73-17104# Joint Publications Research Service, Arlington, Va.
EMOTIONAL STRESS DURING SPACEFLIGHT
L. Khachaturyants and L. Grimak 23 Jan. 1973 9 p Transl. into ENGLISH from Aviats. i Kosmonavt. (Moscow), no. 11, 1972 p 33-34
(JPRS-58039) Avail: NTIS HC $3.00

An examination of the emotional stress of cosmonauts during spaceflight is reported. Specific examples are cited including crews of the Voskhod-2 and Soyuz-4 and Soyuz-5 space ships. Author

N73-17105*# National Aeronautics and Space Administration, Washington, D.C.
PROBLEM OF ACCELERATION IN AVIATION MEDICINE. PART 3: FUNCTIONAL CHANGES IN THE NERVOUS SYSTEM DURING G-LOADS AND WEIGHTLESSNESS

G. L. Komendantov Feb. 1973 59 p refs Transl. into ENGLISH of the publ. "Problema Uskoreniy v Aviatsionnoy Meditsine. Chast 3: Izmeneniya Funktsiy Nervnoy sistemy pri Peregruzkakh i Nevesomosti" Moscow, USSR Min. of Health, 1971 p 3-44
(NASA-TT-F-733) Avail: NTIS HC $3.00 CSCL 06S

G-loads and weightlessness subject the human body to unusual stress during flights in aircraft and space vehicles. Equilibrium is difficult to maintain, and normal conditioned reflex activity is distorted by G-loads directed from the head to the pelvis and from the chest to the back. Numerous statistical data from a broad spectrum of Soviet sources constitute a survey of these specific problems. Author

N73-17106# Advisory Group for Aerospace Research and Development, Paris (France).
SPECIAL ASPECTS OF AVIATION OCCUPATIONAL MEDICINE. CARDIOVASCULAR AND NERVOUS SYSTEM EFFECTS OF BROMOTRIFLUOROMETHANE
K. C. Back (AMRL) and E. W. VanStee (AMRL) Nov. 1972 20 p refs
(AGARD-R-599) Avail: NTIS HC $3.00

The effects of three fluorocarbons of the haloalkane group, principally with bromotrifluoromethane, which have applications as effective fire extinguishing agents are studied. Animal experiments, performed to explore the mechanisms of the pharmacodynamic properties and to assess the toxic hazards associated with their use, are described. All three compounds have biological side effects and the report provides preliminary information, derived from animal experiments, on acceptable working concentrations for human exposure. Author

N73-17107*# Aerojet Medical and Biological Systems, El Monte, Calif.
MICROBIAL ECOLOGY MEASUREMENT SYSTEM Final Report, Oct. 1970 - Jul. 1972
Jul. 1972 128 p
(Contract NAS9-11371)
(NASA-CR-128731) Avail: NTIS HC $8.50 CSCL 06M

The sensitivity and potential rapidity of the PIA test that was demonstrated during the feasibility study warranted continuing the effort to examine the possibility of adapting this test to an automated procedure that could be used during manned missions. The effort during this program has optimized the test conditions for two important respiratory pathogens, influenza virus and Mycoplasma pneumoniae, developed a laboratory model automated detection system, and investigated a group antigen concept for virus detection. Preliminary tests on the handling of oropharygeal clinical samples for PIA testing were performed using the adenovirus system. The results obtained indicated that the PIA signal is reduced in positive samples and is increased in negative samples. Treatment with cysteine appeared to reduce nonspecific agglutination in negative samples but did not maintain the signal in positive samples. Author

N73-17108# Research Inst. of National Defence, Stockholm (Sweden).
CORRELATION BETWEEN MAN AND MOUSE IN RESPECT OF PHYSICAL ACTIVITY AND OXYGEN CONSUMPTION FOA Reports, Volume 6, No. 11
Carl-Olov Criborn Oct. 1972 7 p refs
(FOA-1-B-1233-A5; ISBN-91-7056-018-8) Avail: NTIS HC $3.00

In an attempt to discover the extent to which the results of experiments with mice are comparable to corresponding results found in studies of man, a study was made of correlations between mouse and man primarily in respect of physical activity and oxygen consumption. Treadwheels or treadmills are used to define and measure activity in the form of running speed, running time, distance run, etc. The basal metabolism, measured in oxygen consumption per unit of body weight, differs greatly between man and mouse, whereas the relative change in oxygen consumption on a change in activity is roughly the same. The difference in basal metabolism, however, may affect the sensitivity to variations in room temperature differently in man and in mouse, and may give rise to discrepancies in respect of the duration of symptoms. Author

N73-17109*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
MICROBIOLOGICAL SAMPLING OF SPACECRAFT CABLING, ANTENNAS, SOLAR PANELS AND THERMAL BLANKETS
R. C. Koukol 15 Feb. 1973 20 p
(Contract NAS7-100)
(NASA-CR-130383; JPL-900-602) Avail: NTIS HC $3.00 CSCL 06M

Sampling procedures and techniques described resulted from various flight project microbiological monitoring programs of unmanned planetary spacecraft. Concurrent with development of these procedures, compatibility evaluations were effected with the cognizant spacecraft subsystem engineers to assure that degradation factors would not be induced during the monitoring program. Of significance were those areas of the spacecraft configuration for which special handling precautions and/or nonstandard sample gathering techniques were evolved. These spacecraft component areas were: cabling, high gain antenna, solar panels, and thermal blankets. The compilation of these techniques provides a historical reference for both the qualification and quantification of sampling parameters as applied to the Mariner Spacecraft of the late 1960's and early 1970's. Author

N73-17110*# Kanner (Leo) Associates, Redwood City, Calif.
PHYSIOLOGICAL PROBLEMS OF PROLONGED WEIGHTLESSNESS
N. N. Gurovskiy and A. A. Kiselev Washington NASA Feb. 1973 16 p Transl. into ENGLISH from Astronaut. Acta (Austria), v. 17, 1972 p 79-88 (Russian language report)
(Contract NASw-2481)
(NASA-TT-F-14672) Avail: NTIS HC $3.00 CSCL 06S

Two dogs were exposed to weightlessness for about 22 days aboard the Soviet Cosmos 110 artificial satellite. Changes in cardiodynamics characterized as the functional hyperdynamia cordis syndrome were revealed. The functions of the digestive, motor, coagulative and other systems of the animals' organisms were investigated. Among the significant changes discovered were: a 30 percent loss in body weight; disturbances of ion equilibrium and related water loss; disturbed enzyme forming function of the large intestine resulting in a sharp increase in the content of the intestinal enzymes enterokinase and alkaline phosphotase; 10-11 percent reduction in the mineral concentration in bone tissue; and descrease in lysozyme activity. The data indicate that space missions of relatively long duration (over 20 days) produce qualitatively new and more pronounced changes in the animal organism as compared to earlier flights of shorter duration. Author

N73-17111*# North Dakota State Univ., Fargo. Dept. of Polymers and Coatings.
QUANTITATION OF BURIED CONTAMINATION BY USE OF SOLVENTS Semiannual Report, 1 Jul. - 31 Dec. 1972
S. Peter Pappas, Paul Hsiao, and Loren W. Hill 31 Dec. 1972 13 p refs
(Grant NGR-35-001-012)
(NASA-CR-130720) Avail: NTIS HC $3.00 CSCL 06M

An investigation was made to determine (1) sporicidal properties of amine solvents that solubilize silicon resins, (2) recovery properties of a silicon potting compound (RTV 41) used in spacecraft, and (3) viability of spores during chemical curing of the potting compound. Results show that: (1) spores do remain viable during RTV 41 silicon potting chemical curing, and (2) spore recovery from cured silicon potting compound RTV 41 is very high when silicon rubber is dissolved in butylamine and series dilution with benzene prior to plate curing. E.H.W.

N73-17112*# Ohio State Univ. Research Foundation, Columbus. Dept. of Anatomy.
EFFECTS OF WEIGHTLESSNESS ON THE DEVELOPMENT OF THE VESTIBULAR APPARATUS AND OCULAR NYSTAGMUS IN THE RAT Annual Report, 1 Oct. 1971 - 30 Sep. 1972
David L. Clark 18 Dec. 1972 54 p refs

(Contract NAS2-6634; RF Proj. 3329-A1)
(NASA-CR-114569; Rept-4) Avail: NTIS HC $4.75 CSCL 06C

The chronic 2g centrifuge was constructed for testing weightlessness effects on development of vestibular apparatus and ocular nystagmus in the rat. Both the stationary and rotating rail tests were performed. A physiological review is presented on vestibular apparatus, along with a system analysis. Time constants and input threshold level of the system are also considered. J.A.M.

N73-17113*# St. Louis Univ., Mo. Dept. of Physiology.
OBJECTIVE EVALUATION OF CUTANEOUS THERMAL SENSIVITY
W. VanBeaumont Oct. 1972 62 p refs
(Grant NGR-26-006-039)
(NASA-CR-114564) Avail: NTIS HC $5.25 CSCL 06P

The possibility of obtaining reliable and objective quantitative responses was investigated under conditions where only temperature changes in localized cutaneous areas evoked measurable changes in remote sudomotor activity. Both male and female subjects were studied to evaluate sex difference in thermal sensitivity. The results discussed include: sweat rate responses to contralateral cooling, comparison of sweat rate responses between men and women to contralateral cooling, influence of the menstrual cycle on the sweat rate responses to contralateral cooling, comparison of threshold of sweating responses between men and women, and correlation of latency to threshold for whole body sweating. It is concluded that the quantitative aspects of the reflex response is affected by both the density and activation of receptors as well as the rate of heat loss; men responded 8-10% more frequently than women to thermode cooling, the magnitude of responses being greater for men; and women responded 7-9% more frequently to thermode cooling on day 1 of menstruation, as compared to day 15. F.O.S.

N73-17114*# Battelle-Northwest, Richland, Wash.
MEASUREMENT OF RADIATION EXPOSURE OF ASTRONAUTS BY RADIOCHEMICAL TECHNIQUES Quarterly Research Report, 3 Jan. - 2 Apr. 1972
R. L. Brodzinski 15 Apr. 1972 29 p refs Sponsored by NASA and AEC
(NASA-CR-130538; BNWL-1183-11) Avail: NTIS HC $3.50 CSCL 06S

Only two of the fecal specimens collected inflight during the Apollo 15 mission were returned for analysis. Difficulty in obtaining reasonably accurate radiation dose estimates based on the cosmogenic radionuclide content of the specimens was encountered due to the limited sampling. The concentrations of Na-22, K-40, Cr-51, Fe-59, and Cs-137 are reported. The concentrations of 24 major, minor, and trace elements in these two specimens were determined. Most concentrations are typical of those observed previously. Major exceptions are extremely low values for selenium and extraordinarily high values for rare earth elements. The net Po-210 activities in the Apollo 11 and 12 Solar Wind Composition foils and in the Apollo 8 and 12 spacecraft reflective coatings due to lunar exposure have been determined. Equilibrium concentrations of 0.082 + or - 0.012 disintegrations /sq cm sec of Rn-222 in the lunar atmosphere and 0.0238 + or - 0.0035 disintegrations /sq cm sec of Po-210 on the lunar surface have been calculated for Oceanus Procellarum. Author

N73-17115# Texas Technological Univ., Lubbock. Center of Biotechnology and Human Performance.
INDIVIDUAL DIFFERENCES AS A FUNCTION OF FOUR CHOICE INFORMATIONAL LOAD AND S-R COMPATIBILITY
Lewis E. Waldeisen, Jerry M. Owens, and Charles G. Halcomb Oct. 1972 21 p refs
(Contract DAAD05-69-C-0102; DA Proj. 1T0-14501-B-81A; Proj. Themis-603)
(AD-752073) Avail: NTIS CSCL 05/10

A four choice reaction-time task using color and symbol dimensions was varied in terms of type of stimulus presentation and S-R compatibility. Six groups of 20 Ss each performed six different task versions. Responding with hands only in four groups proved significantly easier than hand-foot responding in two other groups. The group receiving a singular dimension of colors performed significantly better than a group receiving only symbols. Both of these groups demonstrated greater efficiency than two groups required to filter noise or irrelevant dimensions. Distributions of scores increased considerably about group means with increasing informational load and decreasing S-R compatibility. The utility of the choice reaction task for discriminating individual skill potentials in various information-handling situations was affirmed. Author (GRA)

N73-17116# Human Engineering Labs., Aberdeen Proving Ground, Md.
PUPILLOMETRY USING AN ADVANCED-DESIGN OCULOMETER
Robert J. Hall Nov. 1972 18 p refs Presented at the 80th Ann. Conv. of the Am. Psychological Assoc., Honolulu, Hawaii, 2-8 Sep. 1972
(AD-752121; HEL-TM-25-72) Avail: NTIS CSCL 05/10

A number of available eye monitoring techniques are briefly contrasted to show the advantages and limitations of each. In addition a recently developed oculometer is described which is unique in that it provides; (1) a technique for tracking and observing the eye which does not interfere with the subject's normal viewing behavior, (2) data reduction capacity for handling large volumes of data on an on-line basis enabling immediate feedback to the subject and (3) measurement of a wide spectra of visual responses which include basic measures such as voluntary eye movement, blinking, changes in pupil size and derived measures such as variability of fixation times and scan patterns. Author (GRA)

N73-17117*# Martin Marietta Corp., Denver, Colo.
CONCEPTUAL DESIGN STUDY FOR A TELEOPERATOR VISUAL SYSTEM, PHASE 1 Final Report
D. Adams, C. Grant, C. Johnson, R. Meirick, C. Polhemus, A. Ray, D. Rittenhouse, and R. Skidmore Dec. 1972 175 p refs (Contract NAS8-29024)
(NASA-CR-124059; MCR-72-276) Avail: NTIS HC $10.75 CSCL 05H

Results are reported for work performed during the first phase of the conceptual design study for a teleoperator visual system. This phase consists of four tasks: General requirements, concept development, subsystem requirements and analysis, and concept evaluation. Author

N73-17118*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PILOT PERFORMANCE DURING A SIMULATED STANDARD INSTRUMENT PROCEDURE TURN WITH AND WITHOUT A PREDICTOR DISPLAY
John G. Kreifeldt and Thomas Wempe Jan. 1973 34 p refs Prepared in cooperation with Tufts Univ., Medford, Mass.
(NASA-TM-X-62201) Avail: NTIS HC $3.75 CSCL 05E

A simulator study was conducted to measure the effectiveness of predictor information incorporated into a CRT display of a computer simulated aircraft's horizontal and vertical situation. Professional pilots served as subjects for the task of executing a standard instrument procedure turn at constant altitude in constant crosswinds with and without their predicted ground track displayed. The results showed that the display with the predicted ground track was markedly and significantly superior to the display without this information and that the subjects were generally satisfied with this type of information. Mean rms lateral path error was independent of the crosswind velocity with the predictor information, and increased without it and with increasing wind velocity. Rms stick activity decreased with the predictor display which also uncoupled aileron and elevator activity. Author

N73-17119# Civil Aeromedical Inst., Oklahoma City, Okla.
GPSS/360 COMPUTER MODELS TO SIMULATE AIRCRAFT PASSENGER EMERGENCY EVACUATION

Earl D. Folk, J. D. Garner, E. Allen Cook, and Jimmy L. Broadhurst (IBM, Oklahoma City) Sep. 1972 30 p refs
(FAA-AM-72-30) Avail: NTIS HC $3.50

Live tests of emergency evacuation of transport aircraft are simulated by computer models based on statistics from measured components of the escape path. The models utilize a computer programming language to represent various features of the escape process: passenger mix, seating and exit configuration, door-opening delay, time on the escape slide, and slide capacity. Two particular configurations of aircraft have been simulated: the Boeing 720 124-Passenger Model and a 234-Passenger Model. On the former the total time for all passengers to get out averaged 89.23 seconds, with a standard deviation of 6.38 seconds for 20 randomized runs. On the latter the corresponding average and standard deviations were 74.09 and 2.29 seconds, respectively. Both models indicated under-utilization of the aft exit. Author

N73-17120*# Acurex Corp., Mountain View, Calif.
HIGH PRESSURE SPACE SUIT GLOVE Final Report
William Elkins Jan. 1973 30 p
(Contract NAS2-7008)
(NASA-CR-114535) Avail: NTIS HC $3.50 CSCL 06Q

The High Pressure Space Suit Glove Program yielded one prototype glove assembly with an operating pressure of 8.0 psi. The following developments are reported: (1) A new layup technique for incorporation of the mini-convolute systems; (2) modification in the mini-convolute construction to assure cycle life at 8.0 psi in excess of 100,000 cycles; (3) the development of a unique non-orthogonal low torque wrist joint; (4) the development of a low torque single axis joint for use in the thumb and finger first metacarpal joints; and (5) a number of approaches to 1st metacarpal joints were fabricated and tested to establish the joint technqiues. Author

N73-17121# Joint Publications Research Service, Arlington, Va.
PROBLEMS OF MAN'S INTERACTION WITH HIS NATURAL ENVIRONMENT
Ye. K. Fedorov and I. B. Novik 31 Jan. 1973 18 p refs Transl. into ENGLISH from Vopr. Filosofii (Moscow), no. 12 p 46-58
(JPRS-58113) Avail: NTIS HC $3.00

A survey of published discussions concerning problems of environmental pollution and depletion of natural resources is reported. It is concluded that in the process of optimization of interaction with nature there are fundamental advantages in a social system based on collective ownership. Author

N73-17122*# National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AN INVESTIGATION OF A STERILE ACCESS TECHNIQUE FOR THE REPAIR AND ADJUSTMENT OF STERILE SPACECRAFT
Franklin H. Farmer, Harry V. Fuller, and Richard M. Hueschen Washington Feb. 1973 57 p refs
(NASA-TN-D-7147; L-8538) Avail: NTIS HC $3.00 CSCL 06M

A description is presented of a unique system for the sterilization and sterile repair of spacecraft and the results of a test program designed to assess the biological integrity and engineering reliability of the system. This trailer-mounted system, designated the model assembly sterilizer for testing (MAST), is capable of the dry-heat sterilization of spacecraft and/or components less than 2.3 meters in diameter at temperatures up to 433 K and the steam sterilization of components less than 0.724 meter in diameter. Sterile access to spacecraft is provided by two tunnel suits, called the bioisolator suit systems (BISS), which are contiguous with the walls of the sterilization chambers. The test program was designed primarily to verify the biological and engineering reliability of the MAST system by processing simulated space hardware. Each test cycle simulated the initial sterilization of a spacecraft, sterile repair of a failed component, removal of the spacecraft from the MAST for mating with the bus, and a sterile recycle repair. Author

N73-17123*# BioTechnology, Inc., Falls Church, Va.
HABITABILITY ISSUES IN LONG DURATION UNDERSEA AND SPACE MISSIONS Final Report
James F. Parker, Jr. and Martin G. Every Jul. 1972 67 p refs Sponsored in part by NASA
(Contract N00014-71-C-0397; NR Proj. 196-113)
(NASA-CR-130537; AD-747690) Avail: NTIS HC $5.00 CSCL 05/5

The report reviews a number of studies in the area of habitability. Emphasis was placed on extracting from these studies that information most relevant to any long-term mission in confinement. It is concluded that, whereas the basic laws of habitability are known, there is much yet to be learned concerning development of social structures in small groups in relative isolation, planning for necessary hygiene needs, development of proper work spaces, and construction of internal and external communications systems. With respect to testing for habitability and the documentation of habitability principles, the space program was found to be considerably more advanced than was the program for undersea missions. Author (GRA)

N73-17124# Naval Aerospace Medical Research Lab., Pensacola, Fla.
EMPIRICAL REDUCTION IN POTENTIAL USER POPULATION AS THE RESULT OF IMPOSED MULTIVARIATE ANTHROPOMETRIC LIMITS Medical Research Progress Report
William F. Moroney and Margaret J. Smith 21 Sep. 1972 17 p refs
(AD-752032; NAMRL-1164; PR-1) Avail: NTIS CSCL 05/5

Data describing thirteen, cockpit related, anthropometric features of 1547 naval aviator personnel were examined. Two analyses were performed on these data. In the first analysis individuals not included within the 5th percentile to 95th percentile critical limits on any of the 13 features cited above were eliminated. After all 13 eliminations had been completed, 814 (52.6%) of the original 1547 naval aviator personnel had been excluded. In the second analysis, the critical limits were established at the 3rd and 98th percentiles, and 499 (32.2%) of the personnel were excluded. Thus, where one might have expected only 10 per cent of the population to have been excluded, 52.6 per cent were excluded, and where only 5 per cent theoretically might have been excluded, 32.2 per cent were excluded. This seeming discrepancy may be attributed to the intercorrelations existing between the 13 variables. The importance of considering the relationship between anthropometric features in determining anthropometric compatibility is discussed. The preparation of bivariate data, which are not variable specific but which could be used when the correlation between anthropometric features is known, is proposed. Author (GRA)

N73-17125# Naval Postgraduate School, Monterey, Calif.
THE USE OF A LINEAR RATING SCALE IN SELECTING A SUBCRITICAL TRACKING TASK PARAMETER
Ronald A. Hess Sep. 1972 29 p refs
(AD-752036; NPS-57HE72091A) Avail: NTIS CSCL 05/10

The results of a brief experimental study are presented in which subjective operator opinion, expressed on a linear, nonadjectival rating scale, was used in selecting a subcritical tracking task parameter. Author (GRA)

N73-17126# Environmental Health Lab., McClellan AFB, Calif.
THE INDUSTRIAL HYGIENE SURVEY Final Report
Ronald D. Burnett May 1972 42 p
(EHL Proj. OBC-209)
(AD-751897; EHL-M-72M-11) Avail: NTIS CSCL 06/9

The paper describes the complexities involved in conducting a meaningful industrial hygiene survey and is illustrated with numerous photographs of environmental evaluations being accomplished at a variety of typical Air Force industrial operations. The paper was presented at the USAF Occupational Safety and Health Act Conference held at the Air Force Inspection and Safety Center, Norton AFB, California on 18-20 Apr. 72 to familiarize safety personnel with the field of industrial hygiene. Author (GRA)

N73-17127# American Cyanamid Co., Bound Brook, N.J. Organic Chemicals Div.

PLASTIC MATERIALS FOR EYE PROTECTION FROM LASERS Technical Report, 3 May 1971 - 15 Jul. 1972

Allan E. Sherr, William F. Cordes, III, and Robert J. Tucker Oct. 1972 101 p refs

(Contract F41609-71-C-0019; AF Proj. 7784)

(AD-752594) Avail: NTIS CSCL 06/17

Plastic goggles were produced which offer protection against several lasers. The goggles had a minimum optical density of 3 at 300-400, 840, 1,060, 780-1,760 and 2,755 to 14,000 nm. Cast plastic sheet was prepared which had similar protective capabilities. Over 300 organic compounds were evaluated and/or synthesized as possible near infrared absorbing compounds. Several of these structural systems offer promise for laser protection. The compounds were evaluated in a variety of plastics including cellulose propionate, polymethyl methacrylate, polycarbonate, polyethylene terephthalate, and polyvinyl chloride. The propionate and methacrylate were the polymers of choice for most of the work. Cadmium stannate was investigated as an absorber and was shown to have some interesting spectral properties. A discussion is presented on the correlation between structure and spectral properties of several of the compounds studied. Author (GRA)

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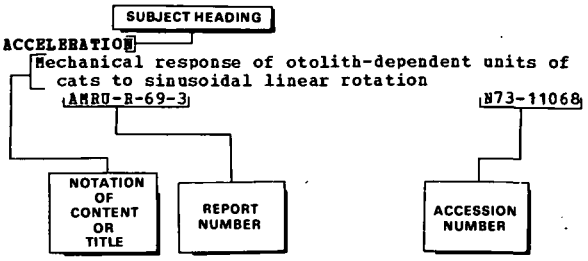

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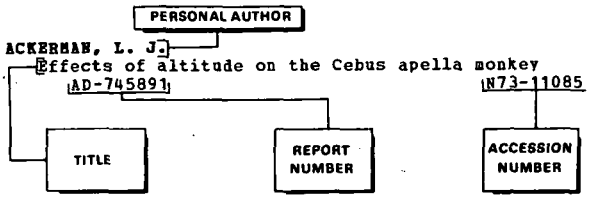

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